

Clinical outcomes of acute appendicitis in children and the impact of diagnostic delay on its complications.

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Background:

Acute appendicitis is the most common condition in children requiring emergency abdominal surgery. The key to a successful outcome is early diagnosis followed by appendectomy before gangrene or perforation develops.:

Aim of study:

To analyze the time of presentation and complications of acute appendicitis

Patients and Methods:

This is a retrospective study conducted in Al –Mustansiria Hospital over a period of three years from January 2005 to January 2008 .Data were collected from the patients case sheets. The patients were then divided into two groups according to the length of diagnostic period , group A including those children who presented in the first 48 hours after the onset of symptoms, and group B including those children who presented beyond the 48 hours after the onset of symptoms. Then the patients were subdivided into three age groups (<5 years,5-11 years ,and> 11 years).

Results:

Total number of (105) children with acute appendicitis were operated upon in Al-Mustansiria Hospital over a period extending from January 2005 to January 2008. 63 (60%) were males and 42 (40%) of the patients were females; and the male to female ratio was 1.5:1. 38(36.2%) children fall into group A, while 67(63%) children fall into group B. Perforated appendicitis was observed in 25 out of the 105 patients (23.8%) when differentiated by age, perforation is more common in young children, both in group A and group B. Perforation were more frequent in group B compared to group A, 21 out of 63 (33.3%) and 4 out of 42 respectively. This was associated with higher incidence of post operative complications, 4 out of 42(9.5%) in group A and 21 out of 63 (33.3%) in group B ($p>0.05$). Four children from group A with non perforated appendix had wound infection .Of those cases in group A , non had perforation and non had postoperative paralytic ileus .Wound infection was observed in 15 out of 63of children in group B(23.8%).Postoperative paralytic ileus was observed in 6 out of 63children in group B(9.5%).Postoperative complication in both groups.

Conclusion:

Appendicitis is the commonest surgical emergency in children .Diagnosis is mainly clinical .Delay in diagnosis and improper treatment increases morbidity .

Key words: Acute appendicitis ,Appendectomy in infants & children

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Introduction:

Acute appendicitis is the most common surgical condition of the abdomen and should be included in the differential diagnosis of every patient presenting with acute

abdominal pain.[1]. About 250,000 cases of appendicitis are diagnosed and treated in US annually [2] Appendicitis has a male to female ratio of 3:2 and is most common in the teens and twenties. The life time risk for appendicitis is 8.6% for males and 6.7% for females. Appendicitis is less frequent in third-world countries [3]. Patients with acute appendicitis present with abdominal starting in periumbilical area and then shifting to right iliac fossa. It is associated with nausea, vomiting, anorexia and sometimes with low grade fever. Diagnosis is mainly clinical [4]. To improve clinical diagnostic accuracy and to reduce the rate of negative appendectomy clinical scoring system like Alvarado score has been used [5].

Children differ in clinical presentation from that of adults as their description of symptoms is dependent more on family rather than patients themselves. As age group differs even in pediatric patients it becomes even more important for the pediatric surgeon to make early and appropriate diagnosis so that resultant complications can be avoided.

Patients and materials :

This is a retrospective study conducted in Al –Mustansiria Hospital over a period of three years from January 2005 to January 2008 .Data were collected from the patients case sheets including :

* patient age and sex

*diagnostic period (the time elapsed between the first complaint and definitive diagnosis .

*clinical presentation

*operative findings

*post operative course

The patients were then divided into two groups according to the length of diagnostic period , group A including those children who presented in the first 48 hours after the onset of symptoms, and group B including those children who presented beyond the 48 hours after the onset of symptoms. Then the patients were subdivided into three age groups (<5 years,5-11 years ,and> 11 years).

Differences between the groups were analyzed using (Chi square tests), and statistical significant was established at (p<0.05).

Children who presented initially with appendicular mass were excluded from the study, the remaining cases were studied regarding the mode of presentation , the occurrence of perforation which is noted at time of operation , and the postoperative complications.

Results

Patient's characteristics:

Total number of (105) children with acute appendicitis were operated upon in Al-Mustansiria Hospital over a period extending from January 2005 to January 2008.

63 (60%) were males and 42 (40%) of the patients were females; and the male to female ratio was 1.5:1.

38(36.2%) children fall into group A , while 67(63%) children fall into group B .The distribution of patients according to age and sex is shown in(Table 1) and (Table 2) respectively.

Mode of presentation:

All children with group A had brief manifestation, starting with pain in the umbilical and para umbilical region which is shifted to the right lower abdomen. Almost all had been nauseous and had vomited .Most of them also had unmistakable peritoneal irritation signs localized in the right lower quadrant.

Nature and course of the primary manifestation were rather diverse in the delayed group (group B), however abdominal pain was evident in almost all cases. Rectal examination was not performed routinely.

Perforated appendicitis:

Perforated appendicitis was observed in 25 out of the 105 patients (23.8%) when differentiated by age, perforation is more common in young children, both in group A and group B . Perforation were more frequent in group B compared to group A, 21 out of 63 (33.3%) and 4 out of 42 respectively. This was associated with higher incidence of post operative complications, 4 out of 42(9.5%) in group A and 21 out of 63 (33.3%) in group B (p>0.05).Perforation rate in each age group is shown in (Table 4).

Postoperative complications:

Four children from group A with non perforated appendix had wound infection .Of those cases in group A , non had perforation and non had postoperative paralytic ileus .Wound infection was observed in15 out of 63of children in group B(23.8%).Postoperative pralytic ileus was observed in 6 out of 63children in group B(9.5%).Postoperative complication in both groups is shown in (Table 4).

Age (in years)	Group A		Group B		Total	
	N ₀	%	N ₀	%	N ₀	%
<5 years	1	0.9%	6	5.7%	7	6.6%
5-11years	7	6.7%	15	14.3%	22	21%
>11years	34	32.4%	42	40%	76	72.4%
Total	42	40%	63	60%	105	100%

(Table 1) Age Distribution

Sex	Group A		Group B		Total	
	N ₀	%	N ₀	%	N ₀	%
	15	14.28%	27	25.71%	42	40%
	23	21.91%	40	38.09%	63	60%
Total	38	36.19%	67	36.8%	105	100%

Table 2) Sex Distribution(

Age (in years)	Group A		Group B		Total	
	N ₀	%	N ₀	%	N ₀	%
<5 years	0/42	0%	5/63	7.9%	5/105	4.8%
5-11years	1/42	2.3%	6/63	9.5%	7/105	6.7%
>11years	1/142	2.3%	8/63	12.6%	9/105	8.5%
Total	2/42	4.6%	19/63	30.1%	21/105	20%

(Table 3) Perforation in each age group

Complications	Group A		Group B		Total	
	No	%	No	%	No	%
Wound infection	4/42	9.5%	15/63	23.8%	19/105	18%
Paralytic ileus	0/42	0%	6/63	9.5%	6/105	5.8%
Pelvic or sub phrenic collection	0/42	0%	0/63	0%	0/105	0%
Total	4/42	9.5%	21/63	33.3%	25/105	23.8%

(Table 4) Postoperative Complications

Discussion:

Appendicitis is the most common indication for emergent abdominal surgery in childhood and has been diagnosed in 1 to 8 percent of children evaluated in urgent care setting for abdominal pain [6,7]. The incidence increases from an annual rate of one to two per 10,000 children between birth and four years of age to 19 to 28 per 10,000 children younger than 14 years [8, 9] and this findings go with our study as show that patient age less than 5 years constitute only 6.6% of the total number and the patients above 5 years account for 93.4%.

Whenever a child present with pain in the umbilical and para umbilical region shifting to the right lower abdomen within 24 hours, nausea and vomiting, pain on transportation, and local peritoneal irritation at physical examination, the diagnosis of acute appendicitis is clear,as acute appendicitis is a clinical diagnosis and no laboratory or radiological tests are 100% accurate[10]. This situation is applied to the patients in group A in this study. The diagnosis of acute appendicitis is often complicated by non specific symptoms [11, 12].Intermittent abdominal complaints and parental delay have also been described to cause diagnosis delay [13], in addition to the difficulty in verbal communication with children.

Acute appendicitis is a clinical condition which needs surgical treatment as soon as possible , if ignored it may get complicated and increase the morbidity and mortality [14].Delayed diagnosis is common, particularly in young children, and has been reported in as many as 57 percent of cases in children less than six years [15] and this goes with our study as group A include only one out of seven (14%) patients while 6 out of seven (86%) patients in group B .This may be due to atypical presentation of appendicitis in this age group as in table (1).

Perforation correlates strongly with delayed diagnosis [16]. The risk of perforation is highest in the first four years of life and has been reported in more than 70 percent of children in this age group [17], in our study 71% of patients less than 5 years revealed perforation table (3); this finding was consistent with many studies e.g. **CH Chung et al** [18] which had showed 72.2% perforation rate, and **Bickell NA et al**[19] that had reported about 84% perforation rate in children less than 4 years.

The incidence of complications was higher in group B. Some of these complications were severe and necessitated reporting. The higher incidence of complications in group B is responsible for the fact that in this group hospitalization is longer than in group A, a similar findings were seen by **CH Chung et al** [18],and **Bickell NA et al** [19].

Post operative wound infection is the most common complication of appendicitis and it ranges from 5-50% [20] and this goes with our study as wound infection occur in 18% of patients ,post operative paralytic ileus has been reported in 5.8% of patients all of them from group B which may be due to electrolytes disturbances table(4).We did not have proper long term follow up so we could not conclude regarding rate of development of post operative intestinal obstruction .There was no mortality in this series.

Conclusion & recommendation:

Appendicitis is the common surgical emergency in children .Diagnosis is mainly clinical .Delay in diagnosis and improper treatment increases morbidity. Awareness of this fact by general practioners, paediatric physicians & parents is highly recommended

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