

Role of ultra sonography in differentiating the surgical and non- surgical cases of intussusception

By

Ashraf Talaat Youssef *G.E Ahmed ** El Kassem Ahmed El Gameel.**

From

Departments of Radiology* and pediatrics , Faculty of medicine , Fayoum university**

Abstract :-

Background :*Intussusception is the invagination of bowel segment into the lumen of more distal bowel ,intussusception is mostly ileo colic but can be ileo ileal and Colo colic, the diagnosis depends on clinical criteria and imaging modalities.*

Ultrasonography can be used with high accuracy in the diagnosis . Cases of intussusception can be managed surgically or conservatively .

Objectives :-

The aim of the study is to assess the usefulness of ultrasonography in differentiating surgical from non surgical cases of intussusception .

Materials and methods :

100 cases of clinically suspected intussusception were examined using the ultrasonography . We assessed the length of intussusception mass , presence of enlarged lymph nodes ,

The wall vascularity using the color doppler technique , the presence of dilated small intestinal loops and free peritoneal fluid . The results were correlated with that of surgery and clinical follow up.

Results :-

30 cases were diagnosed by ultrasonography.

All cases which showed dilated small intestinal loops , free peritoneal fluid and absence of wall vascularity were managed surgically

- *40 % of cases showed enlarged lymph nodes within the intussusception mass .Among them 33 % of cases managed Surgically .*
- *60 % of cases showed intussusception mass length >3.5cm ,among them 54 % of cases managed surgically and 6 % improved with conservative follow up*
- *4 % of cases of intussusception mass length < 3.5 cm were managed surgically .*

Conclusion :-

- *Ultrasonography is usefull imaging modality can be used to differentiate surgical from non surgical cases of intussusception*

Introduction :-

Intussusception is the invagination of a bowel segment into the lumen of more distal bowel, the invaginated segment (intussusceptum) is carried distally by peristalsis.

The blood vessels and mesentery become involved with intra luminal loop and are squeezed within the engulfing segment (intussusciptient). Bowel obstruction is the presenting sign of intussusception. Intussusception usually occur in children between 6 months and 2 years old and appears to be idiopathic.(1)

If it occurs in neonates or children older than 2 years old usually there is initiating lead point that leads to intussusception. The focal lead point can be small intestinal polyp, Enlarged lymph nodes, lymphoma, focal bowel wall odema and adhesions sequalea of recent abdominal surgery, Meckel diverticulum, cystic fibrosis, leukaemia involving the bowel , Henoch-Schnolein purpura and inflammatory bowel disease.(2,3,4)

Intussusception can be complicated by intestinal obstruction, Bowel wall necrosis and perforation.

Intussusception is mostly ileo colic but can be ileo ileal or colo- colic. The diagnosis depends on the clinical criteria and imaging modalities. Plain X ray abdomen may show features of intestinal obstruction, gasless cecum, abnormal intra luminal Bowel mass and pneumo peritoneum in perforated cases ,however the sensitivity of X ray radiography is often low as not all patients may show manifestation of intestinal obstruction or perforation.

Ultrasonography can be used with high accuracy, Sensitivity of 98-100 % and specificity of 88-100 % (5) in diagnosing intussusception with visualization of intestinal mass lesion of pseudo kidney or target appearance, multilayered outline showing alternating echogenic and hypoechoic layers. (6)

Barium enemas should be performed only for therapeutic cases. (2) Some cases of intussusception may reduce Spontaneously especially if intussusception mass length less than 3.5cm (7) but others necessitate rapid surgical intervention.

Objectives:-

The aim of the study is to assess the usefulness of ultrasonography in differentiating surgical from non-surgical cases of intussusception.

Materials and Methods:-

100 cases of clinically suspected intussusception were examined between April 2007 and March 2009 at Fayoum university hospital, mean age 20 months, range of age 6 months to 7 years.

All cases were subjected to clinical examination after taking a brief history.

All cases were examined with high resolution ultrasonography using 7.5 linear, 3.5 - 5 convex ultrasonic transducers (GE logic 7, Siemens versa plus machines)

The diagnosis of intussusception depends on the presence of an intestinal mass lesion of target shape, pseudo kidney appearance with a central area of hyperechogenicity and peripheral layers of hypoechogenicity showing multilayered outline (6).

The color coded Doppler technique is used to assess the wall vascularity (8)

The length of the intussusception mass lesion was measured along the longitudinal axis and recorded (7,9).

The presence of enlarged lymph nodes > 11 mm in length within the intussusception mass was recorded (5).

Results:-

30 cases of small bowel intussusception were diagnosed by sonography among 100 cases suspected clinically.

Among the 30 cases, 13 cases were treated conservatively and 17 cases needed surgical intervention.

Among the 17 cases needed surgical intervention, 10 cases showed manifestation of intestinal obstruction with dilated bowel loops proximally > 3 cm in caliber and collapsed distally, 7 cases showed free peritoneal fluid, 3 cases showed no color flow signal by color Doppler study within the bowel wall indicating bowel wall necrosis which were proved at surgery.

No case with small intestinal obstruction, free peritoneal fluid and bowel wall necrosis was managed conservatively.

Among the 30 cases with positive sonographic findings of intussusception 12 cases showed enlarged lymph nodes within the intussusception mass lesion, with 10 cases needed surgical managements and 2 cases improved during the conservative follow up.

18 cases observed with the length of the intussusception mass lesion > 3.5 cm in 16 cases underwent surgical management and 2 cases had responded to conservative follow up.

Conservative follow up was clinical and sonographic at 40 minutes, 4 and 24 hours after initial diagnosis (9).

A 1 case from the 12 cases showed intussusception mass, length less than 3.5cm underwent surgical management as he did not improve with conservative follow up.

All cases (6 cases) of children older than 2 years old were managed surgically even if no focal lead point

demonstrated by sonography as they did not respond to conservative follow up.

Tables: - Table I

	<i>Number</i>	<i>%</i>
- <i>Total number of cases suspected clinically.</i>	<i>100</i>	<i>100 %</i>
- <i>Number of cases diagnosed by ultrasonography</i>	<i>30</i>	<i>30%</i>
- <i>Number of cases managed surgically</i>	<i>17</i>	<i>17%</i>
- <i>Number of cases managed conservatively</i>	<i>13</i>	<i>13%</i>

Table 2: - the relationship between the sonographic findings and type of management in cases diagnosed by ultrasonography

Sonographic finding	Number Of cases 30	%	Management			
			Surgical		conservative	
Intestinal obstruction	10	33%	10	33%	0	0
Free peritoneal fluid	7	23%	7	23%	0	0
Absence of color flow Signal on the intussusceptum wall.	3	10%	3	10%	0	0
Length of intussusception mass > 3.5 cm	18	60%	16	54%	2	6%
Length of intussusception mass <3.5cm	12	40%	1	4%	11	36%
Enlarged lymph nodes within the intussusception mass	12	40%	10	33%	2	7%

Table 3:- Sensitivity and specificity of intussusception mass length and enlarged lymph nodes as predictors of surgery

Sonographic finding	Sensitivity	Specificity
Length of intussusception mass lesion	90%	96%
Enlarged lymph nodes within intussusception mass	84 %	90%

Figures :-

Ultrasonography and color doppler images



Figure 1 :Ileo colic intussusception With length of intussusception Mass 4.5cm.



Figure 2 : Enlarged lymph nodes within the intussusception mass

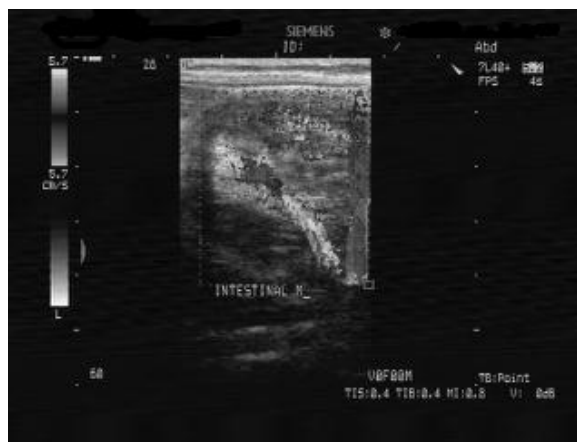


Figure 3:- Preserved vascularity within the wall of intussusceptum .

Discussion:-

The most reliable ultrasonic diagnostic criteria used to differentiate the surgical cases from non surgical cases of intussusception according to our study are the identification of intestinal obstruction pattern by Ultrasonography, which show dilated small intestinal loops > 3 cm proximal to the site of the mass lesion and collapsed bowel loops distally. The presence of free peritoneal fluid, suggesting of intestinal perforation and subsequent peritonitis. The above mentioned criteria were matched with the results of Munden et al (9).

Absence of color flow signals in the oedematous Bowel walls of the intussusception mass lesion suggesting of intestinal wall necrosis and infarction is considered as absolute predictor of surgery, which also was shown in the study performed by Lim et al (8) who showed the significance of the presence or absence of color flow signal of the intussusceptum wall in the reducibility success of intussusception.

Komanidow et al (5) showed that the presence of enlarged mesenteric lymph nodes within the intussusception mass has low reducibility rate 46.4 % .in our present study only 2cases from 12cases (16%) underwent spontaneous reduction on follow up with sensitivity 84% and specificity 90% as predictor of surgical management.

So we considered the enlarged lymph nodes within the intussusception mass as a strong predictor of irreducibility but not absolute predictor.

Munden et al (9) showed a sensitivity of 93 % and specificity of 100 % for length of intussusception > 3.5 cm as predictor for the surgical intervention.

Our results showed sensitivity of 90% and specificity of 96 % for intussusception length > 3.5 cm as a predictor for surgical management and irreducibility

So we consider the intussusception mass length as strong predictor but not absolute predictor for surgical management.

Neonates and children older than 2 years usually had focal lead point initiating the intussusception. So they are better managed surgically once the diagnosis is confirmed by Ultrasonography.

In Conclusion :-

For differentiation of surgical from non surgical cases of intussusception we consider the presence of intestinal obstruction, free peritoneal fluid and absence of color flow signal in the intussusceptum wall as an absolute predictor of surgery and the presence of enlarged lymph nodes within the intussusception mass and intussusception length > 3.5 cm as a strong predictor for surgical management.

References :-

- 1. Doi O, Aoyama K, Hutson JM. Twenty-one cases of small bowel intussusception: the pathophysiology of idiopathic intussusception and the concept of benign small bowel intussusception. Pediatr Surg Int 2004; 20:140-143.*
- 2. Navarro O, Daneman A. Intussusception part 3. Di-agnosis and management of those with an identifiable or predisposing cause and those that reduce spontaneously. Pediatr Radiol 2004; 34:305-312.*
- 3. Siaplaouras J, Moritz JD, Gortner L, et al. Small bowel intussusception in childhood (in German) Klin pediatr 2003; 215:53-56.*
- 4. Sonmez K, Turkyilmaz Z, Demirogullari B et al Conservative treatment for small intestinal intussusception associated with Henoch-Schonlein' s purpura. Surg Today 2002; 32:1031-1034*
- 5. C. Koumandiow . M. vakaki , Gaul P. Mirilas . sonographic Detection of lymph nodes in the intussusception of infant and young children :Clinical evaluation and hydrostatic reduction : AJR 2002 ; 178 : 445 – 450*
- 6. Tiao MM, Wan YL, Ng SH, et al. Sonographic features of small bowel intussusception in pediatric patients. Acad Emerg Med 2001;8:368-373.*
- 7. Lvoff N, Breiman RS, Coakley FV, Lu Y, Warren RS. Distinguishing features of self limiting adult small bowel intussusception identified at CT. Radiology 2003; 227:68-72.*
- 8. Lim HK , Bea SH , lee KH , Assessment of reducibility of ileo colic intussusception in children: usefullness of color doppler sonography Radiology 1994 ; 191 : 781 – 785.*

9. *Munden Martha M. , Bruzzi John F . Sonography of Pediatric small bowel intussusception : differentiating surgical from non surgical cases . AJR 2007 ; Vol . 188 : 275 – 279 .*