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Clinical Duration as a Predictor for Bowel Resection in Intussusception

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Abstract

Introduction. Delayed hospital presentation is a characteristic we found in management of intussusception in our institution. However, with this delayed, surgical intervention is the only option in treatment. Thus, duration of onset is an answered problem. We run a study aimed to find out whether duration is a predictor of bowel resection in management of intussusception.

Method. We run retrospective study on idiopathic intussusception managed in period of January 2008 to December 2015 in Cipto Mangunkusumo Hospital, Jakarta. Those other than idiopathic and insufficient data were excluded. Period of onset, signs and symptoms, ultrasound and surgical treatment as well as intraoperative findings were set as the variables and subjected to statistical analysis using χ^2 or Fisher's exact test and t-test; significance is met if p value of <0.05 . Analysis to find out cut-off point using receiver operating characteristic curve were carried out.

Results. There were seventy-three subjects diagnosed as intussusception enrolled in the study. Median age was 7 months (3-48 month). Median period of onset to definitive treatment was 81 hours (15-256 hours). Bloody stools found in 90.4% instead of classic triad (28.7%). All subjects underwent surgical procedure, and out of 73 subjects, 61.6% underwent resection. We found clinical duration was associated to bowel resection (p 0.004) and area under curve 73.7% (p 0.001). The cut-off point as prediction of bowel resection was 78.5 hours with sensitivity of 67.9% and specificity of 71.1%.

Conclusion. Surgical intervention is recommended for management of intussusception in those with clinical duration of more than 78.5 hours, instead of non-surgical reduction.

Keywords: *intussusception, clinical duration, bowel resection*

Introduction

Intussusception is a common gastrointestinal obstruction found in pediatric. Asymptomatic to non-specific one of primary (idiopathic) type is the most often found in our clinic lead to the difficulty in clinical diagnosis. However, in well developed countries, radiologic confirmation showed diagnostic accuracy in diagnosis let the appropriate treatment to be carried out within 24 hours' period of onset.^{1,2} Reports from developing countries showed that a considerable number of these children with intussusception, for some reasons were delayed presented to have a treatment appropriately.

Barium- and more recently air-contrasted enemas have been established as the initial diagnostic and therapeutic tools of choice in management of intussusception. Hydrostatic or pneumatic reduction of intussusceptions has been reported to be a successful treatment for more than 90% in the early stage, let a surgical correction to be spared. This kind of non-surgical reduction is somehow followed by reduced length of stay, shorten recovery period, decreased costs, and decreased the risk of complications related to abdominal surgery. Surgical reduction is then applied in those who were failed with non-surgically treated, or complicated ones. Resection of necrotic- and perforated bowel, or in the existence of a lead point that would not otherwise be expected to resolve spontaneously or manually, such as found in Meckel's diverticulum.^{3,4}

The characteristic of our population in dr. Cipto Mangunkusumo General Hospital is those with delayed presentation, where this

delayed might be contributed that surgical management as the treatment of choice. Thus, we run a study to assess this pre-hospital delays and analyze it as a clinical predictor of a necessity to carried out a bowel resection.

Method

This is a retrospective study enrolling subjects diagnosed as intussusception and managed in our hospital over a period of January 2008 to December 2015. We analyze data of medical record; those with symptoms and who were diagnosed clinically and abdominal ultrasound and treated surgically. Period of onset was recorded. Those with insufficient data and or otherwise than primary (idiopathic) were excluded. These variables were subjected to statistical analysis. Proportions were compared with χ^2 or Fisher's exact test and t-test was used; significance is met if p value of <0.05 . The analysis preceded to find out cut-off point using receiver operating characteristic curve. The study approved by Ethical Committee of Research in the Faculty of Medicine, Universitas Indonesia (Ethical Clearance No. 220/UN2.F1/ETIK/2016) and Research bureau of Cipto Mangunkusumo hospital (No. LB.02.01/X.2/353/2016).

Results

There were seventy-three subjects were diagnosed and treated for intussusception over an 8 year period. There were 45 boys and 28

girls (ratio 1.7:1) ranged of 3–48 months (median 7 months). The median clinical duration of onset to definitive treatment was 81 hours (range of 15–256 hours).

Table 1. Subject characteristics

Characteristics	Frequency n = 73	Percentage
Gender		
– Boys	45	61,6
– Girls	28	38,4
Clinical features		
– Bloody stool	66	90,4
– Vomiting	65	89
– Abdominal distension	40	54,8
– Abdominal pain	29	39,7
– Abdominal mass	19	26
Diagnostic methods		
– Ultrasound	66	90,4
– Surgical intervention	7	9,6
Type of surgical intervention		
– Manual reduction	28	38,4
– Bowel resection	45	61,6
Age	7(3-48) months	
Clinical duration	81 (15-256) hours	
Length of stay	7 (3-33) days	

The most findings in presenting sign and symptoms were bloody stool (90.4%), vomiting (89%), abdominal distension (54.8%) and abdominal pain (39.7%). Mostly there were more than a symptom found. Abdominal mass was less a common finding (26%). The classic triad (emesis, pain, and bloody stools) found in 21 subjects (28.7%). Just 9.5% of subjects showed both of classic triad and an abdominal mass on the assessment.

Table 2. Subject characteristics and bowel resection

Characteristics	Resection		Description
	Yes	No	
Age	8.49 ± 1.26	7.89 ± 0.77	0.384 [†]
Clinical duration	103.7 ± 49.4	69.89 ± 45.13	0.004 [†]
Clinical feature			
• Bloody stool	39	27	0.473 [†]
• Vomiting	41	24	0.952 [†]
• Abdominal distention	24	16	0.348 [†]
• Abdominal pain	18	11	0.750 [†]
• Abdominal mass	10	9	0.168 [†]
Diagnostic			
• Ultrasound	36	24	0.700 [†]
• Surgery	9	4	
Length of stay	10.53 ± 5.71	6.50 ± 3.41	0.001 [†]

[†] Chi square test, [‡] T-test

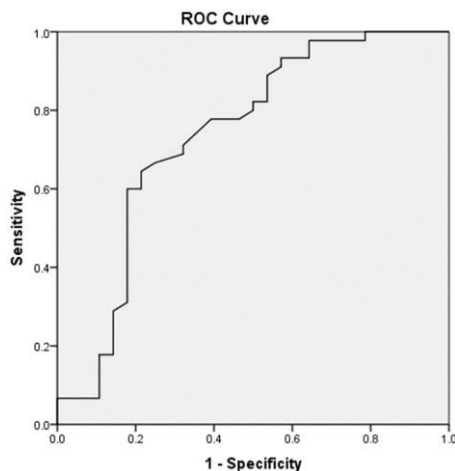


Figure 1. ROC curve of clinical duration and bowel resection

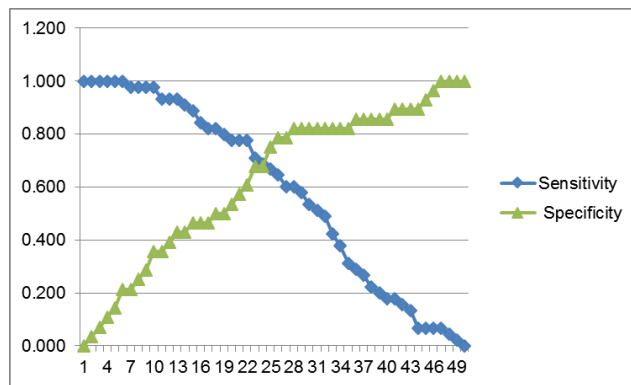


Figure 2. Cut-off point curve of clinical duration and bowel resection

All subjects were surgically treated. Out of 28 (38.4%) subjects' viable gut was found and preceded manual reduction with or without appendectomy; there were 45 (61.6%) subjects found to be necrotic, gangrenous or perforated, and gut resection were preceded with end to end anastomosis or stoma.

Overall median length of stay was 7 days (3–33 days). Those underwent manual reduction showed the mean length of stay of 6.5 days (+ SD 3.724), while as mean length of stay in those who underwent gut resection was 10.5 days (+ SD 6.552) and showed a difference 4 days stay longer than in those with manual reduction (p 0.001). Clinical duration showed association with the necessity for gut resection with (p 0.004). further analysis using area under curve we found 73.7% (p 0.001) and cut-off point was 78.5 hours with sensitivity of 71.1% and specificity of 67.9%.

Discussion

In the study we found the clinical duration showed cut-off point of 78.5 hours in predicting management plan in our case with intussusception. Those with clinical duration less than 78.5 hours referred to a candidate of non-surgical correction. In contrast, those who presented with duration more than 78.5 were prepared to an optimal condition to precede surgical intervention with the possibility of bowel resection; continued with end to end anastomosis or stoma (temporary or permanent). Such a treatment option remains of surgeon's consideration on patient's perspective comprehensively to obtain a better clinical outcome.

The diagnosis instituted based on clinical features, but one should note that most subjects representing non-specific signs and symptoms. Supposition should be placed when dealing with population of specific age as well as specific problems encountered. Mostly affected age group in our study is similar to the published reports, so does the gender.¹⁻⁸ In the perspective of signs and symptoms, in a study we found only 28.7% subject showed the classic triad of intussusception, while as in the published report this finding is a quarter.^{1,5-11} In a study, bloody stools is the most feature found (90.4%) which is higher than reported in former studies of 32–61%.^{3,4,11-14} With this evidence, it is reasonable to place bloody stool as the first objective finding might be found as a diagnostic criterion in intussusception of complicated one. Non-invasive diagnostic ultrasound that showed sensitivity and specificity near to 100% are available nationwide referred to a low cost diagnostic tool which is not only show a merit in diagnosis also useful in procedure of reduction using barium enema (ultrasound guided). Studies showed that sonographic imaging have been evaluated to predict reducibility of the intussusception using enema, and represent data of bowel necrosis.^{1,3,4,6-10} In a study, ultrasound is the most frequent used tools in diagnostic confirmation (90.4%); the rest (9.6%) were confirmed intra-operatively, as the subjects presented in emergency department

with strangulated, obstruction syndrome, and severe abdominal distension where emergency surgery and ultrasound assessment is not of necessity. In addition, expertise of ultrasound was found not match to the clinical diagnosis.

Studies reported that delayed presentation predisposes bowel complications requiring surgical intervention. This was found to be the evidence in a study that subjects presented after 24 hours of onset with clinical features such as rectal bleeding, abdominal distension, and absence of bowel sounds were associated with non-vital bowel intra-operatively. This intra-operative non-vital bowel was found increased in those with prolonged interval between onset to definitive treatment. The longer interval the more bowel complications will be found.^{2,4,10,11} In a study reported subjects with clinical duration after 48 hours' period of onset which was found as much as 86.7% were complained bloody stool (90.4%) and followed by bowel resection (61.6%). Kaiser et. al reported that 61% of their population requiring surgical intervention much higher than published reports in recent series, which is 8% to 34%.³ Presumably, the largest impact on this high rate of surgical intervention was the significant number of subjects with prolonged duration. One hundred and thirty-four (59%) subjects in their series had symptoms for >1 day, and 34% were resected. Most subject enrolled in a study in this group showed complicating, unusual, late presentations, or a complex past medical history.³ Khumjui et. al showed that 49% subjects were admitted more than 24 hours after the onset is associated with a significantly higher odds ratio of 2.65 for surgical intervention.¹² These findings imply that in the management of delayed presented subject of more than 24 hours of onset a surgeon should have a high suspicion of non-vital bowel and work the subject up for resection.² It is realized that bloody stool usually found as the last symptom found and showed a higher risk of bowel necrosis with consequent resection,^{1,5} but we found in the study bloody stool place the first objective finding in our population and we found find the cut-off point of clinical duration with bowel resection is 78.5 hours.

Conclusion

we concluded that a surgical intervention is recommended for management of intussusception in those with clinical duration of more than 78.5 hours, instead of non-surgical reduction.

Conflict of interest

Author disclose no conflict of interest.

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