

# INTUSSUSCEPTION AMONG INFANTS AND CHILDREN IN MALAYSIA

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## SUMMARY

*The results of a 10-year study of intussusception seen in the General Hospital Kuala Lumpur is presented. Incidence among Indians was found to be the lowest in comparison to the other two major racial groups. In 63.5 percent of infants there was no pain. A large number of patients presented with diarrhoea (21.8 percent), constipation (31 percent) and abdominal distension (43.7 percent). Overall mortality rate was high (14.4 percent). This could be attributed to late presentation (only 30.8 percent) of cases were seen within 24 hours of onset of symptoms) which also accounted for a higher resection rate. A high incidence of lead points (28.7 percent) was also seen. The usefulness of barium enema reduction in this country is discussed. Mainstay of management in the majority of cases is operation with adequate pre and postoperative care.*

## INTRODUCTION

Intussusception is one of the common paediatric surgical emergencies in this country. It is known that there is a wide geographical variation in its

incidence,<sup>1,2,3,4,5,6,7</sup> but little is known of the disease in this part of the world. This survey summarises our 10-year experience in the General Hospital Kuala Lumpur from January 1971 to December 1980. It is proposed firstly to define the characteristics of the disease in the local context and so assist in making an earlier diagnosis, and secondly to study the factors which contribute to the high mortality rate encountered here and to suggest possible ways of reducing this.

## MATERIALS AND METHODS

Case records of patients admitted over the study period were traced from ward admission and the operating theatre register. Diagnosis was confirmed either by barium enema or at operation. There were 104 cases but in only 87 were there adequate detailed information in the case notes; records of 10 patients were irretrievable. There were 63 males and 41 females. Admissions were distributed throughout the year but the incidence appears to decrease towards the end of the year (Fig. 1).

## RESULTS

### Age

The age distribution is shown in Fig. 2. 71.2 percent of the children were under 1 year of age and 54.8 percent under 7 months. Two patients were 9 years of age, two 13 years and one 14 years. 18.0 percent of children under 1½ years died whereas the mortality rate among children over 1½ years of age was 7.1 percent.

### Race

Incidence of the disease among the three major

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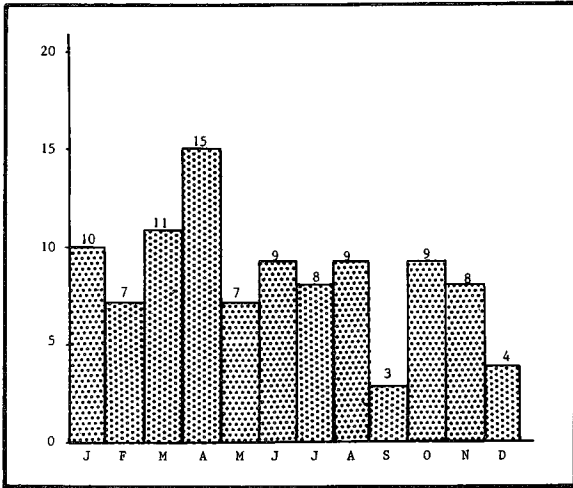


Fig. 1 Number of admissions according to month of the year in 104 patients.

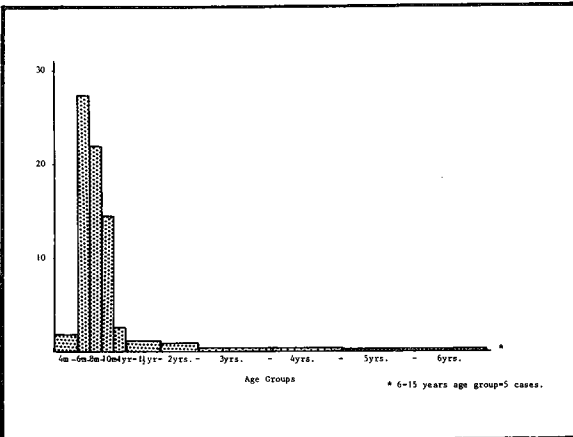


Fig. 2 Histogram showing incidence of intussusception by age in 104 patients.

ances in Malaysia is shown in Table I. The proportion of Malay and Chinese children appeared to correlate with the admission rate. However, the disease was significantly uncommon in Indian children ( $p < 0.01$ ).

### Clinical Features

Less than a third of patients were admitted within 24 hours of onset of symptoms (Table II). The majority (53.2 percent) presented between 1 to 4 days of onset of symptoms. Over 90 percent of cases presented with vomiting (Table III). The classical triad of vomiting, pain and rectal bleeding (Fig. 3) was seen in only 9 patients (10.3 percent). Constipation and abdominal distension,

TABLE I  
ADMISSION RATE BY RACIAL GROUPS (1971-1980)

Race	Cases with intussusception (104 cases) %	Overall paediatric surgical cases (7237 cases) %
Malay	55.8	35.2 (N.S)
Chinese	38.5	36.9 (N.S)
Indian	5.7	27.3 ( $p < 0.01$ )
Others	0.0	0.6
Total	100.0	100.0

TABLE II  
DURATION OF SYMPTOMS IN 94 CASES

Duration (Hr.)	No.	%
< 12	5	5.3
12 < 24	24	25.5
24 < 48	14	14.9
48 < 72	28	29.8
72 < 96	8	8.5
96 or more	15	16.1

TABLE III  
CLINICAL FEATURES IN 87 PATIENTS WITH INTUSSUSCEPTION

Feature	No.	%
Vomiting	82	94.3
Blood and Mucus on Rectal exam.	52	59.8
Passage of blood PR.	46	52.9
Abdominal mass	39	44.8
Abdominal distension	38	43.7
Pain	30	34.5
Constipation	27	31.0
Fever	27	31.0
Diarrhoea	19	21.8
'Crying', 'Fretful' 'unwell'	13	14.9
Intestinal obstruction on abdominal x-ray (n=76).	56	73.7

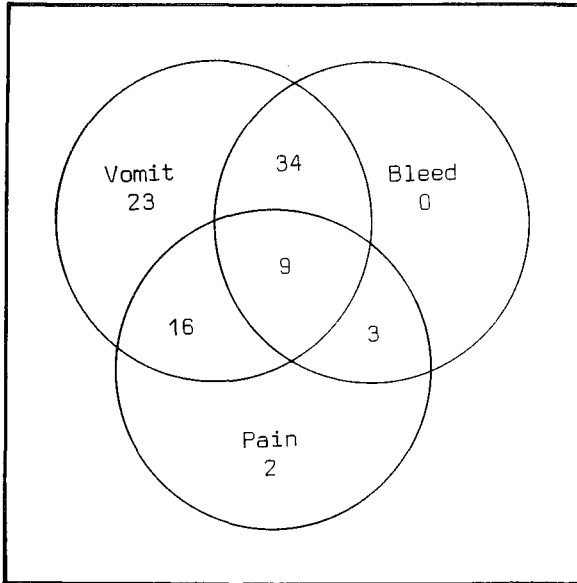


Fig. 3 The relative frequencies of symptoms in the classic triad in 87 patients.

two features of late disease were relatively common (31.0 percent and 43.7 percent, respectively). Abdominal pain was a presenting symptom in only 30 cases (34.5 percent). The 'painless' group comprised mainly of children under 1 year of age (Fig. 4). Of those with pain, there was an almost

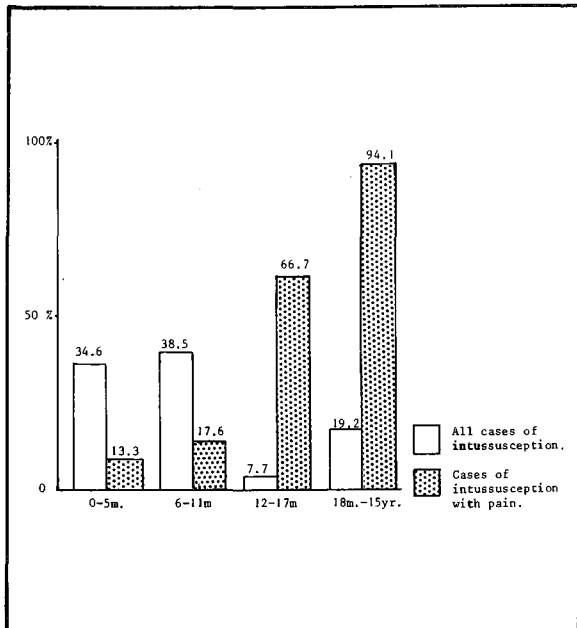


Fig. 4 Percentage of patients with pain in the various age groups.

TABLE IV  
PAIN, RECTAL BLEEDING AND DIARRHOEA  
RELATED TO TIME OF ADMISSION TO THE  
HOSPITAL IN 87 CASES

Symptom	When presenting at the hospital					
	< 24 hr			≥ 24 hr		
	No.	Total	%	No.	Total	%
Pain	12	31	(38.7)	18	56	(32.1)
Bleeding	25	34	(73.5)	21	53	(39.6)
Diarrhoea	5	60	(8.3)	14	27	(51.9)

similar proportion of early and late cases (Table IV). Rectal bleeding ('redcurrent jelly stools') is usually a cause of considerable concern to most parents and this was reflected in their earlier hospital admission. In patients with diarrhoea admission was usually delayed, only 8.3 percent seeking medical attention within 24 hours.

Diagnosis was made largely on clinical grounds. Plain abdominal x-ray was performed in 76 cases and in 56 (73.7 percent), it assisted in arriving at the diagnosis. Barium enema was required in 14 cases to confirm the diagnosis. Hydrostatic reduction was attempted in seven cases only, with two complete successes, one partial reduction and four failures. However, in two of the latter, the intussusception was found to be completely reduced at operation.

#### Treatment

There were 15 deaths most of whom had a history of 24 to 96 hours. The highest rate of resection was required in those presenting within this period as a result of gangrene or irreducibility (Fig. 5).

Mortality associated with the different modalities of surgical treatment is shown in Table V. As expected, higher mortality rate (27.8 percent) was seen when gut resection was performed. Appendicectomy after reduction of intussusception carried approximately the same mortality risks as reduction alone (6.7 percent and 8.5 percent, respectively). However, Meckel's diverticulectomy was associated with a much higher mortality.

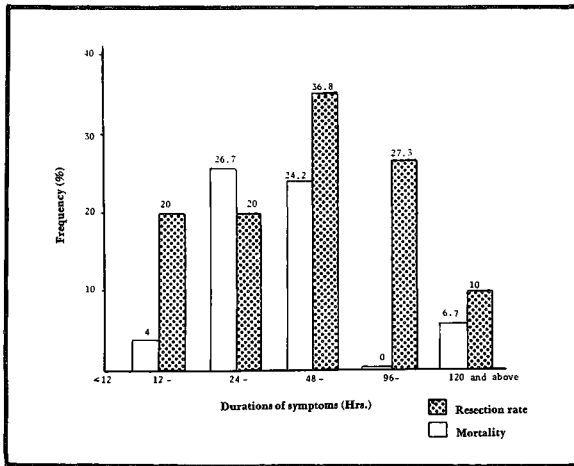


Fig. 5 Mortality and resection rates in relation to duration of symptoms in 94 cases.

TABLE V  
MORTALITY RELATED TO TYPE OF SURGICAL PROCEDURE

Procedure	Cases		Deaths	
	No.	No.	No.	%
Resection	18	5	5	27.8
Simple reduction only	47	4	4	8.5
Reduction and Meckel's diverticulectomy	7	4	4	57.1
Reduction and closure of perforation	7	1	1	14.3
Reduction and appendicectomy	15	1	1	6.7
Unknown	10	-	-	-
<b>Total:</b>	<b>104</b>	<b>15</b>	<b>15</b>	<b>14.4</b>

Of those who died, 7 had septicemia, one of whom had an anastomotic leak and one each had aspiration pneumonia, fluid and electrolyte imbalance and gangrenous gut left unresected. Five died of unknown cases.

### Pathology

Fig. 6. shows the frequency of the different types of intussusception. Two thirds were ileocolic; of these 13 were ileo-ileocolic (i.e. ileoileal component combined with an ileocolic component), and only 8.7 percent were calcocolic.

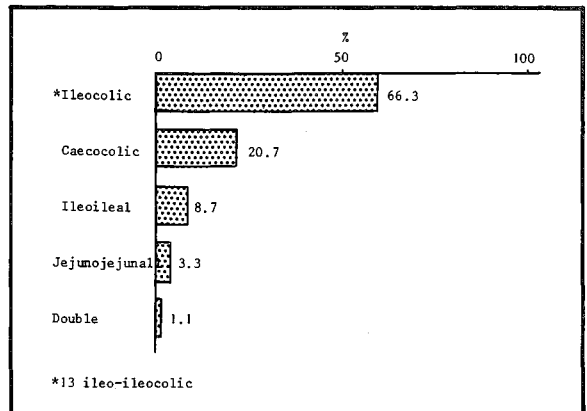


Fig. 6 Types of intussusception in 94 cases.

Lead points were present in 27 cases (28.7 percent). There were 10 cases with Meckel's diverticulum, 3 with benign polyps and 14 with enlarged Peyer's patches. Twenty-two of the 27 cases with lead points were found in children below one year of age.

### DISCUSSION

Rarity of intussusception among Indian children has never been mentioned in Indian publications.<sup>8,9,10,11</sup> This is evident in this study in a multiracial society. In contrast, the incidence of hypertrophic pyloric stenosis<sup>12</sup> (Laidin, in preparation) and worm bolus obstruction<sup>13</sup> is relatively high among Indians.

Age of weaning is regarded an aetiological factor. Time of weaning appears to be different among the three races. Indians are known to introduce semisolids late<sup>14,15,16</sup> as compared to Malays and Chinese.<sup>16,17</sup> It might be that the infants' intestines are better able to cope with the thicker consistency at a later age.<sup>18</sup> The change from breast milk to powdered milk feeds<sup>19</sup> is probably not an important factor since compared to the other two major races the Malays in fact tend to breast feed the longest.<sup>16,20</sup> Another speculative factor might be the status of nutrition of Indian infants. It is a known fact that intussusception is more commonly encountered among the better nourished children.<sup>21</sup> In this country various studies have shown a higher prevalence of protein-calorie malnutrition among Indian children as compared to the other two racial groups.<sup>16,22,23</sup> The influence of these factors have not been examined in this study.

There appears to be no seasonal variation in

incidence. Although the true incidence of the condition in this country remain unknown, the annual admission rate of between 4 and 13 cases (average 10.4) to this 2000-bedded general hospital indicates that it may not be as common as in Europe,<sup>24,25</sup> Britain,<sup>18</sup> North America<sup>26</sup> and Australia<sup>27</sup> where the admission rate varies between 30 to 60 cases per year. Macmahon<sup>28</sup> gives an absolute incidence of 1.9 per 1000 births in the Birmingham area. In Taiwan, it is 0.77 per 1000 births.<sup>20</sup>

Variability of susceptible age-groups exists in certain parts of the world. In South Africa,<sup>1,6,30</sup> Nigeria<sup>2</sup> and Korea,<sup>4</sup> the disease occurs commonly in older children and adults. The caecocolic and colocolic varieties tend to predominate in Nigeria<sup>2</sup> and in South Africa, Coloured and Black children are more predisposed to these varieties than Whites.<sup>6,30</sup> The difference has been attributed to a higher incidence of worm infestation, malnutrition and diarrhoeal diseases among Coloured and Blacks. In this study, the disease occurred predominantly in infants (71.2 percent). This is in accordance with most Western reports<sup>18,26,27,31</sup> and similar to the experience in Taiwan<sup>29</sup> and the Philippines.<sup>32</sup> However, despite a high worm infestation rate among Malaysian children<sup>33,34</sup> and a high incidence of gastroenteritis,<sup>35</sup> caeco- and colocolic intussusception is found in only 8.7 percent in this study.

In the majority of the patients the intussusception was painless (Table III). This entity was first reported by Cumming.<sup>36</sup> Its incidence is variable, but usually less than 20 percent of cases.<sup>26,27,31,37,38</sup> Ein *et al.*,<sup>39</sup> showed that the average age of children with painless intussusception was 8 months. It is of interest that only 7 percent of their cases could be reduced by hydrostatic pressure and 90 percent had to be reduced surgically with a 37 percent resection rate. Apart from the possible existence of painless intussusception as a clinical entity is the question of the interpretation of pain in the young infant by the parents. It is doubtful that any parent could ignore the classical sudden severe screaming attacks with drawing up of the knees associated with vomiting and not interpret these as symptoms of abdominal colic. On the other hand, much significance may not be placed on abdominal pain which appear to be of a mild nature. Since almost similar proportions of those presenting under 24 hours and those presenting after 24 hours had pain (Table V),

it is possible that this may be the reason. In 13 cases in this study, vague symptoms of fretfulness, and intermittent or continuous crying were reported. Therefore, in order that the diagnosis will not be missed, it may be wise not to overlook these especially if they are associated with vomiting or rectal bleeding. Abdominal pain per se especially in the infant, is an inconstant symptom and therefore undue emphasis should not be placed on it.

A high proportion of patients presented with diarrhoea (21.8 percent). This is in contradistinction to most Western reports. It is possible that many of these children developed intussusception as a result of the gastroenteritis. Strang<sup>18</sup> found that 4.5 percent of his cases were preceded by enteritis.

Lead points were found in 28.7 percent of our cases. Even if enlarged Peyer's patches were excluded, there is still a high proportion of cases with lead points (13.8 percent). This has been also noted by Singh *et al.*<sup>11</sup> among Indian patients and in one British study<sup>40</sup> among a rural population. In most other reports however, the incidence of lead points is less than 8 percent.<sup>18,26,31,38</sup> Spontaneous reduction occurs in 5 to 7 percent of cases,<sup>19</sup> predominantly in those where no lead points are evident. However, this is probably an underestimation.<sup>41</sup> If it could be assumed that the majority of those without lead points could reduce spontaneously, then the high incidence of cases with lead points in this series could be explained, since those cases with spontaneous reduction would not seek medical attention.

The chronic (non-ischaemic) form of intussusception made up the majority of the later cases who survived. It makes up about 15 percent of most Western reports and is associated with a low mortality.<sup>38,42</sup> It explains the lower mortality rate among those cases presenting after 4 days (Fig. 5). Unlike African<sup>2,3,6</sup> and Korean<sup>4</sup> reports this form constitutes less than 16 percent of our cases, which is similar to the Western pattern.

The mortality rate of 14.4 percent compares favourably to Indian reports<sup>10,11</sup> but is distressingly much higher than the Western figures of 1 to 2 percent.<sup>27,31,43,44</sup> The single most important factor in determining mortality is delay in seeking medical treatment, as majority of the cases are of the acute type where the vascular supply to the affected segment of gut is compromised early. Hence, the high mortality in cases presenting 1 to 4 days after

onset of symptoms (Fig. 5). The only way to overcome this problem is to educate the lay-public and doctors in the significance of vomiting, rectal bleeding and abdominal colic in children of the susceptible age group.

As a consequence of delay in treatment, a large proportion of cases (43.7 percent) developed abdominal distension, and features of intestinal obstruction detected clinically and demonstrated radiologically (73.3 percent). Distension also made the palpation of abdominal masses more difficult, hence the low rate of detection (44.8 percent).

The presence of intestinal obstruction and abdominal distension preclude hydrostatic reduction.<sup>27,37</sup> Even if these features were absent, it is inadvisable to attempt this procedure after 24 hours of onset of symptoms. In Australia<sup>27</sup> and Scandinavia<sup>24,25,44,45</sup> where 60 to 80 percent of cases present within the first 24 hours, this form of treatment is ideal and safe. In this study however, only 30.8% were seen within 24 hours (Table III). Furthermore, the 'painless intussusception' which made up a significant proportion of our cases, are known to be relatively refractory to enema reduction.<sup>39</sup> The majority of cases of intussusception in this country are therefore not suitable for barium enema reduction. Indeed this may be dangerous because of late presentation in more than 70% of cases and the possibility of compromised blood supply. Also, there is a high proportion (21.8 percent) of ileo-ileal intussusception which will not be reducible by this method. Hence the mainstay of treatment here is operative reduction.

Reduction with or without appendicectomy performed in 62 cases (59.6 percent) carried the lowest mortality risk (6.7 percent and 8.5 percent respectively, Table V) Resection increased mortality by more than three times (27.8 percent). It appears that reduction and Meckel's diverticulectomy carry a formidable mortality (57.1 percent). However, the number in this group is too small for any firm conclusion to be made.

One of the most important factors in the reduction of operative morbidity and mortality is intense pre- and post-operative management particularly in relation to fluid and electrolyte replacement and the judicious use of appropriate antibiotics.<sup>46</sup> This is particularly in relation to those children under 1½ year where there were 2½ times more deaths than those above 1½ years. It must be admitted that majority of our deaths

appear to be related to inadequate pre- and post-operative care especially of the late and complicated cases. It is important therefore that if the services of a paediatric surgeon is unobtainable, the assistance of an experienced paediatrician should be sought in dealing with these very ill infants

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