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GUEST EDITORIAL:

THE DILEMMA OF PSYCHIATRY

M. PARAMESHVARA DEVA

INTRODUCTION

IN MANY developing countries, psychiatric services are provided from overcrowded and poorly equipped huge anonymous institutions that claim to be hospitals more by designation than by design. Any attempt to move away from these huge edifices takes time but is usually done in fits and starts, and sometimes at the expense of the already critical shortages of staff in the institutions. The result often is that "model units" that are started in general hospitals fight losing battles in their struggle to act as embryos of reform in psychiatric care in the country. The large institutions often win in the battle and remain entrenched as the backbone of psychiatric services together with all the associated evils (Goffman, 1968). "Institutional neurosis" is an iatrogenic disease caused by the system along which institutions are run — the rigid hierarchy, the climate of distrust and their dehumanising effects on the individual. The individual in a mental hospital becomes an anonymous being bereft of ties with kith and kin. His only sin is that he has mental illness.

COMMUNITY CONCEPTS

The problems of institutionalisation and backwardness in psychiatric care are recognized the world over. The answer lies in the decentralisation of psychiatric care to the level of the general as well as district hospital. It also depends on the move away from the institutional to a community-based concept of psychiatric care. The concept revolves around the theory that psychiatric disease is the result not only of disordered genetics or biochemistry but of stresses and discord in the environment of the patient — primarily in relation to his family. The management of the patient

should therefore revolve around mental health, child psychiatry, family and marital therapies and preventive psychiatry. Thus mental illness, when it occurs, should primarily be managed in the community with the help of relatives and parents or in day centres. Hospitalisation in short stay wards should be for acute episodes of disturbed behaviour. Further, the rehabilitation of the patient should focus on the psychological, social and occupational aspects as soon as possible and be conducted in day centres and therapeutic communities.

To be successful, such a concept of community-based psychiatric care depends upon the availability of trained manpower. Despite liberal possibilities of volunteers and semi-professionals helping to run the system, it really depends on a core of professionals in the various specialities and sub-specialities of psychiatric practice. These include psychiatrists, child psychiatrists, social psychiatrists, adolescent psychiatrists, psychologists, psychiatric social workers, occupational therapists and psychiatric trained nurses *in adequate numbers*.

The contribution of psychiatry is not confined to the treatment of psychiatric patients but includes the promotion of mental health and the prevention of emotional problems. It's role in the prevention of emotional problems through community mental health programmes, providing of professional advice to vulnerable groups or occupations and providing expertise in the early detection and management of psychological problems, is hardly felt in Malaysia.

THE DILEMMA

The principal problem in improving psychiatric care in Malaysia is tied in to the lack of trained staff. There are only 19 psychiatrists out of 2500 doctors in Malaysia (not to mention the shortage of the other para psychiatric professionals). This means that there is only one psychiatrist to 750,000 of the population. However, this figure is

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actually misleading since only 10 psychiatrists are fully engaged in the Ministry of Health as the other 9 are in the Universities, Armed Forces or private practices. Dax (1962) a WHO Consultant recommended that by 1968, there should be "the barest minimum of 11 psychiatrists as well as many more in training" in Peninsular Malaysia. Yet, today there are only eight psychiatrists in Peninsular Malaysia in the major service centres for psychiatric patients. As for specialists in the various sub-specialities, the problem is even more acute. There is only one clinical psychologist, in one of the medical schools, in the whole country. There is but one child psychiatrist in Malaysia which has over five million children. Can anything be urgently done to right this obvious imbalance?

THE TRAINING OF PSYCHIATRISTS

Psychiatry, being a speciality that is not considered popular, does not attract many trainees in most countries. In Malaysia, with its system of institutional psychiatry, it attracts even less trainees. Most of the present 19 psychiatrists have been trained overseas. It was not until 1973, that a local two year course leading to the Masters in Psychological Medicine was established in the University of Malaya. Thus far, five batches have undergone or are undergoing training at the University of Malaya. But despite its existence, the course has not been fully utilized and due to various factors, has added only two serving psychiatrists to the total in the country. Like the rest of the medical professions, the psychiatrists in the country have tended to emigrate. But the recent loss of ten psychiatrists (not to mention trainees) within thirty months is a most serious problem.

A figure of one psychiatrists per 100,000 population has been quoted as ideal for many countries. On such a basis, Malaysia would today need about 125 psychiatrists. However, there are only 19 today. If a figure of 1 : 250,000 were to be considered, Malaysia would still require a total of 50 psychiatrists now — or an additional 31 psychiatrists. Even if six psychiatrists were trained

each year, this would require seven years before the requirements of 1978 were met, not allowing for wastage.

CONCLUSION

This then is the dilemma — we are trying to care for the mentally ill with a psychiatric system that is not only woefully outmoded but seriously undermanned. The effect that this has on the mentally ill, not to mention the emotional health of a young and growing population of children, is something that requires serious consideration. For too long, emotional problems and mental illnesses have been swept into institutions out of sight and out of minds. It is only when drug dependence or truancy hits the headlines that mental health comes to the forefront. Major problems include the shortage of psychiatrists, long-waiting lists and the lack of modern facilities for treating the mentally ill. There is an urgent need to make psychiatry less frightening to the people, and the training in psychiatry more attractive to our young doctors, so that the number of qualified psychiatrists can be increased. This can be done by the provision of more scholarships with perhaps less stringent bonds, the setting-up of modern general hospital units with provision for day centres, the practice of modern treatment methods and the use of trained para psychiatric staff.

The dilemma of psychiatry is not one of numbers alone, but one of attitudes. Do we care for our mentally and emotionally ill? Do we care that our children grow up not only healthy in body but also in mind to be the future generation of this country?

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DEMOGRAPHIC AND PSYCHIATRIC ASPECTS OF ATTEMPTED SUICIDES — NINETY-SIX ATTEMPTS

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INTRODUCTION

THE ATTEMPT ON one's life with the intention to die, however ambiguous, has grave implications for the individual and his society. The psychopathology of the individual who attempts suicide has to be understood in the background of his socio-cultural matrix. Durkheim illuminated this postulate as early as 1897. The expression of suicidal attempts may be culturally influenced by traditional mores and values.

The enumeration of attempted suicides in any society is far from easy. As it is against local laws, there is under reporting by friends or relatives and only cases serious enough to be admitted to Hospitals are available for study. Even then, not all cases brought to Hospitals are diagnosed as "attempted suicide". This may result from the desire of the doctor to maintain confidentiality or from a low index of suspicion of apparently minor cases of overdose or "accidental" self injury. Denial of suicidal intent also contributes to under reporting of cases. The person's own statement of intent to die can be motivated other than the wish to die or indifference to live at the time of the act. A further difficulty in studies of attempted suicide is the shame it evokes in the attempter and the fear and abhorrence in his family or in-group, resulting in the reluctance to talk about it. This, in some cases, leads to the covert understanding between cases and relatives to deny and cover up the act. Stengal (1970) states an operative definition of "A suicidal act is any deliberate act of self-damage which a person committing the act could not be sure to survive" and added that all cases of

potentially dangerous self-poisoning or self-inflicted injury ought to be regarded as suicidal acts.

This paper deals with the study of 96 cases of the three major ethnic groups in Klang District in Malaysia.

METHOD

The two authors were employed in the 400 bed Klang General Hospital with psychiatric consultation facilities. From the period 23rd January, 1977 to 13th November, 1977 all cases of attempted suicide by any method were referred to one of the two authors. Cases who denied attempting suicide but were suspected of doing so were also referred. All cases were interviewed by one of the two authors and relative or friends were also interviewed to confirm the data supplied. The data recorded were personal data and details of the circumstances surrounding the attempts and clinical assessment.

RESULTS

A total of 96 attempts by 94 persons were recorded during the period. One person left the Hospital immediately after admission and only her sex, race and age were included in the study. An Indian male and a female attempted twice within the same period. Their demographic characteristics were recorded once each, but the details surrounding the circumstances of their attempts and admissions and follow-ups were recorded as separate events. Only 95 attempts by 93 persons were fully recorded.

Race and Sex

It is readily apparent in Table 1 that the Indians were over represented, comprising 66% of the sample of 94. The Chinese and Malays comprised 20.2% and 11.7% respectively. In Singapore, Chia and Tsoi (1974) noted a similar ranking for the same 3 ethnic groups. In both

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Table I
Race and sex distribution of 94 persons who attempted suicide

Race	Female	Male	Male Female Ratio	Percentage of sample	Estimated percentage of District population (mid-1977)
Indian	19	43	1:2.3	66	25.4
Chinese	3	16	1:5.3	20.2	43.0
Malay	2	9	1:4.5	11.7	31.1
Eurasian and Others	0	2		2.1	0.5
Total	24@	70@	1:2.9	100	100

@ Total of 94 persons with a total of 96 suicides attempts.

Table II
Race, sex and age distribution of 94 persons who attempted suicide

Race	Sex	Age in Years					
		10-14	15-24	25-34	35-44	45-54	55 and over
Indian	Male		8	9	2		
	Female	5	34	2	1	1	
Chinese	Male		1	2			
	Female		8	4	3		1
Malay	Male		2				
	Female		7	1	1		
Eurasian and Others	Female		2				
Total @		5	62	18	7	1	1

@ Total of 94 persons with a total of 96 suicide attempts.

Table III
Marital status and sex of 93 persons who attempted suicide

Race	Married		Unmarried		Widow/ Separated Female
	Male	Female	Male	Female	
Indian	7	16	12	26	1
Chinese		9	3	5	1
Malay		4	2	4	1
Eurasian and Others				2	
Total @	7	29	17	37	3

@ Total of 93 persons excluding 1 of unknown status.

these neighbour countries, the incidence was highest in Indians who comprised the minority of the ethnic groups.

Females of all ethnic groups were encountered approximately 3 times more frequently than males. This predominance of females in attempted suicide is well documented in other countries as well. (Stengel, 1969.)

Age

Nearly three-quarters of the sample were between 15 to 24 years (Table II). The rate for females below 24 years was significantly 5 times that of males. ($\chi^2 = 9.56$, $df = 1$, $P < 0.01$). Both extremes of age were in females, the oldest being a Chinese of 65 and youngest, an Indian of 12. Four other Indian females were aged 13 and 14.

Marital Status

36 were married and 57 were single (Table III). The ratio of married to singles was 1:1.6. For both sexes the rates for the unmarried were highest, but the difference in marital status between the sexes was not significant. ($\chi^2 = 1.38$, $df = 1$, $p > 0.05$). Most of the unmarried were living with parents or relatives, only 3 females and 1 male were living on their own. Three elderly females who were divorced, separated or widowed lived with their grown-up children.

The highest rate for unmarried males was between 21 to 25 years and for unmarried females between 16 to 20 years.

Religion

Religious beliefs correspond closely to ethnic origin, but the Christian faith was practised by 4 Indians, 1 Chinese and 1 Eurasian. There were 58 Hindus and 17 Buddhists or Taoists. The Malays were exclusively Muslim.

Socioeconomic Status

The classification of social class in the country is poorly defined. No attempt is made to classify the sample in this study, but the educational, occupational and income status are described to indicate the social status of the sample.

Eighty-six percent of the sample were educated of whom 2% had tertiary, 43% secondary and

41% primary education.

Only 2 males were unemployed, one of whom was a patient who suffered from poliomyelitis. Another male was in University. Thirty-eight females (61%) above 16 years of age were unemployed. The majority of these were housewives or young Indian females living with parents.

Of those in employment, 9 received an income of less than 100 dollars monthly, 28 received between 100 to 300 dollars monthly and 9 received 300 dollars and above monthly. Thirtynine were unskilled workers and 5 were semiskilled. Two were trained teachers and they constituted the highest profession in the sample.

From the economic, occupational and educational indicators, it was apparent that the rate in the lower socioeconomic classes was high with only a scattering in the middle socioeconomic class. The significance of this finding is difficult to interpret without knowledge of the distribution of social classes in the general population for comparison. It is generally accepted that attempted suicide is more frequent in the lower socioeconomic classes. (Kessel 1965, Stengel 1969, Morgan *et al.*, 1975).

Methods Used

Ninety percent resorted to self-poisoning. The high incidence of self-poisoning as a method of self injury had been similarly recorded in Singapore as 94% (Chia and Tsoi, 1974) and in British studies from 95% to 99% (Morgan *et al.*, 1975, Holding *et al.*, 1977, Bancroft *et al.*, 1977).

The agent used most frequently varies among countries and in Malaysia varies among ethnic groups. The commonest agent used was insecticide, used by almost a third of all cases (Table IV). Other agents used in descending order of frequency were tranquillisers and hypnotics (24%), detergents (15%), methyl salicylate liniment (12%) and weedicide (6%). Among other agents used were analgesic tablets (3 cases), formic acid, antiseptics, camphor, kerosene, methylated spirit and dermatological solutions. The steady increase in the use of psychotropic drugs including tranquillisers in Britain was reflected here as well but only among the Chinese and Malays.

Table IV

Distribution of 95 attempted suicides by type of poison or method used

Race	Sex	Insecticide	Psychotropics	Detergent	Liniment	Others	Total
Indian	Male	13	2	2	1	2	20
	Female	12	3	5	10	14	44
Chinese	Male		3				3
	Female	1	6	5		3@	15
Malay	Male		2				2
	Female	1	5	2		1	9
Eurasian and Others	Female		2				2
Total @		27	23	14	11	20	95

@ Excluding 1 attempted suicide of unknown mode.

A Schizophrenic female attempted by wading into the sea in full view of the public during the day time.

Both Indian males and females preferred the use of insecticides. More than half the Indian males and more than one-fourth of the Indian females, attempted with insecticides. The ingestion of liniment was exclusively by Indians and one-fourth of Indian females used it.

About one-fourth of all cases attempted with psychotropic drugs mainly tranquillisers and two-third of these were females. The use of psychotropic drugs among Chinese and Malays were higher than among Indians. More than a third of Chinese females used tranquillisers and another third used detergent solution. These were the two agents most frequently used by Chinese females.

Six cases used weedicide. All were from the rural agricultural sector with easy access to this type of poison.

Other methods used were almost entirely by Indian females and all agents were readily available in the house or place of work. One

Indian female took camphor which had a religious significance as it was used as incense at prayers. She had believed she was possessed by spirits and possibly used it with the unconscious desire to be exorcised. Her expressed reason was that her husband was in love with her sister. In her culture her belief of spirit possession was acceptable. She was not psychotic.

The same tranquilliser and insecticide were used by two repeaters in different attempts.

Source of Poison

Ten of the 23 cases who attempted with tranquillisers obtained their supply from their doctors. One female collected her tranquillisers from three practitioners. Three cases suffering from Schizophrenia overdosed with their own medication. Six cases obtained their supply illegally from drug stores. The other sources of tranquillisers were from friends, mother, husband and a pharmaceutical firm in which one female was employed.

The source of insecticide was almost entirely domestic. Three cases bought the insecticide prior

to their attempts. The cases using weed killer were all from the agricultural estates where the poison was readily available.

Sources of other poisons including methyl salicylate, kerosene, methylated spirit, antiseptic, camphor and anti-spasmodics were all domestic.

Place of Attempt

The scene of the attempt was their own home in 75 cases and in relatives' homes in 2 cases. One female attempted in a suicide pact in her boy friend's house. Out of the 75 cases, 7 were alone in the house, but in two instances the mother and husband were expected home. None of the 75 cases locked the door of the room where the attempt was made. Four cases attempted in the vicinity of their homes. Hence, a total of 83% attempts were in domestic surroundings.

Two of the 6 cases who attempted in their places of work had been reprimanded by their supervisors at work.

Two cases attempted by the roadside, another in his Club and a schizophrenic female in the sea. A second suicide pact couple attempted in a field.

Precipitating Causes

The most frequent reason expressed was chronic domestic strife, and 31 cases reported this (Table V). This strife occurred in both the married and unmarried but more frequently expressed by females.

Conflicts over love affairs were revealed by 29 cases. All were single. Twenty-seven of these were as a result of opposition by parents or elders to their relationship with the opposite sex. This was observed more often in Indians. Two suicide pact Indian couples attempted for this reason. Two other Indian females resisted pressure to marry their parents' choice of husbands. Relationship resulting in illegitimate pregnancies as in two Indian females had not only brought shame to themselves but to their families also. A Chinese female attempted for the same reason. A lesbian attempted after a break up with her partner, another female attempted after an unsatisfactory affair with a married man. One male homosexual whose relationship was discovered attempted

because he felt shame and the inability to withstand the ridicule of his housemates.

Three gave difficulties at work as their reason. Of these, two attempted in their place of work after being reprimanded by their work supervisors. Another gave absence of a job as the reason.

One Chinese male attempted because of financial difficulty and a Chinese female attempted because of gambling debts which she could not pay. She was arrested on a complaint of a creditor while in Hospital.

Five Indian males were alcoholics. Two attempted during "black outs". Three others had contemplated suicide for some time. An Indian female with alcoholism attempted after inability to solve her debts incurred over her drinking. Two males with physical deformities from poliomyelitis attempted for this reason. Five attempted as a result of their Schizophrenic illness. Two were acutely ill for the first time and three chronic cases were depressed.

Fourteen (16%) cases denied suicidal intention. This subgroup comprised 10 Indian females and 3 males and a Malay male. Eight of the Indian females maintained they took the poisons to cure chronic abdominal pain. Another maintained she swallowed an organophosphorus insecticide, mistaking it for cow's milk. One of these females re-attempted with the same insecticide, 3 months later. The background of these 10 cases were investigated and all had shown considerable stress in their home environment. Of the 3 Indian males who denied, all took insecticides. One male took it a day after a close friend died, another after a quarrel with his brother. In Kessel's study (1965) 23% males and 16% females gave no reasons for their attempts.

Interpersonal conflict with key persons was the precipitating factor in 40% of cases in the study by Morgan *et al.*, (1975). An almost similar rate of 47.3% was observed in this study. Reasons of poor health, financial difficulties, accommodation problems were infrequently encountered.

Decision to Act

Fifty-six percent of the 81 cases who acknowledged their attempts had decided on the actual

Table V**Distribution of 95 attempted suicides according to the precipitating cause @**

Precipitating Cause	Indian		Chinese		Malay		Eurasian
	Male	Female	Male	Female	Male	Female	Female
Domestic Conflicts	3	17		7		4	
Love Affairs	7	11		5	1	3	2
Alcohol Addiction	5	1					
Illness	1	3		1			
Work	1		2	1			
Others		2	1	1	1	1	
No Reason Stated	3	10				1	

@ Excludes 1 attempted suicide of unknown cause.

Table VI**Distribution of 95 attempted suicides according to the intended outcome**

Race	Sex	To Die	Intention: Uncertain	Not To Die
	Male	11	2	7
	Female	26	2	16
Indian	Male	3		
Chinese	Female	10	2	3
Malay	Male	1	1	
	Female	4	1	4
Eurasian and Others	Female	1		1
Total @		56	8	31

@ Excluding 1 attempted suicide of unknown intention.

Table VII — Consequences

Race	Improvement	No Change	Deterioration	
Indian	31	31	2	
Chinese	11	5	2	
Malay	8	2	1	
Eurasian and Others	1	1		
Total @		51	39	5

@ Excluding one attempted suicide of unknown consequence.

day of the attempt and the majority (47.3%) were impulsive decisions. A high rate of impulsiveness of two-thirds of the acts was similarly noted by Kessel (1965). Twelve percent had contemplated suicide within the week and 32% exceeded one week. Three cases stated they had thought of it for 2 months and the longest period was for 6 months in one case. There was no significant difference between the sexes.

The precipitant was often a row or reprimand by key persons with whom the interpersonal relationship had been bad. Bancroft *et al.*, (1976) had found that 58% had a row before the attempts.

Intention and Risk

During the interview, spontaneous statements of intention to die were recorded and if no spontaneous statements were obtained, direct enquiries were made. In 56 instances (59%) the intention was to die, in 8 the intention was uncertain and in 31 (33%) the intention was not death (Table VI). It was difficult to be certain of the actual intention based on their statements. Even the statement of intention to die could be motivated by the expectation of help and acceptance by the staff. In other cases, though the intention may be death, the shame and fear of rejection by the community could motivate them to deny the intention to die or even the act itself. A total of 41% denied or were uncertain of their intentions. This was a large percentage in view of the manifest behaviour of attempted suicide as understood by observers, yet 41% denied what it seemed to be. Other intentions included threats to husbands or parents, prevention of husband from gambling, to obtain permission to work, to force husband to return home and to obtain permission to marry. There was no significant difference among the ethnic groups.

Medical Assessment of Risk

The interviewer assessed the possibility of fatality arising from the attempt if no intervention had occurred, taking into account the quantity and type of poison and the method of attempt. Only in 4 cases were death likely to occur. In 45 cases death was unlikely, and in forty six cases survival was certain even if not discovered or medical attention given.

Consequences

The reasons given for attempting suicide and the consequences arising from the attempts were studied (Table VII). Fourteen cases denied the attempt but were included to observe the consequences of their actions. The consequences were divided into three groups, improvement, no change and deterioration in solving their conflicts.

Fifty-one cases (54%) achieved improvement in solving their conflicts. There were 12 males and 39 females. Twenty-one females were Indians and most of their conflicts were with parents or elders or over love affairs. Included in these 21 cases were one suicide pact couple and 3 other females who overcame opposition to their marriages and one female who succeeded in the rejection of a marriage arranged for her. In two cases, their boy friends agreed to marriage. A Chinese female also overcame the opposition to her marriage.

The frequent outcome of improvement in the other cases were attention and sympathy directed towards them. The significant persons in their lives became aware of their conflicts and reacted, at least initially with sympathy. In many cases, no shame was felt when they returned to their family, but were accorded special attention. Among married females, pressure from in-laws lessened and attitude of husbands improved. As a consequence of their attempts, 2 cases were diagnosed as Schizophrenia and one case for severe depression.

Five met with deterioration in their conflicts after the attempt. The consequences encountered were further rejection by the husband, son and lovers in four cases and being taken to court over a debt in the other case.

Thirty-nine cases (40%) comprising 13 males and 26 females had brought about no change in their conflicts. This group included an Indian female who attempted twice.

There were no significant differences in consequences between the sexes.

Previous Attempts

Fourteen cases (15 percent) were repeaters.

Table VIII
Psychiatric diagnosis of 93 persons attempting suicide

		Diagnoses					
Race	Sex	Psychosis	Neurosis	Personality Disorder	Alcohol Addiction	Mental illness Absent	
Indian	Male		4	5	5	5	
	Female	2	6	3	1	31	
Chinese	Male	3					
	Female	1	5	4		5	
Malay	Male		2				
	Female		3	4		2	
Eurasian	Female			2			
Total		6	20	18	6	43	93 @

@ Excluding 1 person who defaulted before interview.

two of them repeated within the period of the study. Eleven cases were second occasion repeaters, and three were third occasion repeaters. These were 5 Indian females, 4 Indian males, 4 Malay females and one Chinese female. The previous attempts ranged from one month to 6 years with 8 cases repeating within 1 year and particularly within 6 months. Methods used were self-poisoning in all cases except for one who tried strangulation. Five cases used the same poison on different attempts.

Morgan *et al.*, (1975) recorded that 48% had previous attempts and almost half within the past year. The incidence of 15% encountered in this present study was lower and had been obtained only from history-taking. The actual incidence could be higher, realising the culturally determined reluctance to talk about suicidal behaviour.

Prior Warnings and Suicidal Notes

Twelve cases had spoken to someone or talked of suicide before their attempt; 3 cases within 24 hours, the other nine cases for some weeks to months.

A married Indian male told his sister-in-law on the same day that he could not live without her. She was his mistress. He re-attempted 6 weeks later because of objections from relatives over the affair. On his second attempt, he left a note disclaiming responsibility of others for his attempt.

Two others spontaneously told the authors they wrote suicidal notes. One was a 17 year old Eurasian girl who attempted because her boy friend was to marry another. The note was addressed to him. A 20 year old Malay girl left a note for her husband after he had received a letter from his past girl friend.

A schizophrenic patient under treatment had spoken of suicide to friends for months. A male transexual had told his housemates after he was discovered having a relationship with a man.

Of the twelve cases, ten had told someone close to them. Four girls had told their mothers with whom they had quarrelled. Two females told their husbands; one of them had been forced to marry the husband, the other because the

husband brought his mistress home. Three had threatened their boy friends after they had quarrelled or had been rejected. One man told his mistress. In most cases warnings were directed at the persons with whom they had been close but had felt rejection or had been reprimanded.

Medical History

Two cases had suffered limb deformities from poliomyelitis in childhood. Both gave this as the reason for attempting suicide. Two cases were being treated by general practitioners for asthma, one for 10 years and another for 3 months. One was an epileptic, and another had hypertension. None of these four gave medical illness as their reasons for attempting.

Three females gave reasons of chronic abdominal pain for their attempts. All three had in addition, marital or family strife.

Psychiatric Diagnosis

All cases were categorised into formal psychiatric diagnoses. In 46% of cases no mental illness was diagnosed (Table VIII). The highest incidence for this category was in Indian females and 70% of them were judged as not suffering from mental illness as opposed to 24% for the rest of the sample and 26% for Indian males. Kessel (1965) found 26% males and 20% females had no psychiatric illness in his series in Edinburgh and Morgan *et al.*, (1975) found an incidence of 10% without psychiatric illness in Bristol. In Singapore, Tsoi (1970) found only 32% to be mentally ill.

The high incidence in Indian females with no formal psychiatric illness in this study could be explained by the circumstances surrounding the act in that it usually was impulsive and occurred after a quarrel with or reprimand by elders. This could be viewed as a mode of expression in their culture where females are still bound by strict cultural mores with limited degree of verbal retaliation especially to elders.

The most common diagnosis were neurosis (22%) mainly depressive neurosis, personality disorder (19%), alcohol addiction (6.5%) and psychosis (6.5%). The incidences of psychosis in findings by Kessel (1975), Tsoi (1970), and

Morgan *et al.*, (1975) were 5%, 13% and 12%. The incidence of neurosis ranged from 5% to 63% in British studies. (Kessel, 1965, Morgan *et al.*, 1975, Holding *et al.*, 1977.)

Alcoholism which was a frequent finding in attempted suicides in European studies was not observed here. Only 6.5% were addicted to alcohol as compared to 48% in males and 16% in females noted by Holding *et al.*, (1977) in Edinburgh and 18% by Morgan *et al.*, (1975). A low incidence of 2% was noted in Singapore by Tsoi (1970).

Current drug abuse was not observed in this study. There were only 2 cases of ex-Heroin abuse.

After Discharge Psychiatric Attendance

Eighty-four cases were given appointments for further psychiatric treatment. Two cases were transferred and lost to follow-up. Seven cases were not advised further psychiatric management after discharge because the cases refused or the therapists felt that the psychiatric intervention while they were in Hospital had relieved their conflicts or the crises had been resolved. Of those offered further treatment, only 40% complied, with 17% for one follow-up session, 13% for 2 sessions and 10% between 3 to 9 sessions.

The subgroup of those who did not give reasons for their attempts were compared with those who did in their subsequent attendance. There was no significant difference. Though cases may be reticent about the reasons for their attempts, some had accepted help. Inquiry from friends or relatives had usually revealed the precipitating causes and formed the basis for therapeutic intervention. The importance of after discharge psychiatric intervention favourably influencing subsequent suicidal behaviour was reported by Greer and Bagley (1971).

DISCUSSION

The objectives of this study is to describe the characteristics of those who attempted suicide and ethnic differences if observed.

The high frequency of attempted suicide in younger individuals, the female sex, the single

state and the lower socio-economic classes in this study were similar to reported studies elsewhere (Stengel, 1970; Holding *et al.*, 1977; Morgan *et al.*, 1975).

The choice of method of attempted suicide was self-poisoning in 99%. This trend was different from that of completed suicides in which poisoning was reported at 24.9% and hanging at 50% (Teoh 1974). The choice of poison was different in the ethnic groups. The Indians used insecticides frequently and the Chinese and Malays used psychotropic drugs.

The various poisons were generally available in domestic surroundings and 83% of the attempts were at home.

The incidence was highest in Indians and particularly in single Indians. The main precipitating cause in young single Indians was objection to their boy or girl friends by parents or elders. In the highly structured Indian sub-culture, it has been the tradition that the young man or girl accepts the spouse chosen from the same caste by their parents. The preliminary approach and eventual marriage proposal are entirely carried out by parents and the process is highly patterned and ceremonial. To marry out of caste or before one's older siblings is not readily tolerated and could affect adversely the marriage prospects of the siblings. This cultural mores and heritage are being challenged by the younger generation to choose their own spouse and cause severe conflict between the young and their elders. The act of attempted suicide in this instance has appeal qualities and is a message of severe distress. In some cases, the objectives were achieved.

Another situation in which the young Indian female found herself in this study was conflict in her role in the family. Usually after a reprimand by the parent, she attempted. The reprimand may be trivial but alike the proverbial straw it was last in a series of events. Here again, the young female in a traditional family structure is expected to be submissive and obedient. This role is again changing. Verbal means of expression are limited in this structured family system. Attempted suicide in this instance is not so much a cry for help but a scream of anguish and despair against the rigid expectations. The

consequences of the act is usually a change in attitudes towards the girl.

The low incidence in Malays may be due to the Islam religion which explicitly forbids suicide. This could also be attributed to the relatively more traditional community unlike the migrant ethnic groups of Indians and Chinese.

Few cases were in financial difficulties or unemployed. More females than males were unemployed but many were housewives or teenagers. This low index of unemployment was lower than expected. The findings of Holding *et al.*, (1977) and Morgan *et al.*, (1975) revealed a higher proportion unemployed and a higher than national average respectively. It would appear that financial difficulties was not a major factor in motivation of attempted suicide in this sample. This could be due to the collective responsibility for each other in the extended family systems.

Social isolation as evidenced by living alone or in hostels so frequently noted in other studies (Kessel 1965, Morgan *et al.*, 1975) was not evident here. The prevalence of the extended family system in the Asian community acts as a barrier against social isolation.

A formal psychiatric diagnosis was made in only 54% of the cases. Neurosis, mainly reactive depression was diagnosed in 22%. Schizophrenia was diagnosed in 5 cases. The pre-conception of a person who attempts suicide as either a young hysterical female or a person suffering from depressive illness was not observed in this study. Most attempts were made as a result of chronic interpersonal strife but precipitated by trivial events. This finding has implications for management, suggesting that environmental manipulation and brief psychotherapeutic support would suffice in these cases. This approach was used in this study.

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BREAST FEEDING — A STUDY OF 8750 MALAYSIAN INFANTS

I. PATHMANATHAN

ONE OF THE foremost issues in infant nutrition in the 1970's has been the value of breast feeding. At the beginning of the decade a Symposium on "The Uniqueness of Human Milk" summarised the recent advances and highlighted the issues involved in the subject. In 1974, the twenty-seventh World Health Assembly passed a Resolution aimed at encouraging breast feeding and preventing a further decline in this practice.

In Malaysia, concern for breast feeding was demonstrated at a National Seminar on Breast Feeding in the context of National Development held in 1976 which focussed attention on the importance of breast feeding and discussed plans for a national breast feeding campaign. Baseline epidemiological data is a prerequisite to the planning of effective measures.

The objective of this study was to provide data that can be used to determine targets, priorities and strategies for action to promote breast feeding in Malaysia.

METHODOLOGY

The data presented in this paper was collected during a study on Maternal Health and Early Pregnancy Wastage conducted in Peninsular Malaysia in 1973-74, during which 9506 married women aged 15-44 years were interviewed to obtain information on their socio-economic background, patterns of pregnancy, childbirth, abortion and contraception as well as their history of lactation.

These women were resident in 13,704 randomly selected households in the urban areas of Kuala Lumpur, Ipoh and Petaling Jaya and six rural areas from five different Malaysian States

(Baling, Kuala Kangsar, Ulu Selangor, Temerloh, Gemas and Segamat). These areas included Malay 'kampongs', Chinese settlements, rubber estates, tin mining villages, padi growing areas and land development schemes (FELDA).

The interviews were conducted by trained female interviewers matched as far as possible with the respondents in language and ethnic group so as to minimise communication difficulties. The survey methodology and questionnaire are described in detail in the Report of the study. The respondents gave information on every pregnancy they had experienced — its date, the place of birth and the related breast feeding experiences. In order to minimise error due to inaccurate recall, the data presented in this paper refers only to live-births that occurred during 1970-74.

RESULTS

Data relating to 8755 livebirths (born to 5160 women) occurring during the period 1970-74 is presented in this paper. Of these, 3807 (43.5%) were urban and 4198 (56.5%) were rural. The ethnic distribution was 3268 (37.3%) Malays, 4109 (46.9%) Chinese and 1337 (15.7%) Indians.

BREAST FEEDING

5625 (64.2%) of the 8755 infants were breast-fed i.e. they had been put to breast. There was considerable variation between breast feeding in the major ethnic groups with breast feeding being initiated in 88.9% (N 2906) of Malay infants compared to 69.7% (N 955) of Indian infants and only 42.3% (N 1741) of Chinese infants. A similar ethnic variation in breast feeding was also found in the Malaysian Fertility and Family Survey (Chander et al., 1974).

URBAN-RURAL DIFFERENCES

As anticipated, breast feeding was far less popular in the urban than in the rural sector. Among urban infants only 47.0% (N 1788) were

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breast-fed whereas 77.5% (N 3837) of rural infants had been put to breast.

This urban-rural difference in breast feeding was most prominent among Chinese — the percentage of rural infants who were breast-fed being x 2.5 the percentage of urban infants. The difference in percentages of breast-fed rural and urban Indian infants was much smaller (x 1.2) and the difference between urban and rural Malays was negligible.

TRENDS IN BREASTFEEDING 1960-74

There is a difference in the trends in breast feeding between 1960 and 1974 in urban as compared to rural areas. Comparison of the percentage of infants put to breast during each of the five-year periods 1960-64, 1965-69 and 1970-74 showed that in urban areas there has been a decline in each of the major ethnic groups — the decline being most marked in Chinese and Indians and mild in Malays (Fig. 1). In rural areas there has not been a reduction of breast-feeding among either Malays or Indians and only a slight decline among Chinese.

DURATION OF BREASTFEEDING

Almost half the urban Malay and Indian women and two-thirds the urban Chinese who put their infants to breast had stopped breast-feeding before the third month. On the other hand however, 25% of urban Malays who breast-fed continued to do so after the ninth month, as did 12% of urban Chinese and 21% of urban Indians.

In the rural sector, 30% of the Malays, 40% of the Indians and 44% of the Chinese who breast-fed stopped before the third month. However, among Malays, 50% continued after the ninth month whereas only 21% of Indians and 19% of Chinese did so.

AGE OF MOTHER

Surprisingly in both urban and rural areas there was no significant difference in the percentage of mothers who breastfed in each of the five-year age groups between ages 15 and 44. This was true for all the three major ethnic groups. ($p > .14$ for all groups).

Fig. 1 Urban and rural trends in breast feeding 1960 — 1974

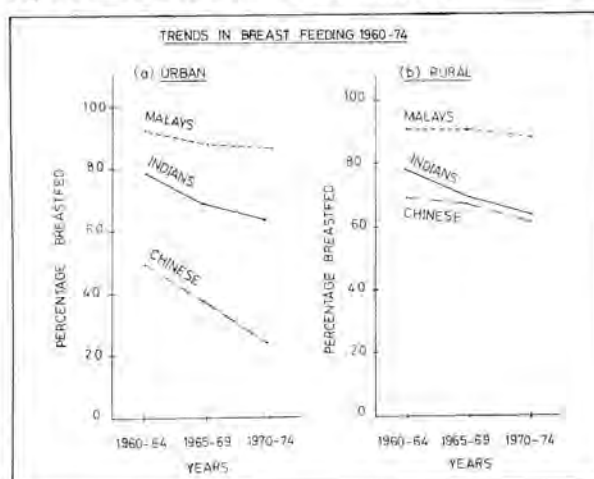


TABLE I

Breast feeding among urban and rural Malay, Chinese and Indian infants 1970 — 74

	URBAN			RURAL		
	TOTAL	BREAST FED	% BREAST FED	TOTAL	BREAST FED	% BREAST FED
MALAYS	977	845	86.4	2291	2061	90.0
CHINESE	2210	549	24.8	1899	1192	62.8
INDIANS	582	374	64.3	755	581	77.0
OTHERS	38	20	—	3	3	—
TOTAL	3807	1788	47.0	4948	3837	77.5

TABLE II
DURATION OF BREAST FEEDING @

Stopped BF before:	U R B A N						R U R A L					
	MALAYS		CHINESE		INDIANS		MALAYS		CHINESE		INDIANS	
	N	%	N	%	N	%	N	%	N	%	N	%
1 month	162	21.6	90	17.4	59	17.6	157	9.8	73	6.9	36	7.0
3 months	369	49.2	343	65.9	155	46.3	476	29.8	462	43.7	207	40.4
6 months	474	63.2	419	80.6	228	68.1	676	42.3	723	68.4	336	65.6
9 months	560	74.7	458	88.1	264	78.8	806	50.4	858	81.2	405	79.1
Continued 9+ months	191	25.4	60	11.6	71	21.2	790	49.5	198	18.8	107	20.9
TOTAL	751		518		335		1596		1056		512	

@ Infants still being breast fed at the time of interview have been excluded in this table.

TABLE III
AGE OF MOTHER AND BREAST FEEDING

AGE	U R B A N						R U R A L					
	MALAYS		CHINESE		INDIANS		MALAYS		CHINESE		INDIANS	
	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF
15 — 19	44	90.9	40	27.5	22	54.5	81	86.4	36	36.1	27	81.5
20 — 24	240	89.5	389	24.4	141	75.1	543	89.9	352	36.9	232	75.9
25 — 29	338	86.7	766	22.5	180	61.7	605	91.2	578	37.4	200	77.5
30 — 34	214	82.7	652	26.4	130	62.3	495	90.7	513	39.2	151	74.8
35 — 39	101	85.1	268	26.9	82	57.3	390	89.5	264	37.5	101	81.2
40 — 44	37	89.1	87	29.9	26	61.5	157	92.4	149	30.9	35	74.3
TOTAL	974		2202		581		2271		1892		746	
X ² test	.14 < p < .22		.1 < p < .16		.8 < p < .9		.5 < p < .7		.5 < p < .7		p = .8	

(Column totals differ from Table I because "Unknown Age" have been excluded.)

FAMILY INCOME

There was no significant difference in the percentages of urban Malay mothers breastfeeding their infants in high, middle and low income groups. Among urban Chinese and Indians, however, mothers in the \$500 — \$999 and \$1000/- + income groups had lower percentages ($p < .0005$) who breastfed than those in the lower income groups.

EDUCATION OF MOTHER

Among Malay mothers, the percentage who breastfed was not significantly different in mothers with different levels of education. However, among urban Chinese and Indians, those who had only Primary school education had the highest breast feeding percentages. Those who had no formal education or only religious education were the second highest group while

TABLE IV
FAMILY INCOME AND BREAST FEEDING

FAMILY INCOME	URBAN						RURAL					
	MALAYS		CHINESE		INDIANS		MALAYS		CHINESE		INDIANS	
	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF
MS100/-	1	—	7	—	18	—	190	89.5	17	—	19	—
MS100 — \$299	405	89.4	626	30.5	306	69.6	1333	89.9	598	61.5	448	75.2
MS300 — \$499	241	83.0	608	25.9	99	70.7	511	92.6	682	64.7	217	77.9
MS500 — \$999	155	87.1	514	23.2	73	52.1	213	90.1	460	62.6	62	87.1
MS1000/- +	166	85.5	407	17.2	82	45.1	30	73.3	123	67.5	6	—
TOTAL	969		2162		578		2277		1880		752	
X^2 test	.13 < p < .2		p < .0005		p < .0005		p < .005		.3 < p < .5		.2 < p < .3	

(Unknown Family Income is excluded from this table)

TABLE V
EDUCATION OF MOTHER AND BREAST FEEDING

	URBAN						RURAL					
	MALAYS		CHINESE		INDIANS		MALAYS		CHINESE		INDIANS	
	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF
Nil/ Religious only	86	89.5	417	35.7	92	69.6	642	89.7	550	62.2	248	73.0
Primary only	559	85.6	1160	51.4	276	72.8	1452	91.1	1224	64.5	451	80.0
Secondary	295	86.7	581	17.4	190	51.0	180	86.1	118	50.0	51	68.6
Post- Secondary	31	83.9	47	23.4	22	45.5	6	—	7	—	4	—
X^2 test	.5 < p < .8		p < .0005		p < .0005		.08 < p < .13		p < .01		p < .05	

those with Secondary and higher levels of education had considerably lower percentages ($p < .0005$). A similar pattern existed among rural Chinese and Indians ($p < .01$ and $< .05$).

OCCUPATION OF MOTHER

Comparison of the percentages of breast feeding among the different types of working women and housewives showed that the behaviour of working women of the various ethnic groups was different.

Among urban Malays, although maids and domestic workers and nurses etc. had lower percentages than other working women and housewives, the number was too small to be tested for significance. Among urban Chinese, working women with lower percentages than housewives were teachers, clerks, typists and tailors, while farmers and workers in medical fields (nurses etc.) had higher percentages. ($p < 0.0005$). Among urban Indians too, teachers, clerks and typists had lower percentages than housewives ($p < 0.0005$).

TABLE VI
OCCUPATION OF MOTHER: (a) URBAN

	MALAYS		CHINESE		INDIANS	
	Total	% BF	Total	% BF	Total	% BF
Nurses, midwives & other medical staff	10 [@]	50.0	24	45.8	7 [@]	—
Teachers	40	85.0	65	16.9	25	52.0
Typists, clerks, cashiers, etc.	53	86.8	96	7.3	26	26.9
Maids & other domestic workers	11 [@]	63.6	62	25.8	24	79.2
Farmers, tappers & other agricultural workers	0	—	21	42.9	0	—
Tailors, dressmakers	2 [@]	—	77	18.2	1 [@]	—
Salesgirls	6 [@]	—	48	22.9	6 [@]	—
Housewives/others not employed	800	87.9	1644	26.3	477	66.7
X^2 test	$p < .9^@$		$p < .0005$		$p < .0005$	

[@] Numbers were too small to be included in the test of significance.

Among rural Malays and Indians, there was little difference between housewives and working women ($M .2 < p < .3$; $I p = .15$). Among rural Chinese, agricultural workers surprisingly had higher percentages than housewives and white collar workers.

For all the ethnic groups both urban and rural, farmers and agricultural workers had relatively high percentages who breast fed — comparable or even higher than housewives while in general, "white-collar" workers had lower percentages.

TABLE VI
OCCUPATION OF MOTHER: (b) RURAL

	MALAYS		CHINESE		INDIANS	
	Total	% BF	Total	% BF	Total	% BF
Nurses, midwives, & other medical workers	17	82.4	1	—	3	—
Teachers	36	88.9	16	25.0	5	—
Farmers, tappers, agric. workers	385	88.8	890	68.4	379	79.4
Salesgirls	9	—	18	33.3	0	—
Housewives/others not commercially employed	1788	91.1	925	59.6	344	75.0
X^2 test	$.2 < p < .3$		$p < .0005$		$p = 0.15$	

PLACE OF BIRTH OF THE INFANT

Among urban Chinese, those who delivered in private hospitals and clinics had the lowest breast feeding rates, followed by those delivered in Government hospitals. ($p < .0005$). A similar pattern was true for rural Chinese.

Among Malays, for the urban sector there was little variation of breast feeding with different places of birth ($p < .07$) but in the rural women hospital deliveries had lower breast feeding rates ($p < .0005$).

Among Indians there was no significant difference for different places of birth.

TABLE VII
PLACE OF BIRTH AND BREAST FEEDING

	U R B A N						R U R A L					
	MALAYS		CHINESE		INDIANS		MALAYS		CHINESE		INDIANS	
	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF	Total	% BF
Govt. Hosp.	437	81.2	663	31.8	387	66.4	437	84.7	1218	62.9	531	75.7
Pr. Hosp./ clinic	122	81.1	1442	22.0	134	54.5	9	—	178	52.2	11	54.5
Govt. M/W.	124	85.4	42	47.6	27	77.8	1171	92.3	413	71.4	91	83.5
Unq. M/W.	280	90.0	23	47.8	30	66.6	668	89.9	53	66.0	117	78.6
X^2 test	.07 < p < .11		p < .0005		.03 < p < .04		p < .0005		p < .0005		.11 < p < .17	

DISCUSSION

Since the percentage of women who initiate breast feeding is strikingly different in each of the major ethnic groups and this difference is maintained in different educational, economic, age and occupational groups, it appears that cultural factors related to the different ethnic groups have a strong influence on whether or not a newborn infant is put to breast. While urban Malay and Indian women had relatively high breast feeding rates, urban Chinese had rates that were almost as low as in developed countries. Meyer (1966) in a study in the U.S.A. found 18% of mothers initiating breast feeding and Sloper et al. (1975) in Oxford found 27% compared to 25% of urban Chinese in the study. It appears that efforts to improve breast feeding rates among the Chinese should include a study of cultural and other factors that serve as deterrents to breast feeding in this community. Furthermore, since urban breast feeding rates have also begun to decline in the other two communities, measures to halt this decline could include reinforcing the cultural factors that have, up to this time, preserved the practice of putting the infant to breast among Malays and Indians.

The most disturbing feature of the breast feeding practices among the women studied is that in all the ethnic groups, among both urban and rural women a very high proportion of those who did initiate breast feeding had stopped by the end of the second month. For example, 67%

of all the urban Malay mothers and 72% of all the urban Indians were not breast feeding after the second month. Going out to work could not have been an important factor in stopping breast feeding since only 19% of the urban Malay and Indian mothers were working outside their homes. Sloper et al. (1975) reported a similar pattern in Oxford where despite successful efforts in the hospital to improve the percentage who initiated breast feeding, a high proportion (50%) had stopped by the end of the second month. Sloper et al reported that solids were introduced early — more than 60% by the second month. A subsequent study by Sloper et al. (1977) reported the effectiveness of advice by health visitors and midwives in prolonging breast feeding and delaying the introduction of solids. It is interesting that in a rural Malaysian community too (Pathmanathan, 1975) 67% of infants had been introduced to solids by the third month of life — the majority being commercial cereals.

Women in the higher income groups and "white-collar" working women predictably had lower breast feeding rates. Although it might be argued that these women might be able economically to provide their infants with adequate nutrition without breast milk, their influence in the community as trend setters and "role models" should not be ignored.

The lower breast feeding rates in infants born in hospitals and private clinics highlights the need

to review hospital routines and advice given while the mother is in hospital — both of which are factors that have been shown to influence the initiation of breast feeding (Sloper et al., 1975).

The association between the different educational levels and breast feeding is possibly influenced by other factors. For example, women with secondary education possibly have a larger proportion of working women than those with only primary school education. Further analysis is necessary to understand the influence of the educational level of the mother on her decision to breast feed her infant.

SUMMARY

A study of 8755 Malaysian live-births which occurred during 1970-74 showed that although 64% were initially breast fed, between half to two-thirds of these had been taken off the breast by the end of the second month. Chinese had low breast feeding rates compared to Malays and Indians suggesting differing cultural influences related to breast feeding in the different communities. Since there is a decreasing trend in breast feeding even among Malays and Indians in the urban areas, it is suggested that these cultural influences be studied and incorporated into educational efforts to improve breast feeding among Chinese and to prevent a decline among Malays and Indians.

Priority should be given to efforts to prolong the duration of breast feeding. Routine advice given by public health nurses in relation to the early introduction of solids and bottle feeds should take into account the desirability of prolonging breast feeding.

Efforts to improve the initiation of breast feeding should be centred in maternity hospitals and clinics — especially those in the private sector, and particular attention should be given to women in the higher income groups and working

women who are likely to influence "fashion-trends" in breast feeding in the community.

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INFANT FEEDING PRACTICES IN MALAYSIA

S.T. CHEN

INTRODUCTION

IT HAS been found that protein-calorie malnutrition is common among children in Malaysia (Chong, 1976; Chen, 1975; Chen, 1977; Rampal, 1977), the prevalence being highest among the Indians, intermediate among the Malays and lowest among the Chinese. In all ethnic groups it is highest among lower income children. Millis (1954, 1956, 1958) has shown that the inadequacy of the weaning diet is an important cause of the slow gain in weight among infants of the poor. Undoubtedly nutrition is the most important single factor influencing growth and this in turn is related to the feeding pattern of infants. In this study the feeding practices of a group of children in Kuala Lumpur and Petaling Jaya are examined.

MATERIALS AND METHODS

One hundred mothers, whose children aged 6 months to 2½ years had been admitted to the Pediatric Unit of the University Hospital, were interviewed regarding the feeding practices of their children. Table I shows the frequency distribution of the children according to their ethnic

Table I

Frequency distribution of children by ethnic group and income

Monthly household income (M\$)	Malay	Chinese	Indian	All ethnic groups
500	11	30	24	65
500 or more	7	19	9	35
All income groups	18	49	33	100

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and income characteristics.

RESULTS

1 Milk Feeding

(1) Breast feeding.

(a) Incidence

Table II shows that only 49% of the mothers breast fed their babies wholly or partially. Breast feeding was most common among the Malays (78%) followed by Indians (55%) and the Chinese (35%). These differences are statistically significant. Further, only 30% of the babies were wholly breast fed at birth.

There is no significant difference in the milk feeding pattern between the upper and lower income groups (where M\$500 or more is defined as upper income group). 58% of working mothers breast fed their babies compared with 46% of housewives. However this difference is not statistically significant.

Table II

Frequency distribution of children by ethnic group and milk feeding pattern

Ethnic group	Breast feeding				Artificial feeding (cow's milk)		Grand total	
	wholly		wholly and partially		No.	%	No.	%
	No.	%	No.	%				
Malay	10	(55.6)	14	(77.8)	4	(22.2)	18	(100.0)
Chinese	8	(16.3)	17	(34.7)	32	(65.3)	49	(100.0)
Indian	12	(36.4)	18	(54.5)	15	(45.5)	33	(100.0)
All ethnic	30	(30.0)	49	(49.0)	51	(51.0)	100	(100.0)

(b) The duration of breast feeding.

Figure 1 gives the cumulative percentages of infant according to the duration of breast feeding. On the whole the duration of breast feeding was short. 50% of the breast fed babies had stopped breast feeding by the age of 3 months. The duration of breast feeding was longest among the

Malays (50% at 6 months of age) and shortest among the Chinese (50% at 1½ months of age). It is interesting to note that there is no significant difference in the duration of breast feeding between working mothers and housewives.

Lower income mothers tended to breast feed longer than upper income mothers so that by the age of 6 months, the proportion still breast feeding were 47% and 10% respectively.

The main reasons given for stopping breast feeding were inadequate lactation (67%), work (15%) and the hospitalization of the infant (5%).

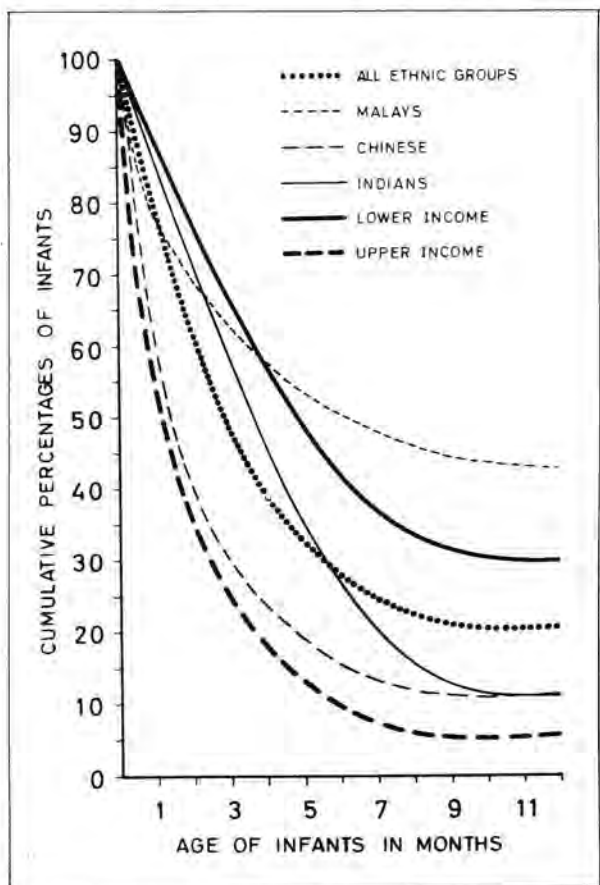


Fig. 1 Cumulative percentage of infants of various ethnic and income groups by the duration of breast feeding.

(2) Artificial feeding.

The chief reasons given for artificial feeding were convenience (26%), mother's illness or weakness (23%) and poor lactation (20%).

The main type of milk used was powdered milk (95%). Only 5% of the mothers fed their babies with sweetened condensed milk.

2 Non Milk Feeding

Figure 2 shows the cumulative percentages of children being introduced to non milk foods.

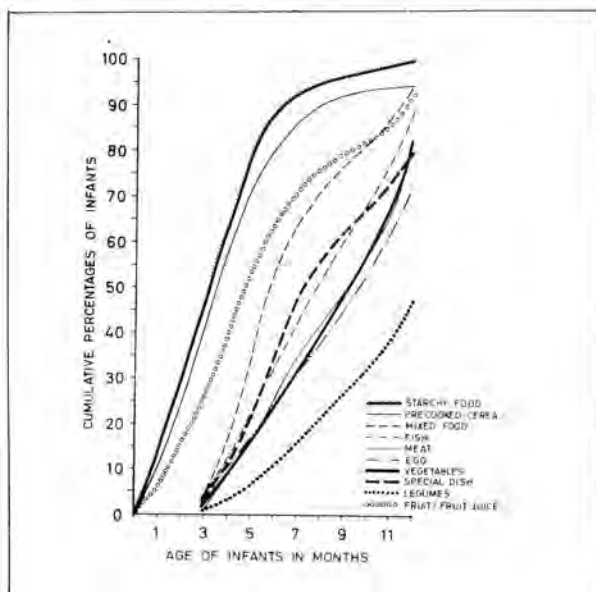


Fig. 2 Cumulative percentages of infants by the initiation of non milk food.

(1) Starchy foods.

This includes foods such as rice, rice powder, commercially prepared precooked cereal, bread, biscuits or rusks. Starchy foods were introduced early, sometimes as early as one week of age and by the age of 3½ months 50% of the infants were receiving starchy foods. However by the age of 9 months, 5% of the infants had still not been given any starchy foods. The Malays tended to start starchy foods earlier than the other ethnic groups and by the age of one month 50% of the Malay infants were receiving starchy foods. The most common first solid food given was precooked cereal. A few children, especially the Chinese, were given rice powder as the first solid.

(2) Fruits.

5% of the infants were given fruit or its juice at one month of age, 50% by 4½ months and 93% by 1 year.

(3) Vegetables

Vegetables were given late to the majority of children. Only 25% were receiving vegetables by the age of 6 months and 48% by the age of 9 months. Legumes were uncommonly used.

(4) Meat, fish and eggs.

Meat, fish and eggs were given late. Only one third of the children were receiving one or more of these items by the age of 6 months. The Indians started fish and meat later than the Malays and the Chinese, while the Chinese started eggs later than the others.

(5) Mixed foods

Mixed foods, which can be defined as a starchy food together with an animal protein other than milk protein, was started by a few as early as 3 months of age but only 50% received mixed foods by 6 months of age, 76% by 9 months and 95% by one year of age. On the whole the Indians and the lower income children tended to start mixed foods later.

However only 80% of the mothers who gave mixed foods to their infants during the first year of life cooked a special dish for the child, the remaining 20% merely gave precooked cereal or biscuits or portions of adult food such as starchy foods with soya sauce, yeast extract or gravy and the occasional fish that the child was able to take. Fewer Indians prepared a special dish for their children compared with the Chinese or the Malays.

On the whole, upper income children tended to receive a more satisfactory weaning diet compared with lower income children.

DISCUSSION

The incidence of breast feeding among the Chinese and the Indians was found to be lower than that reported by Dugdale (1970) for families studied in Kuala Lumpur 10 years ago. However the incidence of breast feeding among the Malays was similar in both the studies.

Compared with rural populations (Teoh, 1975; Balakrishnan, 1977) the incidence of breast feeding was lower in Kuala Lumpur than among rural peoples.

The duration of breast feeding was short especially among the Chinese. The main reason for stopping breast feeding seems to be inadequate lactation. This is not surprising as most of the mothers who breast fed also supplement with bottle feeding right from birth. Milk production depends on the prolactin reflex which is initiated by baby sucking on the breast and the more the baby sucks, the greater is the milk production. In other words, supply equals demand. One of the reasons why many babies were given supplementary feeding right from birth is the fact that babies were put to the breast late after delivery. In a study of babies born in some hospitals in Kuala Lumpur and Petaling Jaya, it was found that most of the babies were put to the breast more than 24 hours after delivery and that babies were given bottle feeding before the initiation of breast feeding. This undermined the mother's confidence in her ability to breast feed, and also gave the impression that bottle feeding was perhaps best for baby since hospitals encouraged such practices. Consequently many mothers breast fed partially resulting in lactation failure in a short time. To ensure successful lactation, mothers should be encouraged to breast feed wholly and babies should be put to the breast as soon as possible (within 6 hours after birth) in a 'rooming-in' type of setting. No bottle feeding should be given in the postnatal wards unless this is absolutely essential.

In contrast to Millis's study in Singapore (1954, 1956, 1958), the Chinese and Indians introduced starchy foods to their babies early in life. However the late introduction of mixed foods, meat, fish, eggs and vegetables was similar to Millis's study in Singapore.

The use of precooked cereal is wide spread among all children. This practice should be discouraged among the lower income children as it is expensive. Table III compares the nutritive values and cost of a home cooked balanced meal with that of a precooked cereal. It can be seen that the precooked cereal costs almost 3 times as much as a home cooked meal. Medical and nursing staff should discourage low income group parents from giving precooked cereal to their children and should instead teach them to prepare a well balanced meal suitable for the infant, using locally available and cheap sources of food. The wide spread practice by medical and nursing staff of

Table III

Comparison of cost of precooked cereal with a well balanced home cook meal

Home cook meal consists of 60 gm raw rice (1 small chinese rice bowl, cooked), 20 pieces of dry small ikan bilis (10 gm raw), 30 gm spinach, 1 slice of papaya and cooking oil (5 gm).

Type of food	Calories	Protein (gm)	Vitamin A (i.u.)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)	Iron (mg)	Calcium (mg)	Cost
Home cooked food	333	10.44	740	0.33	0.44	6.94	56	7.1	361.3	0.21
Precooked cereal	333	8.74	1532	0.49	0.57	7.68	36.77	12.75	563.87	0.72
½ daily requirement of one year old child, weighing 10 Kg.	333	8.33	500	0.17	0.2	2.66	10	2.33	166.66	-

giving free samples of precooked cereal should be discontinued.

The weaning diet of about one third of the children, especially among the Indians and the lower income group, was unsatisfactory and would fail to meet the physiological requirements for rapid growth of infants. This would account for the higher incidence of protein-calorie malnutrition among the Indians and among the lower income children.

To prevent protein-calorie malnutrition breast feeding, among other measures, should be encouraged by all available means. Lactating mothers should be helped to breast feed for as long a period as possible even up to 2 years.

The importance of a transitional diet from milk to adult diet should be stressed to parents. Beginning from the 5th month of life a transitional diet, consisting of a staple diet such as soft rice, legumes and a little animal protein and vegetables should be gradually introduced, at first once a day and gradually increasing to 3 or 4 times a day. Fruits should also be added. During the second year of life suitable protein rich portions from adult meals should be given to the child. However, if the adult food is too "spicy" or tough, then a special dish should be prepared (as in infancy) for the child until the age of 1½ to 2 years when the child eats an adult diet.

To conclude, I would like to quote McArthur

(1962), in relation to her survey of Kampongs, in Perak and Malacca.

"Were toddlers to get a *per capita* share of the family's purchases of animal foods, they could indeed be well on the way to getting the requirement of 1.5 g. of 'reference protein' per Kg. body weight Unfortunately, in most households they did not get this 'per capita share'".

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CONGENITAL HEART DISEASE AMONGST MALAYSIAN CHILDREN.

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INTRODUCTION

CONGENITAL HEART disease provides a major contribution to the work load (inpatient and ambulatory) of the paediatric, medical and surgical services of the University Hospital. To date, University Hospital has been the major referral centre for heart disease in Malaysia, being the only hospital with "open heart" surgical capability.

The purpose of this brief report is to indicate the incidence of congenital heart defects in Malaysian children as experienced by the paediatric section of the University Hospital Cardiac Service.

SUBJECTS

During the 2½ years from November 1975 to April 1978 1,148 children under the age of 12 years, were referred for cardiac evaluation. 1,037 were diagnosed as having congenital heart disease. Of the remaining 111, 47 had rheumatic heart disease and 64 were considered not to have heart disease at all. Infants with heart disease (especially sick neonates) were referred infrequently, and most cases of childhood rheumatic heart disease in University Hospital, and presumably elsewhere in Malaysia, were managed without referral to the cardiac unit. It is believed therefore that both of these groups are significantly under-represented.

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METHODS

All patients were assessed at least once by one or more of the authors, and in many instances by members of the adult cardiac service also. In every case clinical diagnosis was aided by chest radiographs and electrocardiograph. Other non-invasive investigations (haemoglobin determination, arterial blood-gas studies, phonocardiography, and echocardiography) were employed as diagnostic aids where appropriate.

Clinical diagnosis alone was available for three quarters of the children with congenital heart disease. Confirmation of diagnosis was possible for only 24.8% of cases. In this latter group, confirmation was by cardiac catheterization (with cardiac angiography when indicated) in 43%, by cardiac catheterization and subsequent surgery in 26.5%, by surgery alone in 26.5% (mostly patent ductus arteriosus), by echocardiography alone in 1% (hypertrophic obstructive cardiomyopathy, 1 case, and mitral valve prolapse, 2 cases) and by autopsy in only 3%.

INCIDENCE OF DIFFERENT CONGENITAL HEART DEFECTS

We found simple Ventricular Septal Defect (VSD), Patent Ductus Arteriosus (PDA), Tetralogy of Fallot, secundum Atrial Septal Defect (ASD), Pulmonary Stenosis (PS) with intact interventricular septum, Endocardial Cushion Defect and Transposition of the Great Arteries (TGA), in that order, to be the 7 most common defects. These defects also ranked within the first 10 in other series (Loh, 1969; Nadas and Fyler, 1972; Keith *et al.*, 1967).

Simple VSD, accounting for 40.4% of our cases, was more common than usually reported (31.4% by Loh (1969), 19.4% by Nadas and Fyler (1972)). This may be due to overdiagnosis of simple VSD and to under-representation of other defects (especially those which present in early infancy) rather than to an actual higher incidence of simple VSD.

Table I
Incidence of congenital heart defects by diagnosis

Rank Order of Lesion	Diagnosis	Number of Cases	Percent of Total	Number of cases with Confirmed Diagnosis
1.	Ventricular Septal Defect (VSD) Simple	419	40.4	22
2.	Patent Ductus Arteriosus (PDA)	156	15.0	102
3.	Tetralogy of Fallot	148	14.3	35
4.	Atrial Septal Defect (ASD) Secundum	53	5.1	17
5.	Pulmonary Stenosis (PS) with intact interventricular septum	52	5.0	14
6.	Endocardial Cushion Defect	22	2.1	5
7.	Transposition of the Great Arteries (TGA)	17	1.6	7
8.	Dextrocardias	16	1.5	
9.	Pulmonary Atresia with VSD	15	1.5	5
10.	Myocardial Diseases	12	1.2	7
11.	Arrhythmias	12	1.2	
12.	VSD with PDA	9	0.9	6
13.	Tricuspid Atresia	9	0.9	2
14.	VSD with ASD	8	0.8	7
15.	Coarctation of Aorta	8	0.8	3
16.	Aortic Stenosis — congenital	8	0.8	3
17.	VSD with PS	7	0.7	2
18.	Total Anomalous Pulmonary Venous Drainage	7	0.7	3
19.	Mitral Incompetence (MI) — non-Rheumatic	7	0.7	2
20.	VSD with Aortic Incompetence	4	0.4	3
21.	Ebstein's Anomaly	4	0.4	2
22.	Pulmonary Hypertension — idiopathic	4	0.4	1
23.	VSD with coarctation of aorta	3	0.3	2
24.	VSD with MI	3	0.3	0
25.	Corrected TGA	3	0.3	0
26.	DOuble outlet right ventricle	2	0.2	2
27.	Coronary arterio-venous fistula	2	0.2	2
28.	Sinus of Valsalva fistula	2	0.2	1
29.	Truncus Arteriosus	2	0.2	0
30.	Aortic Incompetence — non-Rheumatic	2	0.2	0
31.	Hypoplastic Left Heart	1	0.1	0
	Complex Cyanotic — type undertermined	18	1.7	0
	VSD with other defects	2	0.2	2
TOTAL		1,037	100.3%	257

VSD with PS (and left to right shunt) was very much less common in our experience (0.7%) than reported by Loh (1969) (3.2%) or Nadas and Fyler (1972) (3.1%). Tetralogy of Fallot accounted in our experience for a larger proportion of congenital heart disease (14.3%) than found by Loh (1969) (9.4%), and was the commonest cyanotic lesion. TGA was diagnosed in only 1.6% of our cases compared with 4.7 — 7.6% reported by others. This is probably an under-representation as most cases of TGA present in early infancy and many die before referral for cardiac

evaluation. Also some of the "Complex Cyanotic — type undertermined" group of patients may have transposition.

We found low incidence of Coarctation of Aorta (0.8%) and congenital Aortic Stenosis (AS) (0.8%), both of which lesions can be diagnosed clinically with a fair degree of confidence. Low incidence of these lesions was also reported by Loh (1969) in Singapore and is in sharp contrast to Western experience, where coarctation and AS are common. Nadas and Fyler (1972) ranked

Coarctation of Aorta third (8.1%) and Aortic Stenosis sixth (5.5%).

Hypoplastic Left Heart was infrequently diagnosed in Singapore (6 cases, 0.5%) (Loh, 1969) and only once in this report, despite its quite common occurrence in Western centres. It is highly likely that the true incidence of this lesion is much higher than we found, as most cases of Hypoplastic Left Heart, a uniformly lethal defect, die within the first week of life. It may be speculated, however, that Hypoplastic Left Heart, like other left sided obstructive lesions, has a truly lower incidence in Malaysia and Singapore than in Western countries.

The spectrum of congenital heart defects encountered at the University Hospital, Kuala Lumpur, is similar to that described in other cardiac centres. We must emphasise that in 75% of our cases, the diagnosis was made clinically and this may partly account for the difference in the incidence of specific cardiac defects compared to those reported in Western countries. Documentation of the true incidence and distribution

of the various congenital cardiac lesion in this country will have to wait until full investigative cardiac services are available for every child suspected of harbouring a heart defect.

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NORMAL ELECTROCARDIOGRAM AFTER MYOCARDIAL INFARCTION

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INTRODUCTION

THE PRESENCE of pathological Q waves on the surface electrocardiogram is generally recognised to indicate a transmural infarction. With healing, the Q wave often persists because a dead core of electrically inert scar tissue remains. Horan *et al.* (1971) demonstrated a correlation between surface electrocardiographic evidence of scarring with corresponding zones in the left ventricle at autopsy. Other workers have shown pathological Q waves associated with severe degrees of left ventricular asynergy in up to 78% of cases (Bodenheimer *et al.* 1975, Banka *et al.*, 1974). It is also recognised that in some instances there is complete restitution of the electrocardiogram after acute myocardial infarction. This observation is generally stated in various textbooks of cardiology, but a search in the literature provided scanty discussion on this aspect of myocardial infarction. Early reports by various authors found incidences of 6-14% in studies varying from one to six years (Table 1).

This report is of 4 cases of acute myocardial infarction which showed complete electrocardiographic restitution on follow up. They comprise 4% of 96 patients with definite myocardial infarction admitted to the University Kebangsaan Division of the Coronary Care Unit, General Hospital, Kuala Lumpur, followed up from 3 to 12 months.

CASE 1

K.A., a 29 years old Malay meter-reader was admitted to the Coronary Care Unit on

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Table 1

Incidence of normal electrocardiograms following myocardial infarction

AUTHOR	NO. OF PATIENTS	NORMAL ECG		PERIOD OF STUDY
1. Kaplan & Berkson (1964)	211	2	1	8 weeks
		12	6	3½ years
2. Master <i>et al.</i> (1942)	202	28	14	4 years
3. Mills <i>et al.</i> (1949)	100	9	9	6 years
4. Gittler <i>et al.</i> (1956)	51	1	8	1 year

14-12-1977, 4 hours after he developed severe chest pains while driving home from work. Electrocardiogram on admission showed acute inferior infarction. Serum aspartate transaminase on consecutive days were raised with a peak value of 198 I.U./L. Clinical examination also revealed symptoms and signs of thyrotoxicosis. This was subsequently confirmed by thyroid functions tests — Serum T_4 , 21 μ g/dl., I_{131} uptake at 4 hours 61%, uptake at 24 hours 76%.

The post infarction clinical course was uneventful. Propranolol (Inderal) was started on the third day and adequate blockade was achieved with 240 mg/day. Neomercazole was given when diagnosis of thyrotoxicosis was confirmed. It was discontinued when an extensive rash developed, and methylthiouracil 100mg 8 hourly substituted. He was discharged 7 weeks after admission.

On the fifth follow up visit (14-6-1978), he had resumed normal work and was clinically euthyroid. Electrocardiogram by this visit had returned to normal.

CASE 2

A.G., a 48 years old Malay electrician had been on regular treatment for hypertension for 2 years. Two weeks prior to admission he developed angina pectoris. On 18-1-1978 he experienced severe retrosternal pains lasting 20 minutes associated with sweating. electrocardiogram on admission showed a fresh antero-septal infarction (Fig. 1). Serial serum aspartate transaminase values were raised with a peak of 90 I.U./L.

Clinical course in the coronary care and rehabilitation ward was uneventful. Propranolol was commenced on the third day and maintained on 160 mgm/day. Isosorbide dinitrate 10mg 4 hourly was added later. He was discharged seventeen days after admission.

The last review on 19-7-1978, six months after infarction, he remained well and was back to full time work. Electrocardiogram on this visit showed a complete reversal to normal (Fig. 2)

CASE 3

E.S., a 42 years old Indian clerk, experienced severe retrosternal pains radiating to the left shoulder while resting after dinner. Electrocardiogram on admission (1-6-1978) showed a fresh inferior infarction. Serial serum aspartate transaminase on three consecutive days were 38, 126 and 86 I.U./L. respectively. His post infarction clinical course was unremarkable. He was discharged on the 15th day on propranolol 160 mgm./day.

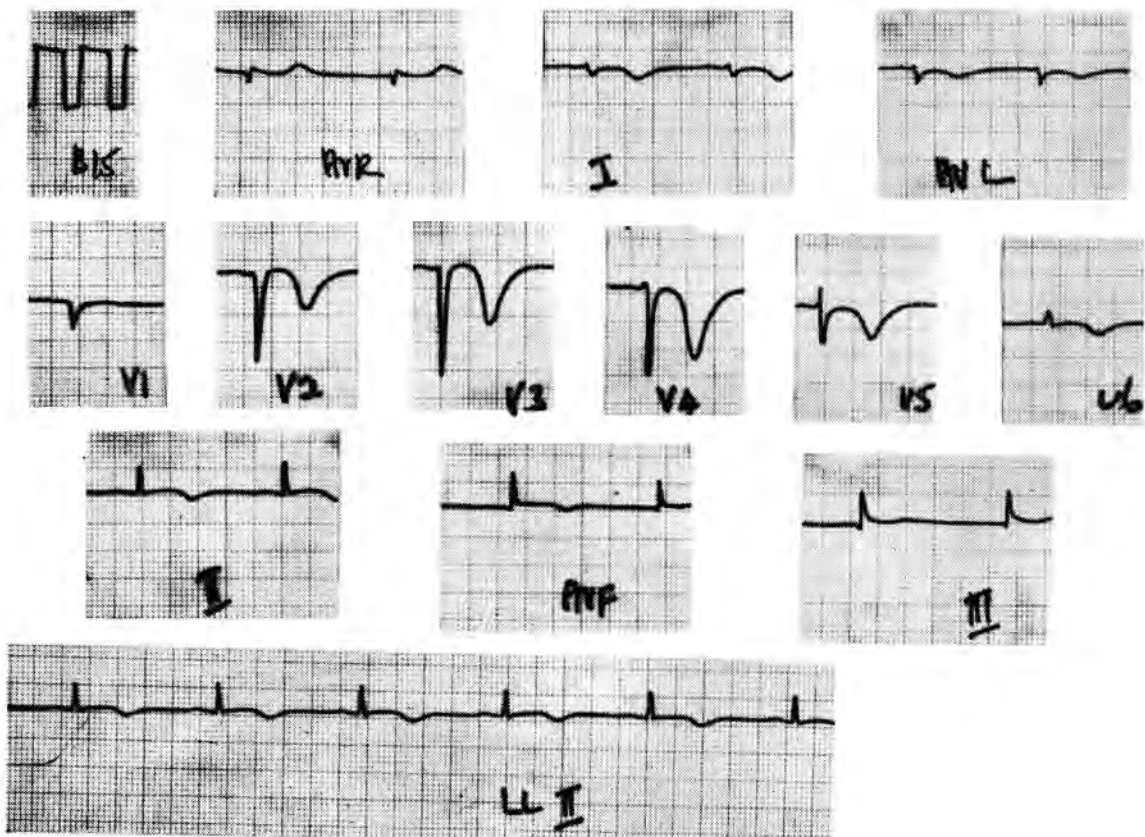


Fig. 1 Electrocardiogram on admission (18-1-78) showing acute antero-septal infarction

On the second follow up visit on 25-7-1978, 2 months post infarction, he remained well and electrocardiogram on this visit was normal.

CASE 4

K.S., a 35 years old Indian security guard, developed severe chest pains while taking his evening bath on 25-1-1978. Admission electrocardiogram showed a fresh antero-septal infarction. Confirmatory serum aspartate transaminase values were 33,182 and 142 I.U./L. His stay in the Coronary Care Unit and rehabilitation ward was uneventful and was discharged on the 22nd post infarction day on metoprolol (Betaloc) 300 mg/day.

On the third review on 2-5-1978 he was well. Electrocardiogram on this visit was normal and has remained normal on the next two visits.

DISCUSSION

Abnormal Q waves have been regarded as pathognomonic of myocardial infarction. A widely held concept of the origin of the Q waves is that it is produced by the failure of electrically inert muscle tissue in the vicinity of the electrode to contribute a positive vector force in the initial 0.04 seconds of the depolarization process. Cook *et al.* (1958) demonstrated that for Q waves to be produced, between 50-70% of the thickness of the left ventricular wall must be ischaemic. The small r or R wave that follows represents depolarization of normal sub-epicardial tissue adjacent to the infarct. Gross *et al.* (1964), in experimental studies involving ligation of coronary arteries of dogs, showed transitory Q waves in multiple leads. The Q waves appeared within 3 minutes of ligation and disappeared within 5 minutes of ligation release. Similar transitory Q waves have

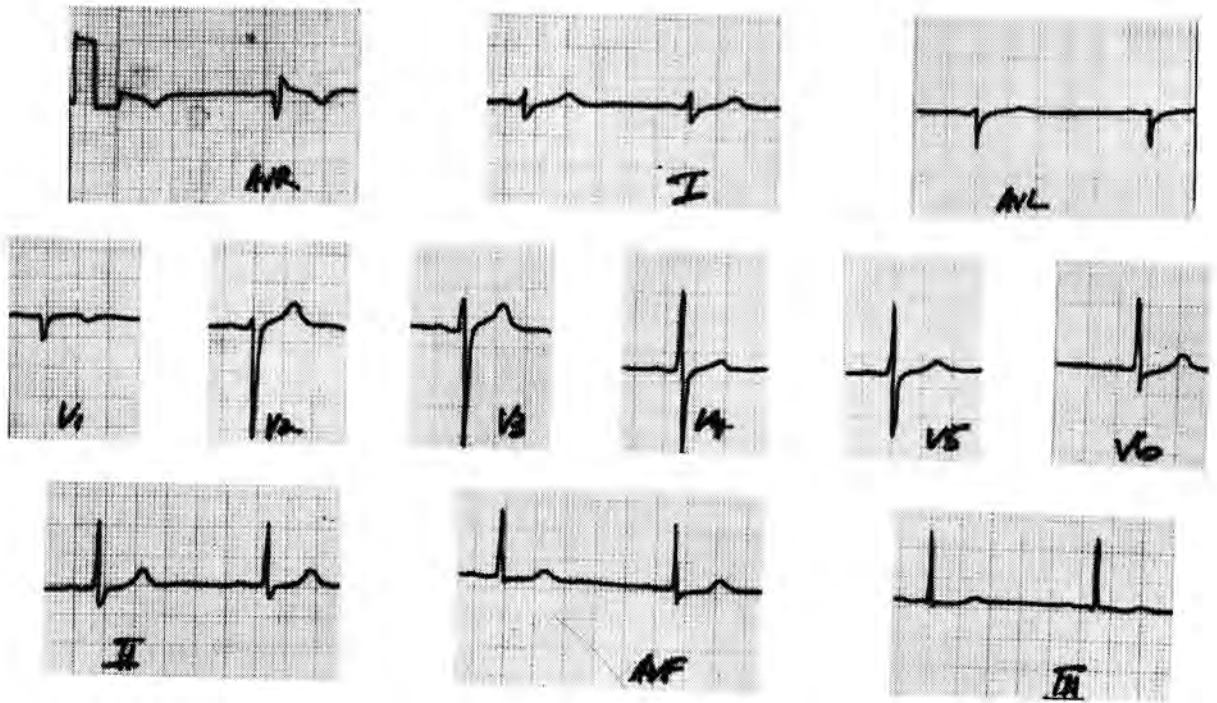


Fig. 2 Normal electrocardiogram on 19-7-78

also been reported with electrolyte imbalance (Nora and Ritz, 1959), shock and hypoglycaemia (Goldman *et al.*, 1960). The Q waves may persist up to 5 days but disappeared with correction of the metabolic disturbances. However, no mention was made of the associated cardiac enzyme changes. It is reasonable to assume that a period of time exists after the interruption of blood flow to an area of myocardium during which the QRS abnormalities that appear would be reversible. A lessening of the severity of the metabolic stress in the peripheral areas of the infarcted core enables islands of myocardium around to recover and resume electrical activity. The period of reversibility would be related to the severity of the resultant metabolic disturbance of the myocardium. The disappearance of the Q wave with electrocardiographic restitution as seen with these 4 cases would suggest that a significant amount of myocardium was effected to give rise to the early electrocardiographic and enzymatic changes. A sufficient area of myocardium was present which, although severely affected by ischaemia, was reversible.

Thyrotoxicosis with cardiac manifestations has been reported by De Groot (1972). The increased adrenergic activity accounts for many of the classical symptoms and circulatory changes. Chest pains of angina pectoris or myocardial infarction may be produced especially on a compromised coronary circulation. Conduction defects also occur with thyrotoxicosis. Campus *et al.* (1975) described two patients with heart block, both of whom reverted to normal when rendered euthyroid. Resnekov and Falicov (1977) reported 3 cases of thyrotoxicosis in young female patients presenting with severe angina and myocardial infarction. Normal coronaries were found at angiography. An abnormal lactate response occurred with pacing-induced stress suggesting myocardial cellular hypoxia due to increased oxygen demand as the reason for the chest pain. After treatment and when euthyroid, one patient showed persistent Q wave with ST elevation but no mention was made of the other 2 cases described. Case 1 demonstrates normalization of the electrocardiogram when euthyroid after treatment. Selective coronary angiography was not performed to demonstrate any major occlusion of his coronary arteries. It would be unusual to find severe coronary artery disease in his age in the absence of other risk factors. A

satisfactory symptomatic response with electrocardiographic restitution seen after adequate treatment of his thyrotoxic state would suggest a metabolic basis for the infarction.

Beta-blockers are used extensively in post infarction angina and arrhythmias with good results. Its use in acute myocardial infarction was first reported by Snow (1966), who showed a substantial reduction in mortality of patients who had received propranolol. Moroko *et al.* (1971), and Shell and Sobel (1973), showed that propranolol reduced infarct size in experimental infarction. This has revived recent interest in the use of beta-blockers in the early post infarction phase in the attempt to preserve ischaemic myocardium; delay evolution of infarction and enhance reversibility of ischaemic area. In all the 4 cases beta-blockade was used in the early post infarction period. This could have contributed to the electrocardiographic restitution seen.

Selective coronary angiography was not performed on any of the 4 cases studied. No literature is available on the relationship between patients who show electrocardiographic restitution after myocardial infarction and the state of their coronary circulation. This radiological procedure would provide invaluable information regarding long-term prognosis as electrocardiographic changes alone cannot prognosticate survival of the patients.

SUMMARY

This report is a retrospective study of the electrocardiograms that revert to normal after myocardial infarction. 4 patients (4%) showed complete electrocardiographic restitution on 3-12 months follow up. The incidence is comparable to other reported series. Possible pathophysiologic mechanisms are discussed.

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PREVENTION OF HOSPITAL INFECTION*

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HOSPITAL infection is defined as an infection acquired while staying in hospital or as a result of staying in hospital. It may occur as isolated cases or as epidemics and is seen not only in infectious and isolation wards but also in so called clean wards such as newborn nurseries.

The source of infection can be endogenous, i.e. from the patient himself, or hospital infection may arise from exogenous sources such as, from another patient or in the case of a newborn, from its mother, from the patient's attendants (doctors, nurses, orderlies), from the air via dust or droplets, or from other sources that include contaminated intravenous fluids, contaminated blood as well as food and drink.

In this presentation I can only briefly touch on certain aspects of hospital infections which we have had personal experience of in the last few years at the Paediatric and Postnatal Wards and the Special Care Nursery of the University Hospital, Petaling Jaya.

Most of our own efforts at investigation have been prompted by epidemics that have occurred in our wards, with a view of tracing and later eliminating the source of infection.

The first was an unusually large number of septicaemias seen in 1970. This was followed by an epidemic of gastroenteritis in 1973 (Lam, 1973), then an increased incidence of *Staphylococcus pyogenes* sepsis in 1975 (Lam, 1975) and more recently the problem of neonatal meningitis due to *Flavobacterium meningo-septicum* in 1977 (Thong, 1977).

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INFECTION OF BABIES BY THEIR MOTHERS

Infection of babies by their mothers was investigated following the epidemic of gastroenteritis in 1973. Rectal swabs were collected from 640 mothers in the labour ward, and oral and rectal swabs were collected from the baby at the time of delivery and daily for 2 days after birth. Of the 640 mother-baby pairs, enteropathogenic *Escherichia coli* was isolated in 23 or 3.5% of the mothers and 14 or 2.18% of the babies. In only 5 or 0.78% of the pairs was the organism isolated in both the mother and child and of these 5 the same serotype was obtained in only 2 instances. None of the newborns developed any signs or symptoms of diarrhoea and we concluded that though there is a possibility that mothers carrying enteropathogenic *Escherichia coli* can infect their babies, this risk is small. On the whole, our experience indicates that hospital infections arise from other exogenous sources.

INFECTION FROM THE PATIENT'S ATTENDANTS

I firmly believe that the doctors are a major source of cross infection in our Unit and very likely in other similar Units as well. For example in 5 days of 1973 a particular serotype of enteropathogenic *Escherichia coli* spread from the Special Care Nursery to all the Paediatric wards and to prevent further infection we were forced to close the Unit. The doctors were the only staff working in all the areas of the Unit. As it was vacation time, we could not put the blame on the medical students!

It is very easy to transmit organisms from one patient to another via the hands or our stethoscopes and it would be interesting to find out how many of us routinely wash our hands between patients and how many of us clean and disinfect our stethoscopes periodically. Even if a doctor is conscientious enough to wash his hands

between patients we should then ask if this is done thoroughly and, after washing, are facilities for hand drying adequate? Drying facilities may amount to just a hand towel hung on a towel rack used repeatedly and changed perhaps once a day and after the first few uses the towel is more wet than dry and can actually serve as a source infection. This was a problem we found during investigations of the outbreak of gastroenteritis in 1973 (Lam, 1973). Following this we now use squares of old hospital linen that can be re-washed and re-used and this has proved satisfactory and economical.

During an outbreak of *Staphylococcus pyogenes* infection in 1975, a nasal swab survey of 123 staff members, including doctors, nurses and attendants in both the Paediatric and the Obstetric wards was carried out. Of these, 41 or 33.3% were found to be nasal carriers of *Staphylococcus pyogenes*.

This was alarming but we later learnt from the Director of the Cross Infection Reference Laboratory in London that it is the personnel with actual skin lesions on their hands that are the dangerous disseminators of *Staphylococci* and that as far as the asymptomatic *Staphylococci* carriers are concerned, it is the perineal rather than the nasal carriers that we should worry about as these are the ones who tend to spread the *Staphylococci* they carry.

INFECTION FROM EQUIPMENT AND INSTRUMENTS

The disposable intravenous sets with attached measuring burettes are very useful but if used over long periods can become potential killers as was shown by Thong and Tay (1975). The drip chambers can become contaminated by organisms as early as the 4th day of use even when antibiotics are present in the infusion fluid. We now routinely change these sets every 2 days if prolonged intravenous therapy is indicated. When patients are on parenteral intravenous alimentation, these are changed daily. Even then, there is still about a 10% risk of septicaemia in this category of patients despite painting the external surfaces of the drip sets with Povidine every 2 hours.

Thermometers are a common source of cross infection if shared among patients especially if

they are not disinfected between use with a suitable disinfectant for an adequate period of time.

We have learnt that isolettes if not cleaned carefully after use can be a serious source of hospital infection. The most difficult part to disinfect and keep sterile is the water reservoir and even if it is sterile to begin with, it becomes, while in use, quickly and heavily contaminated by organisms such as *Staphylococci*, *Pseudomonas* and *Flavobacteria*.

Only staff who have been trained to dismantle and clean incubators should be responsible for cleaning them and it is now our policy not to use so called cleaned isolettes until we have bacteriological proof that the disinfection has been adequate.

We change incubators routinely every week and for the past 2 years we have also stopped putting distilled water in the reservoirs as our air is already over 90% saturated and there really is no need to try to further humidify it.

DISINFECTANTS

In the past there has been no set unit or hospital policy as to what antiseptic or disinfectant to use for barrier nursing, sterilization of instruments, septic material like dressings or nappies and even floors. Recent work by Puthuchery and Thong has given us some indication of the effectiveness of simple hand washing with soap and water and some of the commonly used agents in this country against 4 common organisms, namely, *Staphylococcus pyogenes*, *Escherichia coli*, *Pseudomonas species* and *Flavobacterium meningosepticum*.

It can be seen from Table I that with the test organisms, soap and water is as effective if not better than Dettol and Resiguard. The exception is Dettol and *Escherichia coli*. It can be seen here that Dettol is superior to soap and water. Aqueous Chlorhexidine and aqueous Cetrimide are better than soap and water and are uniformly effective against all the 4 organisms. Povidine, an iodinated compound, is highly effective against all the test organisms.

It is of interest to mention here that one of the

two active ingredients in Resiguard, Benzalkonium chloride, is an agent incorporated into culture media for isolation of *Pseudomonas* species.

As part of the epidemiological study of *Flavobacterium meningosepticum*, Thong (1977) examined stock samples of aqueous preparations from various areas of the hospital and found them heavily contaminated with mixed bacteria and *Pseudomonas cepacia*.

Table III (Thong, 1977) shows results of culture of different concentrations of aqueous Chlorhexidine during use and while in stock bottles. All samples grew mixed organisms and in the case of the 0.05% solution, *Flavobacterium meningosepticum* as well. Note that the pH of all the solutions is 6. Chlorhexidine works best at pH7 or at a slightly more alkaline pH than 7.

Distilled water, which is mainly used as a diluent or to humidify oxygen for example in

Table I: Effectiveness of Antiseptics versus Washing with Soap and Water

Agent	Bacterial Count			
	Staph. pyogenes	E. Coli	Ps. aeruginosa	Flavobacterium meningosepticum
Control	160,238	61,962	422,488	53,350
Resiguard 1:160	441	84	207	100
Povidine	0.5	0.8	7.6	1.6
Soap and water	647	132	136	13
Chlorhexidine 1%	1.6	5.4	28	2.1
Cetrimide 1%	1.8	3.5	9	5.3
Dettol 1:40	60,435	6.5	117	38.4

Table II: Samples of Aqueous Preparations Examined Bacteriologically

Solution	pH	Source of Solution	Total Viable Count per ml (Mixed Bacteria)	Ps. cepacia isolated
2% Sodium bicarbonate	10.0	Special Care Nursery	2×10^4	—
1% Cetrimide	7.0	Maternity operating theatre (stock bottle)	3×10^4	+
1% Cetrimide	6.5	Pharmacy	1×10^6	+
1% Cetrimide	7.0	Pharmacy	3×10^6	+
Salvon I/100 (0.5% Cetrimide and 0.5% Chlorhexidine)	6.0	Pharmacy	1.7×10^6	+

Table III

Samples of aqueous solutions of Chlorhexidine (Hibitane) examined bacteriologically

Conc. of aqueous Chlorhexidine	pH	Source of Chlorhexidine	Mixed Bacterial Growth	F. meningosepticum
0.5%	6.0	^x SCN (Wash Basin)	+	—
0.05%	6.0	^x SCN (Stock Bottle)	+	+
1.0%	6.0	^x SCN (Stock Bottle)	+	—
0.05%	6.0	* LW (Stock Bottle)	+	+
0.5%		^a Mat. 1 (In use)	+	—
0.05%		^a Mat. 3 (Stock Bottle)	+	+
0.05%	6.0	^a Mat. 4 (Stock Bottle)	+	+
1.0%	6.0	Pharmacy stock	+(1.4 x 10 ⁶)	—
0.05%	6.0	Pharmacy stock	+(4.6 x 10 ³)	+

^x Special Care Nursery

*Labour Ward

^a Maternity Ward

croupettes, is only as sterile as the equipment from which it is obtained and the container it is stored in. With the deionising method of obtaining ion free water direct from tap water the effluent is of course not sterile. *Pseudomonas* and *Flavobacteria* thrive in both.

CONCLUSION

I am sure that there have been many instances of hospital infection that we have missed and that there will be many more outbreaks of hospital infection in time to come.

We may not be able to eliminate hospital infection but with the experience gained and with constant vigilance, we can reduce it to a minimum. I hope that this paper will stimulate a critical reappraisal of current practices particularly in the neonatal area where the newborn and premature are especially susceptible to infection.

ACKNOWLEDGEMENT

I would like to thank our colleagues from Medical Microbiology who did and are still doing all the hard work in our attempts to reduce hospital infection in the Paediatric Unit.

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NERVE CONDUCTION VELOCITIES AND DISTAL LATENCIES IN NORMAL MALAYSIAN SUBJECTS

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INTRODUCTION

NERVE CONDUCTION velocities are easily measured on peripheral nerves. Nerve impulses are triggered with graded stimuli of an electrical stimulator. Once the action potential threshold of a nerve fibre is reached the electrical impulse propagates along it in a saltatory manner according to the 'all or none' principle at a rate of a few to about a hundred metres per second. This velocity of propagation varies directly with the diameter of the nerve fibre (Gasser and Grundfest, 1939; Hursh, 1939) and its temperature (Henriksen, 1956; Buchthal and Rosenfalck, 1966). It is influenced by age (Norris *et al.*, 1953; Thomas and Lambert 1960; Downie and Newell, 1961; Buchthal and Rosenfalck, 1966).

The peripheral nerve conduction velocity was first measured by Helmholtz in 1850. The technique of conduction study in clinical practice was introduced by Hodes and associates in 1948 and became well established in the sixties.

This test is an important diagnostic tool in the investigation of some neurological disorders. In conjunction with electromyography, it helps to differentiate primarily muscle disorders from nerve diseases. It aids in localization of the site of the nerve lesions particularly entrapment syndromes, e.g. carpal tunnel syndrome. It may indicate either an axonal or demyelinating type of peripheral neuropathy (Gilliat, 1966). Here we would like to report a series of normal values and the techniques which we employed to obtain them.

MATERIAL

The measurements were made on the upper and lower limbs of 27 male and 20 female volunteers with no clinical evidence of neuromuscular disorders. The volunteers with ages between 19 and 35 years, with a mean of 25.6, and a S.D. of 4 years, consisted mainly of medical laboratory technologists and medical students.

METHOD

In each subject antidromic motor and antidromic sensory distal latencies and conduction velocities of the median and ulnar nerves were measured. On the lateral popliteal and posterior tibial nerves only motor velocities were studied. In addition, antidromic sensory conduction velocity was measured on the sural nerve.

The sites of stimulating and recording electrode placement are shown in the Table I. The electrodes were held in place by skin adhesive tape. The electrical contact was maintained by NaCl solution and/or electrode paste.

The nerves were supramaximally stimulated with square wave of duration 0.2 msec and voltages up to 500 volts at a rate of one pulse per second. The stimulating pulses were delivered from DISA 14E10 stimulator via an isolation transformer. The electrode consisted of an anode and a cathode held 25 mm apart. They were made of 6 mm cotton wick held in a stainless steel cup. During stimulation the cathode was placed directly above the nerve trunks distal to the anode.

The action potentials were picked up by the recording electrodes made of either silver disc of 10 mm in diameter or 3-5 mm by 50 mm flexible silver strips for the fingers. The action potentials were led to DISA 14A30 3-channel electromyograph which amplified at 100 uv/Div. and 10

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Table 1
Sites of stimulating and recording electrode placement

Nerve	Site of Stimulation	Site of Recording
Median Motor	wrist, elbow and axilla	thenar muscle
Median Sensory	wrist, elbow and axilla	index finger
Ulnar Motor	wrist, elbow and axilla	hypothenar and 1st dorsal interosseous muscles
Ulnar Sensory	wrist, elbow and axilla	last finger
Lateral popliteal Motor	ankle and knee	extensor digitorum brevis muscles
Post. tibial Motor	ankle and knee	abductor hallucis muscles
Sural Sensory	7, 14 and 21 cm above the recording electrode	lateral malleolus

mv/Div. for sensory and motor potentials respectively. The stimulus artefacts and the responses were displayed on a large cathode ray tube. The latencies were measured electronically from the stimulus artefact to the onset of motor action potentials and to the 1st negative peak of sensory action potentials (Fig. 1).

For safety reasons and reduction of main interference a ground electrode of a lead strip was placed in between the stimulating and the recording electrodes.

The lengths of a nerve were estimated from the measurement with a flexible measuring tape along the surface of the limb between the cathode positions. The distal latencies in msec were taken from direct readout and the conduction velocities in metres per second (m/s) were calculated by dividing the segment length with the latency difference.

The room and skin temperatures were measured with an electronic thermometer ELLAB Type TE3.

RESULTS

The means and standard deviations of both motor and sensory distal latencies and conduction velocities of the ulnar and median nerves in the upper limbs are shown in the Table II. The values for the upper segment are generally higher with

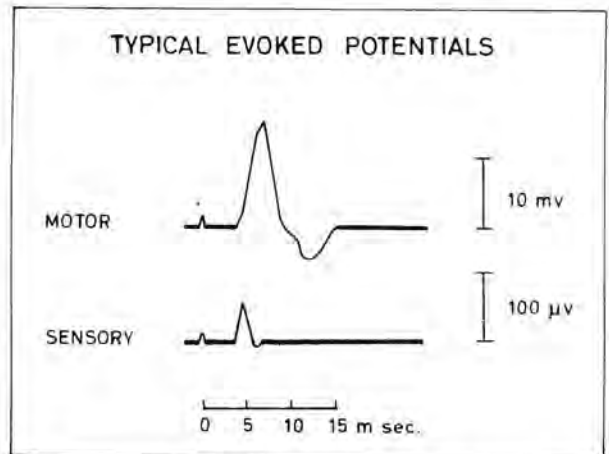


Fig. 1. Schematic diagram showing stimulus artefacts preceding the evoked motor and sensory nerve potentials.

greater scatter. The mean motor distal latency of the ulnar nerve from wrist to the 1st dorsal interosseous muscle was 4.0 msec S.D. 0.6 msec. The values for the lateral popliteal and the posterior tibial nerves are shown in the Table III. The conduction velocities are generally slower than those of the upper limb. The antidromic sensory conduction values of the sural nerve are shown in the Table IV.

The surface temperatures near the recording electrodes and room temperatures are shown in Table V.

Table II
Motor and sensory conduction in the upper limb

Nerve		Distal latency msec	Conduction velocity wrist — elbow m/s	Conduction velocity elbow — axilla m/s
Ulnar	Motor	3.1 ± 0.7	56.8 ± 4.9	62.5 ± 7.7
	Sen.	3.0 ± 0.4	58.7 ± 4.2	60.2 ± 7.7
Median	Motor	3.5 ± 0.5	58.6 ± 4.2	68.6 ± 5.6
	Sen.	3.3 ± 0.4	58.6 ± 4.9	65.9 ± 6.4

Table III
Motor conduction in the lower limb

Nerve	Distal latency msec	Conduction velocity ankle — knee m/sec
Lat. Popliteal	4.5 ± 0.4	50.8 ± 5.0
Posterior Tibial	4.3 ± 0.7	48.8 ± 5.8

Table IV
Sural nerve conduction

	Distal latency msec	Conduction velocity m/s
Lower Segment	2.3 ± 0.2	50.0 ± 6.0
Upper Segment	3.7 ± 0.3	53.2 ± 5.2

Table V
Skin and room temperatures at test

LOCATION	Mean °C	S.D. °C	Range °C
Ulnar N.*	30.3	±2.1	24.3 — 37.0
Median N.*	30.8	±4.1	27.0 — 35.5
Lat. Popliteal N.*	30.0	±2.0	25.8 — 36.0
Post. Tibial & Sural N.*	29.3	±1.9	25.3 — 32.5
Room	22.9	±2.0	21.5 — 24.8

*Skin temperature near the recording electrodes

DISCUSSION

Surface electrodes were used instead of needle electrodes for stimulating the nerves and for recording the responses. This method is painless. Trojaborg (1964) had shown that there was no significant difference in the motor conduction velocities derived by either surface or needle stimulating and recording electrodes. Since the lengths of nerve segment were estimated by surface measurement it introduces a 4.5% error to the nerve conduction velocities (Buchthal and Rosen-

falck, 1966), basing on the finding that surface measurements were only 0.3 to 0.8 mm shorter than the dissected median and ulnar nerve lengths (Carpendales, 1956).

The results of this present study of motor conduction of the peripheral nerves are comparable with the average of the published series of some workers from 1948 up to 1966 (Table VI). The values of these workers were mostly measured from Caucasian subjects. Tong and Wong (1977) in 268 Singaporeans obtained

Table VI

Motor nerve conduction velocities (M/SEC)++

Ulnaris	Medianus	Peronaeus	Tibialis	Authors
64*	60 — 65	56.6±0.91	45 — 50	Hodes et al. 1948, 1949
55 (45 — 68)***				Magladery and McDougal 1950
58.4 (SD4.28)*				Wagman and Lesse 1952
54 (46 — 62.7)**				Bolzani 1954
59.1 (49.1 — 65.5)*	58.5 (53 — 64.3)	51.2 (45.6 — 56.3)		Henriksen 1956
57.5 (51 — 75)*	60.5 (52 — 79)			Redford 1958
56.2 (SD4.2)**	57.2 (SD4.2)	49.7 (SD7.1)	43.2(SD4.9)	Thomas et al. 1959
62.4 (SD4.5)*	62.4 (SD4.5)			Ferrari et al. 1960
55.1 (SD6.4)*	50.1 (SD7.2)		50.2(SD9.3)	Johnson and Olsen 1960b
59.9 (44 — 76)*	58.8 (46 — 70)	50.2 (36 — 66)		Mulder et al. 1961
62.4±1.44*	59.1±1.12	47.1±0.92		Lawrence and Locke 1961
52.3 (SD5.1)***				Corbat 1961
56.4 (SD6.2)*		49.3 (SD5.7)		Skilman and Johnson 1961
			43.8±0.51	Skorpil and Kolman 1961
63.9±7.0**				Pinelli et al. 1961
56±1 (SD5)**	56±1 (SD5)	50±1 (SD4)		Trojborg 1962
53.1±0.04**				Vyklicky 1962
60.0 (56 — 62.7)*	64.3 (59.8 — 70.4)			Marmor and Libman 1962
53.3 (SD6.5)**	53.8 (SD5.3)	51.5 (SD5.7)		Wiesendanger and Bischoff 1962
				Gamstorp 1963a
63.0 (SD5.6)*	63.0 (SD5.6)	56.0 (SD5.2)		Poloni and Sala 1962
54.27±0.66**	54.27±0.66			Arrigo et al. 1962
			46.3 (SD3.3)	Mayer 1963
57.8±2.1*	58.9±2.2	49.5±5.6		Drechsler et al. 1964
56.18±4.55**			45.5±3.8	Krebda et al. 1965
59.78±2.08**				Kyral 1964
	58.8±5.91			Kaerer 1965
58 (SD5.32)*	56 (SD4.24)	50 (SD5.09)	44.5±4.13	Doutlik and Skorpil 1966
			46 (SD4.70)	
			45.9±2.9	
Av.57 m/sec	59 m/sec	51 m/sec	46 m/sec	
+56.8 (SD4.9)*	58.6 (SD4.2)	50.8 (SD5.0)	48.8 (SD5.8)	<i>Present Series</i>

* Surface electrodes

** Needle electrodes

+ The italics are our own insertion.

++ We thank Elsevier/North-Holland Biomedical Press, Amsterdam for permission to reproduce these tables from Handbook of Electroencephalography and Clinical Neurophysiology 1976, 16A: 80 — 87.

conduction values similar to those of our series with a difference of less than 5% after correction for a difference in temperature of 1°C between the two series. However, the distal latency of the posterior tibial nerve measured by them is more prolonged than our value by 20% (Table VII). We are unable to explain this difference.

The antidromic technique was employed to elicit sensory conduction. This technique was described by Sears in 1959. Although Buchthal and Rosenfalck (1966) demonstrated that the antidromic conduction velocities were the same as the orthodromic ones, our sensory results are not comparable with the Singapore series. In the

upper limbs, the antidromic conduction velocity were studied between wrist and elbow, elbow and axilla, whereas Tong and Wong obtained the orthodromic conduction velocity between the wrist and the fingers. Our values however fall between those of the published series since 1958 up to 1966 (Table VIII).

Using computer averaging technique in 30 normal subjects, Murai *et al.*, (1969) obtained a mean sensory sural nerve conduction velocity of 54 m/sec with a S.D. of 3.3 m/sec; a value very close to our value of 53.2 m/sec, S.D. 5.2 m/sec for the upper segment and 50.0 m/sec, S.D. 6.0 m/sec for the lower segment.

Table VII

Comparison of motor conductions between present series and Singapore series

	Median mean ±S.D.		Ulnar mean ±S.D.		Lat. popliteal mean ±S.D.		Post. tibial mean ±S.D.	
	Dist. Lat.	Cond. Vel.	Dist. Lat.	Cond. Vel.	Dist. Lat.	Cond. Vel.	Dist. Lat.	Cond. Vel.
	msec	m/sec	msec	m/sec	msec	m/sec	msec	m/sec
Present Series (19 — 35 yrs.)	3.5 ±0.5	58.6 ± 4.2	3.1 ±0.7	56.8 ± 4.9	4.5 ±0.4	50.8 ± 5.0	4.3 ±0.7	48.8 ± 5.8
Singapore Series (21 — 30 yrs.)	3.1 ±0.4	62.5 ± 5.2	2.8 ±0.5	62.1 ± 5.4	4.1 ±0.8	52.1 ± 6.2	5.1 ±0.8	50.4 ± 4.9
1 °C Compensation in the Singapore Series	3.4	60.5	3.1	60.1	4.4	50.1	5.4	48.4

Table VIII

Sensory conduction velocities in the upper extremity ++

Nerve	N	Age (years)	Conduction time Finger-wrist msec	Conduction velocity Finger-wrist m/sec	Conduction velocity Wrist-elbow m/sec	Conduction velocity Elbow-axilla m/sec	Authors
Ulnaris:	SE 39		2.2 — 3.4		55.7±6.26	52.2±3.32	Gilliatt and Sears 1958
	SE 30	10 — 35		67.7±3.9	63.8±3.8	63.1±4.3	Vyklicky 1960
	16	36 — 50		66.5±3.4	67.1±4.7	70.6±2.4	Mayer 1963
	18	51 — 58		57.5±6.6	56.7±3.7	64.4±3.0	Mayer 1963
	NE			63.5±0.9	63.5±0.9	63.5±0.9	Rosenfalck and Buchthal 1963
	NE 9	18 — 25	2.8±0.2	51.9±1.9 (SD5.6)	63.9±1.7 (SD5.1)	62.5±2.4	Buchthal and Rosenfalck 1966c
	NE 8	70 — 88	3.0±0.1	50.2±1.2 (SD3.7)	54.2±1.7 (SD5.1)	64.4±3.7 (SD9.9)	Buchthal and Rosenfalck 1966c
	+SE 47	19 — 35	3.0 (SD0.4)	—	58.7 (SD4.2)	60.2 (SD7.7)	Present Series
Medianus:	SE 28		2.5 — 4.0				Gilliatt and Sears 1958
	SE 30	10 — 35		67.5±4.7	67.7±4.4	70.4±4.8	Mayer 1963
	SE 16	36 — 50		65.8±5.7	65.8±3.1	70.4±3.4	Mayer 1963
	SE 18	51 — 80		59.4±4.9	62.8±5.4	66.2±3.6	Mayer 1963
	NE 66	18 — 25	3.1±0.1	55.2±1.4 (SD5.2)	64.8±0.6 (SD5.2)	68.7±1.0 (SD7.2)	Buchthal and Rosenfalck 1966c
	NE 11	40 — 61	3.3±0.1	54.9±1.2 (SD4.4)	55.5±0.8 (SD2.6)	67.7±3.1 (SD10.2)	Buchthal and Rosenfalck 1966c
	NE 24	70 — 80	3.5±0.1	53.1±0.9 (SD2.6)	53.5±1.0 (SD4.7)	60.9±1.8 (SD7.8)	Buchthal and Rosenfalck 1966c
	+SE 47	19 — 35	3.3 (SD0.4)	—	58.6 (SD4.9)	65.9 (SD6.4)	Present Series

SE = surface electrodes, bipolar.

NE = needle electrodes, monopolar.

+ = The italics are our own insertion.

++ = We thank Elsevier/North-Holland Biomedical Press, Amsterdam for permission to reproduce these tables from Handbook of Electroencephalography and Clinical Neurophysiology 1976, 16A: 80 — 87.

Buchthal and Rosenfalck (1966) and Henriksen (1956) reported a drop of nerve conduction velocity of 2 and 2.4 m/sec respectively for every 1°C fall in temperature. An increase of 0.3 msec in the distal latency for 1°C drop in temperature was reported by Redford (1958). The room temperatures monitored during our measurements fluctuated between 21.5 and 24.8°C with a mean of 22.9°C (S.D. 2.0°C). The skin temperatures varied around 30°C, a value considered to be satisfactory for nerve conduction study by Lenman and Ritchie (1977). With the stable room temperature in our tropical climate conduction variability due to temperature change is likely to be small. Extreme temperature fluctuation causing laboratory error is a distinct possibility in temperate countries.

CONCLUSION

Nerve conduction study is a useful and harmless investigation which is easily performed with a minimal cooperation from the patient. The results are objective and easily reproducible.

SUMMARY

Motor and sensory conduction velocities and distal latencies were obtained from the median, ulnar, lateral popliteal, posterior tibial and sural nerves of 47 healthy Malaysian young adults. Their arithmetic means and standard deviations were tabulated. Comparisons of our results with those of other workers were made. The material, methods, equipment used were described.

ACKNOWLEDGEMENT

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ACUTE PUERPERAL INVERSION OF THE UTERUS

K.E. KHOO

INTRODUCTION

ACUTE puerperal inversion of the uterus is considered a rarity, the incidence varying from 1:17,000 to 1:200,000 deliveries (Donald, 1969). Hence, personal experience in managing this emergency during the training period of an obstetrician may be lacking.

Many methods of reducing an uterine inversion have been described, from manual replacement to operative intervention. Manual replacement is extensively utilized in the United States. (Hanton and Kempers, 1964). However, in the presence of a soft, boggy uterus, a great degree of skill and dexterity is essential. In cases where there is delay between inversion and treatment, the dangers and difficulty of reduction are greatly increased. Such a situation often occurs in this country. Hydrostatic reduction of acute uterine inversion was first described by O'Sullivan (1945) and subsequently sporadically used. A survey of the literature reveals an inadequate description of the technique. Dewhurst and Bevis (1951) and Enright (1953) did not describe an important manoeuvre essential for the success of O'Sullivan's procedure. A personal experience of four cases of acute uterine inversion managed over a short period of time emphasizes the importance of an extra step.

CASE REPORTS

From 1.1.74 to 31.12.77, there was a total of 28,008 deliveries in General Hospital, Malacca. During this period of four years, there were 8 cases of major acute uterine inversion, giving an incidence of 1:3,500. The clinical features are summarised in Table I. Of the 8 cases, 4 were primiparous, 3 were of parity 2 to 5 and one was a grandmultip.

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Prior to 1976, acute inversion was treated by Haultain's operation. Subsequently, reduction was achieved by the hydrostatic method. Both techniques successfully reduce the inversions and there were no deaths. However, the duration of hospitalization was twice as long with Haultain's operation when compared with the hydrostatic method.

Case No. 6 required an abdominal hysterectomy because of placenta accreta which could not be safely removed. One patient (Case No. 1) subsequently returned with a second pregnancy. In view of the history of a Haultain's operation, an elective lower segment caesarean section was performed at 38 weeks gestation. At operation, an obvious thin uterine wall was noted over the site of the incision.

TECHNIQUE OF HYDROSTATIC REDUCTION

Resuscitation of the patient is essential, but one need not wait until the blood pressure is normal before proceeding to carry out the procedure. In fact, as long as the inversion continues, the BP will very likely remain low.

Light general anaesthesia is used. With the douche can raised to about seven feet above the ground, the sterile tubing held in the right hand is introduced into the vagina. With an assistant helping to occlude the introitus, 3,000 to 4,000 mls of warm sterile normal saline is run in briskly. The vaginal wall can be felt to balloon out and the cervical ring stretched and lifted up.

At this stage, the critical step for the successful performance of the procedure is carried out. Using the knuckles or carefully, with the finger tips, a small dimple is created by gentle pressure on the lowermost part of the inverted fundus. Once this dimple is created, the pressure in the vagina gently and rapidly reduces the inversion. Without this extra step, the

TABLE I
Summary of 8 cases of Acute Uterine Inversion

Patient	Age	Parity	Gestation (weeks)	Delivery	Status of Accoucheur	Delivery of Placenta	Interval Between Inversion & Reduction (hours)	Method of Reduction
1	20	1	40	N	H.O.	CCT	2¼	Haultain
2	24	2	?	N (Flying Squad)	Rural Midwife	?	7½	Haultain
3	21	1	40	N	H.O.	CCT	1	Haultain
4	22	1	39	N	H.O.	CCT	3	Hydrostatic
5	34	7	?	? (Flying Squad)	G.P.	CCT	3¼	Hydrostatic
6	29	3	39	N	Midwife	CCT	3	Hysterectomy
7	19	1	36	N	H.O.	CCT	1	Hydrostatic
8	25	3	39	Breech	M.O.	CCT	2	Hydrostatic

CCT = Controlled Cord Traction
H.O. = House Officer
M.O. = Medical Officer

hydrostatic technique is less likely to succeed and will require a longer time.

With the hand kept in-situ and with the douche still flowing, ergometrine is given intravenously. Simultaneously, a normal saline drip with 100 units of Syntocinon is infused rapidly. The hand must be kept in until the uterus is felt to contract and more important, the cervix is felt to reform firmly and clamp on to the wrist. Then and only then is the hand withdrawn. Syntocinon drip is maintained for the next six hours. No uterine packing is used.

DISCUSSION

The data reveals some important features. In six cases, the deliveries were conducted by junior House Officers or midwives. One case (No. 5) was delivered in a private maternity home. In seven cases, controlled cord traction was used to deliver the placenta. Case No. 2 was conducted by a rural midwife and the mode of delivery of the placenta was not known. All the cases except one were normal deliveries. There is a preponderance

of primiparas; 50% in this series was in this category.

The combination of inexperienced accoucheurs and CCT is the most significant aspect of this series. While it is possible that occasionally no obvious etiological factors may be present, most authorities would agree that mismanagement of the third stage is the most potent cause. (Kitchin et al., 1975).

In most cases in this series, there were several hours delay between the development of inversion and its reduction. This delay would have made manual reduction difficult and dangerous. Hydrostatic reduction by contrast is gentle, minimally traumatic and easy once the importance of creating a dimple to act as a lead is realised.

Some authorities do not favour oxytocics (Dewhurst and Bevis, 1951) in case the inversion has not been completely reduced. Incomplete reduction will not occur with the Hydrostatic method. Oxytocics are vital to ensure contraction

of the uterus and prevent recurrence of the inversion. Immediately after reduction, the uterine cavity and the cervical canal are so grossly dilated that it is difficult if not impossible, to note where the vagina, cervical canal and uterine cavity beings and ends. In such a situation, recurrence of inversion and severe haemorrhage are very real possibilities.

Although some authorities advocate uterine packing (McHenry, 1960), it was not used here. It is unnecessary, prevents involution and greatly increases the risk of infection. The possibility of immediate recurrence of inversion is easily obviated by oxytocics.

Operative intervention should only be resorted to if reposition via the vaginal route fails. Incising the uterus creates a scar much like a classical caesarean scar with all its inherent disadvantages. Abdominal delivery is thus often necessary at subsequent pregnancies.

The incidence of inversion in this series is extremely high. The unbridled enthusiastic rush to use CCT by inexperienced accoucheurs must be checked.

SUMMARY

Eight cases of acute inversion of the uterus are presented. The association of relatively inexperienced staff with CCT in inversion is strong. A description of the hydrostatic method of reduction with an important additional step is given.

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REPORT OF A RARE CASE OF TRACHEAL FOREIGN-BODY IN AN ADULT

ABDUL RAHIM BIN MAJEED

INTRODUCTION

TRACHEAL foreign bodies are quite unusual and life threatening and removal of the foreign body is the only way to save the life. They are rare because of the strong protective function of the larynx which prevents their entry. In a series of 11 cases of foreign bodies in the respiratory tract, Sambamurthy and Patel (1971) reported that tracheal foreign bodies were seen in 9% of cases. Harboyan et al. (1970) reported that out of 213 cases of foreign body in the respiratory tract, 96% were found in the trachea. In a similar series by Alvi (1967) out of 96 cases, tracheal foreign bodies were found in 52% of cases. The incidence in trachea as reported by various authors is not in agreement. Once the foreign body passes this laryngeal barrier (watchdog of the lungs) it gets inhaled right down into the bronchus or into one of its branches, depending upon the size of the foreign body. Only large foreign bodies which cannot go beyond the main bronchial orifice remain in the trachea. The size of the foreign body relative to the dimension of the tracheo-bronchial tree which varies with age, determines its ultimate location. A small peanut may be relatively larger for an infant's bronchial orifice and may remain in the trachea whereas in an adult the same may be inhaled into the lower lobe bronchus causing atelectasis of a segment of the lung. After a short spell of spluttering coughing spasm, difficulty in breathing, haemoptysis (if the foreign body has a rough surface or spiky projections) and perhaps cyanosis, the patient gets adapted to the foreign body in the trachea followed by a relief of the acute symptoms. But the difficulty in breathing progressively increases until the patient is choked to death if obstruction becomes complete. Stridor is of 'to and fro' type, can be heard on auscultation or even appreciated on palpation over the pre-tracheal region.

Tracheal foreign bodies are usually encountered amongst mischievous children and mentally unsound adults. All kinds of bizarre foreign bodies of the tracheobronchial tree have been reported in the literature.

Inhaled foreign bodies are potentially fatal. The returns of the Registrar-General for England and Wales showed that 443 deaths in 1960 and 471 deaths in 1961 were attributable to the effects of inhaled foreign bodies.

CASE REPORT

Mr. L.A.K., a Chinese male aged 45 years, was admitted to the General Hospital, Seremban, on 11.8.1976 at 4.30 p.m. with a history of having inhaled a metallic nut on the night of 10.8.1976, which he was keeping in the mouth while lying down. He had an initial severe bout of cough following the incident lasting for about ½ hour and it subsided gradually on its own, to occur at intervals whenever the patient shifted his position. This patient was an old case of schizophrenia (paranoid type) under follow-up at the psychiatry clinic.

On examination at the time of admission, which was about 24 hours later than the incident, he was seen to be a well-built adult. He was restless with hurried breathing, no cyanosis, no dysphagia and had coughed out blood stained sputum. He was unable to give a clear account as to why this incident had happened but mentioned his numerous personal and social problems. 'To and fro stridor', close to the neck of the patient, was heard. His voice was normal. Stridor was palpable over the cervical trachea which was slightly tender. Air entry was poor on both sides. Rhonchi were heard over both lung fields.

Investigations

An X-ray of the soft tissue of the neck revealed a metallic radio-opaque nut in the cervical trachea just above the suprasternal notch. The lie of the nut was almost on the sagittal plane with a visible

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Fig. 1 Lateral view x-ray of the neck showing a radio-opaque foreign body in the cervical trachea.

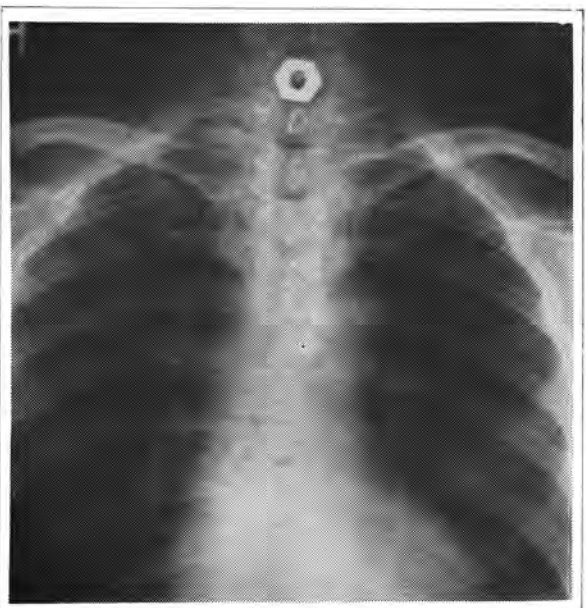


Fig. 2 X-ray of the chest showing normal lung and heart shadows. The foreign body is seen in the trachea in the midline.

central hole (Fig. 1). An X-ray of the chest showed a foreign body in the upper trachea. There was no collapse of the lungs and the heart shadow was normal (Fig. 2).

Management

The patient was taken to the operation theatre and the foreign body (Fig. 3) was removed under general anaesthesia. The patient made an uneventful recovery and was later referred to the Psychiatrist for follow-up.

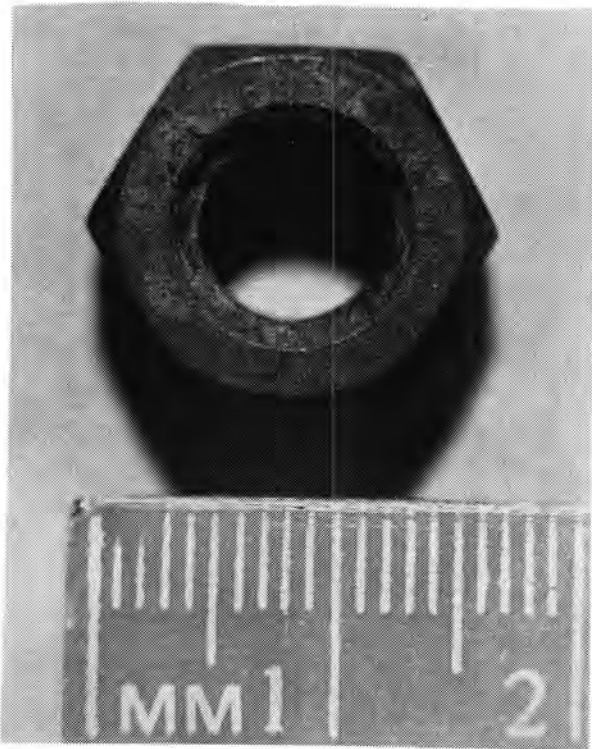


Fig. 3 Specimen of the foreign body removed.

DISCUSSION

The diagnosis of foreign body in the trachea was made out clinically in this case because of a positive history, the presence of a cough with haemoptysis, progressive increase in the difficulty in breathing and an obvious 'to and from stridor' present at the time of the examination.

Because the foreign body was large and radio-opaque it was easily seen on X-rays. The initial X-ray of the soft tissue of the neck showed the almost sagittal lie of a metallic foreign body in

the cervical trachea. It is unusual for a fairly heavy metallic foreign body to be retained in the cervical trachea for so long. The presence of a central hole in the foreign body allowed us to select the correct instruments required to remove it.

The removal of a foreign body from the trachea requires a lot of skill. It will only be possible with proper instruments and a good reliable anaesthetist. If endoscopic removal fails, one should be prepared to do a tracheotomy and to use the bechic blast to move the foreign body to the site of the tracheotomy from where it can be removed. A head-low position is preferred while the foreign body is being removed.

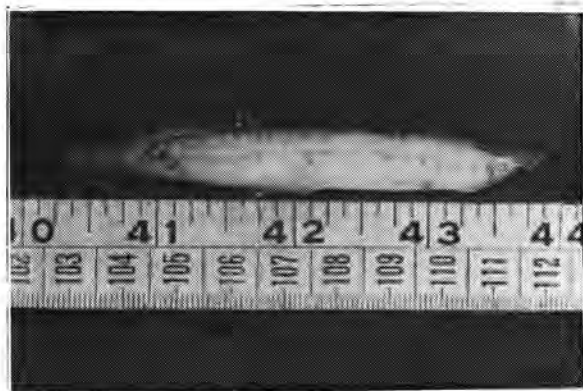


Fig. 4 Specimen of the 4 inch long fish removed from the trachea of a boy of 13 years.

In Fig. 4 is shown an unusual tracheal foreign body, a 4 inch long fish, from the trachea of a boy aged 13 years, which I removed while working in the E.N.T. Department of the Stanley Medical College Hospital, Madras, in 1970.

SUMMARY

A foreign body in the trachea in a mentally unsound adult is reported for its rarity of incidence. It was removed successfully by endoscopy. Its unusual location in the cervical trachea at the time of X-raying is noted.

ACKNOWLEDGEMENTS

My grateful thanks are due to the Medical Superintendent, General Hospital, Seremban, for permitting me to publish this report. I am also grateful for the excellent cooperation given to me by my anaesthetist and would like to thank Mr. Wong Wai Ming for the clinical photographs, and Mr. Charlie Delima for secretarial help.

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REPORT ON TWO CASES OF HYPEROSMOLAR, HYPERGLYCAEMIC NONKETOTIC DIABETIC COMA

LOW SEANG GIP

CHONG K.F

ABDUL RAHIM OMAR

INTRODUCTION

THE SYNDROME of hyperosmolar hyperglycaemic nonketotic coma (HHNK) was first recognised by Sament and Schwartz in 1957. Since then more than 200 cases have been reported in the world literature. The condition, however, occurs more frequently than the figure suggests. Over a two-year period at King's County Hospital, for example, 32 patients were admitted with this diagnosis (Arieff and Carroll, 1969). In the Medical Unit III, General Hospital, Kuala Lumpur, two cases were seen over a six-month period. This paper describes these two cases of HHNK diabetic coma and discusses the pathogenesis and management of this condition.

CASE HISTORIES

Case one was a 57 year old Indian man who complained of intense thirst with polyuria and vomiting two weeks prior to admission. He also complained of extreme tiredness and lethargy and was not able to cope with his job as a dishwasher in a hotel. His brother-in-law noticed a change in his behaviour: he was restless and confused and took baths at odd hours as at 2 in the morning.

There was no history of cough, dysuria, fever or abdominal pain. He was not on any medication such as thiazide diuretic, corticosteroids or phenylhydantoin. There was no history of diabetes mellitus, hypertension or epilepsy.

On examination, the patient was drowsy and confused. He was moderately dehydrated. His blood pressure was 140/100 mm Hg. and pulse rate 100 per min. The temperature was 101°F. and the respiratory rate 20 per min. There was no Kussmaull breathing. The rest of the examination was normal.

His urine was orange for glucose but negative for acetone. The blood glucose was 935 mg%. Blood urea was 75 mg%, sodium 160 mEq/L, potassium 4 mEq/L and chloride 117 mEq/L. Arterial blood gas analysis showed a pH of 7.45 (standard bicarbonate 25 mEq/L), a base excess of +0.5, PO₂ 70 mm Hg and P CO₂ 33.5 mm Hg. The electrocardiogram and chest Xrays were normal. Plasma osmolality was not measured but can be calculated from the following formula:—

$$\text{Plasma osmolality} = 1.86 (\text{Serum Na} + \text{Serum K}) + \text{Blood urea}/5.6 + \text{blood glucose}/18 \text{ mOsm./kg. H}_2\text{O}.$$

Substituting the measured values in the above formula, the plasma osmolality of this patient was 370 mOsm/kg. H₂O. The patient, therefore, had features of HHNK diabetic coma namely, glycosuria without acetonuria, hyperglycaemia without ketoacidosis and hyperosmolality.

A small dose of soluble insulin was given intramuscularly and repeated hourly to control the hyperglycaemia. Hydration was achieved with 0.45% NaCl solution and potassium supplement was also given. 90 units of insulin and a total of six litres of fluid were given in the first twenty-four hours by which time the patient was fairly well recovered. Blood glucose was 98 mg%, sodium 140 mEq/L, potassium 4.0 mEq/L, chloride 105 mEq/L and the blood urea 87 mg%. At discharge, his diabetes was well controlled on diet alone, the blood urea was 46 mg% and the serum creatinine 1.0 mg%.

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Case two was a 30 year old Indian man who presented with a 10-day history of blurring of vision and was unable to see distant objects clearly. At the same time he experienced intense thirst and was markedly polyuric. He had to empty his bladder almost every half hour. He also felt extremely tired and easily fatigued but observed that he felt refreshed after a bath. He, therefore, took baths fairly frequently and often found it necessary to bathe in the middle of the night. On the morning of admission the patient collapsed while preparing for work and was brought to hospital. There was no history of recent infection or drug ingestion. There was no history of abnormal behaviour or disorientation during this period. There was no past or family history of diabetes mellitus.

On examination, the patient was drowsy but was conscious and rational. He was slightly obese and was moderately dehydrated. The blood pressure was 120/90 mm Hg, pulse rate 102/min. and respiratory rate 18/min. There was no Kussmaull breathing and the temperature was normal. The rest of the examination was normal.

Urine testing for glucose was orange but acetone was absent. The blood sugar was 943 mg%, blood urea 115 mg%, potassium 4.7 mEq/L and chloride 109 mEq/L. Calculated plasma osmolality was 398 mOsm/Kg H₂O. The arterial pH was 7.35, standard bicarbonate 20 mEq/L, base excess - 5, pCO₂ 34 mm Hg, and pO₂ 92 mm Hg. The haemoglobin was 15.0 gm% and white blood cells 15,000 (neutrophils 70%, lymphocytes 30%). Urine culture on admission was sterile; ECG and chest xrays were normal.

In summary this patient was drowsy and dehydrated, had glycosuria but not acetonuria, had marked hyperglycaemia but without ketoacidemia. These and the hyperosmolality are features of HHNK.

The diagnosis of HHNK in the second case was only made 8 hours after admission when the biochemical parameters were available. In the meantime, the patient was treated as diabetic ketoacidosis and started on 40 units of soluble insulin intramuscularly. Over the first 24 hours he was given a total of 160 units of insulin and 1800 ml of normal saline. The urine output over

the corresponding period was only 200 ml. The next day, the patient went into shock with rapid pulse and unrecordable blood pressure. The blood sugar then was 310 mg% with a blood urea of 120 mg%; serum sodium was 145 mEq/L, potassium 4.4 mEq/L and chloride 110 mEq/L. The patient was resuscitated with rapid I.V. infusion. 4 litres of normal saline were given in the first 6 hours and 10 litres over the 24 hours. The patient's general condition was improved after 7 litres of fluid replacement. His blood pressure came up to 100/80 mm Hg and urine output 800 ml. Blood urea was then at 135 mg%. Serum sodium was 160 mEq/L, potassium 4.0 mEq/L and chloride 137 mEq/L. Normal saline infusion was then changed to hypotonic (0.45% NaCl) solution. During the next two days the patient had a diuresis and blood urea steadily dropped to a normal value. the progress of Case No. 2 is summarised in Fig. 1, 2 and 3.

However, contrary to expectation the patient required high doses of insulin — up to 32 units three times a day to control his diabetes. Urine culture grew Klebsiella organism and after a course of antibiotics, his insulin requirement dropped and on discharge his diabetes was well controlled on diet alone.

Pathophysiology & Pathogenesis of HHNK

Why is there no ketoacidosis in patients with HHNK? Several factors controlling lipolysis contribute to the pathogenesis of HHNK.

Low levels of insulin can inhibit release of free fatty acids from adipose tissue (Arieff *et al.* 1972). Adrenaline, growth hormone, corticosteroids and glucagon on the other hand have adipokinetic properties. Patients who develop HHNK usually have maturity-onset form of diabetes mellitus; a condition usually associated with a high circulating plasma insulin. This is in contrast to juvenile-onset, insulin-dependent diabetes mellitus who are prone to diabetic ketoacidosis. It has been shown by Zierler and Rabinowitz (1964) that at low levels there is a dissociation of the effect of insulin on fat and carbohydrate metabolism. At very low plasma levels insulin has no effect on glucose uptake by cells, yet still can inhibit release of free fatty acid from adipose tissue. Plasma insulin levels measured in HHNK diabetic coma patients prior to therapy have

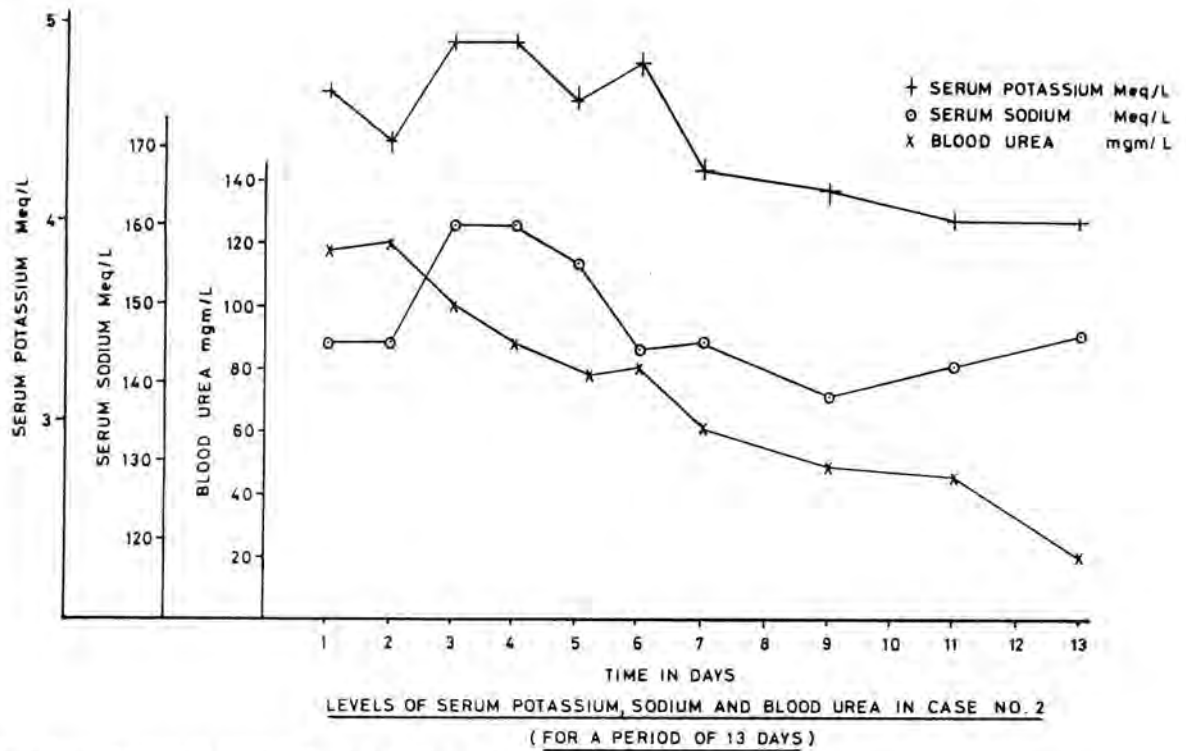


Fig. 1 shows the level of serum potassium, sodium and blood urea over a period of 10 days

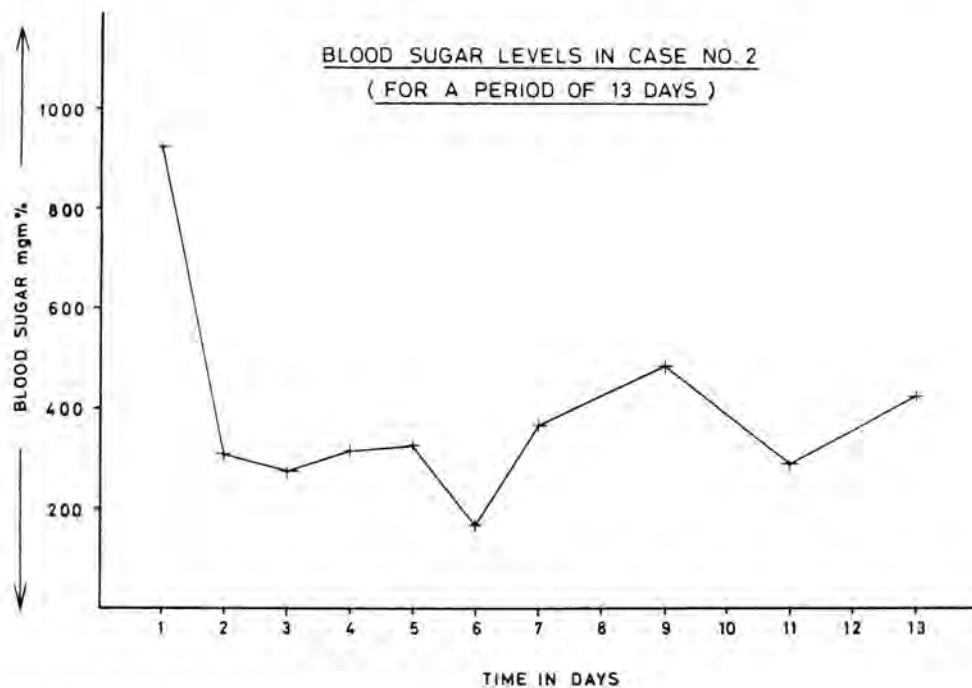


Fig. 2 shows blood sugar levels over the same period of Case No. 2

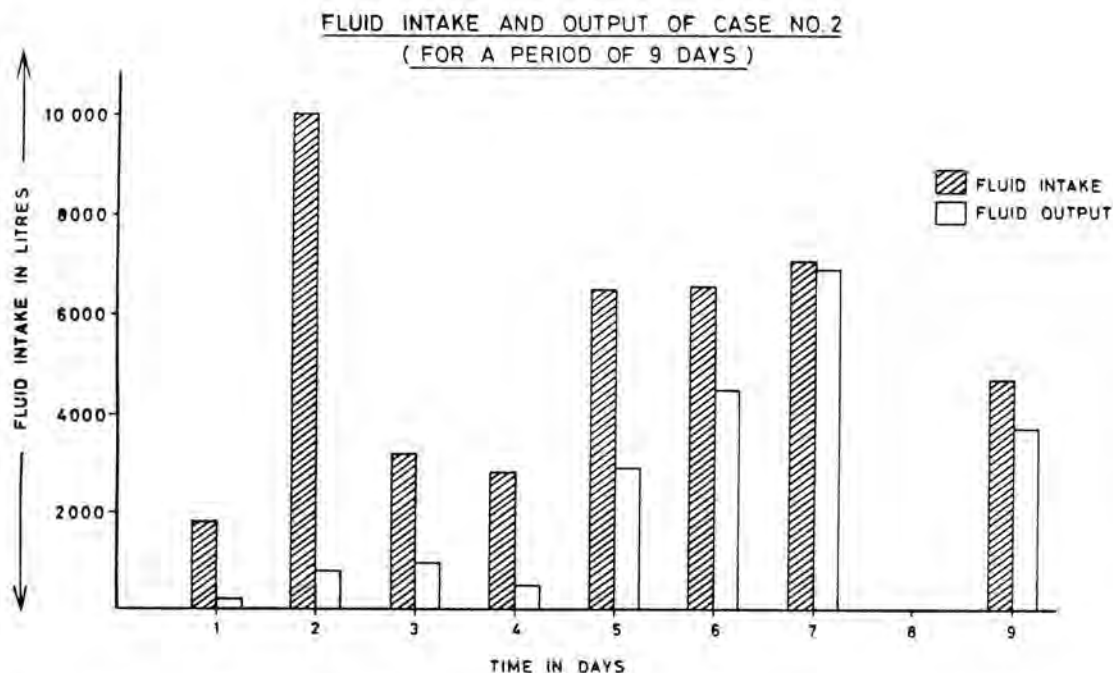


Fig. 3 shows fluids intake and output of the same patient, also for a period of 8 days.

been low. Deficiency of adipokinetic factors such as corticosteroids, adrenaline and growth hormone may contribute to failure of lipolysis, hence the absence of ketosis. Evidence exists that hepatic parenchymal damage causing a block in the conversion of acetyl-CoA to ketoacids may play a role in the absence of ketosis in some cases.

Seltzer *et al.* (1964) infused normal subjects with glucose continuously over several days and showed that they were able to prevent hyperglycaemia by increasing and maintaining high insulin secreting rates. Patients with maturity-onset diabetes mellitus in contrast were unable to maintain a high insulin secretion. In response to a continuous glucose infusion their insulin level peaks by the 2nd day, following which it drops considerably allowing hyperglycaemia to develop. From the above observations and that of Zierler and Rabinowitz (1964) showing the dissociation of the effect of insulin on fat and carbohydrate metabolism, a typical picture of the pathogenesis of HHNK diabetic coma can be drawn. A patient with maturity-onset diabetes mellitus is exposed

to some continuous diabetogenic stress such as infection, thiazide diuretics, steroid therapy or a glucose load. Under the constant hyperglycaemia stress, the B-cells eventually fatigue and plasma insulin level drops. Hyperglycaemia worsens but the low level of circulating insulin prevents ketosis. The phase of hyperglycaemia and glycosuria is therefore prolonged allowing the patient time to develop severe dehydration with a marked deficit in water and electrolytes.

DISCUSSION

HHNK diabetic diabetic coma is characterised by stupor, elevation of plasma osmolality, severe hyperglycaemia, and absent ketoacidosis. The average age of patients who develop HHNK diabetic coma is 57 years (Mc Curdy 1970). One of our patients was 30 years. This is uncommon as only 7 cases were reported aged under 40 years (Mc Curdy 1970). In half of the reported series (Mc Curdy, 1970) the onset of symptoms could be traced to some precipitating event as acute gastro-enteritis, acute pancreatitis or ingestion of a drug known to aggravate the diabetic state.

The rapid deterioration of the second case, culminating in a hypovolaemic shock and acute renal failure was most likely precipitated by a rapid lowering of the blood glucose coupled with an inadequate fluid replacement. Before the sodium deficit is corrected the blood glucose is responsible for maintaining a significant fraction of the plasma volume. A rapid correction of hyperglycaemia is thus potentially dangerous as this would rapidly reduce the effective plasma volume, and several authors have reported the development of hypotension early in the course of treatment especially when large doses of insulin had been used.

Patients with HHNK diabetic coma usually have a large fluid deficit averaging up to 8 litres because of the prolonged hyperglycaemia and the persistent osmotic diuresis before they seek medical attention. It is generally agreed that the best therapeutic regimen for most patients is a liberal fluid replacement with hypotonic saline. Insulin therapy should be given cautiously and in low doses. However, if a patient presents in shock, the initial treatment must be with an isotonic saline or a plasma-volume expander regardless of the plasma osmolality.

The mortality of HHNK diabetic coma in reported series is 40-50%. Awareness of this condition with early recognition and appropriate treatment should improve the prognosis.

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HYPERTHYROIDISM AND AUTOIMMUNE HEMOLYTIC ANEMIA — A CASE REPORT

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INTRODUCTION

IT IS well known that autoimmune hemolytic anemia (AIHA) may occur in patients who have suffered from, or are suffering from diseases such as systemic lupus erythematosus, rheumatoid arthritis, ulcerative colitis and lupoid hepatitis which are thought to be of autoimmune origin. Wasastjerna reported a case of AIHA and Hashimoto's thyroiditis. Pernicious anemia has been strongly associated with hypothyroidism, hyperthyroidism and thyroiditis. Here we report a case of hyperthyroidism manifesting some six years after the onset of AIHA.

CASE REPORT

In August 1972, a 39 year old Chinese woman was admitted with a two month history of amenorrhoea and generalised weakness and two weeks of giddiness and palpitations. She had marked pallor, mild jaundice and was in cardiac failure. Lymph nodes, spleen and liver were not palpable. Erythrocyte sedimentation rate (ESR) was 140 mm in the 1st hour, hemoglobin (Hb) 6.8g/dl, leucocyte count $4 \times 10^9 / l$ ($4,000 / mm^3$), platelet count $370 \times 10^9 / l$ ($390,000 / mm^3$) and reticulocyte count 1.5%. Peripheral blood showed red blood cells moderately hypochromic, microcytic with a few well hemoglobinised normocytes. Bone marrow picture was consistent with hemolysis. Direct Coomb's test initially negative, was positive two months later. Rheumatoid factor was weakly positive and no LE cells were detected. IgG antibody of no known specificity was detected.

She improved with blood transfusion, prednisolone and folic acid. However she required further admissions for hemolytic crises easily controlled by stepping up the maintenance dose of steroids. In October 1975, she complained of generalised weakness and clinically had proximal myopathy. Her Hb 8.4g/dl, ESR 113 mm in 1st hour, serum creatine phosphokinase, serum aldolase, blood urea and serum electrolytes were within normal. She remained weak and lost weight. In May 1978, she was readmitted with severe hemolysis and thyrotoxicosis. Her thyroid gland was firm, diffusely enlarged but she had no eye signs or acropachy. Radioiodine thyroid uptake studies confirmed hyperthyroidism. Antinuclear factor, antimicrosomal antibody and antithyroid antibody were negative. A transient pancytopenia with Hb 5.6g/dl, leucocyte count $2.6 \times 10^9 / l$ ($2,600 / mm^3$) and platelet count $20 \times 10^9 / l$ ($20,000 / mm^3$) was noted. Reticulocytes were 10%. The bone marrow showed megaloblastosis though serum folate and vitamin B₁₂ levels were normal. She was given therapeutic radioiodine.

COMMENT

Our patient probably has Graves' disease, an autoimmune disease, and its coexistence with AIHA is not surprising. Pirofsky (a) found 24 patients with clinically demonstrable thyroid disease in 234 patients with AIHA of whom only four had hyperthyroidism. Twenty-one of these 24 patients were females with a median age of 40 years at the time of onset of detectable thyroid disease. AIHA preceded the thyroid disease by 4, 15 and 191 months in three patients; the reverse occurred in 14 patients while in seven patients both diseases were simultaneously discovered. Seventeen of these 24 patients already with these two pathologies had additional disease states representing a cross section of immunologically related disease.

It is highly probable that, in our case, hyperthyroidism, while still clinically inapparent and

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untreated, made control of AIHA brittle as decreasing the steroid dosage to maintenance doses appeared to precipitate hemolytic crises. Although steroids are used to treat autoimmune conditions, whether they are beneficial in Graves' disease remains conjectural.

As regards the pancytopenia, it is unlikely that our patient has pernicious anemia as serum vitamin B₁₂ level is normal. However pancytopenic type of AIHA has been documented. (Pirofsky (b))

Thus besides excluding the well known secondary causes of AIHA (Dacie) for any de-

terioration in the patient's health, other diseases of autoimmune aetiology could easily coexist and must be considered.

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CHORIOCARCINOMA — AN UNUSUAL CASE

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INTRODUCTION

CHORIOCARCINOMA most commonly develops after a molar pregnancy, most cases occurring within two years. The development of choriocarcinoma 18 years after a molar pregnancy and in a post-menopausal woman is both very unusual and rare.

CASE REPORT

S.B.I., a 63 year old Malay lady was admitted on 3.11.76 with a two day's history of bleeding per vagina. In 1975, she had a similar episode of post-menopausal bleeding and was admitted to another hospital where a diagnostic curettage was done. The diagnosis then was probably a malignant condition as she developed symptoms suggestive of cytotoxic therapy after a course of drug. She defaulted from further follow-up and was next seen one year later at General Hospital, Malacca. There was a history of a molar pregnancy in 1957. This was her last pregnancy. On examination, the uterus was found to be evenly enlarged to 14 weeks size. No other abnormalities were detected.

INVESTIGATIONS

The chest X-ray was normal. Urine for pregnancy test (Gravindex) was positive in normal concentration but negative at 1:4 dilution. A diagnostic curettage was carried out on 10.11.76. The histological report indicated a neoplastic lesion, but its exact nature could not be identified.

CLINICAL PROGRESS

A total abdominal hysterectomy was performed on 17.11.76. The uterus was enlarged to 12 cm. in size. A necrotic, fungating mass was

found at the upper half of the uterus. There was no invasion of the myometrium. Both ovaries were normal.

Histopathologically, the diagnosis was Choriocarcinoma. The pregnancy test was still positive on the 10th post-operative day. Oral Methotrexate 5 mgm every six hours was given for five days. The pregnancy test became negative on 6.12.76. The patient was then given a further 5 courses of Methotrexate at 2 to 3 weekly intervals. The pregnancy test remained negative, chest x-rays were normal and physical examination revealed no abnormalities.

She was well on follow-up until 3.6.77, when a chest x-ray showed numerous round shadows. She was started on Actinomycin-D alternating with 6-Mercaptopurine at 2 to 3 weekly intervals. The response to this regime was dramatic. The lung shadows disappeared completely after three courses each of the two drugs. A further two courses were given to ensure complete eradication. At last check-up on 20.6.78, the patient was well with no respiratory, neurological or gynaecological symptoms.

DISCUSSION

The case presents with two unusual features. The long (and possibly the longest) interval between a molar pregnancy and the occurrence of choriocarcinoma, a span of 18 years. The previous longest reported interval was 17 years. (Lewis, 1956). Choriocarcinoma in a post-menopausal woman is very rare.

There is at present no acceptable theory to explain this late development of malignancy. The answer probably has an immunological key. Novak and Novak as early as 1958 had postulated that trophoblasts were held in check by a maternal immune defense mechanism. Advancing age with the resultant failure of immunosurveillance then permits the trophoblasts to proliferate.

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Another interesting feature about this case was the development of lung secondaries after surgery and treatment with Methotrexate. The possibility that the cytotoxic therapy, by suppressing the immune system of the body thus permitting the trophoblastic emboli to grow, cannot be excluded.

At this stage, it would be relevant to emphasize that the haemagglutination-inhibition test for Human Chorionic Gonadotrophin is unreliable to accurately monitor trophoblastic diseases. (Ratnam, 1977 personal communication). Present commercial reagents measure HCG concentration in excess of 800 i.u. per litre. Hence, trophoblastic tissue can be present in spite of a negative pregnancy test by these preparations. This is clearly illustrated by this case where the pregnancy test was negative in spite of obvious secondaries in the lungs. The insensitivity of the haemagglutination test in the management of trophoblastic disease must be realised as cessation of cytotoxic therapy prior to complete eradication of all trophoblastic tissues can lead to exacerbation of the disease which can prove fatal.

Chemotherapy is the mainstay in the treatment of metastatic choriocarcinoma. (Tow and Cheng, 1967). If a tumour shows resistance, an early change to other cytotoxic drugs is vital. Hammond and Parker (1970) advocated a multi-drug regime. However, this was associated with a high morbidity and a mortality of 10 to 15 per cent directly attributable to the drugs. Local experience favours hysterectomy followed by single drug therapy.

The long term prognosis of this patient has to be guarded as metastases to the brain is a high possibility in patients who have late development of choriocarcinoma.

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THE KARMAN CURETTE FOR GYNAECOLOGICAL DIAGNOSTIC CURETTAGE (A Preliminary Report)

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UTERINE aspiration is a valuable therapeutic and diagnostic technique. This suction technique has been employed successfully in termination of early pregnancy (menstrual regulation) and has gained world wide popularity (Population Report, No. 4, May 1974). The menstrual regulation equipment has been used to treat aseptic incomplete abortions (Faton 1969; Filshie et al., 1973; Eaton Marshall, 1971). Some have even used the equipment to evacuate uterus with hydatidiform mole in early gestation of not more than 8 weeks (Eaton, 1969, Petetz et al., 1967).

The introduction of uterine aspiration for diagnostic purposes in the non-pregnant uterus was inevitable following the favourable results of its use in the pregnant uterus. This was the result of the search for a simpler, cheaper and time-saving method to perform diagnostic curettage as this procedure is indispensable in gynaecology.

Jensen (1970); Holt (1970), and Bjerre et al., (1971) employed aspiration techniques for diagnostic curettage and obtained favourable results. These workers used the Vabra aspirator consisting of a disposable 3mm stainless steel cannula and collecting system which attaches to the

suction source. Poyas (1971) performed suction diagnostic curettage using stainless steel cannula currettes of his own design. Muenzer (1974) used medical grade silicone rubber tube (silastic) for suction curettage.

We report a small series of patients in whom diagnostic suction curettage was performed using the Karman curette equipment. The Karman cannula developed by Harvey Karman in the late 1960's (Karman et al., 1973) has been used successfully and most widely for menstrual regulation. Filshie et al., (1973) used the 8mm Karman cannula for the evacuation of uterus in incomplete abortions. His suction source however was a modified Malmstrom vacuum pump. We have extended the use of the Karman cannula into the diagnostic field using as our suction source, the modified Karman syringe.

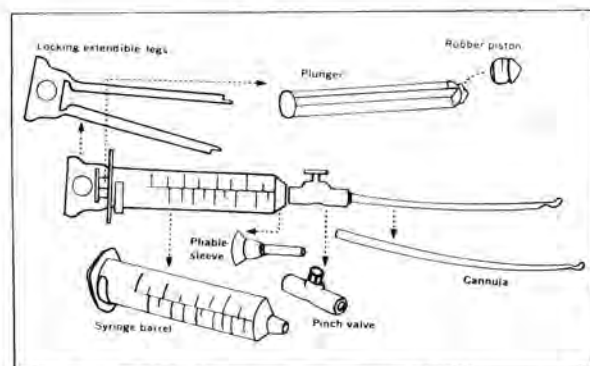


Fig. 1 The Karman aspiration set-up used for gynaecological diagnostic curettage.

METHODS AND MATERIAL

Patients

Fifty one patients admitted into the University Hospital in the months of August, September and October, 1974, requiring diagnostic curettage formed the basis of this study. The age of these patients ranged from 21 years (youngest) to 58 years (oldest). Of the 51 patients, 22 were Chinese, 17 Indians and 12 Malays.

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The pre-curettage clinical diagnosis of the patients were as follows:-

Infertility	25 cases
Dysfunctional uterine bleeding	12 cases
Perimenopausal bleeding	4 cases

For the 16 cases diagnosed as dysfunctional uterine bleeding and perimenopausal bleeding, only diagnostic curettage was performed. For the infertility cases, a tubal insufflation was performed prior to the diagnostic curettage.

BASIC EQUIPMENT

The following instruments were used in the procedure:

- 1) 50 c.c. aspiration syringe.
- 2) Karman cannulas: 4mm, 5mm, 6mm, 8mm.
- 3) Cervical stabilizer (Vorsellum).
- 4) Small ovum forceps.
- 5) Bivalve speculum.

Other basic equipment also included the pre-medication drugs (Pethidine and Sparine), anti-septics and sterile gauze pads.

PROCEDURE

The patient was admitted into the hospital either the evening prior to the procedure or early morning on the same day. A history and physical examination was performed to exclude any obvious contra-indication to this minor surgical procedure. An intra-muscular injection of 100 mg. pethidine and 50 mg. sparine was given to the patient about 30 to 45 minutes prior to the procedure.

With the patient in the dorsal lithotomy position, a bimanual vaginal examination was performed. A bi-valve speculum was inserted and cervix exposed. The syringe was evacuated (i.e. vacuum created) before attaching it to the cannula. With the pinch valve open, the plunger was pushed forwards completely. Then the pinch valve was closed. The syringe body was then grasped firmly in one hand and the plunger pulled out with the other, until the legs of the handle snap out and lock the plunger firmly in its fully extended position.

The Karman Cannula was then firmly pushed into the end of the rubber liner so that it held securely.

The anterior lip of the cervix was grasped with a toothed vorsellum to stabilise the cervix. The external os was then cleaned with antiseptic. The cannula, held with a sterile forceps, was introduced through the external cervical os. Occasionally, resistance was met at the internal os. In these cases, the cannula was grasped near the tip with the sterile forceps and light pressure applied. The cannula was passed into the uterine cavity until the tip was felt to gently touch the fundus. The depth of the uterine cavity was then estimated.

With the syringe securely attached to the cannula, the pinch valve was released to begin aspiration. The cannula was grasped about 8 cm from the cervix and rotated gently through 180 degrees. At the same time the cannula was gently shifted in and out, in a curette-like motion. Endometrial tissue was seen to flow into the syringe via the cannula. When all four quadrants of the uterine wall were thus curetted, or when sufficient endometrial tissue was obtained, the curettage was stopped. Before the cannula was removed from the uterine cavity, the pinch valve was closed. The cannula still secured to the aspirator, was gently removed. The tip of the Karman cannula was then inserted into a specimen bottle containing the preservative (formalin) and then the pinch valve was released, so that there was a suction of the solution into the syringe via the cannula, taking with it the pieces of endometrial tissue from within the cannula. The cannula was then detached from the aspiration syringe and the contents of the syringe was transferred into the specimen bottle. The specimen so collected was examined and sent for histopathology.

Occasionally, if we felt that the initial curettage was inadequate, re-aspiration was accomplished with a cannula one size larger than the one used in the original procedure.

After the procedure, the cervix and uterus was examined for any bleeding and the patient sent back to the ward for hourly observations for 4 to 6 hours. The patient was discharged the same evening. She was advised that if there was any evidence of fever or haemorrhage, to return immediately to the hospital.

RESULTS

1) Time

Besides the premedication used, no additional anaesthesia was required. The average time taken per person was about 12.0 minutes. However for

the 16 patients who only had a curettage performed, the average time was 11 minutes. The other 35 patients who had a tubal insufflation performed besides the curettage, the average time taken was 14 minutes per person. Hospital stay for each patient was not more than one complete day.

2) Pain

During the procedure most of the patients experienced some form of pain. This pain was noticed to occur at two specific times of the procedure:

- a) at the time of the introduction of the cannula through the internal os. The pain was especially evident when resistance was met at the internal os and light pressure had to be exerted to push the cannula in;
- b) at the time when the tip of the cannula hit the fundus of the uterus. This however occurred less frequently.

The intensity of the pain was mild to moderate and the pain was described by most as similar to mild "period pain". Post-operatively, pain still persisted in some patients but we did not have to use more powerful analgesics than paracetamol to relieve the discomfort.

3) Adequacy of specimen

The endometrial curettings obtained in all the 51 cases appeared to be adequate for histological analysis. The pathologists had no difficulty in using the specimen. The endometrial fragments, however, were noticed to be a little smaller than the ones obtained from conventional dilatation and curettage.

4) Complications

The anticipated complications include faintness, syncopal attacks, bleeding, cervical trauma and infection. In the 51 patients in our series, we did not encounter any such complication. Except for some uterine cramps and pain during the procedure, we did not have any patient who went into neurogenic shock or who had excessive bleeding. Post-operatively, all patients remained afebrile. The follow-up of these patients also revealed no further complications.

DISCUSSION

Uterine aspiration with Karmen curette, as a diagnostic tool, has been found to be safe, quick,

effective and potentially advantageous as an out-patient procedure (Bjerre et al., 1971; Holt, 1970; Jensen, 1970; Poyas, 1971).

From our initial small series of patients, we confirm that it is a relatively safe procedure. Firstly, the risks of general anaesthesia are absent. Also the use of the Karman cannula, a flexible plastic instrument, avoids the introduction of metal instruments into the uterus. Hence the Karman flexible plastic cannula minimises the risk of uterine perforation.

The possible dangers of diagnostic curettage using the Karman cannula, however, are few. The tip of the Karman cannula may break-off and become detached within the uterus. Incidences quoted are 1:5,000 (when the Karman cannula is used for menstrual regulation). In all the reported cases, the tip is expelled from the uterine cavity within 72 hours. This rare complication is avoided if the tip is examined carefully (prior to insertion into uterine cavity) to make sure that it is in good condition and shows no sign of breaking off.

Uterine infection may follow the procedure. If the no-touch technique is employed for the cannula insertion, and the instruments are sterile, then the risks of infection are minimal. The operator need not wear a special operating gown, mask or cap; but the use of sterile gloves are recommended. It is wise to swab the cervix with a mild aqueous antiseptic prior to cannula insertion. Uterine infection was not a complication in our series.

Immediate complications of shock, haemorrhage, and severe cramps are not commonly seen, and were absent in our series of patients.

The average time taken per procedure was 12 minutes. This included the time from when the patient is brought into the theatre to the time she leaves. The actual procedure of curettage itself took only about 1 to 2 minutes per patient. Time is saved not only in avoiding the use of anaesthesia but also in sterilising the equipment used. Also hospital stay is minimised to 1 day. The wider application of this procedure, using the Karman cannula, can help to popularise it as an "office" procedure, thus saving time and money for the patients. Poyas (1971) using stainless steel

cannula curette (of his own design) performed 334 curettage and recommends the use of this suction curettage as an "office" procedure.

It may be a little premature, at this stage, to conclude that the Karman cannula is completely effective in obtaining adequate amounts of endometrial tissue for diagnostic histopathology. Although in all our cases, we obtained adequate samples, we had not designed this study so that we could compare the histological findings with those found with the conventional dilatation and curettage or at hysterectomy. However, others who have used metal curettes found that the diagnosis based on uterine aspiration and conventional curettage were identical for 97.8 per cent of the specimen. Uterine aspiration was performed in a total of 713 patients, altogether by Bjerre, et al., (1971); Holt, (1970) and Jenson (1970). Of these 713 patients, inadequate endometrial tissue for diagnosis was obtained only in 14 uterine aspirations (2.0%). A discrepancy in the findings by uterine aspiration and by subsequent sharp curettage was noted in 10 patients (1.4%). Muenzer, R W, et al., (1974) performed uterine aspiration (using silastic cannula) in 500 women who subsequently had either a sharp curettage or hysterectomy. They found in 84.4 percent of the cases, the diagnosis were in agreement. Isaacs et al., (1974), having detected 7 patients with endometrial carcinoma out of the 346 patients who had uterine aspiration, felt that this technique of uterine aspiration may serve as an additional screening technique for the detection of endometrial carcinoma, especially in the high risk patient.

In conclusion, we feel that the Karman Cannula suction-curettage can be effectively used for gynaecological diagnostic curettage. It is relatively safe — no anaesthesia is necessary except for premedication. The procedure is technically simple and quick. It saves time, money and hospital space, provided there is a careful selection of the cases.

SUMMARY

The Karman cannula with its modified Karman syringe was used for gynaecological diagnostic curettage in fifty-one patients. The endometrial curettings obtained in all the

patients appeared adequate for histological assessment. No complications were encountered and the average time taken per procedure was 12 minutes. Our preliminary conclusions are that the use of the Karman Curette equipment for gynaecological diagnostic curettage is a relatively safe, simple and short procedure. It is felt that this gynaecological diagnostic procedure could be safely undertaken as an outpatient or "office" procedure.

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ACUPUNCTURE IN THE TREATMENT OF HYSTERICAL MUSLIM AND FUNCTIONAL VOMITING

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INTRODUCTION

ACUPUNCTURE, although increasingly being used to treat a wide variety of illnesses, has seldom been studied in relation to the treatment of mental illnesses. The aim of this paper is to find out the efficacy of acupuncture in the treatment of hysterical mutism and functional vomiting.

Acupuncture involves the insertion of needles into certain specific points on the body. These points are actually nerve complexes which the ancient Chinese have classified and catalogued under the various meridians. The choice of points varies with the clinical presentation of the disorder. For maximal efficacy not only are the selection of points important but also the accurate localisation, depth of insertion and the proper manipulation of the needles. When these criteria are met the patient will experience a 'Chi' — a feeling of aching soreness at the site of needle insertion and sometimes a sense of fullness. Although the sites of the acupoints are uniform for all individuals the depth when 'Chi' is obtained varies slightly between individuals. Therefore co-operation from the patients is usually necessary but not so to the experienced acupuncturist when he can often feel the needles being gently sucked in when the correct depth is reached.

PATIENTS AND METHODS

All four patients — three Malays (of whom one is a male) and an Indian female had never experienced acupuncture previously. Of the three Malays only one knew about acupuncture. 2.5 cm stainless steel needles of gauge 30 adequately sterilised were used. The needles are solid and unlike injection needles have no cutting edges and are not sharp at the tip. Because of this, when used gently the tips tend to slide over vessels and nerves

when these are encountered. Also most acupuncture needles are from gauge 28 — 30 and for these reasons they are less traumatic to the tissues. An average of 3 — 4 points were used for each patient. The skin was sterilised with surgical spirit.

Acupuncture Points

The points used for hysterical mutism were:

- (1) Liv3 (liver 3) of the liver meridian situated 2 Tsun (about 3.8 cm) from the web between big toe and second toe, the needle going about 2cm deep until Chi is felt.
- (2) P6 (pericardium 6) of the pericardium meridian situated about 2 Tsun (3.8 cm) from the most distal crease at the wrist between flexor carpi radialis and palmaris longus the needle going in perpendicularly about 1.5 cm deep.

Ear points, heart and spirit gate were used on the male the needles going in about 0.3 cm deep.

The points for functional vomiting were:

- (1) S36 (stomach 36) of stomach meridian situated 3 Tsun below the tibial tuberosity and one finger breadth from the tibial crest the needle going in perpendicularly about 2 — 2.5 cm deep into the tibialis anterior.
- (2) P6 (described above).
- (3) H7 (heart 7) of heart meridian on distal crease of wrist lateral to pisiform bone the needle going in perpendicularly about 1.2 cm deep.

The correct site and depth of the acupoints were critical and when these were achieved the patients felt the 'Chi' and the acupuncturist will also note the needle being sucked in like a bait being taken by a fish. The needles were inserted in a screwing motion clockwise and then twirled in an up and down motion every five minutes. The needles were removed after half an hour.

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Tsun is a measure of length in acupuncture to indicate the depth of needle insertion or location of sites. One Tsun is the distance between the upper end of the distal and middle interphalangeal folds formed by flexing the patient's middle finger at the distal and interphalangeal joints.

CASE REPORTS

Case 1 was a 33 year old Malay female who presented with a history of mutism for 10 days. She was trance-like in appearance and expression, and was completely oblivious to her surroundings. It was impossible to communicate with her and according to her mother she had to be bathed, clothed and fed. She completely ignored her four children, she just sat quietly and very still, not uttering even a whisper. The parents had attempted to cure her by using 'bomohs' with no success. Clinical examination revealed nothing abnormal except what was already described. Two acupoints Liv3 and P6 were needled and although the site and depth were reached there was no facial response though the needles felt sucked in. After twenty minutes the patient began talking to her mother and later to other patients in the clinic. Her appearance also became normal and for the first time in ten days she smiled.

Case 2 was a 54 year old Malay man who presented with a history of mutism for six days. He was normal in appearance and went about his routine work normally. However, whenever he attempted to speak, no words came forth — only guttural sounds. Clinical examination revealed nothing abnormal. The same points were used as in the previous case but after no response was noted within twenty minutes the two ear points, the Heart and Spirit Gate were needled. The former is situated at the most concave point in the middle of the concha of the ear and the latter in the triangular fossa near the crus of the antihelix. There was an immediate response with the patient talking normally again.

Case 3 was a thin 28 year old Indian female who was well educated and who gave a history of paroxysms of severe nausea and vomiting for the past one year. The paroxysms which occurred once a month gradually became worse until after her marriage when it occurred as often as once a week.

The severe vomiting which was always preceded by nausea was persistent and continued even with an empty stomach. She sometimes found relief by stimulating her oropharynx with her finger to induce more vomiting. The attacks of vomiting were only relieved by intramuscular injections of Valium (Diazepam) 10 mg and stemetil 12.5 mg. Although oral Valium (Diazepam) and stemetil were given after the attack was controlled but did not prevent further attacks. She was thoroughly investigated in the University Hospital, Kuala Lumpur, and no organic abnormality was found. She also had the benefit of analysis by the psychiatrist there. I referred her to a Psychiatrist in Singapore. Medication was prescribed and although it did control to a fair extent her nausea and vomiting for two weeks it made her groggy and sleepy and interfered with her job. She found it impossible to go on with the drugs and consequently there was a recurrence of her symptoms.

She was needled daily for twelve days, and vomited only once at home during treatment and twice a few weeks later but it was not persistent. For the last eleven months since treatment was completed she had not vomited nor felt any nausea. Her appetite has improved, and her weight has increased from 36.3 kg before treatment to 49 kg.

Case 4 is a 28 year old Malay female teacher who presented with nausea and vomiting of one month's duration. The attack came once a week. A history and clinical examination revealed nothing abnormal. Although the nausea was persistent the vomiting was not. Intramuscular stemetil 12.5 mg did not control her vomiting and intramuscular Valium (Diazepam) 10mg had to be added. Oral stemetil 5 mg and Valium (Diazepam) 2 mg thrice a day seemed to control her symptoms but these would recur when she stopped taking the drugs. Acupuncture was suggested and after only one treatment her symptoms completely disappeared.

DISCUSSION

These four cases show that acupuncture can be an effective alternative in the treatment of hysterical mutism and functional vomiting. Not only was it dramatic in its effects but it also

required less time and effort. This is important not only to the attending physician but also to the patient especially in terms of expense. None of the patients asked for this form of treatment and among the two who knew something about acupuncture they not only were skeptical about its efficacy but were apprehensive regarding the pain involved. The latter was found to be unfounded as the rapid insertion of the needles caused hardly any pain. Only when the acupoint was reached was there an aching soreness.

The other two cases who presented with mutism knew nothing about acupuncture. When it was later explained to them they did not seem to be interested.

All four patients were told to come back if there were any recurrences of their symptoms. Only the two who presented with nausea and vomiting were followed over several months. As the other two came from rural areas they were lost to follow-up. But as they were cured dramatically with one treatment, it can be assumed they would seek treatment again if there was a recurrence.

SUMMARY

Two cases of hysterical mutism and two of functional vomiting were seen during a one year period from June 1976 to June 1977 in a general medical practice. Only acupuncture was used in the treatment of all four and the results observed were dramatic.

HOSPITAL ASSISTANTS IN MALAYSIAN RURAL HEALTH CARE*

H.K. HEGGENHOUGEN

INTRODUCTION

THE GROWING realization that health care in rural areas throughout the world is inadequate suggests that nonphysician health workers may be best suited to alleviate the problem (Bryant, 1969; Djukanovif and Mach, 1975; Drayton, 1973; Fendall, 1972; Heggenhougen, 1977; I.T.D.C., 1971; Rosinski and Spencer, 1965; Smith, 1973; WHO, 1968). In the United States physician's assistants and nurse practitioners, in China peasant and worker doctors ('barefoot' doctors), and medical assistants elsewhere increasingly perform many tasks of physicians. One of the best documented of these experiences is that of the "feldsher" in the Soviet Union where this intermediate medical profession has existed for over 250 years (Storey, 1972).

Not all such health workers function in identical ways or have the same training and background, but most provide health care to people in remote areas and so make cosmopolitan medicine available to many persons in developing and developed countries. They demonstrate that health care need not always depend on physicians (I.T.D.C., 1971).

In Malaysia, Hospital Assistants (HAs) work alone in rural health centres or work directly with physicians in general and district hospitals; they are, therefore, both physician substitutes and physician assistants. They are also assigned to work in a number of special program, e.g. Filariasis, Yaws, Leprosy etc. In 1978, the Malaysian Ministry of Health employed 1,620 HAs in Peninsula Malaysia.

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The 1976 Hospital Assistant Registration Act describes the duties of rural health workers as nursing, laboratory work, dispensing, examining, diagnosing, and treating simple ailments in patients, and performing minor surgical procedures like dressing and sutures, incision and drainage, removal of foreign bodies, avulsion of nail, excision of cyst, intravenous infusion or injection (Malaysian Ministry of Health, 1976).

Before World War II, HAs were known as "dressers" (some who excelled in work and in examination were given the opportunity of study to qualify as medical officers). In the 1940s, the dressers (by then officially known as HAs) were trained with nurses and awarded SRN certificates. In 1957, after Independence, the Malaysian government recognized the nursing orientation did not equip HAs for clinical duties and eventually initiated a new training program in 1965. In 1970, a School of Hospital Assistants was opened in Seremban, Negeri Sembilan. Entrance requirements were 11 years of general education, speaking knowledge of Bahasa Malaysia, and being less than 24 years of age. All HAs are male (Tham, 1976).

In the rural areas, HAs are the backbone of the curative service component of Malaysian primary health care. Some, however, see HAs as only a stopgap; their usefulness is expected to cease when enough physicians are trained to serve in rural areas.

In 1976, the director of the Division of Training and Manpower in the Malaysian Ministry of Health addressed physicians on their commitment to use paramedics and auxiliaries. Full commitment can optimize their use, promote understanding and avoid a clash of interest. The credibility of paramedics and auxiliaries, their acceptance and image depend on recognition by the medical profession. A shadow of a doubt will adversely affect their position and role in the community (Abdul Khalid, 1977).

If HAs provide inadequate, inferior service to that of Physicians, there would be good reason to think of them as a stopgap. However, their use as paramedic personnel does not mean practicing inferior medicine. Within their qualification they can provide equal, at times even better curative primary care than physicians. They can treat simple complaints and can refer complicated problems to physicians. In developing countries, physicians are scarce and rural health centres must be staffed by paramedics. But this is no disadvantage because health care paramedics are more economical and generally more in touch with the local inhabitants than the doctors; they are more content to remain in the rural areas (King, 1966).

An observer in Latin America states that comprehensive rural health services cannot be practised by doctors alone. If the community is to be provided with simplified medicine under good supervision and a back-up system, which can cure the majority of rural diseases, there are strong economic reasons for abandoning once and for all abortive attempts to resolve the doctor distribution dilemma (Long, 1972).

There are, of course, health care problems that require sophisticated skills. But curative primary health care in most cases does not require sophistication. Common diseases can easily be diagnosed and treated by someone with less training than physician. This is particularly true of the diseases associated with high mortality in developing countries. Physicians should not be "front line" workers but rather man the central facilities and treat patients referred to them for problems too serious and complicated for the skills of the HAs. Physicians should be teachers and supervisors of paramedic health personnel.

In theory -- though not always in practice, especially where HAs have an overload of patients -- there is less distance between professional and patient and thus better understanding and ease of communication between them. The HA may have more time to be concerned with the patients' feelings as well as with their complaints. For these same reasons many patients still prefer to go to the traditional practitioners. There is now a trend to bring traditional practitioners into auxiliary health care in a number of countries (Dunlop, 1975; Harrison and Dunlop, 1974-75; Jilek, 1971;

Neumann *et al*, 1974; Ruiz and Langrod, 1976; Takulia and Parker, 1977; W.H.O., 1975). In Malaysia, the village midwife (*bidan*) who is recompensed by the Ministry of Health is such an example.

METHODS

With the cooperation of the National Union of Hospital Assistances, West Malaysia (NUHA), 483 copies of a 34-item questionnaire with room for open-ended responses were distributed to HAs working in 11 West Malaysian states. About one fourth to one third of all HAs in each state received the questionnaire together with a stamped, self-addressed envelope.

The questionnaire requested data on demographic background, training, continued education, patient load, referral rate and system, relationship with nurses, upward mobility, rural health care in general, most commonly treated complaints, and opinions regarding traditional Malay medicine.

The intent of the questionnaire was not to evaluate the work of the HAs but to assess their feelings and opinions about their aims and work and to accumulate information about their self-concept and their effectiveness for rural health care development.

RESULTS

Demographic Data

The overall response rate was 57.1% (N=276) from one mailing; 75% of HAs responded from Perak, 71% from Kedah/Perlis, and somewhat less from the other states with a low of 45% from one state. One hundred and fifty-seven (57%) of respondents were under 30 years; 69% were married. Malays (N=129) represented 46.7%, Chinese (N=83) 30%, Indians (N=60) 21.7%, and 1.4% (N=4) other ethnic groups. A disproportionately large number of Malay HAs were under 30 years; 77% compared to 40% Chinese and 41% Indians.

Over 90% of the respondents received their training in five institutions (School of Nursing, Penang, 29%; School of Hospital Assistants, Seremban, 25%; School of Nursing, Kuala Lumpur, 18%; School of Nursing, Johore Bahru,

12%, and Preliminary Training School, Johore Baru, 8%).

One hundred and eighty-two (68.4%) had become HAs since 1970, 57 (21.4%) since 1960, and 23 (8.6%) since 1950; only 4 persons (1.5%) were HAs since 1940.

Most HAs indicated that they primarily provide out-patient health care (63%) either in a hospital or in a rural clinic. Over 40% indicated they worked in a rural clinic or mobile clinic. The HAs mentioned a variety of functions, including administration, operating room, TB and eye clinics, orthopedics, and renal technology in addition to curative primary health care. Three HAs were teacher of HAs. Before becoming HAs 46% had been teachers, 21% clerks, 9% had been employed in farming/gardening, and the remaining 24% in a variety of skilled and semiskilled occupations or had not been previously employed.

Most HAs thought they had been adequately trained for their current position, but 89.2% felt the training could have been more complete in certain areas. No significant differences were noted when correlating the responses with place of training. The training received at any one school was not felt to be particularly better or worse than that at another.

An overwhelming majority of HAs (99.3%) wanted to participate in continuing education programs; 88.3% "very much," 11% "yes, possible" (Table I).

Relation With Nurses

The majority of HAs (75%) felt they had a good or excellent relationship with nurses. Only 5% felt their relationship with the nursing staff could be greatly improved. Those who indicated an excellent relationship with nurses were in the upper age group; 55% of those indicating an excellent relationship were over 30 years whereas only 43% of all respondents were over 30 years.

Many who felt that the nurse/HA teamwork was poor attributed this to poor administration rather than to inherent coworker conflict. Some felt conflict came from the ambiguity about "who was in charge" and some thought the problem

Table I

Subjects desired as part of a continuing education program.

Ten most frequently mentioned subjects for desired further training	first choice	Respondents second choice	N
Medicine	1	2	99
General surgery	4	1	58
Public health	2	3	46
Administration (incl. Med. Records)	3	5	41
Ob-Gyn	5	4	29
Orthopedics	9	6	20
Pharmacy	-	7	15
Health education	-	8	15
Diagnosis	7	-	13

Twenty-five additional subjects were mentioned including emergency treatment (N=12), family planning (N=12), and human relations (N=10).

stemmed from nurses feeling themselves to be equal or superior to HAs. Seven percent specifically indicated they did not get cooperation from nurses. (One HA seemed to have found the solution to the problem. He indicated that the HA/nurse relationship was fine "since the nurse is my wife.")

Patient Load and Referrals

Over half the HAs (54%) who treat patients see between 25 to 50, 26% see over 75 patients, and 9% see more than 100 patients each day. HAs working in hospital in-patient and speciality clinics said they saw 25 or fewer patients each day.

Three fourths of the respondents now (or previously) working in rural areas stated they needed to refer less than 5% of their patients to a hospital or to someone more skilled than themselves (Table II).

Table II
Percentage of respondents' patients which are referred

% Patients referred	# Respondents	
	N	%
1	68	29
2-5	106	45
5-10	45	19
10-25	13	6
25 or more	4	2

Forty-five percent stated they or someone working with them followed-up on referred patients; 37% said this was "sometimes done;" 11% said this was "not usual," and 6% said it "was not done at all." Lack of a telephone, or of proper channels of communication linking the levels of the health system, shortage of staff and pressure of work were most often quoted as restricting follow-up.

Only 27% of HAs felt the present referral system, or the inter-relationship of the various segments of the health system, was good and did not need improvement; 73% called for improvements like telephones and transportation or a more clearly defined referral and feed-back system. One HA complained that "referral letters are never replied to by medical officers at the hospital."

Fifty percent felt "team work could be improved," "duplication must be prevented," that "there is a division between the various segments of a health centre" and the "the health centre is not thought of as one unit." The HAs called for an increased dialogue between various staff members to iron out differences so that "suggestions will not always be interpreted as being complaints."

Medical School and Relationship with Physicians

HAs would like to become physicians; 69 (25%) had unsuccessfully attempted to enter medical school. Two thirds (N=174) said they eventually wanted to enter medical school. They desired to "obtain a better career and to improve their knowledge." Some felt that as physicians they would be able to "do better service." Many felt their work as HA was "good preparation for becoming a physician." Some complained that any further study was difficult because "other occupations have study plans as part of work, but HAs would have to resign to carry out further study."

Two thirds (N=170) of the HAs who were not working with a physician wanted to work with one and one third (N=85) wanted to work with another HA if they could choose between the two. The reasons for wanting to work with a physician were that he or she was "better qualified" or that working with a physician would "improve the [HA's] knowledge." They mention that physicians had authority to treat all cases whereas HAs were

"prohibited from prescribing certain drugs." Of those who rather wanted to work with another HA, most commented that "we would understand each other better" and "there would be a much better cooperative working relationship than with physicians." Thirty-five percent (N=30) of those preferring to work with another HA said it was "a waste of training and manpower to have a physician working in a rural clinic" because "in such a setting a HA could do just as good a job as a physician."

Of those wanting to work with another HA rather than with a physician, Malays and Chinese were overrepresented, Indians underrepresented; 33% of all respondents wished to work with another HA; but only 20% of the Indians had such a desire compared to 36% Malay and 38% Chinese.

Of the HAs (N=68) who said they referred only 1% of their patients, 42% indicated that they wanted to work with another HA rather than with a physician. Of the HAs who referred a higher percentage of their patients, only 32% preferred to work with another HA rather than with a physician. Thirty-seven percent of those who felt the current referral system ("the interrelationship of the various segments of the health system") needed improvement wanted to work with another HA; only 17% of those who felt the current system functioned well had such a preference.

Rural Health Care

Of 19 aspects mentioned, HAs most frequently returned to six major concerns in their responses to the open-ended question, "If you had to praise one thing about the rural health care system, what would you praise?" (Table III).

Table III

Aspects of rural health care which H.A.s found praiseworthy.

Aspects praised	Respondents	
	N	%
1. Health center easily available to villagers	86	38
2. Good rural health care system-good combination of staff available	43	19
3. Infant, maternal and childcare, and midwifery services	31	14
4. The poor can get free care	11	5
5. The rural immunization program	9	4
6. Capabilities of HA in rural areas	9	4
Thirteen other items were mentioned	40	16
Total respondents	229	100

An even larger number of aspects was mentioned to the open-ended question, "If you had to criticize something about the present Malaysian rural health care system, what would you want to see improved?" (Table IV).

Table IV

Aspects of rural health care which HAs felt needed improvement.

Aspects calling for improvement	Respondents	
	N	%
1. Facilities, supplies, transportation and staffing	57	27
2. Health clinics are understaffed	21	10
3. Environmental sanitation	15	7
4. Condition for staff	13	6
5. Health education of population/rural motivation	10	5
6. Use of obsolete drugs/HAs restricted in drug prescription	10	5
7. Improve administration	10	5
8. HAs should have (female) assistant and other staff	9	4
9. Review the system — make it work	7	3
Thirty-three other items were mentioned	58	28
Total respondents	210	100

All but four HAs felt they could treat all the patients whom they did not refer (i.e. those with cuts, upper respiratory tract infection, skin infection, worms, etc.) as capably as could a physician. Seven commented simple cases would actually be better treated by HAs than by physicians. One fourth of those who commented further (N=169) specifically stated that HAs' performance compared favorably with that of physicians in treatment of the majority of patients. They urged that restrictions on their authority to use antibiotics should be removed because such restriction limits their treatment capabilities. A number of HAs called for a female assistant because of their heavy workload and because examinations of female patients were at times awkward and, from overriding modesty, incomplete.

Sixty percent of respondents stated the most serious health problems in rural Malaysia were "health education," "malnutrition," "environ-

mental sanitation" and "worms/parasites." Table V lists the problems, in order and frequency of mention to the open-ended question: "What is the most serious health problem in Rural Malaysia?" as perceived by HAs (Table V).

Table V

HAs' response to the question: "What is the most serious health problem in rural Malaysia?"

Most serious problem	Respondents	
	N	%
1. Health education	44	18
2. Malnutrition	39	16
3. Environmental sanitation	33	14
4. Worms/parasites	28	12
5. Poverty — poor nutrition	11	8
6. Outdated cultural beliefs	11	5
7. Infectious diseases	10	4
8. Delay in seeking clinic help	9	4
9. Lack of personal hygiene	9	4
10. Anemia	8	3
Twenty other items mentioned	41	15
Total respondents	243	100

We should note that "malnutrition" (2), "poverty — poor nutrition" (5) and "anemia" (10) taken together account for almost one fourth (24%) of all responses.

When the HAs were asked to list the five most frequent complaints they treated, the complaints listed by frequency of mention in Table VI were indicated.

Traditional Medicine

When asked why some villagers would not come to the clinic even if they were quite ill, the HAs frequently said the "villagers believe in traditional medicine and utilized native practitioners." Villagers were either unfamiliar with or, for various reasons, had "little faith in modern medicine." HAs also thought people did not come to the government clinic for fear of being referred to a hospital. Villagers' reluctance to come to the clinics was put in these terms: "If villagers expect they might die, they want to die at home, and not in a hospital"; "villagers want to see a doctor rather than a half-cooked physician" (HA);

Table VI**Complaints most frequently treated by HAs by frequency of mention**

Complaint	Frequency of mention	
	#	%
1. Upper respiratory tract infection	185	18.4
2. Skin infection	135	13.4
3. Worms	134	13.3
4. Gastritis	80	8
5. Cuts	73	7.3
6. Cold/coughs	66	6.5
7. Headache/fever	64	6.3
8. Anemia/malnutrition	50	5
9. Rheumatism/aches and pains	36	3.6
10. Diarrhea	33	3.3
Forty other complaints mentioned	159	15.8
Total	1006	100

"villagers have no confidence in HA or in health clinic — there is a need for clinic staff to be more consumer oriented"; "the medicines in the health centre are considered worthless since they are free of charge"; "the service at the clinic is not particularly friendly"; "Bomohs (traditional Malay healer) will treat villagers at the patients' own convenience and in a relaxed atmosphere and this is not possible in the health centre".

Only 17% of respondents commented there was no value in going to a traditional Malay practitioner as well as to a clinic. Over 60%, however, specifically stated such dual use was of value, especially for psychosomatic complaints. The remaining responses favored dual use but with qualifications.

More than one fourth (N=69) (26%) of HAs felt it would be of value to their patients if there were a closer relationship (contact) between clinic (hospital) staff and traditional Malay practitioners. Sixty-four percent (N=174) felt such contact could be of benefit in some cases and only 10% (N=26) stated such increased contact would be of no benefit.

HAs working in Selangor and Penang outnumbered those in other states in stating there

was no value in a closer contact between traditional and cosmopolitan health care systems. Overall only 10% felt there was no value in such contact, but in Selangor 16.3% and in Penang 17.6% felt this way.

The age of HAs could not be correlated with the reaction to traditional medicine, but HAs over 30 were more definite in their feelings, one way or another, than those in their twenties. Ethnicity, however, was significantly correlated to the reaction of whether or not there ought to be closer contact between traditional and cosmopolitan health care practitioners.

Although only 3% of Malays felt it would not be beneficial to have a closer contact (compared to 18% and 15% of Chinese and Indians, respectively), one fourth of both Chinese and Indians felt that such contact definitely was of value whereas only 19% of the Malays felt so. Seventy-eight percent of the Malays, 57% of the Chinese and 61% of the Indians felt that contact might be of value. To a question whether traditional Malay practitioners could effectively help patients in ways which could not be performed by HAs or physicians, 31 HAs (12%) stated this was true. A majority (N=189) (74%) felt this to be true in some cases and 14% (N=35) stated in no way could a bomoh effectively heal a patient as an HA or a physician can. Comments to this questions mentioned bomohs were particularly useful for patients with psychosomatic or psychological problems like hysteria and for deactivating charms, and that some bomohs were excellent in setting fractures. Some HAs believed bomohs could treat drug addicts; a few felt the bomoh would be suitable for influencing villagers to go to the clinic.

General Comments

Most HAs commented freely on many topics. These comments are codified by frequency of mention in Table VII.

HAs were very concerned with the restriction to prescribe drugs. Many felt they would be more effective in treating patients if most of the restrictions were removed (Table VIII).

DISCUSSION

The relatively positive response rate indicates that the results may be taken as fairly representa-

Table VII
Most frequent general comments

	Respondents	
	N	%
1. Dissatisfaction with conditions and pay (there is a lack of staff and equipment causing inadequate attention to patient and resulting in lack of confidence)	38	13
2. HAs are not recognized by the government or "VIPs"	27	9
3. Training should be improved (more clinical work; up-grading to college level like U.S. Physicians Assistants; a diploma should be provided; inservice training, etc.)	23	8
4. In a number of instances bomohs can do a great deal (some HAs presenting evidence of effectiveness of traditional Malay medicine)	21	8
5. HAs should be accorded higher status and have assistants	16	6
6. Seminars should be offered HAs (continuing education)	16	6
7. HA work experience should be stepping stone to becoming a physician (more possibilities for promotion depending on exams and experience)	14	5
8. There is need for more health education of the public	11	4
9. HAs should be allowed to use a wider variety of drugs	9	3
10. There should be a union of bomohs and other Malay practitioners (this would improve surveillance and standardization)	9	3
11. Bomohs will not die off, thus it would be to patients' benefit to establish cooperative relationship	7	2
Thirty-nine other items mentioned	100	33

Table VIII

Work assignment of HAs calling for lifting drug prescription restriction

HAs calling for lifting prescription restriction by self-described work assignment	Respondents		All respondents in work category %
	N	%	
Rural health care	18	44	34
Hospital out-patient and emergency	8	20	20
HA	7	17	3
Mobile clinic	2		4
Eye clinic	2		
TB clinic	1		
Medical records	1		
Student	1		
Work directly with physician	1		
No answer	1		
Total	41		

tive opinions and feelings of HAs in general. All but a few questionnaires had extensive comments. Obviously, a great deal of time and care had been taken in completing the forms. A number of respondents expressed their gratitude that an interest seemed to be taken in them and their situation.

From the responses we can infer that most HAs are confident about their capability to treat most complaints presented to them. However, they also convey a sense of frustration as revealed in frequent comments throughout the questionnaire, even though there was no direct question on their sense of job satisfaction. HAs frankly acknowledged dissatisfaction with general working conditions, inadequacy of communication with the present health care system, and with what they felt to be inadequate opportunity for upward mobility.

Training and Continuing Education

The appropriate level of training of paramedics has been discussed in most countries where such personnel are deployed and convincing arguments have been given both for making the training as sophisticated and as rudimentary as possible. One

reason for training HAs is to provide health care for areas that are unable to acquire the services of a physician or where a physician's skills would not be properly used because of the uncomplicated nature of the majority of complaints and the limited support technology. For this reason, training HAs to be "almost physicians" might be self-defeating. HAs would be as dissatisfied and unchallenged as would be physicians by the "simple cases" they would treat and they would want to leave rural areas for a more sophisticated setting. Whatever the level of training job-satisfaction is an important concern because it affects job-performance. It would seem that giving HAs a renewed assurance that they are indeed recognized and that there are means for upward mobility and promotion, which, some HAs now feel, are inadequate, would give them an improved sense of job satisfaction.

Whether the training should be increased to equal four years of university credit (as a few HAs have suggested) can not be argued here. When faced with a work situation it is natural to wish that one's training had included many things it did not, no matter how excellent the program. Ten subject areas were most frequently mentioned in which HAs desired continued education. These subjects could amend current HA training, as could an increased emphasis on "clinical work/training" or incorporation of on-the-job training for credit on the order of some of the Physician Assistants and Nurst Practitioner programs in the United States especially for HAs training for curative service in rural clinics. Many HAs suggested that newly trained HAs should not be sent directly to a rural health centre but should gain experience through work with a physician in a hospital setting for a few years.

Since an overwhelming number of HAs wants to participate in continuing education programs, and to increase their skills as well as to promote job-satisfaction, it might be advantageous to inform the HAs again of such existing programs and to consider developing others. If the programs are initiated, the HAs, who satisfactorily complete such courses, should, of course, be recognized and rewarded, possibly through salary increments.

HAs drew attention to general surgery and Ob-Gyn. Their high interest in general surgery may mean that they would like to increase their

knowledge of minor surgical procedures. "Cuts" was the fifth most common complaint that HAs treated. Obviously, a course in general first aid surgery would enable them to deal with emergency cases. Possibly, the interest reflects a similar tendency in physicians to be drawn to the specialties and the fact that surgery has a higher status than general practice. The trend can be noted in the United States where increasingly Physicians Assistants at a number of schools are becoming Surgical Assistants rather than remaining generalists. The trend, in Malaysia understandable and regrettable, obviously reflects the status orientation of a westernized society. Increased recognition of HAs who provide general curative services in the rural areas could possibly reverse the trend.

A number of HAs apparently felt inadequate to deal with patients' gynecological problem. "Ob-Gyn" was fifth in the list of desired training. Such problems are usually presented to a nurse and referred to a physician if the nurse can not handle it, but HAs are also confronted with gynecological problems. Quite a few HAs asked for female assistant nurses to help in the examination and treatment of women patients particularly for gynecological problems. It is doubtful that examination and treatment for gynecological problems will be accepted from male HAs in rural areas. Therefore, increased training of HAs in Ob-Gyn may not be productive whereas maintaining the competence of nurses in this area would. In the rural clinics, the area of Ob-Gyn would be a logical starting point for the establishment of a closer cooperative relationship between HAs and women nurses in providing curative services, should such a relationship be desired.

Relationship with Nurses — Administration

Although only one fourth of HAs felt their relationship with nurses was less than good, the HA/nurse relationship, it would seem, needs serious attention and has strong implication for general administrative policy. Whether it is a question of an HA having higher status than a nurse or who should be in charge of whom at a health centre, it is obvious from the results that a clearer definition of the roles than has thus far been given is required. This is particularly important for the younger HAs; older HAs were

found to have a disproportionately better relationship with nurses than the younger ones. Obviously, an experienced nurse would know more about certain tasks than a newly graduated HA (as, in certain aspects, an experienced nurse might similarly be superior to a newly graduated physician). But, allowing for the uniqueness of each situation, it is important that the various members in a health system are fully aware of their respective responsibilities and authority.

Many HAs feel that the rural clinic is too segmented and does not function as a unit as is the intent. Whatever the distinct and separate tasks of various clinic personnel are, there is bound to be some interrelationship and the idea of clearly emphasizing who's in charge warrants consideration. Many HAs indicated they prefer to work with a physician rather than with another HA because it is obvious to all personnel that the physician is in charge of the clinic. Without the presence of a physician, however, it is apparently unclear in a number of instances, just who is in charge — situation that leads to confusion and calls for rectification.

Referrals and System Interrelationship

From HAs' responses and comments it is clear that the referral system could function better than it now does even though the majority (74%) of HAs need to refer less than 5% of their patients. Seventy three percent of the HAs felt improvement was needed. Basically, this is a matter of incomplete, or lack of, communication between the various segments of the health care system and may therefore be seen as a problem of follow-up rather than referral. Like physicians who see a great many patients, 35% of the HAs stated they saw more than 75 people a day. Such patient load limits the time available for follow-up and adequate intersystem communication.

An obvious solution to the problem might be additional staff (assistants to help with record keeping and intersystem communication) but a number of factors, primarily economic, prohibit the hiring of extra staff. Another possible improvement, however, might be a review — a revision — of the record keeping system; for example, establishing of an automatic mailing procedure of carbon copies of admission, simple diagnostic and discharge forms to the HA who referred the

patient (and/or to the HA in the clinic nearest the home of the patient). Some follow-up is now carried out by nurses, Jururawat Dea (midwife-and-nurse) and midwives, it is not part of the role of the HA, but the results indicate HAs would appreciate more feed-back regarding such follow-up.

In many instances the referral and intersystem communication procedures may look fine in theory but fall short in practice. Increasing the dialogue between various staff (as HAs suggest) may help to resolve felt problems. The current implementation of a two-tier rural health system may reduce these problems.

Medical School and Relation with Physicians

One fourth of the HA respondents had already attempted to enter medical school and 66% want to do so. The competition for medical schools being what it is the realization of such aspirations is most unlikely but it raises a number of questions:

1. Does it mean HAs feel that their role, their work, is not appropriately recognized?
2. Are HAs frustrated in their current position? Do they have no opportunity for upward mobility or improvement? Is theirs a stop-gap profession?
3. Is the status consideration linked to the feeling that the best health care — no matter what the ailment — can only be provided by a physician?
4. Does this imply overall dissatisfaction with their current work and role?

The results of the survey could support any of the above possibilities. Many other questions could be raised, all requiring consideration of definition of role, of promotion, of appropriate recognition (job satisfaction) and of possibilities for contact with university faculties of medicine.

One could relate the high number of HAs desirous of becoming physicians to the desire of two thirds of HAs to work with a physician rather than with another HA if they could choose. Making such a relationship is particularly tempting because three fourths of all HAs claimed they needed to refer less than 5% of their patients, and all but four HAs felt they could treat the re-

maining cases just as well as could physicians. However, the correlation cannot be substantiated because there were no significant differences in the reactions of HAs wanting and those not wanting to go to medical school in relation to their desire to work either with a physician or with another HA.

Perhaps most of us would naturally want to work with someone more highly trained than ourselves to increase and improve our knowledge even though we are confident about our ability and work. We should remember that all but two HAs wanted to participate in continued education programs. Obviously, the discussion of the HA/physician roles and interrelationship warrants further consideration.

Drug and Prescriptions

A large number of HAs expressed dissatisfaction with the current policy allowing only physicians to prescribe certain drugs. Many felt that their ability to treat many cases successfully was not limited by any lack of knowledge or skill but by the prohibition to prescribe certain antibiotics.

Certainly, great care should be taken to prevent unmonitored drug use and to guard against uncalled for use of antibiotics which might produce short term cures but have long term detrimental effects. Almost one third of the HAs, who felt they could treat the great majority of cases presented to them, unsolicitedly commented that the restriction on drug prescription should be reviewed (many specifically said so in their concluding general comments). Would lifting the restrictions mean improved treatment of patients without enlarging the danger (that exists now for prescriptions by physicians) or misuse? Whether or not the restrictions are to be lifted it may be profitable to amend and up-date drugs kept at the clinics. The issue raised by these responses calls for attention and review.

Some argue that it is primarily HAs working with physicians who tend to request that the restriction to prescribe drugs placed on them be lifted; the implication being such restrictions do not apply to HAs working (in "solo practice") in rural areas. The results seem to contradict this implication. HAs who indicated their work to be in "rural health care" constituted 34% of all

respondents. But "rural health care" HAs calling for lifting drug restrictions constitute 44% of this particular subgroup.

If we assume HAs who indicated their work to be in a "mobile clinic" or who simply claimed to be "HA", also do not work directly with a physician then the combined subgroup constitutes 66% of all HAs calling for lifting the restrictions (HAs in the three work categories constitute only 41% of all HA respondents). Obviously, HAs who work alone in rural areas most strongly felt lifting the restrictions would increase their ability to treat patients more successfully (see Table VIII).

There is no significant difference in responses from the various states; a similar percentage of HAs in each state expressed a desire for lifting the restrictions.

Rural Health Care-Problems and Praise

HAs thought the "easy availability of health centres to villagers" to be the best aspect of the rural health care system. The Malaysian health care system is indeed one of the best in the region; most villages are within a three mile radius of a clinic. A recent Ministry of Health "Survey of Underserved Rural Areas"—which considered 9,581 villages in 46 health districts throughout Peninsular Malaysia — found only 24% of villages containing 12% of the rural population were underserved, that is, outside the three mile radius of a health facility (Malaysian Society of Health, 1978). The per capita expenditure for health in Malaysia is greater than that of Japan (1970 census), and is currently six times as high as that of the Philippines and seven times as high as that of Thailand (Micozzi, 1977).

When asked to comment on what they thought was the most serious health problem in rural Malaysia, "malnutrition" surprisingly constituted the second most frequently mentioned problem. When joined with the problems of "poverty" and "anemia" this combination of problems heads the list. Compared to other countries in the region, the standard of living for rural Malaysians is relatively high. But if the official poverty line is an income of M\$300 per month for a family of 5-6 people, close to half the rural population would have to be counted as poor (Mohd. Nor, 1977) — which is not to say that they are, therefore, malnourished.

As treated by HAs patients who suffered from acute anemia or malnutrition constituted only 5%. But the seriousness of other ailments may be increased by the underlying presence of malnutrition (Behar, 1974; Keusch, 1975). Thus the importance of malnutrition should not be underestimated.

The complaints most frequently treated by HAs confirm they are those for which a physician would be overqualified. The nature (and the frequency) of these complaints justifies a care system that has access to physician support and supervision, and methods for referral but argues for the continued use and permanent establishment of auxiliary health care. In other words, the services the rural population receives from conscientious and well trained HAs is more than adequate and does not constitute "second class" medicine.

Traditional Medicine

The HAs confirmed that villagers still rely on traditional practitioners, either instead of cosmopolitan treatment or in addition to it. However, a disproportionately higher percentage of HAs in Selangor and Penang felt villagers do not come to the clinic because they rely on "native practitioners." This is not necessarily a reflection of reality but, Selangor and Penang being more urban than the other states, HAs there may not be as aware of the situation in most rural areas and of the variety of factors inhibiting use of government clinics. Many reasons inhibit such use not the least is the fear of being referred to a hospital, which is still perceived by many (as in most countries) as a place where people go to die, or where they are treated without human warmth and given over to powers beyond their control in a world they do not understand.

HAs are aware that villagers make extensive use of traditional practitioners; in fact a majority felt it might be of value to patients to seek help from traditional practitioners as well as from the clinic, especially for psychosomatic complaints. Consequently, most HAs (90%) felt patients would benefit if clinic personnel and traditional practitioners had closer contact. It is a remarkably favorable response to traditional Malay medicine.

However, the response should not be interpreted to mean HAs feel *bomohs* are better qualified practitioners or that they can treat most complaints. Only for certain complaints HAs feel that a *bomoh's* treatment might be a viable alternative, and for certain other complaints dual

treatment (emphasizing different aspects of a complaint or approaching it from different perspectives) might obtain better results than treatment by one or the other health care system.

A substantial number of HAs realize villagers use traditional practitioners for other reasons than to assuage "superstitions." The likely inherent value of traditional Malay medicine and its persistent use (even where cosmopolitan medicine is available and used as well) are valid reasons for further exploration of the benefits and pitfalls of possible cooperation.

CONCLUSION

This survey of HAs working throughout Peninsular Malaysia provides a profile of these workers and explores certain issues of rural health care. HAs are confident about the work they do and feel they can treat patients with simple complaints (which constitute over 95% of their case load) just as well as can physicians. Their responses to the questionnaire raised issues discussed which may here be best presented as recommendations for the consideration of those who plan and oversee rural health care and the training, work and role of HAs.

Recommendations

HAs' uncertainty about their future would be clarified by an official statement about their role and the future of the profession in Malaysia and perhaps also by a review of the role of the physician and of the HA/physician relationship. It may be worthwhile increasing HA training to emphasize clinical experience and to reexamine the advisability of placing recently trained HAs in charge of a rural health centre. A broader scope of continuing education of HAs would probably include such courses as medicine, simple surgery, and health administration/medical records.

A redefinition of the role of HAs opposite nurses would help increase the effectiveness of rural health centres. Perhaps a review of the procedures by which HAs refer patients to hospitals, the intrasystem communication, and medical record keeping would be beneficial. An examination of why 66% of HAs want to enter medical school may open additional channels for upward mobility and for recognition of those who excel in their work. A review of restrictions on

drug prescriptions by HAs and a comparison of such restrictions in other countries where paramedics provide curative health care would remove the widespread dissatisfaction among HAs.

The sensitive issue of patients' seeking traditional as well as cosmopolitan medical care deserves examination of the feasibility of closer contact between the two health care systems.

SUMMARY

Paramedic health care personnel represent an alternative to physician-centered primary health care. A survey of Hospital Assistants (HAs) in Malaysia assesses their experiences and opinions of rural health care and discusses their role. HAs show a confident self-concept and feel they can treat patients for simple complaints as well as can a physician. HAs refer only 5% of their patients to physicians. HAs show some frustration with their work situation, their role concept, and uncertainty about their future.

The majority would like to participate in continuing education programs, and feel the HA training programs, the referral system, and intrasystem communication need improvement. Two thirds would like to enter medical school and want to work directly with a physician rather than with an HA if they could choose.

The HAs call for improvement in rural health care facilities, supplies, transportation and staffing, feel malnutrition and poverty constitute the most serious health problems, are happy that the health centers are easily available to villagers, and think closer contact between traditional Malay healers and cosmopolitan medicine will benefit their patients.

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EFFECTS OF INSULIN ON THE STRUCTURE AND METABOLISM OF GLYCOGEN IN CHEMICALLY-INDUCED DIABETIC RATS

T.K. KWAN, V. THAMBYRAJAH,

INTRODUCTION

IT HAS BEEN generally accepted that insulin plays an essential role in the regulation of metabolism particularly that of carbohydrate. Insulin, when administered, favours an increase in the activities of specific enzymes concerned with glucose uptake, glycogen synthesis, fat synthesis, and growth. Its primary function is to favour the formation and storage of substances of large molecular weight such as glycogen, fats, and proteins.

In the study of control of glycogen synthesis, *in vivo* glycogenic procedures, such as administration of D-glucose to starved animals, have been used. Chapman *et al.*, (1955) observed differences in the iodine-adsorption characteristics between the rapidly formed liver-glycogen and 'normal' liver-glycogens. It was suggested that these differences were due to structural differences between the two types of glycogen. It is our aim to investigate the possibility further by rendering the animals diabetic and further treating them with insulin so that the normal and newly formed glycogens can be isolated and their structures compared by both iodine-staining and enzymic degradation methods.

Alloxan and streptozotocin have been the widely used agents, in recent years, to induce diabetes in laboratory animals. Their diabetogenicity arises from its cytotoxic effect on pancreatic islet B-cells and B-cell necrosis has been consistently demonstrated in all species of animals rendered diabetic by these agents. However, streptozotocin, for instance, caused no change in pancreatic glucagon content in the rat

(Pagliara *et al.*, 1975) and led to predominance of A₂-cells in the guinea pig islets (Petersson *et al.*, 1970).

In the present study the effects of alloxan-or streptozotocin-induced diabetes and of insulin treatment of these diabetic rats on liver glycogen metabolism have been examined. The enzymes involved in the regulation of glycogen synthesis, as well as in its degradation, have been examined in three groups of animals, i.e. control, alloxan-or streptozotocin-induced-diabetic and insulin-treated diabetic animals. These studies also explore the possible mechanism of insulin action on glycogen synthesis by studying the structure of glycogen. The structure will reflect the activities of the enzymes involved in glycogen synthesis.

MATERIALS AND METHODS

Alloxan monohydrate was obtained from Hopkin & Williams, England. Streptozotocin was obtained from I.C.N. Pharmaceuticals, England. Protamine zinc insulin (40 units/ml) was obtained from Weddel Pharmaceuticals, London.

Bacillus subtilis alpha amylase and sweet potato beta-amylase in ammonium sulphate suspension were obtained from Sigma Chemical Company, U.S.A.

Experimental Procedures With Animals

The experimental animals were fed on a high carbohydrate diet-pellets (obtained from Zuellig Feed Mills, Malaysia) and 5% glucose solution.

Male rats (*Rattus norvegicus*) aged between two and three months were obtained from the Central Animal House, Faculty of Medicine, University of Malaya.

Control animals were starved for 48 h and then fed with 5% glucose solution. They were maintained on the high carbohydrate diet until sacrifice.

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Experimental animals were made diabetic by a daily intraperitoneal injection of streptozotocin (55 mg/kg body weight in 0.01M sodium citrate of pH 4.5) or alloxan (150 mg/kg). They were maintained daily on a high carbohydrate diet. The onset of diabetes was monitored every 24 h after alloxan/streptozotocin treatment by estimating glucose in the urine using Clinistix strips (Ames Co., Australia). After the fifth day, the rats were all found to be diabetic. These diabetic animals were divided into two groups. One group received no further treatment. The other group was used for insulin treatment. This group of diabetic animals was given an intramuscular injection of protamine zinc insulin (40 units/kg body weight) daily before sacrifice. Throughout the experimental period, they were maintained on the high carbohydrate diet. The rats were sacrificed at 0, 2, 4, 6 and 8 days after insulin treatment. A time lapse of 2 h after insulin administration was allowed before the sacrifice since insulin activation of the glycogen synthetase enzyme would have been completed by this time period (Gold, 1970).

Extraction and Purification of Glycogen

Immediately after sacrifice, the liver was removed, frozen and stored at -20° for enzyme assays. One gramme of the liver was used for the extraction of glycogen using the Pfluger method as described by Manderson *et al.*, (1968). Pieces of liver were digested in 40% (w/v) potassium hydroxide (5 ml) on a boiling water bath. After 45 min, the digest was cooled and two volumes of ice-cold ethanol were added. The glycogen was allowed to precipitate overnight at 4° .

After centrifugation, the precipitated glycogen was redissolved in a known volume of water and aliquots were taken for the determination of carbohydrate by the phenol-sulphuric acid method (Dubois *et al.*, 1956).

The glycogen was purified by five reprecipitations with ethanol, washed twice with boiling ethanol, and finally dried with ether.

This purified glycogen was used for structural studies using iodine-staining, alpha-amylolysis and beta-amylolysis techniques.

Iodine-Staining Procedure

The iodine-staining procedure used was that described by Archibald *et al.*, (1961). The spectrum between 400-600 nm of a solution containing 0.2% of glycogen, 0.2% of iodine, and 2.0% of potassium iodide in half-saturated ammonium sulphate was recorded against an iodine-iodide control using a Beckman Acta III spectrophotometer. From the spectrum, the wavelength of maximum absorption (λ_{\max}) was determined. Under these conditions, the average chain-length of the glycogen (c.l.) is given by the relationship:

$$\text{c.l.} = 16 + 0.114 (\lambda_{\max} - 500)$$

Alpha-Amylolysis Procedure

Digests containing glycogen (0.5 mg), alpha-amylase (60 units), and 0.1% sodium chloride in a final volume of 4 ml were incubated at 37% for 12 h under an atmosphere of toluene. After incubation, the production of reducing sugars was determined as maltose by the Nelson-Somogyi method (Robyt and Whelan, 1968) and the total carbohydrate was determined by the phenol-sulphuric acid method. The apparent percentage conversion into maltose (alpha-amylolysis limit) is related to the average chain-length under these conditions by the expression:

$$100/\text{c.l.} = 23.4 - 0.20 (\text{alpha-amylolysis limit})$$

Beta-Amylolysis Procedure

Digests containing glycogen (1 mg) and beta-amylase (60 units) in 0.1 ml of 0.1 M sodium acetate buffer (pH 4.8) were incubated at 37% for 12 h under an atmosphere of toluene. After incubation, the percentage conversion into maltose (beta-amylolysis limit) was determined in a similar manner to the determinations of alpha-amylolysis limit. The average, exterior chain-length (e.c.l.) was calculated from the average chain-length determined by alpha-amylolysis and the beta-amylolysis limit, by the expression:

$$\text{e.c.l.} = \frac{\text{c.l.} \times \text{beta-amylolysis limit}}{100} + 2.5$$

The average interior chain-length (i.c.l.) was calculated from the expression:

$$\text{i.c.l.} = \text{c.l.} - (\text{e.c.l.} + 1)$$

Enzyme Studies

The following enzyme activities were studied using the methods as indicated: hexokinase/glu-

cokinase (Leloir and Trucco, 1955), phospho-glucomutase (Hers, 1964), glucose-6-phosphatase (Hers, 1964), succinate dehydrogenase (Slater and Bonner, 1952) and phosphorylase (Hers, 1964).

RESULTS

Rats were divided into three groups of six animals. The first group was treated as the control and received no treatment. Of the two remaining categories of diabetic animals, one group received daily administration of insulin. The results shown are an average taken from three separate experiments. Table I shows the variation in liver-glycogen content at the end of the eighth day under different experimental conditions.

It can be seen that the onset of diabetes lowered the liver glycogen content and that there was a rapid resynthesis of glycogen with insulin administration.

The results showed that there was no significant difference between the 'insulin-treated' and 'control' glycogens but there appeared to be a small decrease in the average chain-lengths of the 'diabetic' glycogen.

Fig. 1 shows the variation in hexokinase/glucokinase activities with alloxan/insulin administration time. The insulin-treated rats showed an increase in the enzyme activities whereas the diabetic group showed a decrease in enzyme activities.

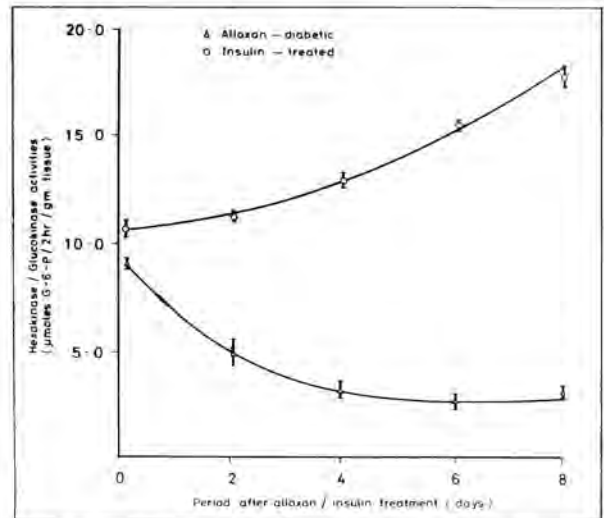


Fig. 1. Effect of the successive administration of alloxan/insulin on the hexokinase/glucokinase activities.

TABLE I
Structural Analysis Of Glycogens From Control, Diabetic And Insulin-Treated Animals

Treatment	Liver glycogen content (% wet weight)	λ_{\max}	c.l. av	e.c.l. av	i.c.l. av
Control	3.4±0.2	466±1	12.1±0.4	7.3±0.2	3.8±0.1
Diabetic	2.9±0.3	457±4	11.1±0.5	6.6±0.4	3.5±0.2
Insulin-treated.	5.5±0.5	469±3	12.5±0.2	7.6±0.5	3.9±0.1

Although both groups of animals showed increased phosphoglucomutase activities, insulin-treated ones demonstrated a higher enzyme activity (Fig. 2).

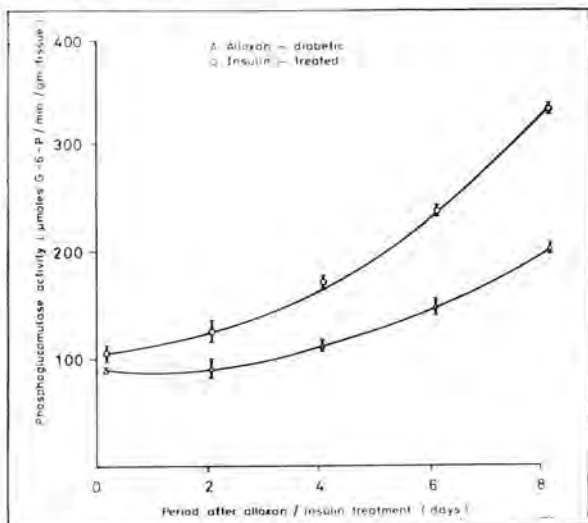


Fig. 2. Effect of the successive administration of alloxan/insulin on the phosphoglucomutase activity.

For the glucose-6-phosphatase activity both groups of animals showed an initial decrease (Fig. 3). The enzyme activity later continued to rise in the diabetic rats but decreased in the insulin-treated group.

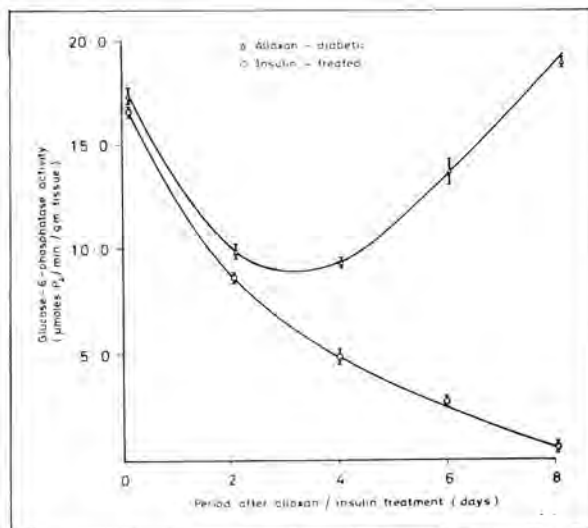


Fig. 3. Effect of the successive administration of alloxan/insulin on the glucose-6-phosphatase activity.

A tricarboxylic acid cycle enzyme, namely, succinate dehydrogenase was studied (Fig. 4).

Both groups of animals showed an increase in the enzyme activities.

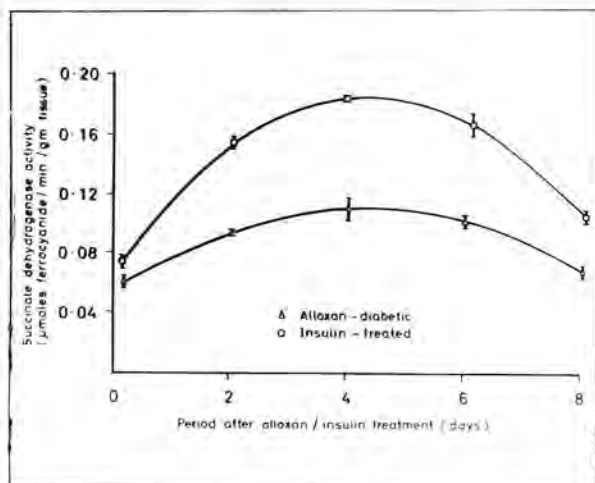


Fig. 4. Effect of the successive administration of alloxan/insulin on the succinate dehydrogenase activity.

The insulin-treated animals showed a greater decrease in the phosphorylase activity than found in the diabetic group (Fig. 5).

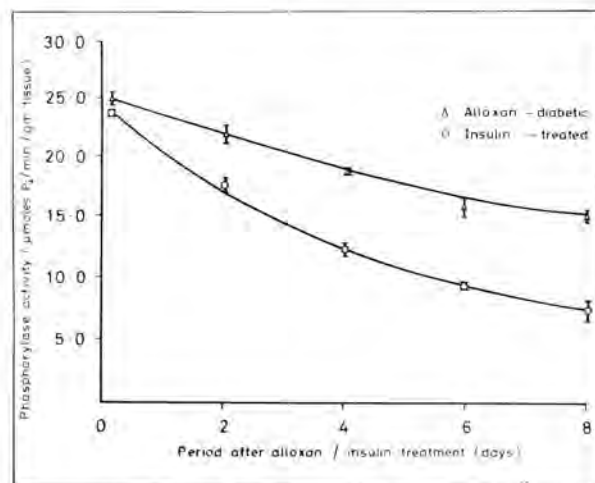


Fig. 5. Effect of the successive administration of alloxan/insulin on the phosphorylase activity.

DISCUSSION

The variation in chain-lengths found in the groups of animals (Table 1) is probably caused by the relative activities of three enzymes, namely, glycogen synthetase, phosphorylase and branching enzyme.

Our results show that insulin does increase glycogen synthesis as evidenced by the larger amount of glycogen content in the insulin-treated animals than found in the untreated ones. Thus, one of the effects of insulin is to increase the glycogen content by activating the glycogen synthesising systems.

The fact that the glycogen structure is little altered in the insulin-treated animals when compared with the control group (although the glycogen content is different in both cases) indicates that the glycogen synthesising enzymes, such as glycogen synthetase, branching enzyme, etc. are all involved in the increase in glycogen content. The branching enzyme must also play a role in the glycogen synthesis as a linear molecule of glycogen would result if glycogen synthetase alone was involved.

In diabetes, glycogen storage is reduced and this is reflected in the decreased kinase activities during glycogenesis (Fig. 1).

Fig. 2 shows that the higher phosphoglucomutase activity in the insulin-treated animals is caused by insulin.

The fact that the glucose-6-phosphatase activity rises, after an initial fall, in the diabetic rats but decreases further in the insulin-treated group is significant (Fig. 3). In diabetes, gluconeogenesis is increased and glucose-6-phosphatase is a key gluconeogenic enzyme.

There appears to be a distinct relationship between the patterns of enzymic activities and accumulation of glycogen in the rats. Phosphoglucomutase, one of the enzymes necessary for synthesis of glycogen, increases in activity during deposition of glycogen. In contrast, activity of glucose-6-phosphatase, which mediates a reaction competitive to glycogenesis, decreases concomitantly. Therefore, accumulation of glycogen in the liver does not seem to be solely a result of a lack of activity of glucose-6-phosphatase but rather is

a consequence of interplay in activity of enzymes involved in glycogen synthesis and degradation.

The increase in the succinate dehydrogenase activity of the diabetic animals is due to an increase in succinate (Fig. 4). This is due to the fact that, in diabetes, proteins and fats are rapidly catabolized and they add their intermediates into the tricarboxylic acid cycle. For the insulin-treated animals, the increase in the enzyme activity was possibly due to increased glucose oxidation in tissues. This increased oxidation can be achieved by the glycolytic pathway, the hexose monophosphate shunt or the tricarboxylic acid cycle.

Insulin provokes inactivation of phosphorylase (Fig. 5) and possibly phosphorylase kinase as well. The question how insulin causes the inactivation of phosphorylase kinase cannot be readily answered. We do not know if the presence of glucagon or other effectors in the portal blood is required for this insulin effect.

A sequential inactivation of phosphorylase and activation of glycogen synthetase has been observed in monkeys treated with glucose or with insulin (Curnow *et al.*, 1975). The sequential change in the activities of the two enzymes has been explained by the observation that phosphorylase *a* strongly inhibits glycogen synthetase phosphatase. It appears therefore that the profound inhibition of glycogen synthetase phosphatase by phosphorylase *a* is a general control mechanism of glycogen metabolism in the liver.

Insulin could act by lowering the hepatic concentration of cyclic AMP. But, it has been found by van de Werve *et al.*, (1977) that insulin did not change the activity of the cyclic AMP dependent protein kinase. Since neither the concentration of cyclic AMP nor the activity of protein kinase were affected by insulin, it appears likely that the hormone acted through a messenger different from cyclic AMP, possibly a cation. Whether calcium ions play a role in the activation of the glycogen synthetase and glycogen phosphorylase phosphatases (Thambyrajah and Karunairatnam, 1972), or whether the insulin effects are exerted by the alterations in the substrates for phosphoprotein phosphatase are not known and further studies are required to unravel the mechanisms of insulin action.

SUMMARY

The structure and metabolism of liver glycogen were studied in rats fed on a high carbohydrate diet and rendered diabetic by alloxan/streptozotocin administration and from the diabetic rats further injected with insulin. The structures of these liver-glycogens isolated, were determined using enzymic and iodine staining techniques. The glycogen content increased in the insulin-treated group whereas that of the diabetic group decreased. The glycogen structure from both groups of animals when compared with that of the control group appeared to be similar. Insulin increased the activities of enzymes such as hexokinase/glucokinase, phosphoglucomutase, and succinate dehydrogenase. It also caused a decrease in glucose-6-phosphatase and phosphorylase activities. Possible mechanisms of insulin actions on glycogen synthesis were also explored.

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ULTRASTRUCTURE OF GLOMERULUS IN TRICHOSURUS VULPECULA (POSSUM)

NALINI EDWIN

INTRODUCTION

THE STRUCTURE of the glomerulus in higher mammals has been described by many workers, using both light and electron microscopy.

The following is an account of the study in the marsupial (*Trichosurus vulpecula*).

MATERIALS AND METHOD

Two animals were used for light and electron microscopy. For electron microscopy, the fixatives were 4% glutaraldehyde (buffered at pH 7.3 with phosphate) followed by 1% osmium tetroxide. Tissues were embedded in Epon-Araldite mixture and sections were stained with uranyl acetate and lead citrate.

RESULTS

The glomerulus of marsupials closely resembles that of higher mammals. The endothelium is discontinuous presenting endothelial pores, and consists of simple squamous endothelial cells. The fenestration rests on a basal lamina (Fig. 1). At their margins, the inner and outer endothelial cytoplasmic membrane becomes continuous. The nucleus are ovoid and do not contain nucleoli. This extensive fenestration implies an important role in facilitation of glomerular filtrate.

The basement membrane is composed of three layers, an outer and inner less dense and a middle dense layer (Rhodin 1955).

The visceral epithelial cell layer seems to fill most of the filtration space between the capillaries. Some of the foot processes of the podocytes interdigitate with adjacent ones. They are applied closely to that of the exterior of the basement membrane (Fig. 1). The opposite sur-



Fig. 1 Endothelium is discontinuous and presents endothelial pores, and consists of simple squamous cells. The fenestration rests on a basal lamina, x 10,000.

face of basal lamina is covered intermittently by foot processes of podocytes. Capillary plasma passes through endothelial cell fenestra through the basal lamina, between the foot processes into the urinary space. The fluid is 'glomerular filtrate'. There is a sub-podocytic space enclosed by part of podocyte cytoplasm. It may or may not be in continuity with the urinary space.

The parietal epithelial cell layer consist of a reflection of cell bodies upward and along the stalk of the glomerular capillaries for a short distance. It is composed of a dense homogenous layer on which rest flattened epithelial cells.

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DISCUSSION

Electron microscopy shows that the renal glomerulus of the opossum (*Trichosurus vulpecula*) has a very similar structure to that of higher mammals. The capillary basement membrane has an outer less dense layer, a middle dense layer and an inner less dense layer and is continuous with the intercellular material of the intercapillary tissue. Lining the capillary lumen is a thin sheet of endothelial cytoplasm which is perforated by numerous 'pores'. Epithelial cells have the same pedicellar arrangements as in higher mammals (Rhodin 1955). Cells exist between peripheral capillary loops and are separated from direct contact with blood by endothelial cells in the place of sections.

SUMMARY

Two animals were used for light and electron microscopy. For electron microscopy the fixatives were 4% glutaraldehyde (buffered at pH 7.3 with phosphate) followed by 1% osmium tetroxide. Tissues were embedded in Epon-Araldite mixture, and stained in uranyl acetate and lead citrate.

The usual fine structural details described in higher mammals were observed. Lining the capillary lumen is a thin sheet of endothelial cytoplasm which is perforated by numerous 'pores'. The basement membrane consists of an outer and inner less dense layer and a middle dense layer. The visceral layer seems to fill most of the filtration space and the foot processes of podocytes interdigitate with adjacent ones. The parietal epithelial cell layers are composed of a dense homogenous layer on which rest flattened epithelial cells.

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HELMINTH PARASITES OF GALLUS DOMESTICUS L. IN PENANG ISLAND

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INTRODUCTION

IN ADDITION to fishes, chickens are an important source of proteins to all Malaysians, which are taken in the form of poultry meat or eggs. Most people in the villages rear chickens in their backyards. Townfolks, however, because of the unavailability of space to do such a practice usually buy chickens from the nearest markets. The chickens available in the markets are obtained from broiler farms where chickens reared may usually be caged or free-ranged. Helminthiasis are common among chickens and if this condition is allowed to continue will affect the economy of poultry rearing as well as depriving people of one of the main sources of proteins.

Incidence of helminthiasis among chickens is affected by climatic and local factors. The tropical climate of high temperature and heavy rainfall is suitable for development of the parasites. Faeces are important sources of infection especially among free-ranged and housed chickens. Moreover, chicken houses are usually poorly ventilated so that damp areas provide adequate environment for the hatching of nematode eggs. The presence of snails, earthworms and arthropods such as ants, cockroaches, house flies, grasshoppers and beetles increase the chance of helminthiasis among the chickens.

Lancaster (1958) gives an account of helminth parasites of fowls in Malaya. This report gives some of the species of helminths that have been identified by various investigators over the years. Several recent published surveys of helminthiasis among fowls had been carried out in this region (Omar and Lim, 1968; Shanta, *et al.*, 1971; Lim, 1971). These surveys revealed the occurrence of

helminths which had not been previously recorded by Lancaster. Many of these were cestodes and these included *Choanotaenia infundibulum* (Bloch, 1779), *Cotugnia digonopora* (Pasquale, 1890), *Davained proglottina* (Davaine, 1860), *Hymenolepis cantianiana* (Polonio, 1860), *Hymenolepis carioca* (de Magalhaes, 1898), *Hymenolepis exiqa* and *Raillietina cesticillus* (Molin, 1858). The nematodes identified were few, namely: *Cepillaria anatis* (Schrank, 1790), *Capillaria obsignata* (Holder Madsen, 1945) *Dispharynx nasuta*, *Gorgylorema* sp., and *Strongyloides avium* (Cram, 1929).

However, none of these surveys made any comparison of helminth burdens between male and female fowls. It is now well known that differences occur in parasitic burdens of male and female hosts. Various studies on vertebrates such as rats (Dobson, 1961 a,b; 1961, 1962), mice (Behnke, 1975) and frogs (Lees, 1962) showed that incidence of helminth infection was generally higher in male than female hosts. However, Berry (1962) demonstrated that more females than males of invertebrates (e.g. snails) are parasitized by trematoda larvae.

This project is undertaken to determine the types of helminths affecting fowls in Penang. It also aims at providing information as to the infection rates, severity of these infections and as to whether there is any difference in helminth burdens and hence susceptibilities between sexes. Information obtained will be useful in the management of poultry farms all over Penang in order to obtain maximum profit through the sale of poultry meat and eggs. It will also benefit members of the public who want to venture into small scale chicken rearing. Attempt is also made to do comparative studies of the nematodes and some of the cestodes identified.

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MATERIALS AND METHODS

Materials for Investigations:

All intestines were obtained from the Jelutong Market in Penang. They were collected from a stall selling dressed poultry of broiler stocks obtained from Ayer Itam, Balik Pulau and Batu Ferringhi Areas. The broiler farms of Ayer Itam and Balik Pulau Areas supplied free-ranged chickens while caged chickens were acquired from Batu Ferringhi area. The ages of these chickens were estimated to be about three months. Occasionally, however, members of the public from the surrounding areas brought their chickens to the stall to be slaughtered. The authors received five intestines from such a source and the ages of these chickens were variable. All intestines were made up of alimentary tract beginning from the duodenum up to the rectum. A total of 100 intestines were obtained and these were sexed prior to examination.

RESULTS

The total number of worms recovered for the various species of nematodes and cestodes is as shown in Fig. 1. Of all the nematodes recovered, *Ascaridia galli* (184 in number) showed the greatest number followed by *Heterakis gallinae* and *Strongyloides avium* (both 35 in number). The greatest number of cestodes recovered were those of *Raillietina tetragona* (280 in number) whose number exceeded that of *A. galli*. Other cestodes recovered arranged in order of decreasing number were *Raillietina cesticillus* (114 in number), *Amoebotaenia sphenoides* (93 in number), *Raillietina echinobothrida* (41 in number) and *Hymenolepis* sp. (11 in number).

The percentage of intestines infected was 50%. The most prevalent group of helminth infection was nematodes (27%), followed by cestodes (10%). The infection rate of cestodes and nematodes was 13%. Infection with one species of helminth per intestine was greatest (29%), with the percentage infection rate decreasing, 16% for two species and

5% for three species, with increase in the number of species per intestine. This negative linear correlation between number of species per intestine and percent of intestine infected was further proved when it was found, the coefficient of correlation = -0.98 (using product-moment formula).

The percentage incidence of infection according to species of nematodes and cestodes is as shown in Fig. 2. The most common nematode infection was with *A. galli* (35%) followed by *H. gallinae* (8%) and *S. avium* (5%). *Raillietina* (23%) was the most common cestode infection with *R. tetragona* being the most common species. Infection rates with *A. sphenoides* and *Hymenolepis* sp., were very low (1% each).

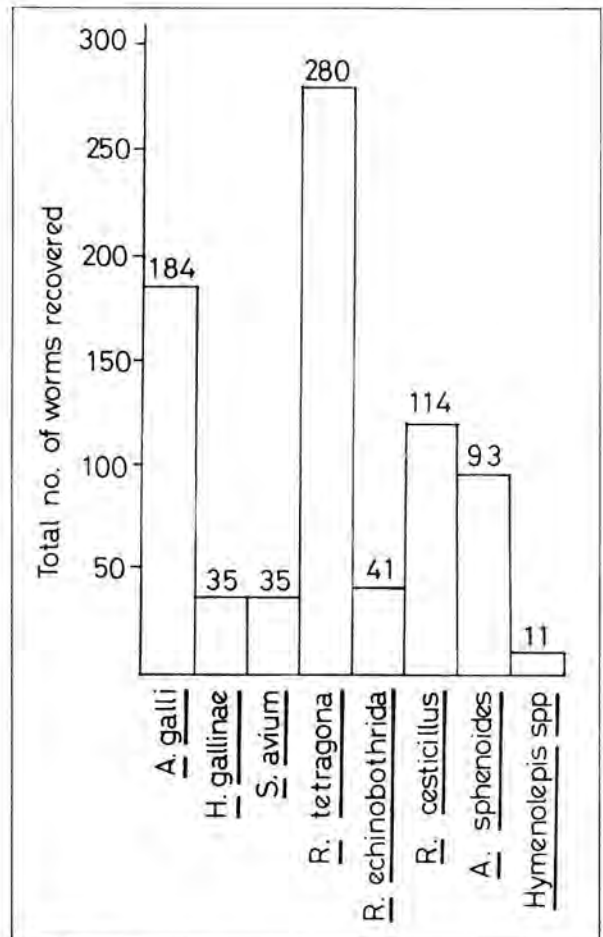


Fig. 1 Bar-chart showing total number of worms recovered according to species of nematodes and cestodes.

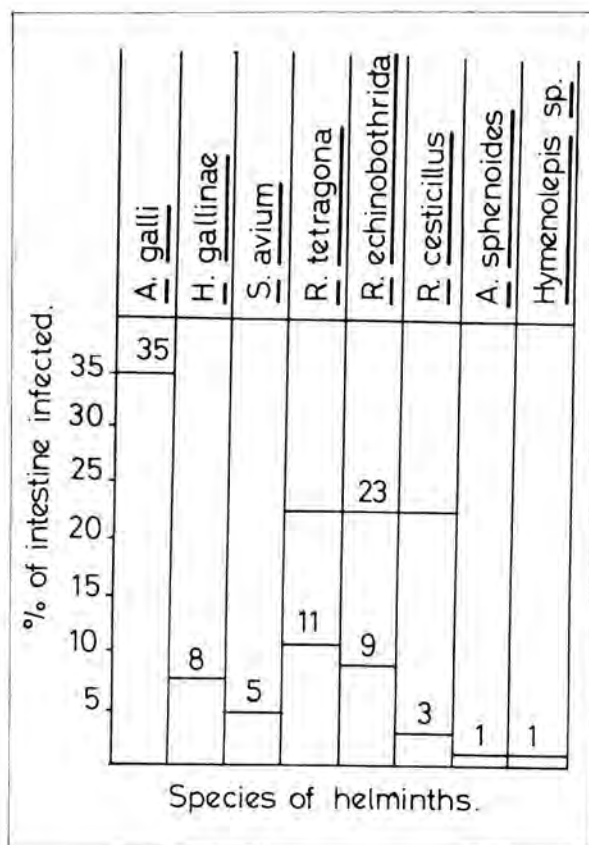


Fig. 2 Bar-chart showing % incidence of infection according to spp. of nematodes and cestodes.

TABLE I

Frequency of species of parasites in relation to number of species for intestine.

Species of Helminths	% of intestines infected with specific parasite among the indicated number of species	
	1	2
<i>A. galli</i>	14	4
<i>H. gallinae</i>	5	3
<i>S. avium</i>	4	1
<i>R. tetragona</i>	5	2
<i>R. echinobothrida</i>	3	2
<i>R. cesticillus</i>	1	0
<i>A. sphenoides</i>	0	0
<i>Hymenolepis sp.</i>	0	0

A finer analysis of the intestinal infection involving the number of species per intestine is given in Table I. Infection rate involving 2 species of parasites per intestine was significantly higher than that involving 3 species of parasites per intestine ($P \leq 0.25$ by chi-square test).

Comparative studies of both nematodes and some of the cestodes show that the female worms of *A. galli* and *H. gallinae* were longer and larger than the corresponding males. The males of *S. avium* were not encountered during this project. The size of the eggs varied in accordance to the species of nematodes. Table III gives the variation in lengths of some of the cestodes with *R. tetragona* (mean 80.5 mm long) being the longest, followed by *R. echinobothrida* (mean 75.6 mm long), *R. cesticillus* (mean 71.9 mm long) and *A. sphenoides* (mean 2.55 mm long). Of the four species of cestodes *R. cesticillus* had the greatest mean diameter of scolex (0.42a mm long). The means of width-length ratio of the various of the cestodes showed that the gravid segments have the largest values. Since lengths of segments of the particular species of cestodes were more or less the same, it is therefore showed that width of segments of the various cestodes increased from scolex backward.

DISCUSSION

General

This project has brought to light the presence of helminthiasis in free-ranged and caged chickens from the broiler farms and probably some of the housed chickens reared by some members of the public. Shanta *et al.* (1971), states that tropical conditions of heat and moisture combined with the intensive or semi-intensive type of management provides ground which favours growth and propagation of the parasites. *S. avium* has a direct life-cycle, infection of bird is mainly by skin penetration, although oral infection may also occur (Soulsby, 1968). Direct as well as indirect life-cycles involving earthworms and arthropods as intermediate hosts occur in *A. galli* (Oslen, 1974). Earthworms are intermediate hosts of *A. splenoides* (Soulsby, 1968), while indirect life-cycle molluscs and arthropod intermediates exist in *Raillietina* (Bhalerao, 1955; Soulsby, 1968; Lim, 1971; Oslen, 1974). Caged birds are usually infected with helminth parasites that undergo

TABLE II
Showing comparison of various nematode species.

Species of Nematodes	LENGTH		Standard Deviation	WIDTH		Standard Deviation	
	Range	Mean		Range	Mean		
<i>A. galli</i>	Male	38 — 48 mm	41.3 mm	2.9 mm	0.5 — 1 mm	0.87 mm	0.22 mm
	Female	68 — 74 mm	71 mm	2.2 mm	1.3 — 2 mm	1.49 mm	0.24 mm
	Egg	59 — 63 μ	61.1 μ	1.4 μ	30 — 35 μ	32.6 μ	1.7 μ
<i>H. gallinae</i>	Male	12 — 16 mm	13.2 mm	1.6 mm	0.22 — 0.24 mm	0.232 mm	0.01 mm
	Female	17 — 22 mm	19.2 mm	1.7 mm	0.32 — 0.034 mm	0.332 mm	0.05 mm
	Egg	56 — 60 μ	58.2 μ	1.4 μ	27 — 30 μ	28.2 μ	1.2 μ
<i>S. avium</i>	Female	2 — 2.2 mm	2.11 mm	0.14 mm	0.003 — 0.034 mm	0.0333 mm	0.12 mm
	Egg	48 — 50 μ	49.1 μ	1 μ	27 — 30 μ	28.9 μ	3.3 μ

TABLE III
Showing comparison of various cestode species

Species of Cestodes	Length		Mean width — Length Ratio			Diameter of Scolex	
	Range	Mean	Immature	Mature	Gravid	Range	Mean
<i>R. tetragona</i>	78 — 86 mm	80.5 mm	2.65	4.67	7.74	0.28 — 0.35 mm	0.317 mm
<i>R. echinobothrida</i>	69 — 80 mm	75.6 mm	2.63	6.46	10.3	0.33 — 0.35 mm	0.336 mm
<i>R. cesticillus</i>	68 — 75 mm	71.9 mm	6.31	9.51	12.6	0.38 — 0.45 mm	0.429 mm
<i>A. splenoides</i>	2.2 — 3 mm	2.55 mm	4	4.67	5.33	0.16 — 0.3 mm	0.187 mm

indirect life-cycle while helminths with direct and indirect life cycles parasites both free-ranged and housed chickens (Lim, 1971).

Worms Identified:

All the worms identified, namely: *A. galli*, *H. gallinae*, *S. avium*, *R. tetragona*, *R. echinobothrida*, *R. cesticillus* and *A. splenoides* are known to occur in Malaya (Lancaster, 1958; Omar & Lim, 1968; Shanta *et al.*, 1971; Lim, 1971). In all these instances, the project carried out showed the presence of *A. galli*, *H. gallinae*, *R. echinobothrida* and *R. tetragona* which indicated that they are relatively more common than the other helminth parasites; *S. avium* was first recorded in Malaysia by Shanta *et al.* (1971). Surveys in Singapore also have recorded the presence of *S. avium* (Lim, 1971).

Infection Rates:

No previous attempts have been made to count individual tapeworms by local investigators. Shanta *et al.*, made actual enumeration of roundworms but not those of tapeworms. Many local investigators enumerated infection rates based on the number of chickens affected by the helminth parasites. Enumeration of infection rates in this manner showed that majority of the chickens affected was of infection with *A. galli* (35%). Omar and Lim (1968) observed that of the 16 helminthiasis cases of poultry diseases majority of the infection was due to *A. galli* and or *H. gallinae*. In Singapore, the most common helminth species in sick birds or fowls was *A. galli* (Lim, 1971). A survey by Shanta, *et al.* (1971) also showed that percentage incidence of infection was highest in *A. galli*. In fact, percentage incidence of infection

caused by other species of helminth parasites in this project resembled closely to that given by Shanta *et al.* (1971).

However, such enumeration of infection rates did not bring to light about the severity of helminth infection. Thus, as can be seen in this project, although the percentage incidence of infection by nematodes (48%) was higher than that produced by cestodes (25%), the severity of infections in chickens or intestines affected by cestodes was higher than that affected by the nematodes (Figs. 1 and 2). Except for *R. echinobothride* which occurred in low numbers (approximately 5 worms per intestine) high numbers of the other representatives of cestodes were found in each of the intestines (approximately 31 worms per intestine). The severity of infection caused by nematodes, namely *A. galli*, *H. gallinae* and *S. avium* was lower, there being approximately 5 worms per intestine.

The percentage infection rate decreased with increase in the number of species per intestine. This negative linear correlation was further supported when it was found that $r = -0.98$, using product-moment formula. This relationship had earlier been recognised by Shanta *et al.* (1971). However, no explanations were given as to why such a situation arose. A comparative study of intestinal infection involving of two and three species of parasites per intestine showed that infection rate of the former was significantly higher than the latter ($P \leq 0.25$). The explanation that may be advanced to explain as to why few intestines were parasitized by large number of parasites is probably because of intraspecific competition between the parasites, due to overcrowding. Hesselberg and Andreassen (1975) showed that there was a decrease in the number of *Hymenolepis diminata* in rats during 8 weeks after infection with high number of cysticercoids. Holmes (1961) suggested that competition was possibly for carbohydrate and occurred more intensely in interspecific competition.

Significantly more nematodes and cestodes were recovered from the duodenum than from other parts of the intestine ($P \leq 0.95$). A possible explanation for the above occurrence is the secretion of bile by bile ducts into the distal end of the ascending part of the duodenum (Sturkie, 1965

and Mc Lellard, 1975). According to Dobson (1962a) bile is a carrier of oestrogen tissue and other parts of the intestine. Besides, it is also known that bile acts directly upon the parasites, inhibiting their metabolism of sugars (Dobson, 1962a).

Helminth burdens of male and female chickens:

Although infection rate among female chickens were significantly higher than males ($P \leq 0.25$), the number of worm burdens in male chickens were significantly higher than those in females ($P \leq 0.995$). This showed that there was a tendency for males to be more heavily infected with the parasites than the females. The difference was more likely to be attributed to higher physiological resistance of females although difference in behavioral resistance of the two sexes might play a part. This is because analysis of food eaten by the two sexes was not carried out which would otherwise eliminate factor due to behavioral resistance. Gray (1972) studied the effect of host age on the course of infection of *R. cesticillus* in fowls and found that in female hosts, age resistance developed more rapidly than in males until the birds were 84 days old.

The fact that female fowls have greater resistance than males could be attributed to the effect of female hormone oestrogen. There are a number of evidence to show that the female hormone in vertebrate animals increases resistance to parasitism. Cases where mammals have shown lower infestation levels in females than in males are given by Dobson (1961a, b;) who demonstrated that male rates were more susceptible to *Nematospiroides dubus* Baylis than the females. Behnke (1975) also showed that the prevalence of infection of *Aspicularis tetraptera* was greater in male than female mice. Similar result has been noted for fish by Thomas (1964) who showed that male trouts were more heavily infected with helminth parasites than females except when later were spawning or recovering from it. The study by Lees (1962) revealed out that incidence of helminth parasites was generally higher in male than female frogs.

Experimental evidence showing that female hormone is involved in increasing resistance in mammals have been discussed by some workers, Dobson (1961b) implanted oestradiol in sprayed

(without ovaries) female rats and found that hosts' resistance to *N. dubis* was increased. Work by Lees (1962) observed that levels of parasitization by helminth parasites was higher in male than female frogs, and that the greatest difference in level of sex hormone in the blood was high. These observations suggested that oestrogen depressed level of parasitization by helminths.

The possible mechanisms thereby that oestrogen may strengthen the resistance of the hosts have been viewed by Dobson (1961a, 1962) who suggested 2 resistance mechanisms of mice against *N. dubius* both of which were controlled by oestrogen. These were the indirect mechanism, involving the laying down of connective tissue and antibody reaction as well as the direct mechanism in which oestrogen carried in the bile and blood acted directly on the nematodes. He also reconstructed the general pattern of resistance of rats to infection of *N. dubius* from the time larvae penetrated the hosts' tissues until they were immobilized by the hosts antibody response, and were then encapsulated and phagocytosed. It was possible that the same mechanisms occurred in female chickens during helminthiasis.

Male hormones seem to favour growth and survival of the parasites as indicated by Dobson (1961a, b). In invertebrates, however, the relationship of parasites to the sex of the host often differs from that generally found in vertebrates. Thus papers cited by Berry (1962) indicated that females of *Littorina saxatilis* (Mollusca) were more heavily infected with trematode larvae than males.

Comparative studies of nematodes and cestodes

No comparative study on the nematodes and cestodes found in this country have been made by investigators. When obtained values were compared to those given by Soulsby (1968) it was found that some of the values did not fit into the ranges given. The values might fall short or exceed the given ranges. This shows that various factors like host animals and the nutritional state of the host probably influence the growth and development of these parasites. Besides the number of parasites examined were low and therefore the values obtained did not give true measurements of the various species. It is also found that values of the various measurements for nematodes given by Soulsby (1968) differ from that given by Bhalero

(1935) and Ershow (1956).

Treatment and Control

Since more important helminth problem appears to be that caused by cestodes, any anthelmintics used should be those that have toxic effect on the cestodes. Other anthelmintics can be used but should be combined with cestoidal drugs. More male chickens should be treated with such drugs because they are the ones most susceptible to the parasites. It has been well accepted that judicious use of drugs give better livestock production and thus higher grass financial return (Campbell, 1977).

Faeces are main sources of infection especially in free-ranged and housed chickens and should be regularly removed. In free-ranged chickens, rotational type of raising chickens may be practiced. The used lands may be ploughed and exposed to the sun to be sterilized before raising the next batch of chickens. Alternatively, the ploughed lands may be used for cultivation and the batch of chickens raised on a new ground. Chicken houses should be well ventilated so that environment is kept dry thus depriving nematode eggs of moist environment which is essential for hatching of eggs.

An important factor in the control of nematodes and cestodes infections is the elimination of intermediate hosts. Chicken enclosures should be well drained to avoid breeding of molluscs and arthropods as well as preventing earthworms from coming to the surface of the ground. Molluscides can be used to destroy snails while arthropods such as ants, cockroaches, house flies, grasshoppers and beetles can be got rid off through the use of insecticides.

SUMMARY

A study of helminth parasites of *Gallus domesticus* L. was conducted based on examination of 100 intestines. The species which parasitized these chickens were *Ascaridia galli* (Schrank, 1978), *Heterakis gallinea* (Gmelin, 1790), *Strongyloides avium* (Cram, 1929), *Raillietina echinobothrida* (Megnin, 1880), *Raillietina cesticillus* (Molin, 1858), *Raillietina tetragona* (Molin, 1858), *Amoebotaenia sphenodea* (Railliet, 1892) and *Hymenodis* spp. Although many

chickens or intestines were infected by nematodes, severe infections were mainly due to cestodes. The study revealed that male chickens were more heavily infected than females. More worms were recovered from the duodenum than other parts of the intestine. Explanations were offered for these two phenomena with particular reference to the female hormone estrogen. Comparative studies of the nematodes and some of the cestodes were carried out.

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CORRESPONDENCE

VITAMIN TREATMENT OF HEMIPLEGIA

Dear Sir,

The treatment mentioned in this letter is based on clinical work done in a rubber estate practice in Malaysia and, if adopted, would reduce the length of time patients were ill and would effect substantial savings in hospital budgets.

Hemiplegia is a tragic illness and in my opinion the treatment to date is not satisfactory. Consequently, I thought that I would try the effect of massive doses of vitamins because there seemed to be no alternative and because they are safe. The results to date have invariably been good. The one that impressed me most was the case of a 64 year old Indian who had a right-sided stroke in Sungei Siput village in January 1972. He was taken to Kamuning Group Hospital and treated within one hour of the stroke occurring. In two days he could walk with the aid of a stick. He relapsed, so we added stugeron to the treatment. After three days he could walk again. After three weeks in hospital he was discharged. He can walk alone though I would prefer that he use a stick. Another interesting case is that of a 70 year Indian who woke at 2 a.m. and found that he could not use his left arm and leg. Within four hours of this occurring he was given the treatment. In four days he could use his arm and leg. That was 1½ years ago. He can walk if he wants to, but he prefers to sit in his chair and watch the world go by. He is a shop-keeper. The other cases are less dramatic because they were brought to me within days, months or years of the stroke occurring. A typical case is that of a 65 year old Chinese woman who was carried into my office by her son two days after her right-sided stroke occurred. After two treatments she was able to come in the bus all by herself from Lintang Village 10 miles away. Another interesting case is that of a Sungei Siput wood-cutter who became paralysed on the left side the day before he came to see me. His brother used to bring him in the side-car of his

pedal bicycle every second day for injections. He refused oral treatment. He recovered so rapidly that soon he was walking to my office alone with only a wooden staff as support. He has left to go to see his wife and family in China.

The first purpose of this letter is a most urgent plea that my colleagues will try this simple and safe treatment. I can imagine nothing more tragic for the father of a family than to be stricken with a palsy. My youngest case is a Chinese fruit-seller of forty-one who has a wife and eight children. He was so sad and depressed and in tears when he first came. Now he can walk better, is slowly recovering the use of his left arm and, most important of all, he can smile and is full of hope. The second purpose of this letter is to hope that a team of medical scientists will investigate this matter properly. It is estimated that 100,000 cases of stroke occur annually in the U.K. and 200,000 annually in the U.S.A. If one could enable them to recover more rapidly than by present orthodox treatments it would be a triumph for therapeutics.

The details of the treatment are as follows. Into the left gluteal muscles are injected the contents of an ampoule of vitamin A (100,000 units) to which is added the contents of an ampoule of vitamin C (500 mgm — vitacimin, Takeda). Into the right gluteal muscles is injected 1 cc of Metaplex, (Takeda), containing vitamins B1 (100 mgm), B2 (5 mgm), B5 (5 mgm) nicotinamide (50 mgm) and Panthenol (5 mgm) and to this is added 1 cc of vitamin B12 (1,000 mgm). Into an arm is injected subcutaneously 1½ cc of colloidal calcium containing 5,000 units of vitamin D per cc (Crooke's Collo-Cul D).

For those who will take oral treatment in addition to the above injections I give one week's supply of the following: 21 tablets of Panvitan-M (a multivite made by Takeda), 21 Tablets of Juvela (a vitamin E tablet of 50 units Esai), 21 tablets of Dumocalcin (each tablet containing

Calcium Hydrogen Phosphate and 500 units of vitamin D, made by Dumex), 84 tablets of vitacimin (a vitamin C tablet containing 100 mgm, made by Takeda), 14 tablets of vitamin B6 (20 mgm in each tablet), 7 tablets of magnesium-containing compound such as Acinorum or Halemag. For those with high blood pressure I find that Rauwiloid in a dose of one tablet per day or even half a tablet per day is sufficient to lower the pressure partly.

This vitamin treatment for hemiplegia may sound complicated but it does not take me long to give the injections, nor my Dispenser long to issue the capsules and tablets. The treatment is simple, safe and inexpensive.

If cases come within hours, days or weeks of the onset of the palsy they do better than those who have been paralysed for months or years. The condition of the arteries in the fundus varies. A few have the "copper-wire" appearance, others

seem to be normal. The improvement after the treatment is not only physical but also psychological. The cases look and become happier, are more alert, more hopeful, more able to use their brains and to interest themselves in their businesses. I encourage them to resume visiting their tin mines, their offices, their stalls in the market and so on. There is nothing more depressing than to see a hemiplegic left abandoned in a gloomy bedroom doing nothing except going periodically to the hospital for physiotherapy. Great wifely and filial kindness and generosity are required for these hemiplegics or they may be left to waste away in a bed or chair in their homes.

I am, etc

D. Reid Tweedie

Estates Medical Officer,
Sungei Siput, N.
Perak

BOOK REVIEW

WORLD Health Organization (1977) **International Nonproprietary Names (INN) for Pharmaceutical Substances, 1977: Cumulative List No. 5**, Geneva, World Health Organization, (ISB N 92 4 056011 4), 352 pp., Sw. Fr. 48._m

In the present day plethora of drugs, medical students and practitioners alike are hard-pressed in their attempt to retain and acquire an adequate knowledge of drugs and their current therapeutic usefulness. It is essential, therefore, that medical school teachers, editors and consultants should facilitate this assimilation of pharmacological knowledge by strictly adhering to the code of using only official names in their reference to drugs. Of all the official names (which include names of national nonproprietary names of many countries published in their respective national pharmacopoeia), it is most logical to use the International Nonproprietary Names (INN) because this set of drug names transcend national boundaries and are internationally accepted. The INN are the equivalent of the botanical names for flowers known by many different common names in different countries.

It is with the above rationale in mind, that this reviewer urges all medical libraries, departmental libraries, clinical units and editors to stock their own copy of the Cumulative List of INN. The relatively high cost of Sw.Fr.48 has precluded it from the possession of the majority of doctors. However, it is perhaps not essential for every doctor to have his own copy so long as he can have ready access to it for reference. Medical school teachers should be aware that they can obtain it at half-price if they order it

through the WHO Programme Coordinator in Kuala Lumpur.

The present Cumulative List is a very much enlarged version, containing all the five official INN — in Latin, English, French, Russian and Spanish. The book also can be a source of reference for national nonproprietary names, molecular formulae of drugs and Chemical Abstracts Service registry numbers. It is indexed for the former two categories. There is also an annex that provides the compact nonproprietary names for radicals and salt forms which may have long and cumbersome chemical names.

The Cumulative List can be used for the following purpose:

- (a) To ascertain the correct INN to use when writing or editing an article or preparing lecture notes.
- (b) To find out the equivalent national nonproprietary name, if any, of a drug for a particular country.
- (c) To find out the identity of a drug in articles published in French, Russian or Spanish. It is presumed here that most readers are conversant only with the English INN.
- (d) To find out the INN of a drug which is only known by its chemical structure. This can be done by looking up the index for molecular formulae.
- (e) To find the accepted nonproprietary name to use for salt and esters which have long chemical names.

T.G. YAP

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Peck and Lowman (1970) demonstrated
It was demonstrated (Peck and Lowman, 1970) that
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