

INCIDENCE OF URINARY STONES IN THE VARIOUS STATES OF MAINLAND MALAYSIA

G. SREENEVASAN

SUMMARY

A study into the incidence of urinary calculi over a 15-year period from 1962-1976 in the states of mainland Malaysia is presented. Figures from the Ministry of Health Returns are the only source for such information.

The incidence from the various states over each five year period from 1962-1972 is tabulated and its significance especially, the pattern of incidence, and its relation to industrialisation is discussed.

Malaysia is beginning to show the same pattern of incidence in the upper and lower urinary tract as that of other industrialised countries.

A plea is made for the establishment of a central registry at the Institute of Urology and Nephrology to carry out a national survey of urinary calculi so that a study into the epidemiology, and if possible, preventive aspects of urolithiasis can be undertaken.

INTRODUCTION

Andersen (1969) in his work on the historical and geographical differences in the pattern of incidence of urinary stones had noted that "there is evidence of a different stone incidence in the industrialised and developing group of countries". He had feared that if an attempt was not made early to study the process of change in the underdeveloped countries it may not be possible to discover aetiological factors before there is a disappearance of "endemic" stones in these areas.

Analysis of the incidence of urinary stones in many countries of Europe, U.S.A. and Asia have been generally carried out by studying hospital admission rates for urolithiasis. Though the figures obtained from hospital admission records may underestimate the true occurrence of the condition they do provide an indication of the trend in national incidence. Incidence of urolithiasis obtained from population studies give a more accurate and clear picture of the problem in regard to geographical variation, ethnic distribution, nutritional factors and socio-economic backgrounds. But such studies are much more difficult to conduct and very few of them are available for comparison.

Primary bladder stones used to be a common malady about 100 years ago in Europe, North America and Japan. With industrialisation and development there has been a decrease in the incidence of bladder stones but at the same time it has been noted that there has been a definite increase in the incidence of stones in the upper urinary tract. The recent work of Ljunghall and Hedstrand, (1975) and Norlin *et al*, (1976) indicate that the increase in incidence continues to be sustained.

Inada *et al* (1958) have made a very interesting statistical study on urolithiasis in Japan by collecting material from 130 hospitals in 42 districts. Their study ranged from 1915 at some hospitals to 1954 at other hospitals. They noted a ratio of stones in the upper urinary tract to the lower urinary tract as 61.8 : 38.2. Ureteric stones were more frequent. In previous papers on the incidence of urolithiasis, they found vesical stones were more frequent and that the ratio of the incidence of upper to lower urinary tract calculi completely changed just before 1930 and after 1950. Inada *et al* (1958) felt "that the most important reason for the remarkable increase of urolithiasis during the last 10 years and the obvious change of the ratio of upper to lower urinary tract calculi and the rapid decrease of this disease around 1945 are

G. Sreenevasan, M.B., B.S., C.H.M. F.R.C.S. (I),
F.R.C.S. (Eng), F.R.C.S. (E), F.R.A.C.S., F.A.C.S.

probably due to the extensive change of the Japanese social circumstances before and after the Second World War".

In summarising their findings they noted that the number of patients with urolithiasis in 1954 was three times as high as before the Second World War. Though the number of lower urinary tract calculi did not show any great change in those 20 years, the number of upper urinary tract calculi showed 2 stone waves, the first from 1937 to 1944 and the second after 1947, and this is still increasing.

In the Indian sub-continent McCarrison (1931) noted that the average incidence of stone estimated throughout India was 10 per 100,000. Punjab had the highest incidence at 438 per 100,000 while the State of Madras had only 0.3 per 100,000. Pyrah quoted a study by Rao (1953-55) in the Mehsana District of Gujarat which noted a varying incidence of 7 to 103 per 100,000 in different parts of the same district. Andersen *et al* (1963) in a personal study carried out in the Ahmadnagar District of India noted that during the famine years 1955-1956 the incidence rose to 8.5 per 100,000 from a figure of 3.5 per 100,000 during the years 1953 and 1954. He also noted that in a clinical study in the Ahmadnagar hospital in 1951-57 the majority of bladder stones occurred in children with a peak incidence at the age of five.

In Thailand, Unakul (1961) carried out an extensive and excellent survey of patients visiting all provincial and other hospitals in Thailand during the years 1953-1959. He noted an average admission rate per 100,000 population with regional variations from 102.9 in some areas to 0.0 in other areas. The survey revealed that the province in the northern and the north eastern regions had the highest incidence while the coastal areas had a much lower incidence. Halstead and Valyasevi (1967) in analysing Unakul's figures found that of 25,149 admissions for stones 89.3 percent were bladder and urethral stones and 10.7 percent were renal and ureteric stones. Of the bladder and urethral stones 53.6 percent occurred in children 10 years or younger. In a further study into the epidemiology of bladder stones in the Ubol Province of Thailand Halstead and Valyasevi (1964 & 1967) found that bladderstones occurred more frequently in the rural than in the urban inhabitants.

Andersen (1969) after studying the incidence in Thailand remarked, "There is at present no adequate information of the incidence in neighbouring countries, but the syndrome is known to be present in China, Vietnam and Indonesia". It is this observation that

persuaded the author to carry out a study on the incidence of urinary calculi in mainland Malaysia, a peninsula whose immediate northern neighbour is Thailand.

GEOGRAPHICAL INCIDENCE OF URINARY STONES IN THE VARIOUS STATES OF MAINLAND MALAYSIA

There has been no previous study on the incidence of urinary calculi in the various states of mainland Malaysia. When a study of this nature is undertaken one is immediately confronted with the absence of easily obtainable accurate statistical information. The only figures obtained are from the Ministry of Health returns from the various hospitals in the respective states.

Though the Ministry of Health Returns is a reflection of hospital incidence only, it does give a trend in national incidence as most people with problems of urolithiasis tend to seek hospital treatment in mainland Malaysia. These records are such that they can be available for reference and comparison at some future date should the occasion arise.

For purposes of ascertaining incidence of urinary calculi in the various states, figures from the Ministry of Health Returns have been collected at 5-yearly periods for a total number of 15 years from 1962 to 1976. The Ministry of Health Returns subdivide the sites of urinary calculi into those found in the kidney and ureter and those found in the other parts of the urinary tract which, for all intents and purposes are mainly bladder stones and a few urethral stones.

The total number of urinary calculi studied during this period was 37,343 of which 23,450 (63 percent) were found in the kidney and ureter and 13,893 (37 percent) in the lower urinary tract i.e. bladder and urethra. Though they are neighbouring countries the percentage of incidence of bladder stones is much higher in Thailand than Malaysia, being 89 percent in the former and only 37 percent in the latter.

Table I indicates the incidence over each of the 5-year periods, of kidney and ureteric stones and that of stones of the lower urinary tract per 100,000 population in the respective states. Fig. 1 indicates the incidence of urolithiasis per 100,000 population over the 15-year period (1962-1976) in the various states of mainland Malaysia. There is a surprisingly high incidence of urinary calculi in the states of Selangor and Negri Sembilan. While it is easy to explain the high incidence in the state of Selangor where many cases were referred to the Department of Urology, General Hospital, Kuala Lumpur,

TABLE I
INCIDENCE OF UROLITHIASIS 1962-1976 PER 100,000 POPULATION

	1962-1966			1967-1971			1972-1976		
	K & U	O	Total	K & U	O	Total	K & U	O	Total
Kedah	3.1	9.5	12.6	2.5	9.3	11.8	7.6	2.6	10.2
Perlis	27.0	2.5	29.5	10.0	7.5	17.5	27.6	13.5	41.1
Penang	19.6	5.2	24.8	30.0	8.4	38.4	34.1	7.2	41.3
Perak	14.4	7.5	21.9	13.7	6.9	20.6	21.6	9.7	31.3
Selangor	4.9	10.6	15.5	26.3	29.1	55.4	37.4	13.6	51.0
Negri Sembilan	26.9	12.7	39.6	16.7	18.4	35.1	9.0	44.1	53.1
Malacca	9.4	6.8	16.2	15.0	4.7	19.7	19.0	3.4	22.4
Johore	12.5	7.0	19.5	13.3	11.5	24.8	9.7	9.3	19.0
Kelantan	8.4	3.6	12.0	24.9	4.4	29.3	33.3	3.6	37.0
Trengganu	9.8	3.3	13.1	6.6	8.6	15.2	21.0	11.7	32.7
Pahang	11.7	7.8	19.5	16.8	8.2	25.0	17.3	7.2	24.5
TOTAL	147.7	76.5	224.2	175.8	117.0	292.8	237.7	125.9	363.6

* K & U = Kidney and Ureter.
O = Other parts of the renal tract.

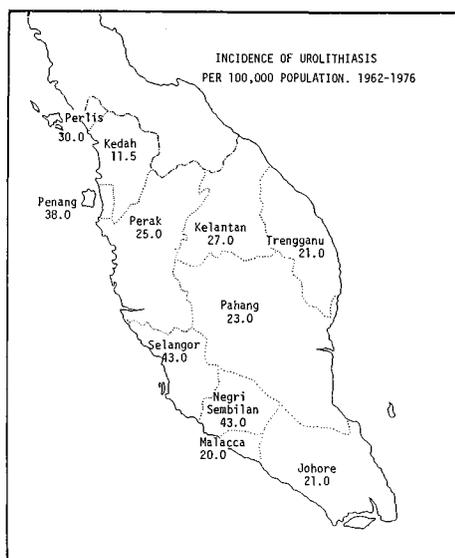


Fig. 1 Incidence of Urolithiasis per 100,000 population. 1962-1976

which was established in 1968, it is difficult to find reasons to account for the high incidence in the state of Negri Sembilan. Fig. 2 shows the incidence of stones in the kidney and ureter and other parts of the urinary tract in the various states of mainland Malaysia. It used to be thought that the east coast states of Malaysia had a higher incidence of bladder stones, but the figures indicate the highest incidence of bladder stones occur in Negri Sembilan and Selangor.

When the incidence of urolithiasis for the 15-year period (1962-1976) in mainland Malaysia is plotted in a graph an interesting picture ensues. For the first five year period (1962-66) the total incidence is 224 per 100,000 of which 148/100,000 i.e. 66 percent are from the kidney and ureter and 77/100,000 i.e. 34 percent are from the bladder. For the second five year period (1967-71) there is an increase in the total incidence, which is 293/100,000 and the incidence of kidney and ureteric stones is 176/100,000 i.e. 60 percent and the incidence in bladder stones is 117/100,000 i.e. 40 percent. For the third five year period (1972-76) there is a considerable increase in

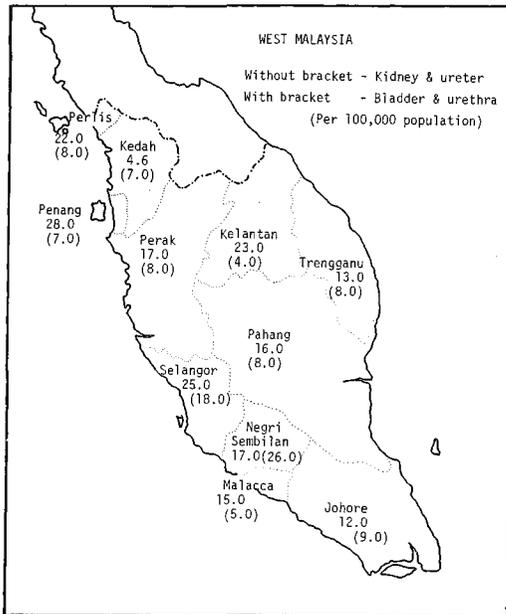


Fig. 2. Map of mainland Malaysia showing incidence of stones in Kidney and Ureter and other parts of renal tract.

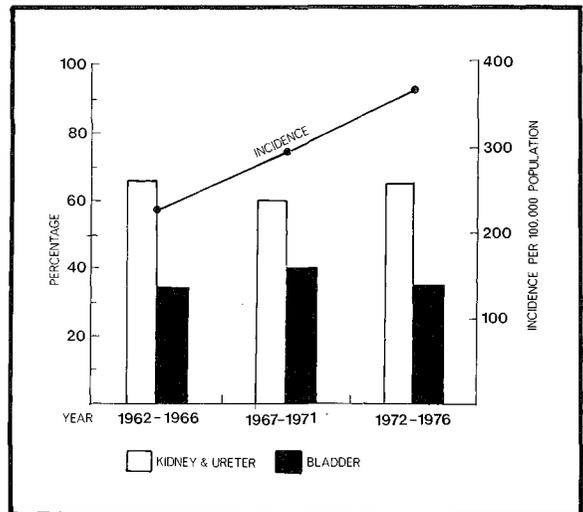


Fig. 3 Graph showing change in the total and percentage incidence of stones.

the total incidence, which is 293/100,000 and the incidence of kidney and ureteric stones is 176/100,000 i.e. 60 percent and the incidence in bladder stones is 117/100,000 i.e. 40 percent. For the third five year period (1972-76) there is a considerable increase in the total incidence which is 364/100,000 and the incidence in the kidney and ureteric stones is 238/100,000 i.e. 65 percent but the incidence in bladder stones is 126/100,000 i.e. 35 percent. When the percentage incidence is considered in the three five year periods (Fig. 3) it will be noted that there are proportionately less bladder stones in the third five year period as compared to the second five year period, though there is an increase in the second five year period compared to the first. This in comparison with the increase of the total incidence of urolithiasis during the three five year periods would indicate that Malaysia is also beginning to show the same pattern of incidence of urinary calculi in the upper and lower urinary tract as that of the Western and other industrialised countries of the world. The incidence of bladder stones is still high compared to Western and Japanese figures but from the graph (Fig. 3) it would appear to be levelling off at a lower range.

Incidence of urolithiasis in the 3 major communities

In order to assess the incidence of urolithiasis in the 3

major communities in a multi-racial country like Malaysia a study was undertaken by the author based on the incidence of stones in the Department of Urology and Nephrology, General Hospital, Kuala Lumpur from November 1968 to October 1973 and his wholly urological private practice for the years 1974-1979. A total of 1,134 cases from the Department of Urology and Nephrology, General Hospital, Kuala Lumpur and 217 cases from the author's private practice was studied. The majority of the cases are from the Kuala Lumpur region. Thus a total of 1,351 cases of urolithiasis in the 3 major communities and others was studied. According to the Population & Housing Census of Malaysia 1970, the population of community groups in Kuala Lumpur consisted of 26.3 percent Malays, 56.2 percent Chinese, 16.2 percent Indians and 1.3 percent others. The total population of Kuala Lumpur according to the same census report was 876,373.

For purposes of this study only patients satisfying the following criteria were included:—

1. Those with definite x-ray evidence of calculus.
2. Those who had operative removal of the calculus.
3. Those with definite renal colic and had produced the stones that was passed or x-ray evidence to confirm its absence.

Patients with doubtful history of renal colic or questionable passage of a stone have been excluded from the series.

Of the 1,351 cases 1,320 occurred in the 3 main ethnic groups, 700 (53 percent) in the Chinese, 331 (25 percent) in the Malays and 289 (22 percent) in the Indians. The

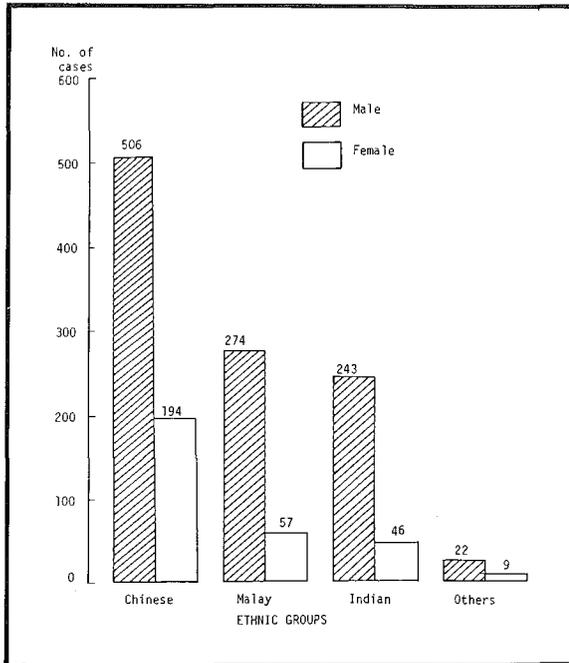


Fig. 4 Graph showing the incidence of calculi in the 3 major communities.

remaining 31 cases occurred in the others, namely the Caucasians, the Japanese and the Indonesians. This is indicated in the block graph shown in Fig. 4.

Sex Ratio

When the sex ratio of incidence was studied, of the 700 Chinese patients 506 were males and 194 females giving a sex ratio of 5 males to 2 females. Amongst the Malays there were 274 males and 57 females giving a ratio of 5 males to 1 female. Amongst the Indians there were 243 males and 46 females giving a ratio of 5 males to 1 female. In the 31 from the other racial groups 12 were males and 9 were females. Of the total number of 1,351 cases studied 1,045 occurred in the males and 306 in the females, giving an overall sex ratio of 3 males to 1 female.

Age Distribution

In order to study the incidence of urolithiasis according to age groups 1,134 cases from the Department of Urology & Nephrology, General Hospital, Kuala Lumpur were plotted as a graph (Fig. 5). This study indicates that there is a higher incidence of urinary calculi in the 3 major communities between the age groups 30 and 60.

Plea for a National Register

While urolithiasis is a common malady in the Malay-

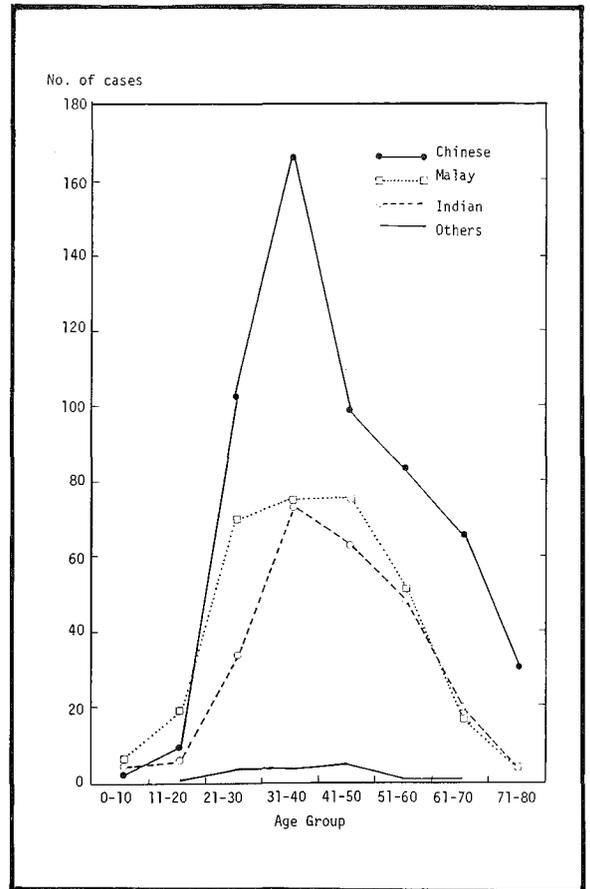


Fig. 5 Graph showing age distribution of urinary calculi — 1134 cases.

sian population there has not been a proper study into the hospital or population incidence of this condition. Undoubtedly the aetiology of calculus disease is multifactorial. Even in recent conferences in Urology the need for further information on dietetic, climatic, racial influences continue to be stressed. In a recent report Bakar *et al* (1980) in a retrospective study have reported that at the General Hospital, Kuala Lumpur over a 2-year period 1977 and 1978, 40 patients with bilateral renal stones had presented with renal failure. This would appear to be a very high figure and early diagnosis may have prevented their progression into renal failure. From the present study it would seem that Malaysia as it is becoming more and more industrialised is showing an increase in the incidence of urolithiasis of the upper urinary tract. This trend is in keeping with the rest of the industrialised world. A plea is made for the establishment of a central register at the Institute of Urology & Nephrology, General Hospital, Kuala Lumpur in order to carry out a detailed study into the incidence, epi-

demology, socio-economic, dietary and other factors responsible for urolithiasis. It is only when such a study is carried out and these factors understood that it may be possible to undertake preventive measures which in due course will reduce not only the incidence but also the morbidity and mortality from urinary calculus disease in the Malaysian population.

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