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Research Article

Outcome of appendectomy: Early versus late presentation

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Abstract: Acute appendicitis is common surgical emergency in adult population but associated with mortality and morbidity if not treated properly, with risk of complication increase with symptoms duration. The objective is to study the outcome of acute appendicitis in relation to time taken from start of symptoms to surgery. This is a prospective and multicenter study, conducted at Khartoum state hospitals .It was carried out during March - September 2015. All adult patients presented with acute appendicitis and treated were included. Excluded were pediatric cases or other causes of acute surgical abdomen. Data was collected using a constructed questionnaire and the variables include; age and gender, clinical presentation and its duration, intra-operative findings (simple inflamed, gangrenous, perforated or appendicular abscess) and outcome of management.A total of 103 patients with acute appendicitis were studied. Male to female ratio was 2.1:1 with a mean age of 26.0±10.9 years and most of them77.7% in the age group 15-30 years. Only 43(41.7%) presented by typical history; pain started in para umbilical region in 77 (74.8%) and in 24 (23%) it started in right iliac fossa. Most of the patients had duration of symptoms < 48 hours (66.1% vs. 33.9), P value 0.001. TWBC >11.000 was seen in complicated appendix, it was 66.7% and 50% in gangrenous and appendicular abscess respectively, P value 0.298. Twenty five (39%) were reported as acutely inflamed appendicitis by U/S but intraoperative 4/25(16%) found to be complicated appendix and in appendicular abscess 4/7(57.1%) were diagnosed correctly by US, P value < 0.001. Intra-operative findings of the appendix revealed 19 (18.4%) complicated appendicitis. It was 7.4% in patients presented within the first 48 hours and 42.9% in those presented after, P value < 0.001. This complicated appendicitis was in the form of; perforation, gangrene or abscesses and seen in 6(5.7%), 5(4.9%) and 8(7.8%) respectively. After 48 hours, gangrenous appendicitis was seen in (80%) from the five cases of gangrene, abscesses in (75%) from the eight cases of appendicular abscesses and perforated appendicitis in (66.7%) from the six cases of perforation. Complications were seen in 16.5% and no mortality was reported in this study. Most of the patients who presented >48 hours had complications more than the earlier presenters (58.8% vs. 10.3%) P value 0.020. Surgical site infection (SSI) rate was 9.7% most of them 80% after 48 hours. SSI was high particularly in appendicular abscess 3/8(37.5%), gangrenous appendix 2/5(40%), P value 0.005.In conclusion; acute appendicitis and appendectomy has a low risk of complications but the risk increase with duration of symptoms. Surgical site infection is the common morbidity.

Keywords: Acute appendicitis, duration of symptoms, complication

INTRODUCTION

Acute appendicitis is the most common cause of acute abdominal emergency in young adult. It needs urgent surgical intervention to prevent complications [1-4]. Appendectomy is the commonest emergency surgical operation performed at most of the health care facilities available [2]. The aetiology of appendicitis is remaining poorly understood [4]. Appendicitis progresses to luminal obstruction and visceral distension leading to gangrene and perforation. Studies have demonstrated an association between perforation and the overall amount of time elapsed from symptom onset to definitive care [3]. Appendicitis is most common between the ages of 10 and 20 years, but no age is excluded with a mean age of 31.3years, it rare in extreme of age [4].The life time risk to develop acute appendicitis is 10% for general population and 8.6 % and 6.7% for male and female respectively [1].

PATIENTS AND METHODS

This is a prospective, analytic and multicenter study, conducted at Khartoum state hospitals (Khartoum, Khartoum North and Omdurman Teaching Hospitals).It was carried out during March - September 2015. All adult patients presented with acute appendicitis and treated were included. Excluded were pediatric cases or other causes of acute surgical abdomen. Data was collected using a constructed questionnaire and the variable includes; age and gender, clinical presentation and its duration, intra-operative findings (simple inflamed, gangrenous, perforated or

appendicular abscess) and outcome of management . Data was analyzed using a computer program Statistical Package for Social Sciences (SPSS) version 20.0. Qualitative data was analyzed using descriptive statistic, the T-test or chi squire tests when appropriate. The P value was considered significant if <0.05 .Ethical considerations were taken (patient' consent, ethical clearance and hospitals administration approval). .

RESULTS

A total of 103 patients with acute appendicitis, who satisfied the inclusion criteria were studied. There is male preponderance 70 (68.0%) while females were 33 (32%) with M: F ratio of 2.1:1. Most of the patients 80 (77.7%) were in the age group 15-30 years whereas those > 45 years were only 5 (4.9%). The mean age was 26.0 ± 10.9 years and ranged from 16-80 years. The age and gender differences were not statistically significant P value 0.290**(Table 1)**.

Table 1: Age and gender distribution in patients with appendicitis in the study

Age	Gender		Total
	Male	Female	
15-30	53 (51.5%)	27 (26.2%)	80 (77.7%)
31-45	12 (11.7%)	6 (05.8%)	18 (17.5%)
>45	05 (04.9%)	0 (0.0%)	05 (04.9%)
Total	**70 (68.0%)**	**33 (32%)**	**103 (100%)**

P value 0.290

Symptoms on presentation

Only 43(41.7%) of our patients presented by typical history of acute appendicitis, pain was the most frequent symptom seen in 103 (98%) of the patients. In course of the disease, this pain origin and shift was different from patient to patient, t started in para umbilical and right iliac fossa in 77 (74.8%) and 24 (23%) respectively, but shifted to RIF in 70 (68%) only. Nausea, vomiting, vomiting preceded by nausea and anorexia; were seen in, 74.8%, 69.9%, 61.1% and 70% respectively. There is significant difference in presentation as regards to gender. Most of the females 29 (87.9%) presented early, less than 48 hours compared to 31 (44.3%) of the males, P value 0.001.

Duration of symptoms

Time lag from complaint to presentation was ranged from 1-186 hours with a mean of 35.6 ± 40 hours. Thirty five patients (34%) had duration of symptoms > 48 hours and 68 (66.0%) patients< 48 hours **(Table 2)**. The most common physical findings were; RIF tenderness and rebound tenderness, seen in (92.2%) each. Guarding was seen in 81 (77.9%) while generalized tenderness and abdominal distention were less frequently seen in 14.6% and 11.7 % **(Table 3)**.

Table 2: Gender distribution according to duration of symptoms

Gender	Duration of symptoms (hours)		Total
	< 48	>48	
Male	39 (55.0%)	31(45.0%)	70 (100.0%)
Female	29(78.8%)	04(21.2%)	33 (100.0%)
Total	**68 (66.0%)**	**35 (34.0%)**	**103 (100.0%)**

P value 0.001

Table 3: Physical findings in patients with acute appendicitis

Clinical signs	Duration of symptoms		Total	P value
	<48	>48		
RIF tenderness	64(66.0%)	32(34.0%)	96(93.2%)	0.445
Guarding	54(66.7%)	27(33.3%)	81(78.6%)	0.489
Rebound tenderness	63(65.6%)	33(34.4%)	96(93.2%)	0.555
Generalized tenderness	08(53.3%)	07(46.2%)	15(14.6%)	0.202
Abdominal destination	04(33.3%)	08(66.7%)	12(11.7%)	0.015

Investigations

Patients with complicated appendicitis had various level of leucocyte counts, 28.6% <7000, 33.3% above 11000 and 38.1% in between. When comparing the 30 patients with TWBC >1100 (76.7% were simple inflamed and 23% complicated appendicitis). In gangrenous appendicitis 60.0% had TWBC >11000 whereas it was 50% in patients with appendicular abscess, P value 0 .298. Ultrasound was done for 64 (62.1%) of the patients, it was normal in 28 (42.4%), acute appendicitis in 30 (46.8%), appendicular abscess in 43(6.2%) and perforated appendix in 3 (4.6%) patients. Of the normal reported ultrasound, 26(92.8%) showed macroscopic evidences of inflammation intraoperative, P value < 0 .001.

Operator status

The appendectomy was done by different medical staff level. Registrars operated on most of the patients 55(53.9%) whereas a single patient was operated by a consultant surgeon. Of the 19 complicated cases of appendicitis; registrars operated in 13(68.4%), house officer in 3(15.7%), medical officer in 2(10.5%) and consultant in a single patient, P value < 0.001.The most common incision done for appendectomy is Gridiron 78 (75.5%). Lanz and midline incisions were used less frequently in 22 (21.4%) and 3 (2.9%) respectively .

Operative findings

Intra-operative findings of the appendix revealed 19 (18.4%) complicated appendicitis. It was 5/68 (7.4%) in patients presented within the first 48 hours and 15/35 (42.9%) in those presented after, this difference was statistically significant, P value < 0.001. This complicated appendicitis was in the form of; perforation, gangrene or abscesses and seen in 6(5.7%), 5(4.9%) and 8(7.8%) respectively. After 48 hours, gangrenous appendicitis was seen in (80%) from the five cases of gangrene, abscesses in (75%) from the eight cases of appendicular abscesses and perforated appendicitis in (66.7%) from the six cases of perforation **(Table4)**.

Table 4: Intra-operative appendicular status and duration of symptoms

Operative findings	Duration of symptoms		Total
	<48	**>48**	
Simple inflamed	61(89.7%)	21 (60.0%)	21 (20.4%)
Appendicular abscess	02 (02.9%)	06 (17.1%)	08 (7.8%)
Perforated	02 (02.9%)	04 (11.4%)	06 (5.8%)
Gangrenous	01 (01.5%)	04 (11.4%)	05 (4.9%)
Normal	02(02.9%)	0 (0.0%)	02 (1.9%)
Total	**68** (100.0%)	**35** (100.0%)	**103**(100.0%)

Outcome

The great majority of our patients were discharge uneventfully, complications seen in 17(16.5%) and no mortality was reported in this study. Most of the patients who presented >48hours had more complications than the earlier presenters (58.8% vs. 10.3%) P value 0.020. No significant difference was noted in the complication rate in relation to age, where 19.2% in >30 years vs. 15.6% in patients <30 years, P value 0.665.

Complications

Ten patients (9.7%) developed SSI. Most of them presented after 48 hours(22.8% vs. 2.9%), P value 0.002.The incidence found to be high in complicated appendix compared to simple inflamed appendix (37.8%) and (4.8%) respectively, SSI was high particularly in appendicular abscess 3/8(37.5%), gangrenous appendix 2/5(40%), P value 0.005.Four patients (3.8%) developed prolong ileus necessitated extension of admission. Three patients (2.9%) has recollection require admission. The diagnosis confirmed by US and treated conservatively, two patients (1.9%) developed adhesive intestinal obstruction respond to medical treatment, one patient (0.9%) developed wound dehiscence, one patient developed (0.9%) chest infection and one patient (0.9%) burst abdomen.Six patients (5.8%) developed more than one complication and four patients (3.8%) were readmitted due to complications**(Table 5)**.

Table 5: Postoperative complications in relation to time of presentation in the study group

Complication	Duration (hours)		Total	P value
	<48	**>48**		
Surgical site infection	2	8	10	0.002
Paralytic ileus	4	3	7	0.608
Abscess recollection	3	0	3	0.207
Chest infection	0	1	1	0.161
Wound dehiscence	0	1	1	0.161

DISCUSSION

Acute appendicitis is the most common acute abdominal condition need surgical intervention. It accounts for the bulk of surgical emergency work load. It can progress to gangrene and perforation leading to serious complications and mortality. The treatment of appendicitis is appendectomy is one of the most procedure done by junior staff and training registrar.

Most of our patients (85%) were in their second or third decades of life. The mean and age distribution were similar to other studies with rare occurrence at the extreme of age [5, 6, 7]. Gender distribution with M to F ratio of 2.1:1 was high comparing with 1.1:1 in previous local study and international literature [6, 7, 8]. The rate of complicated appendix in our study was 19(18.4%) with incidence of perforation in 6 (5.8%) of the patients. This rate is

lower compared to 25%, 15% and 7.3% describe in Elobied, Omdurman and South Korea studies respectively [6, 9, 10].

Delayed presentation for >48 hours was associated with complicated appendicitis in our study. From the six patients with perforation, four (66.7%) presented late, out of five patients with intra-operative gangrenous appendicitis, four (80%) were late comers. Six of the eight patients (75%) with appendicular abscesses as well presented after 48 hours. This is comparable to Arian, et al. findings in Pakistan [11].

Postoperative complications were seen in 17 patients (16.9%); of them 10 (9.7%) patients developed surgical site infection. This is lower than 10.3% and 12.5% rates of SSI in previous local studies, which indicate steady reduction of this complication. However, our rate is still higher than 6.6% in Curtis J, *et al.;* study [6, 9, 10].

Five patients (4.8%) developed prolong ileus which prolong the hospital stay to more than four days. Two patients out of them developed intra-abdominal collection and one patient (0.9%) developed adhesive intestinal obstruction similar to the incidence reported by Khairy 1% [12].

Five patients (4.8%) with acute appendicitis were > 45 years this was in same range reported in other study by Arain SY, *et al.;* (5% -10%) [13]. Three patients out of them 60% developed complications and this is considered high related to Omari, *et al.;* was reported 21% rate [14]. Although this study generates some points of significance, yet larger sample size study is recommended as the prevalence of acute appendicitis is high.

CONCLUSION

Still one third of patients with acute appendicitis presented after 48 hours, this is associated with more perforation, gangrene and appendicular abscess. Leucocytes counts >11000 is suspicious but not diagnostic of complicated appendicitis. Postoperative surgical site infection is more common in this group.

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