REVIEW OF ACUTE ABDOMEN IN PEDIATRICS AGE GROUP

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بحث الحالات البطنية الحادة في فئات الاطفال المراجعين لمستشفى الصدر التعليمي

الخلاصة:
مقدمة: تعتبر الحالات البطنية الحادة من الصعوبات التشخيصية والتي تستوجب التشخيص السريع والعلاج وتندرج الحالات البطنية الحادة في شعبتين وهي الجراحية والغير جراحية ويعتبر التهاب الأمعاء من أكثر الحالات الغير جراحية شيوعا.
الطريقة: هذه دراسة لـ٢٠٠ طفل مصاب بحالة بطنية حادة تم فحصهم في ردهة طوارئ مستشفانا، قسمت هذه الحالات الى أربع مجاميع حسب أعمارهم وهذه المجاميع هي:

١. الأطفال دون عمر السنة
٢. من سنة الى خمس سنوات
٣. من خمس الى عشر سنوات
٤. من عشر الى خمس عشرة سنة.

النتائج: وجد ان من بين هؤلاء الأطفال ١٢٤ ذكر و٧٦ أنثى من مجموع ٢٠٠
وجدت ٨٠ حالة غير جراحية و١٢٠ حالة تحتاج تداخل جراحي
من الحالات الجراحية ٨٢ مصابة بالالتهاب الزائدة الدودية
٣٦ حالة مصابة بانسداد الأمعاء، ٢٣ دون السنة من العمر و ١٣ اكثر من سنة
٧ حالات مصابة بالتهاب غشاء البريتون
حالتين مصابة بالتواء الخصية غير النازلة
المحصلة: الذكور المصابين بهذه الحالات أكثر من الإناث
التهاب الزائدة الدودية أكثر الحالات البطنية الجراحية
الفحص المتكرر السريع يقلل من تفاقم الحالات البطنية ويقلل من حالات الوفاة.

Key Words: Acute abdomen, Pediatrics.

ABSTRACT

Background:- Acute Abdominal pain in children presents a diagnostic dilemma, although many causes of acute Abdominal pain are benign, some require rapid diagnosis and treatment to minimize morbidity.Numerous disorders can cause abdominal pain. The most common medical cause is gastro-enteritis, and the most common surgical cause is appendicitis.

This study evaluates the different cause of the acute abdomen in the pediatric age group in our hospital, including medical and surgical causes.

Methods: - This is a prospective study over a period of six months (from March 15th to September 15th of 2007), a total of 200 kids were included in this study that presented to our hospital with the acute abdomen.Those kids divided into four groups depending on their age,as following:(1.those who are less than one year,2.from one to five years,3.from five to ten years,4.from ten to fifteen years old) and after careful clinical evaluation supplemented by laboratory and radiological investigations, those kids divided into (2) entities (medical and surgical).

The result: - 200 kids suffering from acute abdominal pain were included in this study, 124 male and 76 female.
From the total, 80 kids were diagnosed as medical where 120 kids undergone a surgical operation, 82 kids (44 male and 38 female) undergone appendicectomy. Seven kids from them had generalized peritonitis due to perforated appendices, 36 kids with intestinal obstruction (23 kids below one year and 13 above one year, the remaining two kids with torsion of an undescended testis).
Conclusion: - Appendicitis is the most common surgical cause of the acute abdomen in the children and next common surgical cause is intestinal obstruction.
Any child with an acute abdomen should be examined carefully and repeated examination done by the same surgeon.

Introduction:

Background: The term acute abdomen denotes any sudden non traumatic disorders whose chief manifestations in the abdominal area and for which urgent operation may be necessary, since there is frequently a progressive underlying intra abdominal disorder. Undue delay in diagnosis and treatment inversely affect the outcome [(1)]. Abdominal pain is a common problem in children, although most children with acute abdominal pain have self-limited conditions, the pain may herald a surgical or medical emergency. The most difficult challenge is making a timely diagnosis so that treatment can be initiated, and morbidity prevented [(2)]. Abdominal pain falls into three categories, visceral (splanchnic) pain, parietal (somatic pain), and referred pain.Visceral pain occurs when noxious stimuli affect a viscous, such as the stomach or intestine.Tension, stretching and ischemia stimulates visceral pain fibers.Tissue congestion and inflammation tend to a sensitize nerve endings and lower the threshold for stimuli.Because visceral pain fibers are bilateral and un myelinated and enter the spinal cord at multiple levels, visceral pain usually is dull, poorly located, and felt in the midline pain from foregut structures like stomach is felt in the epigastrium, midgut structures, e.g. small intestine cause periumbilical pain and large intestine cause lower abdominal pain.Parietal pain arises from noxious stimulation of the parietal peritoneum resulting from ischemia. Inflammation is transmitted through myelinated afferent fibers to specific dorsal root ganglia on the same side and at the same dermatomal level as the origin of the pain. Parietal pain usually is sharp, intense, discrete, localized, and coughing or movement can aggravate it. Referred pain has many of the characteristics of parietal pain but felt in remote areas supplied by the same dermatome as the diseased organ.It results from shared central pathways for afferent neurons from different sites. A classic example is a patient with pneumonia who presented with abdominal pain because the T9 dermatome distribution is shared by the lung and the abdomen [(3)]. Age is a key factor in evaluating the cause, the incidence, and symptoms of different conditions vary greatly over the pediatrics age group spectrum, table no.1 demonstrates the differential diagnosis of acute abdominal pain by predominant age [(4)].The clinical diagnosis of acute abdominal pain in children is not easy and consist of (4) steps

analysis as follows:

1. To exclude the medical causes of the acute abdomen like gastro enteritis and mesenteric lymphadenitis. In the acute surgical abdomen, pain generally precedes vomiting while the opposite is true in medical conditions, diarrhea often associated with gastro enteritis or food poisoning.
2. To make the diagnosis of a surgical abdomen by finding definite abdominal sign indicating an organic lesion e.g. tenderness, a spasm intestinal pattern like peristalsis and mass
3. To make the diagnosis of the subgroups of the surgical abdomen namely:
    A. Organ inflammation by finding definite local tenderness and spasm
    B. A palpable distended intestinal loop or a movable solid sausage mass indicate intestinal obstruction
    C. Resistant and silent abdomen indicates generalized peritonitis. These practically cover up all common diseases seen in children
4. To make the diagnosis of the present disease like acute appendicitis or intussusception by their specific cardinal signs [(5)].

The kids have to be examined many times in an appropriate period of time, usually the first examination is at the first visit.The second examination after a laboratory and radiological test, and the third repeat of examination before sending the patient to the ward or back home Full agreement of the positive findings in multiple examinations will make the final diagnosis, if a negative sign appeared in anyone; further observation and re examination should be made.The common positive abdominal sign indicating surgical conditions are local tenderness, muscular spasm, palpable intestinal pattern and mass. The examination should be done by the same surgeon[(6)]. Common surgical causes of the acute abdominal pain in children are:1.Gastro-intestinal tract disorders(Acute appendicitis, Intestinal obstruction (small & large bowel),Incarcerated inguinal hernia, Peritonitis, Peptic ulcer, Meckel's diverticulitis, Inflammatory bowel disease). 2.Liver, spleen, biliary tract disorders: (Acute cholecystitis, Acute cholangitis, Splenic infarction, Hepatic abscess, Spontaneous rupture of spleen, Ruptured hydatid cyst). 3. Pancreatic disorders: Acute pancreatitis.4.Genitourinary tract disorders: (Urinary tract infection, Ureteric or renal colic, Dysmenorrheal, Mittelschmerz,Pelvic inflammatory disease, Threatened abortion, Ovarian or testicular torsion).5.Peritoneal disorders:(Intra-abdominal abscess, Pneumococcal peritonitis, Tuberculous peritonitis).6.Retroperitoneal disorders:Retroperitoneal infection[(7,8)]. There are many medical (non-surgical) conditions, which must be kept in mind to avoid unnecessary surgical intervention;Gastro-intestinal disorders: 1.Gastro-enteritis, Mesenteric lymphadenitis,Infantile spasm (colic),Constipation. 2.Hepatobiliary disorder: Hepatitis. 3.Endocrine & metabolic disorder Diabetic keto acidosis, Uraemia, Acute intermittent porphyria, Acute adrenal insufficiency).4.Haematological disorder: (Sickle cell crisis, Henoch-Schonlein purpura, Acute leukemia. 5. Drugs & toxins:Lead poisoning, Venoms, Salicylate ingestion. 6. Referred pain(From hip & back like hip joint disorders,From the thoracic region:a.Pneumonia,b.Pleurisy).7. Infection & inflammatory disorder: (Herpes Zoster and Acute rheumatic fever)[(6)].

Table (1); differential diagnosis of the acute abdominal pain by predominant age[6]**:**

10-15 years	5-10 years	1-5 years	Birth-one year
Appendicitis Gastro-enteritis Constipation Dysmenorrhea Pelvic Inflammatory disease. Threatened abortion. Ovarian or testicular torsion. Ectopic pregnancy	Gastro-enteritis Appendicitis Constipation Functional pain Urinarytract infection Intussusception Pharyngitis pneumonia Sickle cell crisis Henoch-Schonlein purpura Mesenteric lymphadenitis	Gastro-enteritis Appendicitis Constipation Urinarytract infection Intussusception Volvulus Pharyngitis Sickle cell crisis Henoch-Schonlein purpura Mesenteric lymphadenitis	Infantile colic Gastro-enteritis Constipation Urinarytract infection Intussusception Volvulus Incarcerated hernia Hirschsprung's disease

Patients and Methods:

This is a prospective study of 200 kids of pediatrics age group of both sexes, there were 124 male and 76 female, and the age graduated from one day to 15 years admitted to the casualty ward of AL-Sader teaching hospital suffering from acute abdominal pain from March 15th to September 15th of 2007 . All of these patients were evaluated clinically and received specific management data form included the following: The diagnosis was based on clinical evaluation, including careful history talking of the onset, duration, site, and character of the pain, with associated symptoms, aggravating and relieving factors.The past medical, surgical, family, and drug history, then adequate clinical examination was applied like general and regional examination supplemented by laboratory and radiological investigations when needed, then these kids treated accordingly as conservative or operative then a maximum of three days follow up were done to those undergone surgery and the outcome was recorded.

All these informations were registered in a special patient card supplied for every patient.

Patient card			
Registration number ( )			
Name:	Address:		
Age:	sex:		
Chief complain:	type of diarrhea:		
Date of admission:	watery:		
Date of discharge	mucoid:		
	Bloody		
	Red currant jelly stool		
Season ( )			
OIE			
Vital sign	Temperature		Pulse rate
Abdominal examination	rebound tenderness		
Tenderness	rigidity	mass	
Dehydration	degree mild	moderate	sever
Investigation			
1. CBP			
2. GUE			

3. GSE
4. S. ELECTROLYTS S.K S.Na S.Ca
5. Plain abdomen
6. Chest x-ray
7. Abdominal ultrasound
Treatment:
Conservation
Operative
Feeding : bottle
Breast
Mixed
Outcome : survival, died

Results: In our study, 200 kids were admitted to the casualty ward of AL-Sader teaching hospital suffering from acute abdominal pain were 124 (62%) male and 76 (38%) female. According to their age, those kids were divided into the following (four) groups as shown in table no. (2)

1- (Below one year) 23 children out of 200 (11.5%) were 20 (10%) male and 3 (1.5%) female
2- (from 1-5 years) 32 children out of 200 (16%) were 20 (10%) male and 12 (6%) female
3- (from 5-10 years) 75 children out of 200 (37.5%) were 45 (22.5%) male and 30 (15%) female
4- (from 10-15 years) 70 children out of 200 (35%) were 39 (19.5%) male and 31 (15.5%) female

Table no. (2); Age & sex distribution of 200 children with acute abdomen:

Age	Male	%	Female	%	Total	%
Below one year	20	10%	3	1.5%	23	11.5%
1-5 years	20	10%	12	6%	32	16%
5-10 years	45	22.5%	30	15%	75	37.5%
10-15 years	39	19.5%	31	15.5%	70	35%
Total	124	62%	76	38%	200	100%

80 patients out of 200 (40%) of the total kids were diagnosed as non-surgical case. Of these 80 kids were 48 (60%) male and 32 (40%) female, the gastro enteritis cases were 43 (57.3%), 26 (32.5%) male and (21.2%) female, where as mesenteric lymphadenitis cases were 37 (42.7%), 22 (27.5%) male and 15 (18.8% female as shown in table no. (3).

Table no. (3) ; Age & Sex distribution of 80 children with nonsurgical causes of acute abdomen.

Age	Gastro-enteritis				Mesenteric lymph adenitis				Total
	Male	%	Female	%	Male	%	Female	%	
Below one year	0	0	0	0	0	0	0	0	0
1-5 years	8	10%	6	7.5%	0	0	3	3.75%	17
5-10 years	14	17.5%	9	11.25%	13	16.25%	10	12.5%	46
10-15 years	0	0	0	0	13	16.25%	4	5%	17
Total	22	27.5%	15	18.75%	26	32.5%	17	21.2%	80

120 kids (60%) out of 200 were diagnosed as surgical cases and specific surgical intervention were done according to the cause where 76 (62.8%) were male and 44 (37.2%) were female, as shown in Table no. (4)

Table no. (4) ; Age and sex distribution of 120 kids with surgical causes of the acute abdomen.

Age	Male	%	Female	%	Total	%
Below one year	20	16.7%	3	2.5%	23	19.2%
1-5 years	12	9.9%	3	2.5%	15	12.4%
5-10 years	17	14.7%	11	9.7%	28	23.4%
10-15 years	27	22.5%	27	22.5%	54	45%
Total	76	62.8%	44	37.2%	120	100%

Those kids often completing a clinical, laboratory, and radiological evaluation, which are classified into four main groups , Organ inflammation 75 kids (62.5%),Intestinal obstruction 36 kids (30%),Perforation peritonitis 7 kids (5.8%),Torsion of undescended testis 2 kids (1.7%)

Regarding the clinical diagnosis of surgical causes of the acute abdomen of these 120 cases we have:

(75) Kid (62%) with acute appendicitis, 40 (33.4%) male and 35 (28.9%) were female.(23) Kid (19.1%) with intussusception, 20 (16.6%) male and 3 (2.5%) were female.(2) Kids (1.7%) with fecal impaction were only males.

(2) Kids (1.7%) with incarcerated inguinal hernia, males only.(4) Kids (3.3%) with Hirschsprung disease, 3 (2.5%) male and 1 (0.8%) female.(5) Kids (4.2%) with Ischemia of the small bowel, 3 (2.5%) male and 2 (1.7%) were female.(2) Kids (1.7%) with torsion of the undescended testis, males only.(7) Kids (5.8%) with perforation

peritonitis (perforated appendicitis) among them four males (3.3%) and three females (2.5%) as shown in Table no. (5)

Table no. (5); operated patients distribution according to the common surgical causes:

Disease	Male	%	Female	%	Total	%
Acute appendicitis	40	33.4%	35	28.4%	75	62.5%
Intussusceptions	20	16.6%	3	2.5%	23	19.1%
Fecal impaction	2	1.7%	0	0	2	1.7%
Hirschsprung disease	3	2.5%	1	0.8%	4	3.3%
Obstructed inguinal hernia	2	1.7%	0	0	2	1.7%
Ischaemia of small bowel	3	2.5%	2	1.7%	5	4.2%
Torsion of the undescended testis	2	1.7%	0	0	2	1.7%
Perforated appendix	4	3.3%	3	2.5%	7	5.8%
Total	76	63.6%	44	36.4%	120	100%

According to the age, causes of intestinal obstruction 36 kid (30%) out of 120, 29 (80.6%) were male and 7 (19.4%) were female.
Those divided depending on their age into two groups:Below one year, we have 23 kids (63.9%), male were 20 (55.6%) while female 3 (8.3%).Above one year, we have 13 kids (36.1%), male 9 (25%) while female were 4 (11.1%) as shown in table no. (6)

Table no. (6); age distribution of (38) kid with intestinal obstruction

Age	Male	Female
Below one year	20	3
Above one year	9	4
Total	29	7

Furthermore, surgical causes of the acute abdomen, regarding the operative finding of the 82 patients were diagnosed as acute appendicitis and perforated appendicitis, we divided those patients into (5) groups:Appendices were cattarall in 15 kids (18.3%), 6

were male and 9 were female.Obstructive appendices in 27 kids (32.9%), 11 were male and 16 were female.Suppurative appendices in 32 kids (39%), 21 were male and 11 were female.Gangrenous appendices in one kid (1.2%), a male only.Perforation appendices in 7 kids (8.6%), 4 were male and 3 were female.As shown in Table no. (7)

Table no. (7); case and pathological distribution of 82 patients with acute appendicitis

Pathology	Negative	Obstructive	Suppurative	Gangrenous	Perforation	Total
Male	6	11	21	1	4	43
%	7.3%	13.4%	25.6%	1.2%	4.9%	52.4%
Female	9	16	11	0	3	39
%	11%	19.5%	13.4%	0	3.7%	47.6%
Total	15	27	32	1	7	82
%	18.3%	32.9%	39%	1.2%	8.6%	100%

Regarding the case distribution of perforated and non-perforated appendicitis, 75 kids (91.5%) had non-perforated appendicitis among them 40 male (48.8%) and 35 female (42.7%) while the perforated appendicitis 7 kids (8.5%) were 4 (4.9%) male and 3 (3.6%) female as shown in table no. (5)
For all 82 patients white blood cell count done, only 52 kids (63.4%) show elevated readings but ultrasound was done for only 60 kids of them because the other admitted at night times where no ultrasound facility found, from those kids 55 (91.7%) found to be with positive findings and only 5 (8.3%) with acute appendicitis had negative findings as shown in table no. (8)

Table no. (8); comparison between white blood cell findings and U/S findings of 82 kids with acute appendicitis

Investigation	Total no. of patients	Elevated finding	%	Positive finding	%
WBC count	82	52	63.4%	0	0
U/S	60	0	0	55	91.7%

From 23 kids with intussusception 20 (86.9%) were male and 3 (13.1%) female distributed through the age into 6 groups, every group distributed through 2 months, as shown in table no. (9)

Table no. (9); male to female ratio of 23 children with intussusception

Age/months	Male	%	Female	%	Total	%
Below 2	3	13.1%	1	4.35%	4	17.4%
2-4	1	4.35%	1	4.35%	2	8.7%
4-6	2	8.7%	1	4.35%	3	13.1%
6-8	3	13.1%	0	0	3	13.1%
8-10	9	39%	0	0	9	39%
10-12	2	8.7%	0	0	2	8.7%
Total	20	86.95%	3	13.05%	23	100%

Another distribution through the month of admission to see the higher cases found to be 6 infants in 2 peaks, the first from 15th May – 15th June, and the second from 15th July – 15th August, as shown in table no. (10).

Table no. (10); seasonal variation distribution of 23 children with intussusception

%	No. of patients	Month
8.7%	2	15th March – 15th April
13.1%	3	15th April – 15th May
26.1%	6	15th May – 15th June
17.3%	4	15th June – 15 July
26.1%	6	15th July – 15 August
8.7%	2	15th August – 15th September
100%	23	Total

Regarding the outcome of our surgical patient was as follows:
118 kids from 120 were survived while only two kids were dead, both cases were complaining of intussusception and treated surgically. One is five months old and the second is six months old. The death was because of electrolyte and fluid disturbance.

DISCUSSION

In our study, the male/female ratio was (m:f/1.63:1) which is close to the Indian study of acute abdomen admission in developing third world country by (Srinagar JK) which was 1.6:1 [6].In our study according to the age, we divided the cases into 4 groups, the result of this study similar to that done by (Srinagar JK) where the higher incidence of the acute abdomen was between (5-15) years, which are due to the cases of acute appendicitis [6].The operated patient in our study is more than those in a study done by (Robyn Kruk) / Geneev; NSW health department which is related to the United Nation, where our percentage of those undergone surgery was (60%) while the incidence in the NSW health department was(50%) of the kids treated surgically [7].The most common medical cause was gastroenteritis (53.7%), and then mesenteric lymphadenitis (46.3%), these data occur to be close to the study done by Fraser GC, where the gastroenteritis cases were 55% and the mesenteric lymphadenitis 30% [8].

The most common surgical cause of the acute abdomen is the acute appendicitis which comprises (62.5%) then the intestinal obstruction (30%) then peritonitis (5.8%), all due to perforated appendix, then the torsion of the undescended testis comprises (1.7%), while the study done by (Caty MG showed that the result close to our study as appendicitis was 50%, the intestinal obstruction 32%, peritonitis cases 11% from them 5% perforated appendicitis, 2% perforated appendicitis, 2% perforated cholecystitis, 1% meckel's diverticulitis, and 1% rupture hydatid cyst with 2% torsion of the undescended testis [9].In our study, we have 82 kids, 75 (62.5%) diagnosed as acute appendicitis, and 7 (5.8%) as peritonitis which is due to perforated appendicitis so the percentage of perforation from the total 82 was (8.6%) 4 male and 3 female. This percentage is comparison with a study done by (pal K, Khan'; acute appendicitis in pediatrics) Where the percentage of perforation was (4.2%) which is nearer to the half of the percentage in our hospital, this is because the inflammatory process in the pediatrics age group progress rapidly and the

difficulties encountered in the examination of children specially in un cooperative one will rise the percentage [9,10].In our study, 15 patients out of 82 (18.3%) with normal appendix during the operation and no other pathology was found. These results are nearer to study done by (Raddy RM) which was 16% who attribute the negative findings due to term known as non- specific abdominal pain, which is found in late childhood and nearly adolescent [11].In our study, the entire 82 patient with acute appendicitis and peritonitis the white blood cell count was done, 52 patients (63.4%) shows elevated count and the reminder 30 patients (36.6%) show normal count. Also only 60 patients of them undergo ultrasound examination because they are presented to us during the period of ultrasound facilities from them 55 patients (91.7%) had positive ultrasound finding while 5 patients only (8.3%) had a negative finding, this mean that combining lab and ultrasound investigation are more beneficial than white blood cell count alone in the diagnosis of white blood cell count acute appendicitis in the pediatric age group, and these results were similar to a study done by (Ang A) and (Patch D) [12,13].Regarding the intussusception case in our study, we have the peak incidence between 8-10 months were (39%), which is similar to a study done by (Condat B) revealed the higher incidence at nine months old [14].The seasonal variation of these cases, we have 2 peaks, first one is between March 15th and June 15th (6 infants), and the second peak between August and September 15th (6 infant). This is similar to the study done by 15 (Condat B) that showed the peaks of the disease during March and August [14].

Conclusion and recommendations:

From the present study, we conclude:

1. Acute abdomen in the pediatric age group is more in male than female, with progressing of age, both male and female are at increasing risk of presentation with acute abdominal pain.
2. Repeated physical examination of the kid by the same surgeon is essential to proper diagnosis. Exclusion of medical causes can reduce surgical intervention with postoperative complications.
3. The most common age of presentation with acute abdominal pain was between (5-15) years old. Intestinal obstruction was more in below 5 years (the commonest cause was intussusceptions)
4. In all age groups included in our study there was marked increase in cases of intestinal obstruction in male patients than female.
5. Acute appendicitis in children was more prone to perforation than in an older group.
6. WBC elevation in acute appendicitis in 63.4%.
7. Ultrasound is beneficial in diagnosis, so there is a need for usage in casualty during the nighttime.
8. Mortality in the neonate can be lowered by providing special nursing staff.

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