ORIGINAL ARTICLE

Acute Appendicitis is Still a Morbid Disease in the Developing World

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ABSTRACT

Aim: To evaluate the major factors affecting the clinical outcome in the management of acute appendicitis
Study Design: Prospective case series study
Settings: South Surgical Ward Mayo Hospital, Lahore
Duration: April to September 2019
Methods: All the patients above 12 years of age with the clinical diagnosis of acute appendicitis admitted through Accident and Emergency Department Mayo Hospital, Lahore were included in the study
Results: Age ranged from 13-65 with the mean of 25 ± 11 years and 57% of the patients were male. Duration of pain recorded was <24 hours in 55%, nausea/vomiting in 76%, anorexia in 55% and fever in 47% of the patients. Abdominal tenderness and Blumberg's sign were found in all the patients. 99% of the patients underwent surgical management. Among operative findings, perforated appendix with its complications was found in 20%, ovarian cyst in 6%, ruptured ectopic pregnancy in 1.5% and distal ileum perforation in 1% of the patients. Surgical site infection was observed in 13% and pelvic abscess in 2% of the patients postoperatively. There was no mortality.
Conclusion: Acute appendicitis is the most common cause of acute abdomen remains a challenging task for the surgeons worldwide. The complications of the perforated appendix are associated with significant morbidity and even mortality in the developing countries. The major factors contributing for the advanced disease profile and its complications in the developing world are poverty, late clinical presentation, misdiagnosis, elderly age and lack of latest diagnostic aids in the Emergency Departments.
Keywords: Acute appendicitis, perforated appendix, major factors, peritonitis, appendicectomy, morbidity

INTRODUCTION

The vermiform appendix, a highly specialized part of the gut immune system was considered as a vestigial organ in the past. The removal of the organ has no effect on the immune system, so is useful but not indispensable. Propensity for inflammation results in a clinical syndrome known as acute appendicitis.

Acute appendicitis is the most common cause of acute abdomen in the young adults and is the most common surgical emergency worldwide[1]. No age is exempted from the acute appendicitis but with a peak between the ages of 10 and 30 years[2]. The overall lifetime risk is about 10% which is on rise[3].

Yet, despite the extraordinary advancements in the modern imaging and laboratory investigations, the diagnosis remains essentially a clinical one, requiring a mixture of observations, clinical acumen and surgical science. Because of wide range in symptomatology of the acute appendicitis, the disease mimics with the gastrointestinal, genital and urological conditions[4].

The diagnostic accuracy has improved marginally in recent decades[5]. Even with the new diagnostic aids like leukocyte scintigraphy, C reactive protein, ultrasonography, contrast enhanced CT scan, MRI, barium enema and diagnostic laparoscopy, the diagnostic accuracy remains below 90%[6]. Therefore, the diagnosis rests mainly on the thorough physical examination of the abdomen rather than clinical history or laboratory investigations[7].

Recent trends for the management of acute appendicitis include conservative and surgical by making local incision (gridiron or Lanz's), laparoscopic or laparotomy. Though, some of the cases of acute appendicitis may resolve spontaneously.

Diagnostic inaccuracy, late clinical presentation and extremes of age are the major factors responsible for the advanced disease profile[8]. Even in this modern era, the disease is still associated with significant morbidity (10%) and mortality (1-5%)[9].

METHODOLOGY

The prospective case series study comprising of 200 consecutive patients was conducted in South Surgical Ward Mayo Hospital, Lahore from April to September 2019. All the patients above 12 years of age admitted through the Accident and Emergency Department Mayo Hospital, Lahore with the clinical diagnosis of acute appendicitis were included in the study. The patients with mass right iliac fossa were excluded from the study. The clinical diagnosis of acute appendicitis was made on the basis of detailed clinical history, thorough physical examination and was supported by laboratory investigations like total leukocyte count, differential leukocyte count, urine examination and ultrasound abdomen where needed. Latest invasive diagnostic tools like laparoscopy were not available in the Accident and Emergency Department. Informed consent was taken from all the patients. Nasogastric tube and Foley catheter were passed in the patients with generalized peritonitis. All the patients were managed surgically except two who were managed with antibiotics because of their comorbidity. Drain was placed in all the patients with peritonitis and their skin left open. Antibiotics and analgesics were given to all the patients. All the patients were kept nil per mouth till their bowel activity and observed closely in the ward for the detection of

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postoperative complications and their management. Hospital stay varied from 1-14 with the mean of 3.1 days. All the data of the patients was collected on the prescribed proforma individually and analyzed by SPSS 16. Quantitative variable was applied to calculate the mean and ± SD for age of the patients. Qualitative variables like gender were calculated by taking frequencies and percentages.

RESULTS

The series included 200 consecutive patients with the clinical diagnosis of acute appendicitis was expanded over a period of six months. Age ranged from 13-65 with the mean of 25 ± 11 years and 57% of the patients were male as in table 1.

Table 1: Demographic distribution

Age in years	n=200	Male	Female
13-20	86	41	45
21-30	75	48	27
31-40	25	15	10
41-50	8	6	2
>50	6	4	2

Eighty percent of the patients were belonged to the poor class and treated by the local doctors for multiple times and 10% of the patients were readmitted in the Emergency Department. Duration of pain recorded was <24 hours in 55%, anorexia in 55% and fever in 47% of the patients as in table 2.

Table 2: Symptoms/signs

Symptoms/signs		n=200	%age
Pain	<24 hours	110	55
	24-48 hours	26	13
	49-72 hours	24	12
	>72 hours	40	20
Nausea/vomiting		152	76
Anorexia		110	55
Fever		94	47
Pulse per minute	<80	46	23
	80-100	95	47.5
	>100	59	29.5
Temperature	<99 ^{0}F	106	53
	99-101 ^{0}F	60	30
	>101 ^{0}F	34	17
Total leukocyte count	<10 x 10^9/liter	108	54
	10-15 x 10^9/liter	52	26
	>15 x 10^9 /liter	40	20

Abdominal tenderness and Blumberg's sign were observed in all the patients. 99% of the patients were managed surgically and 1% because of comorbidity was treated with antibiotics. Among surgical approaches, gridiron incision was utilized in 65%, Lanz's in 9%, muscle cutting in 8%, low midline in 13% and laparoscopy (elective list) in 4% of the patients.

Among operative findings, acutely inflamed appendix (grade I) was found in 49% and Meckle's diverticulum in 0.5% of the patients as in table 3. Out of 20% of the patients with perforated appendix, 14% had duration of illness >72 hours and 2% of the patients were >50 years of age.

Table 3: Operative findings

Operative finding	n=200	%age
Grade I appendix	98	49
Grade II appendix	44	22
Grade III appendix	20	10
Grade IV appendix	8	4
Grade V appendix	12	6
Ovarian cyst	12	6
Ruptured ectopic pregnancy	3	1.5
Distal ileum perforation	2	1
Meckle's diverticulum	1	0.5
Mesenteric lymphadenopathy	2	1

Surgical procedures performed were appendicectomy, marsupialization of ruptured ovarian cyst, oophorectomy, salpingectomy, repair or resection and end to end anastomosis of distal ileum, wedge resection of Meckle's diverticulum with repair and mesenteric lymph node biopsy. 10% of the patients underwent two surgical procedures and 6% of the patients had pathology of the other organs rather than the appendix.

In the ward, all the patients were observed keenly to detect the postoperative complications with their prompt management. Surgical site infection was observed in 13% and pelvic abscess in 2% of the patients as in table 4.

Table 4: Postoperative complications with management

Complication	%age	Management
Surgical site infection	13	Wound opened, culture/ sensitivity and dressings
Respiratory tract infection	6	Chest physiotherapy, steam inhalation and antibiotics
Paralytic ileus	4	Suck and fluids
Pelvic abscess	2	Ultrasound guided aspiration, culture/sensitivity and antibiotics

No death was recorded. Hospital stay ranged from 1-14 with the mean of 3.1 days.

DISCUSSION

Acute appendicitis is one of the commonest surgical emergencies that require a prompt diagnosis to minimize the morbidity and to avoid the serious complications. Despite its high prevalence, the diagnosis of appendicitis remains challenging. The diagnosis of acute appendicitis embodies Sir William Osler's spirit when he stated, "Medicine is a science of uncertainty and an art of probability." The clinical presentation is often atypical and the diagnosis is notoriously difficult because the symptoms overlap with other conditions[10]. Therefore, its diagnosis rests mainly on the thorough clinical examination of the abdomen rather than the clinical history or laboratory measures. The fundamental clinical decision in the diagnosis of a patient with acute appendicitis is whether to operate or not.

The peak incidence of acute appendicitis is in early adult life. In the series, the mean age was 25 ± 11 years and 57% of the patients were male which is in resemblance with the study conducted by Chandio A et al[11] where the mean age was 25.04 ± 14.21 years and 59% of the patients were male.

Acute appendicitis remains an enigmatic challenge and a reminder of an art of surgical science. In the study,

nausea/vomiting was recorded in 76%, anorexia in 55%, abdominal tenderness and Blumberg's sign in 100% and leukocyte count >10 x 10^9/liter in 46% of the patients which is in comparison with the study carried out by Thakur BA, et al[12] where they described nausea/vomiting in 55.7%, anorexia in 84.6%, abdominal tenderness in 94.2%, Blumberg's sign in 76.9% and leukocyte count >10 x 10^9/liter in 73% of their patients.

Surgical removal of the diseased appendix through open laparotomy or laparoscopy is the standard but antibiotics may be used as a sole therapy in the acute catarrhal appendicitis. In the series, 99% of the patients were managed surgically, out of them 95% underwent open surgery, 4% with laparoscopy and 1% of the patients managed with antibiotics which is in comparison with the study carried out by Sartelli M, et al[13] where surgery was performed in 95.7% of the patients, out of which open surgery in 42.2%, laparoscopy in 51.7% and 4.3% of the patients were managed conservatively.

With accurate and earlier diagnosis of the acute appendicitis, both the laparoscopic and open approaches are safe, effective and are associated with fewer complications. In the series, postoperative complications observed were surgical site infection 13%, respiratory tract infection 6%, paralytic ileus 4% and pelvic abscess 2% which is in comparison with the study conducted by Salahudin O, et al [14] where they found surgical site infection in 22.2%, respiratory tract infection in 5.5%, paralytic ileus in 5.5% and pelvic abscess in 2.7% of the patients. No mortality was recorded in the series which coincides with the study carried out by Hof KH, et al[15] where no death was described in the study.

Poverty, late clinical presentation, misdiagnosis, elderly age and lack of modern diagnostic modalities were the major factors responsible for high morbidity and longer hospital stay which coincides with the studies conducted elsewhere in the developing world[8].

CONCLSION

No doubt, there is no substitute for skill in interviewing the patients and eliciting the physical signs for the diagnosis of acute appendicitis but a disease still constitutes a diagnostic challenge worldwide. The perforated appendix and its complications are associated with significant morbidity and even mortality in the developing world like Pakistan. Poverty, misdiagnosis because of variability in symptomatology, late clinical presentation, elderly age and lack of modern diagnostic aids with expertise in the Emergency Departments are the major factors responsible for the advanced disease profile and its complications.

Suggestions: The detailed clinical history and thorough physical examination are the cornerstones for the diagnosis of acute appendicitis especially in the developing world. Public awareness through media channels and seminars, earlier presentation, availability of experienced surgeons and latest diagnostic imaging modalities with expertise in the Emergency Departments will definitely reduce the morbidity to the negligible level with no mortality because of immediate and accurate diagnosis along with the prompt management of the acute appendicitis in the developing world like Pakistan.

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