



CLINICAL MANIFESTATIONS, VITAL SIGNS, AND BOWEL VIABILITY IN PEDIATRIC INTUSSUSCEPTION

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ABSTRACT

**INTRODUCTION:** Intussusception is a condition in which part of the intestine slides into an adjacent part of the intestine. Intussusception is an important cause of an acute abdomen and the second most common cause of bowel obstruction in children. The classic triad of intussusception, including vomiting, abdominal colic pain, and bloody stool. However, the triad has only been reported in <50% cases. This study is aimed to evaluate the clinical manifestation, vital signs, and bowel viability in pediatric intussusception.

**METHODS:** This is an observational retrospective study with total sampling.

**RESULTS:** Based on clinical characteristics, there were 44.44% subjects who had manifestations for 2-3 days. Ileocolic was the most common location (77.78%). Majority of the subjects did not have the classic triad (66.67%), had red currant jelly stool (62.96%), did not have abdominal mass (59.26%), complained of abdominal pain (70.37%), did not have abdominal distention (74.07%), did not vomit (55.5%), was lethargic (59.26%), and had viable bowel (62.96%).

**CONCLUSION:** This study found that the most common manifestations of intussusception in children were abdominal pain, red currant jelly stool, and lethargy, with viable bowel and located at ileocolic.

**KEYWORDS :** Intussusception, Characteristics, Triad, Viability.

1. INTRODUCTION

Intussusception is the invagination of one part of the intestine into another. It involves three cylinders of intestinal wall, in which the inner and the middle cylinders are the invaginated bowel, the outer cylinder is the recipient of the invaginated bowel<sup>1</sup>.

Intussusception is one of the most common abdominal emergencies for children<sup>8</sup>. It is the second most common cause of acute abdomen and bowel obstruction in children<sup>2,18</sup>. The worldwide incidence was estimated around 1/10.000 children and 1/1.000 emergency department cases<sup>8,13</sup>.

The diagnosis of intussusception is challenging. Symptoms might not be specific and wide-ranging. Triad of classic symptoms were reported: vomiting, colicky abdominal pain, and bloody stool. However, the triad was reported only occurred in <50% cases<sup>15</sup>.

This study was aimed to evaluate the characteristics of clinical manifestations, vital signs, and bowel viability in pediatric intussusception.

2. METHODS

This study took place from December 2018 until May 2019 at Adam Malik General Hospital. This is an observational study with retrospective design. Samples was taken using total sampling technique. The population was all patients with an intussusception diagnosis in the hospital. Patients who were enrolled in 2016 to 2018, aged <18 year old, and undergone surgery, were included in the study. Univariate analysis was performed.

3. RESULTS

A total of 27 patients were included in this study. Distribution of subject characteristics was shown in Table 1. Eighteen (66.67%) out of 27 subjects were male. Majority of subjects (40.73%) aged 4-6 months. Table 2 showed distributions of vital signs, with predominant normal vital signs.

Table 1. Distribution of Subjects' Characteristics

Variable	Frequency	Percentage (%)
Sex		
Male	18	66.67
Female	9	33.33
Age (months)		

0-3	4	14.81
4-6	11	40.73
7-12	8	29.63
13-24	2	7.41
>24	2	7.41

Table 2. Distribution of Subjects' Vital Signs

Variable	Frequency	Percentage (%)
Blood pressure		
Normal	20	74.07
Elevated	7	25.93
Heart rate		
Normal	21	77.78
Elevated	6	22.22
Respiratory rate		
Normal	19	70.37
Elevated	8	29.63
Temperature		
Normal	21	77.78
Hyperthermia	5	18.52
Hyperpyrexia	1	3.70

Clinical characteristics were shown in Table 3. Only 5 (18.52%) subjects who had symptoms for one day, and almost half (44.44%) with duration of symptoms of 2-3 days. Based on the location, ileocolic was the most common with a total of 21 (77.78%) subjects. Intussusception involving two different spots were found only in one (3.70%) subject; ileocolic and colocolic.

Table 3. Clinical Characteristics of Subjects

Variable	Frequency	Percentage (%)
Duration (day)		
1	5	18.52
2-3	12	44.44
≥4	10	37.04
Location		
Ileocolic	21	77.78
Ileocaecal	2	7.41
Ileoileal	1	3.70
Ileocolocolic	1	3.70
Colocolic	1	3.70
Ileocolic + colocolic	1	3.70
Triad		

Yes	9	33.33
No	18	66.67
Red currant jelly stool		
Yes	17	62.96
No	10	37.04
Mass on palpation		
Yes	11	40.74
No	16	59.26
Abdominal colic		
Yes	19	70.37
No	8	29.63
Abdominal distention		
Yes	7	25.93
No	20	74.07
Emesis		
Yes	12	44.44
No	15	55.56
Lethargy		
Yes	16	59.26
No	11	40.74
Bowel viability		
Viable	17	62.96
Not viable	10	37.04

Only 9 (33.33%) subjects were found with the classical triad. Seventeen (62.96%) subjects reported red currant jelly stool. On abdominal palpitation, mass was found in 11 (40.74%) subjects. Most (70.37%) of the subjects complained of abdominal pain. Abdominal distention was only found in 25.93% of the subjects. Emesis was suffered in almost half (44.44%) of the subjects. Additional symptoms, lethargy, was found in 16 (59.26%) subjects.

Surgical findings showed that non-viable bowel was found in 11 (40.74%) subjects while 16 (59.26%) others had good viable bowel.

**4. DISCUSSION**

It is important to know well the clinical characteristics of pediatric intussusception as it is one of the most common causes of bowel obstruction in children. Based on the clinical manifestations, abdominal pain is the most common (70.37%) finding in this study, followed by red currant jelly stool (62.96%), while the least finding was abdominal mass (40.74%). This result was a little bit different from the study conducted by Fernandes et al (2016), which reported that the most common symptom was vomiting (89.4%), followed by bloody stool (75.5%), and abdominal distention (71.8%). This difference might be caused by different type of population, in which subjects in their study were limited to <1 year old children.

Vital signs, which was evaluated in four parameters, such as blood pressure; heart rate; respiratory rate; and temperature, were normal in most subjects (70.37% - 77.78%). This was similar with case reports by Pineda & Hardasmalani (2008), Tajik & Goudarzian (2018), Percy et al (2017), and Gunawan (2018). The early phase of intussusception, vital signs were usually normal. Along with the worsening of obstruction and ischaemic condition, the child could have fever, become hypovolemic, and tachycardia<sup>19</sup>.

Majority of the subjects had viable bowel. This is similar with the result of the study conducted in Hasan Sadikin Hospital Bandung. The study reported that necrotic bowel was found in 14/32 subjects<sup>17</sup>. Meanwhile this result was in contrast to Johnson et al (2012) study, where they reported only 10% of pathological specimens were found necrosis/infarct.

The difference of findings might be caused by different

symptom duration. In this study, as many as 44.44% subjects had 2-3 days of symptoms, and 37.04% had ≥4 days of symptoms. Previous literature stated that ischaemic necrosis begins at 72 hours in most cases<sup>7</sup>.

Majority of the cases were located at ileocolic. This is similar with the study by (2013) (68%), Rengarajan et al (2017) (72/74), and Caruso et al (2017) (93%). Only 3.7% subjects in this study had intussusception at two different locations. Previous studies had reported that intussusception at two or more locations were indeed rarely found in children, and there were only few reports<sup>16,20</sup>.

Duration of symptoms till subjects sought medical advice was 2-3 days in 44.44% subjects and ≥ 4 days in 37.04% subjects. This was similar to previous findings, Singh & Singh (2015) reported that only 13.6% subjects had duration of symptoms 24-48 hours, 33.6% with duration of 48-72 hours, and 52.72% with duration of >72 hours. The length of symptoms until patients seek medical advice might be related to patients' age, as younger children might not be able to utter the symptoms.

Most of the subjects in this study were male. A Japanese guideline for pediatric intussusception, stated that the ratio of male-to-female was 2:1<sup>12</sup>, and three other wide-scale epidemiologic studies reported male-to-female ratio 1.6:1 to 2.1:1<sup>4,6,10</sup>. Though the numbers of ratio were different, those studies indicated that predominance of male patients in pediatric intussusception<sup>21</sup>. Nonetheless, the reason was not explainable.

The subjects were most commonly aged 4-6 months, followed by 7-12 months. This was along with the study conducted by Ahmad et al (2016), which reported that 68% of pediatric intussusception patients aged 6-12 months. However, this result differed from the one by Muhsen et al (2014), where subject aged 6-11 months constituted almost half (40%) of the subjects. A literature also stated that 75% intussusception cases occurred before 2 year old, and 90% occurred before 3 year old. It was still unknown the reason of tendency of occurrence between that range of age<sup>7</sup>.

This study had several limitations such as the study was conducted in one health centre only. Moreover, Adam Malik Public Hospital might have limited kind of cases, as it was a highest level of health care. The management was also limited, which there was no cases treated by open reduction. Several variables might also cause bias, such as the information of pain that might not be clearly known by history taking from the parents.

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