

Hydrostatic Reduction for Intussusception in Children: A Safe Method in Uncomplicated Cases

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Abstract:

Introduction: Hydrostatic reduction under ultrasound guidance is a well-recognized alternative method for reduction of childhood intussusceptions. The various forms of enema in use for ultrasound guided liquid enema in use include portable tap water, normal saline or Ringers lactate solution. we did hydrostatic reduction of childhood intussusception using saline under US guidance,

Material & Methods: This prospective study was conducted in Government Generai Hospital, Srikakulam during December 2017 to April 2019. The children who presented with excessive cry and red current jelly stools and nausea were admitted and investigated.

Results: The present study conducted over a period of 16 months in a tertiary care hospital, a total number of 25 cases were presented with male preponderance. Their age ranged from 6 months to 36 months with a mean age of 9.8 ± 8.5 . The duration of symptoms ranged from 4 h to 96 h with a mean of 32.5 ± 25.8 h. The most common symptoms being colicky abdominal pain (100.0%), vomiting (78%), and palpable abdominal mass (68%). Two patients (8%) had recurrent intussusception during follow up. at an interval of 1 to 2 months after initial reduction. The duration of the procedure ranged between 8 min to 20 min, with a mean of 12.0 ± 3.5 min. The mean duration of admission between those who had successful reduction was 1.5 ± 0.3 days There was no mortality in our series.

Conclusion: Hydrostatic reduction of intussusception under real time ultrasound with normal saline enema is a suitable non-operative technique of managing childhood intussusception with a success rate of 88%.

Key words: Hydrostatic reduction, intussusceptions, children

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I. Introduction

Intussusception is one of the common abdominal emergency in infants and children. It is also seen in older children and in adults occasionally. The incidence of intussusception is approximately one to four per 2000 infants and children [1, 2]. Most (90%) of the intussusception are ileocolic, while the remaining 10% are of the ileoileal or colocolic type [3]. Hydrostatic reduction under ultrasound guidance is a well-recognized alternative method for reduction of childhood intussusception [4]. Kim et al. [5] described the first successful sonographic guided hydrostatic reduction of intussusception in 1982. Since then, there has been widespread use of this technique due to less morbidity and mortality compared with surgical form of treatment [6]. The other non-surgical methods are reduction with barium or air under fluoroscopic guidance [4,7]. The various forms of enema in use for ultrasound guided liquid enema in use include portable tap water, normal saline or Ringers lactate solution [7,9]. In a review by Bekdash et al. [10], the overall success rate of non-operative reduction of intussusception ranged from 46 to 94%, while recent studies reported that the success rate for hydrostatic reduction with saline ranges from 55.6 to 90% [1, 11,]. we did hydrostatic reduction of childhood intussusception using saline under US guidance, with the idea of reducing exposure to radiation, lessening absorption of radiation by the contrast media and decreasing potential peritoneal contamination in the event of iatrogenic perforation during attempted reduction

II. Material and Methods

This prospective study was conducted in Government Generai Hospital, Srikakulam during December 2017 to April 2019. The children who presented with excessive cry and red current jelly stools and nausea were admitted and investigated .

Inclusion criteria: children aged from 6 months to 3 yrs with ultrasound diagnosis of a doughnut or target-shaped mass on transverse images (hypoechoic edematous bowel surrounding a central area of increased echogenicity) and a pseudo-kidney appearance on the longitudinal images.

Exclusion criteria: children who presented with clinical features of severe dehydration, abdominal distension due to perforation and peritonitis, Prolapsed intussusceptions. History longer than 48 hours , Extremes of age - patient less than three months of age or more than three years , US demonstration of a thick irregular rim of the target measuring more than 10 mm , Absent Doppler signal on a color Doppler signifying non-viable bowel , Ultrasonic demonstration of a lead point

Technique: All patients were placed on intravenous infusion of 4.3Dextrose in 1/5 normal saline for hydration, nil per os, intravenous cefuroxime and metronidazole and urinary catheter to prepare the patient for laparotomy in case reduction failed. The USGHR was performed with the patient lying supine, an appropriate Foley catheter (10F – 18F) was inserted into the rectum and balloon inflated. No sedation was administered. Then pre-warmed Normal saline was suspended 120 cm: above the table level and allowed to flow into the colon under gravity. Under ultrasound visualization the retrograde flow of saline and the regress of intussusceptum were monitored. the peritoneal cavity was scanned intermittently to ruleout the bowel perforation

III. Results

The present study conducted over a period of 16 months in a tertiary care hospital, a total number of 25 cases were presented. There were 16 male and 9 female children with male preponderance M:F ratio 1.7:1.

Their age ranged from 6 months to 36 months with a mean age of 9.8 ± 8.5 The duration of symptoms ranged from 4 h to 96 h with a mean of 32.5 ± 25.8 h and a median of 22 h. The most common symptoms being colicky abdominal pain (100.0%), vomiting (78%), and palpable abdominal mass (68%).

Twenty-Five of the intussusception 22(88%) were ileocolic, 2 (8%) were colocolic while 1 (4%) were ileoileal intussusception. .

Factors affecting influence the hydrostatic reduction of intussusceptions :

the age and gender did not influence successful reduction of intussusception, Two patients (8%) had recurrent intussusception during follow up. at an interval of 1 to 2 months after initial reduction. These patients had successful reduction non-operatively. Most (23/25) of the reduction was achieved during the first attempt of the procedure The duration of the procedure ranged between 8 min to 20 min, with a mean of 12.0 ± 3.5 min. The mean duration of admission between those who had successful reduction was 1.5 ± 0.3 days There was no mortality in our series.

IV. Discussion

Intussusception is one of the common cause of intestinal obstruction in infancy and early childhood. Non-operative reduction has been the gold standard of treatment of intussusception in developed countries. Non-operative treatment for intussusception includes reduction with barium, air or saline enema under fluoroscopic or ultrasound guidance. The saline reduction under ultrasound guidance, has high success rates comparable to fluoroscopic barium or air reduction as per published data.

In the present study, 100% of the reduction was successful. This was similar to the findings of Sanchez et al. [15] in a subset of 14 children that underwent hydrostatic reduction with saline recorded 100% success rate.

Recurrence rate after hydrostatic reduction of intussusception ranges from 5 to 20% with a mean of 10% [16]. Recurrent intussusception in which there is a pathologic lead point even has a higher incidence of recurrence in about 8 to 9% of cases. Half of recurrent intussusception usually occurs within 48 h but recurrences up to 1.5 years later have been documented [17]. In the present study, the recurrence rate was 8%, which was consistent with other literature reports [1, 8]. Gray et al. [19] in a meta-analysis of recurrence rate of non-operative reduction of intussusception found a recurrence rate of 7.5% with saline reduction of intussusception. Recurrent intussusception is amenable to treatment via USGHR, even if it occurs several times [16]. In this series that two children had two late recurrences each at an interval of 1 to 2 months apart.

This study has shown that age and sex of patients has no role to play in the success of hydrostatic reduction. Our study finding is similar with most reports [1,10]. However, Nayak et al. [13] observed a lower successful reduction in young infants.

There is an important predictor of outcome of non-operative reduction of intussusception in children is The duration of symptoms Wong et al. [20] found that a mean duration of symptoms of 2.3 days did not affect the success rate of reduction. In contrast, Chung et al. [21] studied the risk factors leading to surgical reduction and found that long-standing duration of symptoms (> 24 h) was a risk factor for failed reduction. Khorana et al. [18] concluded that the presence of intestinal viability rather the long duration of symptoms is an important risk factor for failed reduction. In thirs series as in some reports [13, 14,] the duration of symptoms did not influence successful reduction of intussusception.

The incidence of intestinal perforation during USGHR appears to be low ranging from 0 to 10% in some series [1, 3, 4]. There is a risk of Bowel perforation due to over insufflation with fluid but most cases of perforation with reduction are said to have occurred before the procedure and as such, these are ‘unavoidable’

[13] Most of the perforation occurring during the procedure are due to intestinal gangrene rather than high intraluminal pressure from saline. In our present study as experienced by some researchers [7,8] no patient had intestinal perforations during the procedure due to case selection for hydrostatic reduction of intussusception. The careful selection of patients clinically combined with the use of color Doppler ultrasound to assess the vasculature of the bowel prior to reduction is important finding.

V. Conclusion

Hydrostatic reduction of intussusception under real time ultrasound with normal saline enema is a suitable non-operative technique of managing childhood intussusception with a success rate of 88% in our study. The approach is simple safe and cost effective.

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