

Intussusception in children: A clinical versus imaging diagnosis

Dr. Khlabus. Kh. Raddam / M. B. Ch. B, C. A. B. P^{*}, Dr. Razzaq. Jameel. Hthaya / M. B. Ch. B, C. A. B. P^{*}, Dr. Ali Jarin. Hasson / M. B. Ch. B, F.I.C.M.S^{*}

Abstract:

A prospective study was conducted on 90 patients who were admitted at Al-Nassiriya pediatric hospital from the period of 1.1.2002 – 31.12.2006. Their history and clinical examination were highly suggestive of intussusception's. Plane abdominal radiography and ultrasound were done for all cases in an attempt to support clinical diagnosis and to compare the efficacy of both tools in the diagnosis of intussusceptions. It was found that males were more commonly affected than females with male: Female ratio of 3: 1. The majority of cases were below 2 years of age (91.34%) with (71.56%) of total number of cases were below one year. No obvious cause for intussusception could be detected in the majority of cases. A pathological leading point as a cause for intussusception reported in only (8.64%) of cases. The findings on clinical bases were compatible with results of ultrasound examination and with the operative findings; clinical examination never missed any case. Ultrasound examination had an efficacy of 100 % in detecting cases of intussusception compared with (49%) for plane radiography. The study had concentrated on the fact that a high index of suspicion and careful evaluation of each patient are essential in detecting cases as early as possible thus avoiding serious complications imposed on late diagnosis.

Key words: Intussusception, Pediatrics, imaging diagnosis, Thi qar

ملخص البحث:

لقد تم إشراك ٩٠ مريض ممن أدخلوا مستشفى الأطفال في الناصرية في دراسة مستقبلية للفترة من ٢٠٠٢/١/١ ولغاية ٢٠٠٦/١٢/٣١، حيث كان تأريخهم المرضي والفحوصات السريرية ترجح بدرجة عالية جدا إصابتهم بتداخل الأمعاء. لقد تم عمل أشعة البطن المستوية وفحص السونار لكل الحالات في محاولة لدعم التشخيص السريري ولمقارنة كفاءة أشعة البطن المستوية والسونار في تشخيص حالات تداخل الأمعاء. لقد وجد من الدراسة أن الذكور هم أكثر عرضة للإصابة من الإناث بثلاثة مرات. إن أغلب الحالات (٣٤,٩١ %) هم دون السنة الثانية من العمر كما أن (٥٩,٧١ %) من الحالات هم دون السنة الأولى. لقد وجد أن هنالك سبب مرضي لتداخل الأمعاء في (٨٦,٤ %) من الحالات، ولكن في الغالبية العظمى (٣٦,٩١ %) لم يكن هنالك سبب واضح. كانت نتائج الفحوصات السريرية مطابقة لنتائج فحص السونار ولما وجد فعلا أثناء العمليات الجراحية. لم يخفق التشخيص السريري في أي حالة. تبين من الدراسة أن لفحص السونار كفاءة تشخيصية ١٠٠ % مقارنة بأشعة البطن المستوية (٤٩ %). لقد ركزت الدراسة على وجوب وجود درجة عالية جدا من الشك وتقييم كل حالة بصورة جيدة للوصول إلى تشخيص مبكر لتفادي المضاعفات المتسببة عن التشخيص المتأخر.

* Department of Pediatrics, College of Medicine, Thi-Qar University

Introduction

Intussusception occurs when portion of the alimentary tract is telescoped into adjacent segment leading to venous compression and bowel wall edema ^(1, 2). If not diagnosed and treated early, the disease process may progress to arterial obstruction, bowel Necrosis, perforation and death ⁽³⁾. Among children, most intussusception develops in the first year of life ^(2, 4). cases rarely occur in children before 2 months of age, reach a peak in 5 – to 7 – month – old children, and then suddenly decline ^(5, 6). It is the most common cause of intestinal obstruction in children aged 2 years and below ⁽²⁾. The cause of this condition in this age group remains unclear ⁽⁷⁾, although infectious agents (Bacterial and viral), gender and environmental or developmental factors have all been implicated ^(2, 8). Of various infectious agents, adenoviruses have been most frequently implicated, but rotavirus, picorna viruses, and herpes also have been suspected ^(2, 9, 10). It has postulated that the introduction of new food proteins result in swollen peyer patches in the terminal ileum leading to mucosal prolapse of the ileum into the colon, thus, causing an intussusception ⁽⁴⁾. There was a substantial increase in the risk of intussusception in infant one year of age or younger after the introduction of the tetravalent rhesus-human reassortant

rotavirus vaccine with in two weeks of immunization ⁽⁴⁾. Reports from the UK showed that there was no evidence to indicate a relationship between OPV and intussusception ⁽¹¹⁾, mean while other studies from India showed alack of the association between diarrheal disease and intussusception ⁽¹²⁾.

In children older than 2 years predisposing anatomic conditions, such as Meckel's diverticula's or polyps can be involved ⁽¹³⁾. The findings of a leading point was variable in different reports ranged between (5.5%) ⁽¹⁴⁾ – (9.5%) ⁽¹⁵⁾. The most common type of intussusception in children is the ileocolic ⁽¹²⁾. The clinical history and physical findings are usually sufficiently typical for diagnosis ⁽⁴⁾. The triad of colicky abdominal pain, bloody stools, and a palpable mass leads to the correct diagnosis in most cases. However, it is somewhat distressing that the similar presentation with abdominal pain, vomiting, and bloody stools in an older child may not result in nearly so urgent diagnosis leading to delayed or inadequate management of such cases because of lack of suspicion of the correct diagnosis ^(16, 17). The aim of this study is to draw an attention toward the importance of careful clinical evaluation and early recognition of intussusception thus avoiding any delay that might lead to serious complications.

Materials and Methods:

We have studied all cases suspected of having intussusception who were admitted to the pediatric department at Al-Nassiriya maternity and children hospital from the period of 1-1-2002 – 31-12- 2006. History obtained from the mother regarding age, sex, history of introduction of new foods in the infant's diet, history of upper respiratory tract infection or recent immunization and the duration of illness before consultation, careful clinical examination was conducted for all patients including P.R examination. Although clinical examination was the main tool for diagnosis but plane abdominal radiography and ultrasound were done for all cases to support our diagnosis and to compare the efficacy of both tools in detecting real cases of intussusception. Barium enema was not available, suspicious cases were kept under observation and dealt with according to the future progress. Any child suspected to have intussusception was considered as emergency; clinical examination and assessment of the general condition was made, serum electrolytes, blood urea and blood sugar were also requested, the state of hydration was assessed and corrected and the Abdomen was examined for the presence of mass or any evidence of peritonitis. The treatment was

started when the general condition was stable and fit for surgery. All the postoperative reports including the pathological findings and mortalities were obtained from the surgical department.

Results:

It was found that males' percentage (75.30 %) more than that for females (24.69 %) with male: female ratio of 3: 1. The majority of cases (91.34%) were below 2 years and (71.59 %) of total number of cases were below one year as shown in Table – 1. Most of the cases consulted the hospital after 24 hours from the start of symptoms (69.12%) as shown in Table – 2. The main presenting symptoms were vomiting and abdominal pain seen in (95%) and (79%) of cases respectively, while the main signs were Abdominal mass and red currant jelly seen in (71.60%) and (70.37%) of cases respectively. Lethargy out of proportion to the abdominal signs seen in most of the cases (86.40%), and the distribution of cases according to clinical signs and symptoms all are presented in Table – 3.

None of the real cases of intussusception was missed by clinical examination (81 cases); but nine cases out of the 90 cases examined and who were suspicious clinically proved not to be intussusception. In 60 cases out of 81 the radiography was highly suggestive (74 %); but in 40

patients out of 60 (49% of total Number of cases) the radiological findings were compatible with the result of ultrasound examination and with operative finding of intussusception. Most of the cases treated by bowel resection (56.76 %), while in the remaining (43.20%) bowel reduction was done as shown in Table – 4. A leading point as a cause for intussusception was reported in seven cases (8.64 %); polyps in four cases, Meckel's diverticulum's in two cases; and small bowel lymphoma in one case.

Ten Patients died (12.34 %):

4 cases due to peritonitis and sepsis

2 cases due to electrolytes disturbances

2 cases due to fatal faecal fistula

one case due to small bowel lymphoma

one case due to aspiration pneumonia

Discussion:

It was found that intussusception is more common in males than females with male: Female ratio of 3: 1, this result is similar to what had been found in other studies done in Iraq ⁽¹⁸⁾, and outside ⁽¹⁹⁾.

The majority of cases were below two years of age (91.34%) with (71.59 %) of total number of cases were below one year. The last results are similar to the findings

in other studies done in Iraq ⁽¹⁸⁾, and in India ⁽¹²⁾. Most of the cases consulted the hospital after 24 hours from the start of their symptoms, and this reflects the delay in diagnosis, as many patients were treated as gastroenteritis and others were treated as amebic dysentery by general practitioners. The main presenting symptoms were vomiting and abdominal pain, while the main presenting signs were abdominal mass red currant jelly; these results are similar to what had been reported in other studies done in Iraq ⁽¹⁸⁾ and aboard ⁽²⁰⁾. Lethargy out of proportion to abdominal signs was reported in most cases in our study (86.40%), similar to the results of studies done outside ^(21, 22). The clinical signs and symptoms described in our study (vomiting, Abdominal pain, Abdominal mass, red currant jelly) are present in more than 70% of cases and can lead to the correct diagnosis, similar to the findings in recent prospective studies done aboard ⁽²³⁾.

None of the real cases of intussusception were not diagnosed clinically or missed, but the nine cases out of 90 who were suspicious clinically proved not to have intussusception.

Plane Abdominal X. ray was performed for all cases as initial investigation of a cute abdomen and to screen for other diagnoses and in the differential diagnosis,

such as constipation, free peritoneal air. Highly suggestive radiography reported in 60/81 cases; but in 40 cases out of the 60 cases the radiological findings were exactly compatible with the correct diagnosis, thus plain Abdominal radiography had an efficacy of 49% in detecting real cases of intussusception, similar to the results recorded in other study⁽²⁴⁾. Ultrasound examination had never missed any case of intussusception which were all proved at laparotomy also, thus ultrasound examination had an efficacy of 100%; these findings are supported by similar results of studies done outside the country^(25,26). At laparotomy 35 patients (43.20%) were treated by reduction of the bowel, while 46 (56.76%) were treated by bowel resection. Leading points for intussusception recorded in 7 cases (8.64%), the last result is similar to what had been reported in other studies⁽¹⁵⁾. Leading points were:

Polyps in 4 cases

Meckel's diverticulum in 2 cases

Small bowel lymphoma in one case

10 patients died in hospital (12.43%)

4 Cases due to sepsis

2 Cases due to electrolytes disturbances

2 cases due to faecal fistula

One case due to small bowel lymphoma

One case due to aspiration pneumonia

The mortality is less than other developing countries, which was as high as 18%⁽²⁷⁾. From the study, we concluded that:

Intussusception is mainly a clinical diagnosis

High index of suspicion is essential particularly in a young male <2 years with suggestive signs and symptoms.

Ultrasound examination has an efficacy of 100% in detecting intussusception.

Thus, we recommend concentrating on:

Earlier recognition and treatment of the intussusception

Improvement in the post anesthetic care with better monitoring leading to prompt recognition and treatment of postoperative complications

Intussusception in children: A clinical versus imaging diagnosis

Table (1): Age distribution of cases

Group	Age range	No. of patients	Percent
Group 1	Below 5 months	10	12.34 %
Group 2	6 – 12 months	48	59.25 %
Group 3	13 – 24 months	16	19.75 %
Group 4	Above 24 months	7	8.64 %
Total		81	100 %

Note: The youngest patient was 4 months old and the oldest one was 12 years old.

Table (2): Distribution of cases according to the duration of illness before hospitalization

Duration	No. of cases	Percentage
< 24 hours	25	30.86 %
25 – 48 hours	48	59.25 %
> 48 hours	8	9.87 %
Total	81	100 %

Table (3): The Distribution of cases according to clinical signs symptoms

Signs and symptoms	No. of cases	Percentage
Emesis	77	95 %
Billious vomiting	48	59.25 %
Abdominal pain	64	79 %
Bleeding per rectum	48	59.25 %
Red currant jelly on P.R	57	70.37 %
Abdominal Mass	58	71.60 %
Lethargy	70	86.40 %
Abdominal distension	8	9.87 %
Fever > 38 C	12	14.81 %
Abdominal pain on palpation	36	44.44 %
Palpable mass per rectum	5	6.17 %
Prolapsing bowel from anus	2	2.46 %

Note: A large number of patients presented with more than one sign symptom.

Table (4): Types of surgical treatment

Surgical treatment	No. of cases	Percentage
Bowel resection	46	56.76 %
Bowel reduction	35	43.20 %
Total	81	100 %

References:

1. Daneman A, Alton D j. Intussusception: issues and controversies related to diagnosis and reduction. *Radiol clin North Am.* 1996; 34: 743 – 756
2. Stringer M D, Pablot S M, Brereton R J. Paediatric intussusception. *Brj Surg.* 1992; 79: 867 – 876
3. Stevenson R J. Intussusception in: Rudolph A M, Hoffman J I E, Rudolph C D, eds, *Rudolph's Pediatrics*, Stamford, conn: Appieton and lange; 1071 – 1972.
4. Robert Wyllie; Intussusception: In *Nelson Text book of pediatrics*, Richard E B, Robert M K, Hal B J. 17th edition. W B. Saunders, 2004; 1242 – 1243.
5. Cooke C D, Lewis E C. A thirty – year survey of acute intussusception in childhood. *Lancet.* 1960; 7165: 1359 – 1364.
6. Hut Chinson I F Olayiwola B, young DG. Intussusception in infancy and childhood *Brj surg.* 1980; 67: 209 – 212
7. Rarashar U D, Holman R C, cummings K C, stags N W, Curns A T, Zimmerman V M, et al. Trend in intussusception–associated hospitalizations and death among us infants. *Pediatrics* 2000, 106: 1413 – 1421.
8. Montgomery E A, Popek E J, Intussusception, adenovirus, and children: a brief reaffirmation. *Hum Pathol* 1994; 25: 169 – 174.
9. Hsu H Y , Kao C L , Huang Km, Ni Y H, Lai HS, Lin FY, et al. Viraletiology of intussusception in Taiwanese childhood. *Pediatric infect Dis J* 1998; 17: 893 – 898.
10. Nicolas J C, Ingrand D, Fortier B, Bricout F. A one – year virological survey of acute intussusception in childhood. *J. Med varol* 1982; 9: 267 – 271
11. Aonymous. Oral polio viruse vaccine and intussusception. *Weekly Epidemiological Record* No. 43. 2000; 75: 345 – 347.
12. Traman, Ceerpen, Varuldas, Abose, Ssen, M K Estes, G Kang, (edt); intussusception in southern Indian *Journal of Gastroenterology* 2003 Vol. 22
13. Stvil D, Brandt M L, Panic S, Bensoussan A L, Blanchard H, Meckels diverticulum in children: a 20 years review. *J. Pediatric surg.* 1991; 26: 1289 – 1292

14. Ein S H. Leading points in childhood intussusception. *J pediatric* 1976; 11: 209 – 211.
15. Ong N T, Beasley S W, The lead Point in intussusception. *J pediatric surg* 1990; 25: 640 – 643.
16. Karakousis, C., Holyoke, E. G. and Donglass, H. O.: Intussusception as a complication of malignant neoplasm. *Arch. Surg.*, 109: 515 – 518. 1974.
17. Wayne , E. R., Campbell, J. B., Kosloske , A. M. and Burrington, J. D.: Intussusception in the older child-suspect lymphosarcoma, *J. Pediatric . Surg .* , 11: 789 – 794, 1976.
18. Al-SHAHWANI ABDUL RHMAN; The use of Air INSUFLATION In MANAGIG Intussusception; *J. Fac. Med. , Baghdad* 2001 , Vol. 43 , No. 2 , Page 173 – 178 .
19. Ugwu B T, Letgbo J N, DAKUM N K, Yiltok S J, Mbah N; Uba FA: Childhood intussusception: 9 year review. *Ann Trop paed* 20 (2): 131 – 135, 2000 Jan.
20. Nathan Kuppermann, MD, MPH; Terosa O'Dea, MD; Cynthia Hoecker, MD: Intussusception in young children. *Arch Pediatr Adolsc Med*, 2000, 154: 250 – 255.
21. Conway EE Jr. Central nervous system findings and intussusception: How are they related? *Pediatr emerg care*; 1993: 15 – 18.
22. Rachmel A, Rosenbach Y., Amir J., Dinari G, Shoenfeld T, Nitzan M, Apathy as an early manifestation of intussusception, *AJDC*, 1983; 137: 701 – 702 .
23. Harrington L, Connolly B, Hux, Wesson DE, Babynp, Schuh S. Ultra-sonographic and clinical predictors if intussus caption. *J Pediatr*. 1998; 132: 836 – 839.
24. Bolin H. Conventional radiography in the diagnosis of intussusception in children. *Acta Radiol Diagn* 1964, 2: 32 – 40.
25. Pracros J P, Tran – Minh V A, Morin definfe C H, Deffrenne – Pacros P, Louis D, Basset T. Acute Intestinal intussusception in children. Contribution of ultrasongoraphy (145 cases). *Ann Radiol (Paris)* 1987; 30 (7): 525 – 530.
26. Verschelden P, Filiatrault D, Garel L, Grignon A, Perreault G, Boisvery J, Dubois J, Intussusception in children: reliability of us in diagnosis – a prospective study: *Radiology* 1992 Sep; 184 (3) : 741 – 744 .

Intussusception in children: A clinical versus imaging diagnosis

**27. Donald E. Meier, C. Dale colon, Frederick J. Rescorla, Akintayo
olaolorum, John L. Tarpley, Intussus-ception No 8, 1996 page:
1 – 2.**