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Surgical Audit of Acute Appendicitis

MOEED IQBAL QURESHI AND KHALID M. DURRANI
Department of Surgery, Shaikh Zayed Hospital, Lahore.

SUMMARY

Acute appendicitis is one of the most common surgical emergency. Its accurate diagnosis is still not possible especially in young females. A surgical audit of 80 emergency admissions with a diagnosis of acute appendicitis was carried out to find.

1. *Accuracy of the diagnosis.*
2. *To highlight and improve deficiencies in the patient management by critical evaluation of the patient files.*
3. *Find out other common causes of pain, which can lead to operation.*

This is a retrospective study with evaluation of the medical file content of patients undergoing appendectomy from October 1998 to September 1999. The results showed that the diagnosis of acute appendicitis is clinical with tenderness and rebound tenderness as the most important physical signs. There was a male dominance of 56%. The average duration of pain was 27 hours. Nausea was present in 53% of the patient, vomiting in 40%. On the basis of histology the appendices were inflamed in 90% and normal in 10%. Seven out of eight patients with normal appendices were young female with a mean age of 21 years. The main postoperative complication was wound infection in 7.5%, mean postoperative stay was 2.85 days.

Review of the patient files revealed, in majority of the patients, a failure to record urinary complaints, menstrual history, performance of rectal examination, documentation of the position of appendix and presence of omentum or fluid in right iliac fossa. In some of the patients histological reports were missing when the files were reviewed. Postoperative antibiotics were also used in acute appendicitis. A performa has been designed to improve collection of clinical and histological data for the future in patients with acute appendicitis. The use of antibiotics in acute appendicitis is limited to a single dose of i/v metronidazole preoperatively while its use in the postoperative period for acute appendicitis has been discontinued.

INTRODUCTION

Audit is defined as the systematic and critical analysis of the quality of medical care. If audit is to be effective it must lead to change[1].

Acute appendicitis is one of the most common surgical emergencies while appendectomy is the most common emergency operation 2. It is unfortunate that quality management of a common surgical problems is uncommon with failure to elicit and record many important features of patient history and examination and operation. Focus on these will lead to a better collection of clinical data which could lead to improved care and management of operated patients with acute appendicitis, first step towards a reduction in the number of appendectomies. It is common in young adults[2] who present with lower abdominal pain accompanied by nausea and vomiting[3]. The diagnosis of acute appendicitis is clinical[4] with tenderness, rebound tenderness[5] and guarding in the right iliac fossa as the most important physical signs.

In patients with equivocal clinical findings, observation of the patient with serial examination[6],

leukocytosis[7] abdominal ultrasound[8] and diagnostic laparoscopy[9] if available will help in the diagnosis of the doubtful patients especially young females.

All patients with acute appendicitis are given prophylactic antibiotics usually a single dose of IV metronidazole preoperatively, and continued for 5 days with IV gentamicin and penicillin's if the appendix is gangrenous or perforated[10,11].

Careful mopping of the pus from right iliac fossa and pelvis, liberal irrigation of the wound with normal saline[10,12,13] and leaving the skin open if gross contamination of the wound occurred with a perforated / gangrenous appendix[11]. In the absence of obvious contamination of the wound with perforated / gangrenous appendix, the wound could be loosely stitched, primarily[10,14]. This would reduce wound infection, the major cause of morbidity.

PATIENTS AND METHODS

To improve the management of patients with acute appendicitis, eighty files of patients undergoing appendectomy in Surgical Unit-I at Shaikh Zayed Hospital during the period October 1998 to September 1999, were submitted to a retrospective study with evaluation of medical file content, patients less than 12 years and interval appendectomy were excluded from t he study.

To evaluate clinical and laboratory data, a review protocol was designed. Appendix was considered inflamed if it showed congestion of its blood vessels, increase in its diameter with congestion and loss of luster.

Preoperative antibiotics were given to all patients with acute appendicitis, usually a 1st generation combination of IV metronidazole and Ampicillin or Cephalosporin. These antibiotics were continued for 5 days with addition of IV Gentamycin if the appendix was gangrenous or perforated. Intra-peritoneal drains were used in perforated appendices with localized abscess in right iliac fossa or pelvis. These were brought out through separate stab wounds and removed after 48-72 hours. The wound were loosely stitched in gangrenous and perforated case.

RESULTS

There were 45 (56.25%) male and 35 (43.2%) female patients. The age ranged between 12-70 years. Majority of patients were between 12-30 year (Table 1).

Table 1: Age and sex incidence in acute appendicitis (n=80).

Age (Years)	*Sex*		*Total*	*Percent*
	Female	*Male*		
12-20	17	22	39	48.75
21-30	12	19	31	38.75
31-40	1	1	2	2.5
41-50	2	2	4	5
51-60	2	1	3	3.75
61-70	1		1	1.25

Operative findings in 45 male patients were acutely inflamed in 40 (50%) gangrenous 1 (1.25%) perforated 3 (3.75%) and normal in 1 (1.25%) (Table 2). In 35 female patients appendix was acutely inflamed in 27 patients (33.75%) gangrenous in 1 (1.25%) and normal in 7 (8.75%) (Table 2).

Table 2: Operative findings in acute appendicitis (n=80).

Appendix	*Female*		*Male*	
	No.	*%*	*No.*	*%*
Normal	7	8.75	1	1.25
Acutely inflamed	27	8.75	40	50
Gangrenous	1	1.25	1	1.25
Perforated	-	-	3	3.75

The cause of pain in females with normal appendix was ovarian torsion in 1 patient and ruptured graffian follicle in 4 patients. In 2 female patients and the single male patient with normal appendix no specific cause for the pain could be found and were attributed to non-specific abdominal pain (NSAP (Table 4). The mean age of female patients with normal appendix was 21 years (Table 3).

Table 3: Age & sex incidence in normal appendectomy.

Sex	*Age (Years)*			
	12-20	*21-30*	*31-40*	*41-50*
Male	1	-	-	-
Female	6	-	-	1

Table 4: Age & sex incidence in normal appendectomy.

Causes of pain	*Sex*	
	Female	*Male*
Ovarian torsion	1	-
Ruptured graffian follicle	4	
Non-specific abdominal pain (NSAP)	2	1

The appendix was retrocaecal in 71.69%, pelvic in 16.98%, pre-ileal in 1.8%, post-ileal in 3.77% and para-caecal in 5.66%. The average duration of pain for acutely inflamed appendix was 27 hours while it was 36 hours for gangrenous and perforated group.

The pain started in right iliac fossa in 37 patient (46.25%) while in 23 patients (28.75%) it was periumbilical and shifted to right iliac fossa. It showed a similar shift from epigastrium to right iliac fossa in 12 patients (14.81%). In 8 patients (10%) the pain was diffuse abdominal pain. Overall the shifting pain was seen 35 patients (43.75%). Nausea was present in 43 patients (53.75%), vomiting in 32 patients (40%). On examination tenderness was present in 79 patients (98.75%), rebound tenderness in 66 patients (88%) and guarding in (43.47%).

Mean total leukocyte count (TLC) was 12,200 cumm in acutely inflamed, while it was 10,500 cumm in normal appendices. Mean temperature was 98.8°F in acutely inflamed group, it was 99.8°F in gangrenous / perforated group. The mean pulse was 98/min in acutely inflamed appendices, while it was 97/min in gangrenous / perforated group.

The incision most commonly made was grid iron in 66 patients (82.5%), Lanz in 14 patients (17.5%). In 6 patients grid ion incision was converted to Rutherford Morrison for better exposure. Surgical residents operated on 73 patients (91.25%), while 7 patients (8.75%) were operated on by consultants. Though all of the appendices were sent for histopathological examination, some of the reports of such examination were not available when the files were reviewed, apparently due to poor maintenance of records.

Gross appearance of the appendix on visual examination showed it to be acutely inflamed in 67 patients (83.75%), gangrenous in 2 patients (2.5%) and perforated in 3 patients (3.7%); appendix was normal in 8 patients (10%) out of which seven were young females and one was male, with a mean age of 21 years (Table 3).

The main postoperative complication was wound infection in 6 patients (7.5%). The mean postoperative stay was 2.85 days.

DISCUSSION

In this study of 80 patients, 70 patients (87.5%) belonged to the 12-30 year age group. This is similar to Bhopal[15], Aamir and Shami[16] (80%). This supports the view that appendicitis is most commonly seen in young adult population.

Emergency appendectomy for acute appendicitis is more common in males and peaked in 12-20 years age group 39 patients in this study (48.75%). This is similar to Bhopal et al.[15] and Primatesta[2].

Emergency appendectomy with normal appendix was more common in females and peaked in the 12-20 year age group, as 7 out of 8 patients in this study were young female (Table 3), similar to the findings of Primatesta[2]. In our opinion this group of young female patients in whom the diagnosis of acute appendicitis is not clear, should be admitted, monitored by serial examination, abdominal ultrasound and diagnostic laparoscopy if available. This approach will lead to a decline in negative appendectomy. Zeilke et al.[8] and Borgstein et al.[9] have expressed similar views.

Pain started in right iliac fossa (RIF) in 37 patients (46%), it shifted to RIF in 35 patients (44%) while in 8 patients (10%), it was diffuse in the abdomen. This is similar to study Bhopal et al.

In this study the average duration of pain was 1.2 days, which was similar to Berends et al.[17] 1.6

days and Bhopal 1.8 days. This indicates better public awareness about acute appendicitis, and early consultation regarding lower abdominal pain in the urban population. Nausea and vomiting accompanied the pain in 54% and 40%, respectively. This is similar to study by Fargoso et al.[3] Tenderness in RIF was present in 99% of the patients followed by rebound tenderness in 88%. Bhopal et al.[15] showed similar results in respect of tenderness and rebound tenderness except guarding which was present in 88% of the cases as compared to 44% in this study. This could be explained by the fact that presence of guarding would signify advanced inflammation, but as the patients are seeking medical advice earlier, it is not a prominent physical sign in this study, 1.2 day versus 1.8 days.

Average total leukocyte count (TLC) was 12,200 cmm in acute appendicitis, 13,700 cmm in gangrenous/perforated appendicitis and 10,5000 cmm in patients with normal appendix. This shows that rising TLC is an early marker for appendiceal inflammation as also shown by Groonroos and Thompson et al.[6,7]

The most commonly made incision was grid iron in 66 patients (82.5%) transverse in 14 patients (17.5%). In 6 patients (9%) gridiron was converted to Rutherford Morrison.

The incidence of wound infection in this study is 7.5%, but due to poor follow up and record keeping there is no data on the severity of wound infection and causative organism isolated on culture. This is similar to wound infection of 11% by Koretelainen et al.[18] and 9.7% Tanphiphat et al.[19]

A combination of prophylactic antibiotics were used for acute appendicitis in this study preoperatively and continued in the postoperative period for variable length of time. This is different from most authors. Qureshi et al.[10] and Cuschieri et al.[11] who advocate that the role of preoperative antibiotics is limited to a single agent effective against anaerobes in acute uncomplicated appendicitis. Postoperative antibiotics in this group do not confer any advantage instead they increase the cost and induce drug resistance.

The average postoperative hospital stay was 2.85 day this is similar to Bhopal et al.[15] but different from Baigrje et al.[20] who reported postoperative stay of 4.1 days. This difference could be because of less post operative complications in this study.

CONCLUSION

1. The diagnosis of acute appendicitis is clinical.
2. In equivocal cases serial observation of the patient, leukocytosis, abdominal ultrasound and diagnostic laparoscopy will help in reaching a diagnosis, especially in young females and reduce the incidence of negative appendectomy.
3. The use of antibiotics in acute appendicitis should be limited to a single preoperative dose of IV metronidazole. Broad spectrum, postoperative antibiotics should be used in gangrenous and perforated cases. This antibiotic protocol has been adopted.
4. There is a need to improve collection of clinical data, which will improve the quality of care and management of the operated patients. Accordingly a performa has been designed, and is being used to improve collection of clinical and histological data in patients with acute appendicitis.

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The Authors:

Moeed Iqbal Qureshi
Assistant Professor
Department of Surgery,
Shaikh Zayed Hospital,
Lahore.

Khalid M. Durrani
Professor
Department of Surgery,
Shaikh Zayed Hospital,
Lahore.

Address for Correspondence:

Moeed Iqbal Qureshi
Assistant Professor
Department of Surgery,
Shaikh Zayed Hospital,
Lahore.