ORIGINAL ARTICLE

Acute Perforated Appendicitis: Clinical Profile and Analysis of Risk Factors

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ABSTRACT

INTRODUCTION: The incidence of complicated acute appendicitis, including perforated or gangrenous appendicitis, remains considerably high (28-29%) despite the availability of modern imaging. Acute perforated appendicitis is associated with increased postoperative morbidity and mortality. The aim of the study was to analyze the clinico-pathological profile and outcomes for suspected perforated acute appendicitis and to determine the factors influencing the risk of perforated appendicitis. **MATERIAL AND METHODS:** This was a prospective observational study conducted at Nepalgunj Medical College and Teaching Hospital from November 2016 to August 2018. Patients with suspected appendicular perforation were included. The diagnosis was confirmed at laparotomy. History, physical findings, biochemical and radiological findings were noted. **RESULTS:** There were 74 patients. The maximum number of patients were in the age group of 0-20 and 21-40 years with a male dominance (M:F 1.9:1). The common presenting features were pain starting in right iliac fossa and becoming generalized with features of peritonitis. Majority presented late to the hospital with the mean duration of 6.35±2.46 days. 17 (22.97%) patients had deranged renal function test at presentation. All patients underwent laparotomy and appendicectomy. The commonest site of perforation was the tip of appendix (58.08%). 27 (52.94%) had generalized purulent peritonitis. All had features of acute appendicitis on histological examination. Of the 75 patients only 17 (22.97%) patients had fecolith. 21 (28.37%) had postoperative complications, commonest being surgical site infection (25.67%). Five (6.67%) patients died after surgery. The common cause of death was septic shock with multiorgan failure. Only one patient died due to myocardial infarction. The complications and mortality were common in those patients whose presentation was late i. e after 72 hours from the onset of symptoms, whose renal function was deranged, age > 60, and who had pyoperitoneum. **CONCLUSION**: Acute perforated appendix is not uncommon. Males are more common with younger people commonly getting affected. Delayed presentation, pyoperitoneum, age >60 are the common risk factors associated with morbidity and mortality.

Keywords*: Acute appendicitis, perforated appendicitis, delayed presentation, pyoperitoneum*

INTRODUCTION

Acute appendicitis is the most common cause of acute surgical abdomen and appendectomy for acute appendicitis is one of the most common abdominal surgeries performed by a general surgeon[1]. There are numerous studies on acute appendicitis, but still it is a clinical challenge and its etiology is not completely understood. Obstruction of the lumen due to fecoliths, hyperplasia of the lymphoid tissue or foreign bodies are proposed as the most common causes of acute appendicitis. The appendix becomes inflamed and edematous and its wall becomes ischemic and necrotic. If not identified timely and operated, the gangrenous appendix is perforated causing peritonitis[2]. The incidence of complicated acute appendicitis, including perforated or gangrenous appendicitis, remains considerably high (28-29%) despite the availability of modern imaging[3].

Appendicectomies in acute appendicitis are performed on an emergency basis to avoid the mortality due to complications such as perforation and peritonitis[4]. The mortality of appendicitis will increases up to 3.5- to 10-fold if the appendix is perforated[5]. It is still unknown that why appendix becomes perforated in some patients. Complications of a perforated appendicitis can be fetal. The fear of a perforated appendicitis has led the surgeons to accept the possibility of removal of an unaffected appendix so that even up to 30% negative appendectomy is acceptable[6].

The aim of the study was to analyze the clinico-pathological profile and outcomes in patients undergoing emergency appendectomies for suspected perforated acute appendicitis and to determine the factors influencing the risk of perforated appendicitis.

MATERIAL AND METHOD

This was a prospective observational study conducted in the department of surgery Nepalgunj Medical College and Teaching Hospital from November 2016 to August 2018. All patients with right iliac fossa pain and pain initially occurring at right iliac fossa (RIF) then becoming generalized were included. The diagnosis of perforated appendicitis was made depending on the history of pain starting at RIF and becoming either generalized to whole abdomen or in the right side of the abdomen and hypogastrium with the presence of signs like rigidity and rebound tenderness.

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The time interval between the onset of pain and arrival to the hospital was recorded. Detailed history was taken, examination done at admission. Complete blood count, renal function tests, electrolytes (sodium and potassium), urine analysis, urine pregnancy test in females were done. Radiological investigations like ultrasound of the abdomen and chest X–ray were also done. Presence of free fluid in the peritoneal cavity was taken as a positive finding suggesting appendicular perforation. All patients with suspected appendicular perforation underwent laparotomy with a midline incision and appendicectomy. The perforation was confirmed on laparotomy. The appendix was sent for histopathological examination (HPE).

RESULTS

97 patients underwent appendicectomy during the study period with suspected perforated appendicitis, out of them 74 had appendicular perforation at laparotomy. There were 49 (66.21%) males and 25 (33.78%) females with a male: female ratio of 1.9:1. Maximum patients (41.89%) were within the age range of 21 to 40. The presenting complaints were pain starting at RIF and becoming generalized to involve either the whole abdomen or right side of the abdomen with distension of abdomen. Time of presentation to the hospital after the onset of symptoms ranged between 3 to 10 days with the mean of 6.47±2.13 days. All 74 patients had pain initially located at RIF then becoming generalized. 56(75.67%) patients had generalized peritonitis and 18(24.32%) had peritonitis localized to the right side of the abdomen and hypogastrium. Of the 74 patients 17(22.97%) had deranged renal function test with a mean creatinine level of 3.29±2.56. Ultrasound abdomen was done in all patients among them 33(44.59%) had free peritoneal fluid, 41(55.40%) had free fluid in RIF and pelvis. Two (2.70%) patients had free air under the right hemidiaphragm.

Age	**Number of patients (%)**
0-21	21 (28.37%)
21-40	31 (41. 89%)
41-60	18 (24.32%)
>61	04 (5.40%)
Sex (M:F)	1.9:1
Clinical Presentation	
Time of presentation*	6.47±2.13 days
Generalized pain abdomen with peritonitis	56 (75.67%)
Pain right side of the abdomen with peritonitis	18 (24.32%)
Deranged RFT	17 (22.97%)
Creatinine level*	3.29±2.56

*values in mean with standard deviation

Table I: Demographics and clinical presentation

All 74 patients had perforated appendix. In 43(58.08%) patients the perforation was located at the tip, 9(12.16%) had in the middle and 22(29.72%) had at the base of the appendix. 51(68.91%) patients had presence of frank pus in the peritoneal cavity and among them 27(52.94%) had generalized purulent peritonitis.

The histopathological examination revealed acute appendicitis with periappendicitis in 33(44.59%) patients, 8(10.81%) patients had chronic appendicitis with reactive hyperplasia of lymph node, 1(17.56%) had acute suppurative appendicitis with periappendicitis, 17(22.9%) had gangrenous appendicitis, 2(2.70%) patients had high grade mucinous neoplasm and one (1.35%) had adenocarcinoma (table II). Patients with high grade mucinous neoplasm and adenocarcinoma underwent right hemicolectomy.

Histology	**Number of patients (%) (N=74)**
Acute appendicitis with periappendicitis	33 (44.59%)
Gangrenous appendicitis	17 (22.9%)
Acute suppurative appendicitis with periappendicitis	13 (17.56%)
Chronic appendicitis with reactive hyperplasia of lymph node	8 (10.81%)
High grade mucinous neoplasm	2 (2.70%)
Adenocarcinoma	1(1.35%)

Table II: Histopathological findings

21(28.37%) patients had postoperative complications. The most common complication was surgical site infection (SSI). One patient developed adhesive small bowel obstruction which needed relaparotomy. Five (6.67%) patients died after surgery. The common cause of death was septic shock with multiorgan failure. Only one patient died due to myocardial infarction (table III). The complications and mortality were common in those patients whose presentation was late i.e. after 72 hours from the onset of symptoms, whose renal function was deranged, age > 60, and who had pyoperitoneum.

Complications	**Number of patients (%)**
SSI	19 (25.67%)
Respiratory complications	12 (16.21%)
Postoperative ileus	9 (12.16%)
Intraabdominal collection	7 (9.45%)
Urinary tract infection	5 (6.75%)
Intestinal obstruction	1 (1.35%)

Table III: Postoperative complications

DISCUSSION

We evaluated 96 patients with suspected perforated appendicitis but among them in 74 patients perforation was confirmed at laparotomy. There was a male predominance and the common age group affected was between 21-40 years .The number of patients with perforated appendicitis who were below 20 years and above 60 were also not uncommon in our study. This findings were consistent with other studies.[7,8] Although no clear justification was presented for the high incidence of perforation in older adults and children, however, absence of clinical symptoms, existence of multiple differential diagnosis, lower levels of sensitivity to pain and presence of co-morbidities in older people, and inability to locate pain and shortness of the omentum in children are among the reasons for the delays in diagnosis and treatment of appendicitis in theses age group[7,8].

Perforated appendicitis was higher in males than in females. This is in contrast to a normal belief that several differential diagnoses in females might result in a delay in appendectomy. A study by Guss et al. reported that the mean delay was 477 and 709 min in males and females respectively. However, the rate of perforated appendicitis was significantly higher among males than females[9]. The rate of perforated appendicitis was about 23.67% in this study. This finding was similar to other studies which states that the incidence of appendicular perforation to be 28-29%[3]. One of the important factors of high incidence of appendicular perforation in our context seems to be delayed presentation.

The complication rate in our study was 28.37%, most common being SSI followed by respiratory problems. The higher rate of complications is likely due to the high number of patients presenting very late with pyoperitoneum and associated acute renal failure. Similar observations support the major cause of mortality being septic shock with multiorgan failure.

CONCLUSION

Our study showed that appendicular perforation is not uncommon and occurs at young age group with male preponderance. The common presentation was generalized pain abdomen and peritonitis. None of the investigations available can diagnose appendicular perforation preoperatively unlike other hollow viscous perforations. Appendicular perforation can be diagnosed only at laparotomy. Delayed presentation, age >60, deranged renal function test, pyoperitoneum are the risk factors for the postoperative complications and morbidity.

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