

NON-OPERATIVE REDUCTION OF INTUSSUSCEPTION IN INFANTS

Mohammad Imran, Mohammad Ayub, Muhammad Yunas,
Viqar Aslam, Inayat Ur Rehman, Abdul Manan

Department of Pediatric Surgery and Department of Radiology,
Riyadh Medical Complex, Riyadh, Kingdom of Saudi Arabia &
Khyber Teaching Hospital, Peshawar

ABSTRACT

Objective: To study the effectiveness of non-surgical intervention in children with intussusception using barium enema reduction under fluoroscopy.

Material and Methods: This retrospective study spread over a period of 1 year and six months from January 2005 to June 2006 was carried out in children and maternity hospital, Riyadh medical complex, Riyadh, Khyber Teaching Hospital Peshawar.

A total of 33 patients, diagnosed cases of intussusception, with duration of symptoms not more than 24 hours were included in this study. Barium enema reduction was tried in all patients, exclusion criteria was patients with sign and symptoms of peritonitis, shock, duration of symptoms more than 30 hours and massive abdominal distension.

Results: Out of thirty three cases, twenty seven (81.8%) were reduced by barium enema, and only six (18.2%) patients required surgical interventions, five (15.2%) were reduced manually during surgery and only one (3%) required resection and anastomosis a patient in which perforation occurred at splenic flexure during barium enema reduction

Conclusion: Surgical intervention in intussusception can be prevented by hydrostatic reduction especially if presented early and no signs of peritonitis.

Key words: Intussusception, Barium Enema, Hydrostatic Reduction.

INTRODUCTION

Intussusception is a condition in which part of intestine telescopes into the lumen of adjacent gut and is the most common cause of intestinal obstruction in infancy. If untreated can lead to gangrene of gut and even death.¹ In children it is related to idiopathic intestinal lymphoid hyperplasia in about 90% of cases, while secondary causes due to pathologic lead point such as intestinal lymphoma, polyp, and Meckle's diverticulum are rare.² Intussusception can also occur after surgery and from blunt abdominal trauma.^{3,4}

It commonly presents with abdominal pain, vomiting, passage of red current jelly stools, a sausage like mass in right iliac fossa and lethargy.

Peak incidence is between 4th and 10th month of age with male to female ratio of 2:1.⁵

Typical history, examination, along with abdominal ultrasound is the usual diagnostic modality for intussusception. Barium enema is diagnostic as well as therapeutic and should be attempted in all cases if presented early. Surgery is reserved for those cases in which barium enema fails, long duration of symptoms or in case of shock, peritonitis and gross abdominal distension.⁶

MATERIAL AND METHODS

This retrospective study was conducted at children and maternity hospital in Riyadh medical complex, Riyadh and Khyber Teaching Hospital Peshawar. The duration of the study was one year and six months, from January 2005 to June 2006;



Fig 1. Barium enema reduction under fluoroscopy control in patient with intussusception



Fig 2. Intussusception reduced by barium enema under fluoroscopy

Infants 3-12 months of age were included in the study with duration of symptoms not more than 24 hours. Total number of patients were thirty three, (23 male and 10 female patients). The patients with duration of symptoms for more than 24 hours, those in shock, gross abdominal distension and peritonitis were excluded from the study. All patients were referred from periphery to emergency department and later admitted to pediatric surgery ward. All investigations were done in periphery hospital along with ultrasound (diagnosed cases of intussusception). They were reassessed in the hospital and in case of doubt u/s and relevant investigations were repeated. Patient's Intravenous line was already established and i/v fluids were started was shifted to radiology department, temperature of the room was maintained around 37 degree Celsius, size 16 Foleys catheter passed per rectum and balloon inflated, barium enema under fluoroscopy control was given from height of 3 feet, 3 attempts were made and each attempt was for 3 minutes. All this procedure was carried out with out anesthesia. But during this procedure operation theatre was ready for any surgical intervention, in case of perforation or failure of the procedure. Figures 1 & 2 show the Intussusception reduced by barium enema under fluoroscopy.

Twenty seven patients with intussusception hydrostatic reduction was possible

after 2-3 attempts, in one patient perforation occurred during reduction at splenic flexure, was shifted immediately to operation theatre and resection/anastomosis was performed. In remaining 5 patients, per operative manual reduction was done.

RESULTS:

This study was conducted on 33 children admitted with intussusception. Out of these 33 cases 23 (69.69%) patients were males and 10 (30.31%) patients were female. Male to female

SUCCESSFUL REDUCTION OF INTUSSUSCEPTION AND SURGICAL INTERVENTION

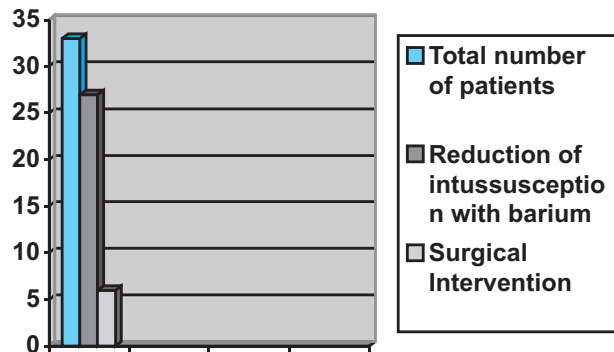


Figure 3

AGE DISTRIBUTION

Age Groups	Frequency	% age
a. 3-6 months	18	51.42%
b. 7-9 months	13	37.14%
c. 10-12 months	5	14.28%

Table 1

ratio was 2.3:1. Majority of patients (51.42%) belong to 3-6 months age group (table 1).

The common signs and symptoms were abdominal pain and vomiting present in all patients (table 2) followed by bleeding per rectum (60%).

Among thirty three patients, 27(81.81 %) cases of intussusception were reduced by barium enema under fluoroscopy, and only 6(18.18%) cases required surgical intervention (Figure 3), all these patients were male, in which 5 were reduced manually during surgery and one required resection /anastomosis.

Complication of the procedure include perforation of intestine, causing barium peritonitis, that's why no attempt with barium should be tried in delayed cases for reduction of intussusception.

DISCUSSION

In 1876 Hirschprung first reported the technique of hydrostatic reduction, and after monitoring a series of 107 cases, reported 35% mortality rate in 1905.⁷

Idiopathic intussusception is very common in infants and rare in older children^{8,9}, but significant variability in diagnosis and treatment exist^{1,2,9-11} and age varies from 4-12 months.¹²

In our study we used barium enema for diagnostic as well as therapeutic purpose. We selected patients, diagnosed case of intussusception with symptoms lasting for not more than 24 hours.

In addition to barium enema, air enema can also be used, and is the technique of choice in most of the centers; it can be used under fluoroscopy as well under ultrasound guidance.¹³ The success rate of air enema reduction ranging from 75-85%.¹⁴⁻¹⁷

Saline enema is the other method of hydrostatic reduction, but in contrast to other methods of hydrostatic reduction, this method of reduction is under ultrasound guidance and ultrasound expertise is required.¹³

In our study the common age group

CLINICAL FEATURES OF INFANTS WITH INTUSSUSCEPTION

Clinical Features	Frequency (n=33)	% age
Abdominal pain	33	(100%)
vomiting	33	(100%)
Bleeding per rectum	21	(60%)
Mass In Right Iliac Fossa	13	(37.14%)

Table 2

presented with intussusception was in the age range of 3-12 months, other study has also reported the same age group¹⁸. The male to female ratio in our study was 2.3:1; it is in comparison with the literature (2.3:1).^{18,19}

It is well documented that the success rate of enema technique is up to 95%.^{20,21} In our study the success rate was 81.81%. In one study done in Japan²², the success rate of barium enema reduction was 94.4%, in other study hydrostatic reduction as successful in 50% cases but it included all cases, even patients who have presented late.²³

Peh Wc et al in their study found the sensitivity of hydrostatic reduction to be 92.9%.²⁴ While, Hadidi T, et al in their study found that success rate of hydrostatic reduction by barium enema was 70%.²⁵

During this procedure reduction is confirmed if there is free flow of barium into terminal ileum, expulsion of faeces and flatus with barium, disappearance of mass and clinically child becomes comfortable, reduction attempts are abandoned.²⁶

Sometimes surgery is needed for intussusception. Surgery may be needed if:

- Enemas have not corrected the problem after two or three attempts.
- Doctors suspect that the intestine has been damaged and needs to be repaired.
- The child is very ill or the intestine has ruptured, leaking stool into the abdomen.

Sometimes intussusception recurs.

- About 10% of the time, intussusception recurs in children after it has been treated with enemas. If intussusception recurs after it has been treated with enemas, additional enemas or surgery may be needed.²⁷
- From 2% to 5% of the time²⁸, intussusception recurs in children after it has been treated with surgery. If intussusception recurs after surgery, another surgery of the abdomen is usually needed to correct it again,

to look for other conditions that may be causing the condition, or to remove the portion of the intestine that is involved

The pediatric surgeon should be the chief observer of the patient from presentation to the end of management to detect any delicate change in clinical findings, especially in the presence of discordance between the radiologic studies, since intussusception is a dynamic diagnosis. Continuation of symptoms of irritability and vomiting and clinical signs of abdominal distention-tenderness and a palpable mass even after notification of reduction radiologically should alert the surgeon to reevaluate the patient. Similarly, disappearance of presenting symptoms and clinical signs rapidly despite the insistence of radiologic evidence of intussusception may warrant a follow-up period during which the radiologic study could be undertaken by a more experienced radiologist before doing surgery. The use of laparoscopy for diagnosis of failure of reduction of intussusception and the hydrostatic reduction by saline enema during laparoscopy can be alternative methods to prevent unnecessary laparotomy, as mentioned recently.^{29,30}

CONCLUSION

1. Early cases can be treated conservatively with barium enema (diagnostic as well therapeutic)
2. General anesthesia is not required, as this procedure can be performed with out G/A.
3. Later complications of surgery like adhesion can be prevented with this technique.
4. New technique like air reduction under fluoroscopy and saline enemas reduction under ultrasound guidance are also available in developed countries, and are the technique of choice.(where the expertise are available).

REFERENCES

1. Difiore JW. Intussusception. *Semin pediatr surg.* 1999;8:214-20.
2. Stringer MD, Pablot SM, Brereton RJ. Paediatric Intussusception. *Br J Surg* 1992;19:867-876.
3. Linke F, Eble F, Berger S. Postoperative intussusception in childhood. *Pediatr surg int.* 1998;14:175-177.
4. Kamodina R, Smrkolj V. Intussusception after blunt abdominal trauma. *J Trauma* 1998;45:616-7.
5. Rehman A, Al-Bassan, Orfale N. Intussusception in infants and children. *Annals Saudi Med* 1995;15(3):205-8.
6. Otsu Kazuhiro, Hydrostatic pressure reduction by barium enema for intussusception in children. *Japanese J Pediatr Surg* 1999; 31(5):459-62.
7. Hirschprung;H: Tifaelde of Subakut Tarminvagination,Hospitalstid:1876:3:321
8. Hans-Iko H; Montse SG, Emmanuel G, Elisabetta F, Zsofia M, Ulrich D, et al. Intussusception among Young Children in Europe. *Pediatric Infectious Disease J* 2006, 25(1):S22-29.
9. Simanovsky N, Hiller N, Koplewitz BZ, Eliahou R, Udassin R. Is non-operative intussusception reduction effective in older children; *Pediatr Surg Internat* 2007;23(3); 261-64.
10. Beasley SW, Myers NA. Intussusception: current views. *Pediatr Surg Int* 1998; 14 :157.
11. Schmit P, Rohrschneider WK, Christmann D. Intestinal intussusception survey about diagnostic and nonsurgical therapeutic procedures. *Pediatr Radiol* 1999;29:752-61
12. Daneman Alan; Navarro Oscar; A review of diagnostic approaches. *Pediatric Radiology* 2003; 33 (2):79-85.
13. Ravitch MM, McCnne RM. Intussusception in infants and children. *J Pediatr* 1950;37:153
14. Lee JH, Choi SH, Jeong YK, Jeong AK. BS Intermittent sonographic guidance in air enema for reduction in childhood intussusception. *J Ultrasound Med* 2006, 25: 1125-30.
15. Bajaj L, Roback MG. Post reduction Management of Intussusception in a Children's. *Pediatrics* 2003; 112 (6): 1302-7.
16. Shapkina AN, Shapkin VV, Nelubov IV, Pryanishena LT. Intussusception in children: 11-year experience in Vladivostok. *Pediatr Surg Internat* 2006, 22(11):901-4.
17. Eshed I, Witzling M, Gorenstein A, Serour F. Reduction of intussusception by air enema in children. *Harefuah* 2003;142(10):659-61.
18. Meraj MZ, Brereton RJ. Intussusception in children beyond infancy. *J Coll Physicians Surg Pak* 1997;7(3):118-21.
19. Mirilas P, Koumanidou C, Vakaki M, Skandalakis P, Antypas S, Kakavakis K. sonographic features indicative of hydrostatic reducibility of intussusception in infancy and early childhood. *Eur Radiol* 2001;1125:76-80
20. Eshel G, Barr J, Heiman E, Bistritzer T, Broide

- E, Klin B, Aladjem M . Incidence of recurrent intussusception following barium vs air enema. *Acta Pediatr.*1997; 86:545 –546
21. Daneman A, Alton DJ, Lobo E, Gravett J, Kim P, Ein SH. Patterns of recurrence of intussusception in children: a 17 year review. *Pediatr Radiol* 1998; 28:913 –9.
 22. Otsu Kazuhiro, Furuta yasuhiko, Ogura yoshio. Hydrostatic Pressure Reduction by Barium Enema for Intussusception in Children. *Japan J Pediatr Surg* 1999,31(5):459-62.
 23. Zamir P, Mogle Z, Lernai D, Branski, Nissan. The efficacy and limitation of barium enema in treatment of intussusception in infancy and childhood, *Pediatr Surg Int*, 1987;2(2):105-107
 24. Peh WC, Khong PL, Lam C, Chan KL, Saing H, ChengLam WW, Leong LL, Low LC. Ileoileocolic intussusception in children diagnosis and significance. *Br J Radiol* 1997;70(837):891-6.
 25. Hadidi AT, El Shal N. Childhood intussusception: a comparative study of nonsurgical management. *J Pediatr Surg.*1999; 34:304 –7.
 26. Rosenkrantz JG, Cox JA, Silverman FN, Martin LW. Intussusception in 1970. Indication for operation *J Paediatr Surg* 1977; 12:367-71.
 27. Wyllie R. Intussusception section of Ileus, adhesions, intussusception, and closed-loop obstructions. In RM Kliegman et al., eds., *Nelson Textbook of Pediatrics*, 18th ed 2007., pp. 1569–1571
 28. Kaiser AD, Kaiser AD, Applegate KE, Ladd AP. Current success in the treatment of intussusception in children. *Surgery* 2007;42(4): 469–477.
 29. Grant R, Piotto L. Benefits of sonographic-guided hydrostatic reduction opposed to air reduction in a case of intussusception due to lymphoma. *Australas Radiol* 2004; 48: 264-6.
 30. Van M, Bax NM. The role of laparoscopy in the management of childhood intussusception.

Address for Correspondence:**Dr Mohammad Imran**

Department of Pediatric Surgery,
Khyber Teaching Hospital,
Peshawar, Pakistan.

Email. Imranmohammad19@hotmail.com