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Acute Appendicitis in Patients with Different Ages at Hodeidah City, Yemen

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Abstract: Open appendectomy (OA) therapy was applied on some cases with the prediagnosis of acute appendicitis between the years of 2008 and 2010. Out of 258 cases, OA was done in 251 patients (97.3 %), while7 cases were medically treated (2.7 %). Age group of 10 - 30 years represented the highest prevalence of acute appendicitis (86 %). Laboratory and radiological investigations were used in the diagnosis of some cases. The CBC, U/S and abdominal x-ray were applied on 43.4 %., 29.8 % and 19.7 % of the total count of patients. The symptoms; abdominal pain, vomiting and fever were mostly accompanied the patient of acute appendicitis aged 10 – 30 years. Thus, 254 cases (98.44%) complained of abdominal pain, 116 cases complained of vomiting (44.9 %). The investigated cases of appendicitis which complained of fever were 77 patients (29.80%). On studying the complications of appendicitis, 5 cases showed appendicular masses. However, the perforated appendix presented by local peritonitis was 10 cases. The complications of general peritonitis were observed in 24 cases. Most of these complications were recorded within 10 – 30 years ages. Concerning the intervention, 251 cases of acute appendicitis were surgically operated (97.3%).

Key words: Open appendectomy · Acute appendicitis · Appendicular mass · Perforation

INTRODUCTION

Acute appendicitis is the most common cause of acute abdominal pain requiring surgery. More than 5% of the population develops appendicitis at some point. It is most common in the teens and 20s but may occur at any age [1]. Open appendectomy remained the gold standard for the treatment of acute appendicitis for more than a century. Acute appendicitis remained the most common general surgical emergency seen in most hospitals [2] and the most common cause of acute abdomen requiring surgical intervention [3]. In industrialized countries, individuals have a 7% lifetime risk of developing appendicitis, with the highest frequency occurring at ages from 10 to 30 years. The risk gradually decreases until age 50, when it stabilizes [1].

Despite technologic advances, the diagnosis of appendicitis is still based primarily on the patient's history and the physical examination [4, 5]. Laboratory investigations including WBC and serum reactive proteins help in supporting the diagnosis of acute appendicitis rather than excluding it. The overall sensitivity, specificity and accuracy of ultrasonography (U/S) in the diagnosis of acute appendicitis were 78%, 92% and 87%, respectively [6]. Computer tomography (CT) scans have a sensitivity and specificity of 98% in the diagnosis of acute appendicitis and are highly cost-effective [7]. Helical CT has reported sensitivities of 90-100%, specificities of 91-99%, accuracies of 94-98%, positive predictive values of 92-98% and negative predictive values of 95-100% [8].

Typical uncomplicated cases of acute appendicitis are easy to diagnose and treat. Typical cases present classically with para-umbilical pain (visceral pain) migrating to the right lower quadrant of the abdomen (RLQ). Pain usually is associated with nausea, vomiting and low-grade fever. Localized irritation and inflammation of the peritoneum results in pain with cough (Dunphy's sign), tenderness and muscle guarding on palpation in the RLQ over McBurney's point and rebound tenderness elicited by deep palpation with quick release (Blumberg sign). Unfortunately, 20-33% of the patients suspected of having acute appendicitis present with atypical findings [9, 10].

An appendix mass is a common surgical clinical entity, encountered in 2-6% of patients presenting with acute appendicitis. Patients presenting late in the course of acute appendicitis are complicated by the development of an inflammatory mass in right iliac fossa (RIF). This inflammatory mass is composed of the inflamed appendix, omentum and bowel loops.

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At the beginning of the 20th century, a non-operative management for the appendix mass followed by interval appendectomy 6-8 weeks after successful conservative management was proposed. This approach became a traditional management of appendicular mass. Conservative treatment (Ochsner–Sherren regimen) comprises hospitalization, intravenous fluids, antibiotics, analgesics and a strict watch on the vitals and general state of the patient. In 80-90% of the patients, the mass resolves without complications [11]. The management of appendiceal mass is surrounded with controversy. Traditional management has been conservative, with interval appendectomy performed weeks after the mass had resolved [12].

The objective of this interventional study was to compare the outcomes and morbidities of open appendectomy (OA) in patients with acute appendicitis at different ages detained in Al-Thwrah and Al-Olfy Hospitals, Hodeidah city, Yemen. The study was conducted during the period from June 2008 to August 2010.

MATERIAL AND METHODS

Patients and Diagnosis: In this prospective study, 258 patients diagnosed clinically to have acute appendicitis were enrolled in this study during the period from June 2008 to August 2010. This study was approved by ethics committee and after obtaining a clear informed consent, open appendectomy was done for 251 patients. The clinical diagnosis of acute appendicitis was based on the migration of pain, anorexia, nausea, vomiting, tenderness in right iliac fossa (RIF), rebound pain, raised temperature (≥37.3°C), leucocytosis, differential white cell count with neutrophils ≥75%.

Open Appendectomy: Appendectomies are performed to treat appendicitis, an inflamed and infected appendix. After the patient is anesthetized, the surgeon can remove the appendix by using the traditional open procedure through an incision in the lower right section of the abdomen. Most incisions are less than 3 in (7.6 cm) in length. The surgeon then identifies all of the organs in the abdomen and examines them for other disease or abnormalities. The appendix is located and brought up into the wounds. The surgeon separates the appendix from all the surrounding tissue and its attachment to the cecum and then removes it. The site where the appendix was previously attached, the cecum, is closed and returned to the abdomen. The muscle layers and then the skin are sewn together [13].

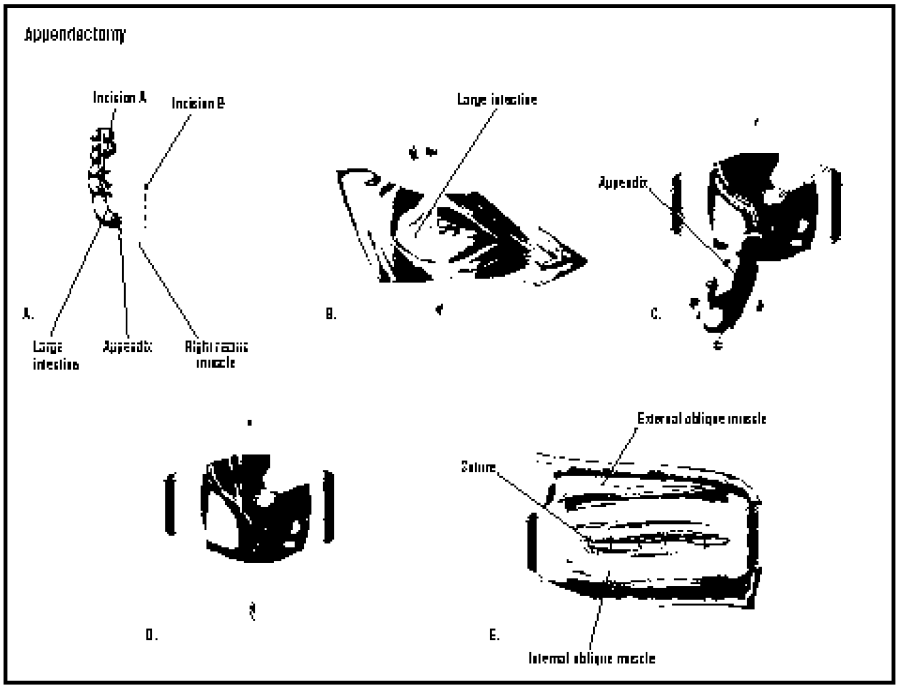

Fig. 1: To remove a diseased appendix, an incision is made in the patient's lower abdomen (A). Layers of muscle and tissue are cut and large intestine, or colon, is visualized (B). The appendix is located (C), tied and removed (D). The muscle and tissue layers are stitched (E). (Illustration by GGS Inc.)

RESULTS AND DISCUSION

In this investigation, both typical uncomplicated and complicated cases of acute appendicitis were diagnosed and treated mostly by open appendectomy. Despite the reduction in wound infection and readmission rate offered by laparoscopy, increased cost is often the reason behind the attraction of open appendectomy. The cost effectiveness needs to be measured in times of hospital stay, re-admission and cosmoses [13].

In this study, 258 patients diagnosed clinically to have acute appendicitis were enrolled and their ages were described in table 1. Acute appendicitis was positive in 88 females and 163 males. Open appendectomy was carried out in 251 patients (97.3 %). Age group of 5 - 10 years is the lowest appendicitis group (12.4 %). Age group of 10 - 30 years represented the highest prevalence of acute appendicitis (86 %). The age group of more than 30 years also showed low appendicitis percentage (15.1 %).

It has been estimated that the accuracy of the clinical diagnosis of acute appendicitis is lying between 76% and 92%, with values correlating with the surgeon's experience [14]. The white blood cell (WBC) count is elevated (more than 10 x10^9 per L) in 80 percent of all cases of acute appendicitis [15]. Unfortunately, the WBC is elevated in up to 70 percent of patients with other causes of right lower quadrant pain [16]. Thus, an elevated WBC has a low predictive value. Serial WBC measurements (over 4 to 8 hours) in suspected cases may increase the specificity, as the WBC count often increases in acute appendicitis [4]. In addition, 95 percent of patients have neutrophilia [17]. An inflamed appendix appears on ultrasound as a non-compressible tubular structure, more than 6 mm in diameter, with a thickened wall. Preoperative ultrasonography (U/S) was done routinely for female patients to exclude gynecological causes and selectively for male patients to exclude renal causes [18]. The overall sensitivity, specificity and accuracy of U/S in the diagnosis of acute appendicitis were 78%, 92% and 87%, respectively [6]. Some authors suggest computer tomography (CT) routine use for abdominal pain in the right lower quadrant, which would probably reduce surgeries and hospital stays [7].

Due to deficiency of the capabilities in our Hospitals, CBC, U/S and x-ray could't be used as diagnostic aids for all patients. Laboratory and radiological investigations are shown in table 2. Out of 258 cases, CBC was carried out for 112 cases which represent 43.4 %. The non-invasive radiological investigation (U/S) was applied for 77 cases of a total population (258), representing 29.8 % of the total number of patients. However, the abdominal x-ray was used in 51 cases (19.7 %) of total count of patients.

Table 1: Categories of acute appendicitis according to the patient's ages and gender

Age	Male No.	Female No.	Total No.
5-10	19	13	32
11-20	75	58	133
21-30	38	16	54
31-40	7	10	17
41-85	14	8	22
Total (%)	153 (59.3%)	105 (40.7%)	258 (100%)

Table 2: Laboratory and radiological investigations of the patients with acute appendicitis in relation to the ages

Age	CBC	Sonar	Abdominal x-ray
5-10	14	10	10
11-20	47	32	8
21-30	30	11	6
31-40	6	8	3
41-85	15	16	24
Total (%)	112 (43.4%)	77 (29.8%)	51 (19.7%)

Table 3: Clinical investigations of acute appendicitis in relation to the ages of patients

Age	Abdominal pain	Vomiting	Fever
5-10	25	12	6
11-20	125	48	33
21-30	45	33	12
31-40	26	9	6
41-85	33	14	9
Total (%)	254 (98.4%)	116 (44.9%)	77 (29.8%)
Males (%)	146 (57.4%)	69 (59.4%)	44 (57.1%)
Females (%)	108 (42.5%)	47 (40.5%)	33 (42.8%)

The highest incidence of acute appendicitis is during the second and third decade of life. While appendicitis is uncommon in young children, it poses special difficulties in this age group because it is difficult to obtain the history and elicit clinical signs in young children, non-specific abdominal pain and mesenteric lymphadenitis are common in this age group and sometimes these are impossible to be differentiated from acute appendicitis on clinical grounds. These factors contribute to a perforation rate as high as 50% in this age group [4]. Acute appendicitis in the elderly is associated with significant morbidity [19]. There is usually delay in the diagnosis because abdominal laxity may hide the clinical signs. Progression to perforation is rapid with significant increase in morbidity and mortality.

The symptoms; abdominal pain, vomiting and fever were mostly accompanied the patient of acute appendicitis aged 10 – 30 years. Table 3 showed that 254 cases (98.44%) complained of abdominal pain.

Table 4: Complications of acute appendicitis of patients in with different ages

		Perforated appendix	
Age	Appendicular mass	Local peritonitis	General peritonitis
5-10	0	2	2
11-20	0	2	7
21-30	2	3	9
31-40	1	1	2
41-85	2	2	4
Total	5	10	24
Males	3	6	14
Females	2	4	10

Table 5: Intervention in appendicitis of patients with different ages

Age	Surgical treatment	Medical treatment
5-10	25	1
11-20	133	1
21-30	49	2
31-40	23	1
41-85	21	2
Total (%)	251 (97.3%)	7 (2.7%)
Males	163	4
Females	88	3

This symptom reached 57.5 % in males and 62.2 % in females, respectively. The data also revealed that 116 cases complained of vomiting (44.9 %). Thus, the vomiting males and females were 59.5 % and 40.5 % of the total cases, respectively. The investigated cases of appendicitis which complained of fever were 77 patients. The recorded percentages of males and females were 57.1 % and 42.8%, respectively.

Delay in diagnosis and treatment can lead to perforation of inflamed appendix. It was estimated that the perforation rate is about 50% in infancy, 10% between 10 and 40 years and 30% at 60 years of age [20]. In the study conducted by Korner *et al.* the frequency of perforated appendicitis was19% [21]. Omundsen and Dennett reported that the perforation due to acute appendicitis was 5% [22], whereas in study by Ma *et al.* the frequency of perforation was 22% [23]. It was 31.3% as recorded by Dian *et al.* [24].

On studying the complications of appendicitis, the results (Table 4) showed that 3 cases of males and 2 cases of females had appendicular masses. However, the perforated appendix presented by local peritonitis was 10 cases (6 males & 4 females). The complications of general peritonitis were observed in 24 cases, including 14 males and 10 females. Thus, the total percentage of perforation was 13.1%. Most of these complications were recorded within 10 – 30 years ages.

In our study, complications were due to delayed presentation of the patients (especially from rural areas) into the hospital due to difficulties of traffics in the mountainous roads which delay the diagnosis of the disease and sometimes, delay in surgical intervention due to heavy emergency operations.

The management of appendiceal mass is surrounded with controversy. Traditional management has been conservative, with interval appendectomy performed weeks after the mass had resolved. A conservative management is still a highly acceptable approach for appendix mass. This should be followed with interval appendectomy especially in patients with persistent right iliac fossa pain [12].

Surgical and medical interventions in appendicitis of patients are presented in Table 5. The data cleared that 251 cases of acute appendicitis were surgically operated (97.3%). In addition, 7 cases were medically treated. Out of them, 5 patients underwent appendicular masses, therefore, they had conservative treatment for few weeks and finally they were operated. Two rare cases were recorded as chronic appendicitis.

Laparoscopic appendectomy (LA) had its own limitation which includes technical difficulty, non availability of equipment all the time, longer duration of operation and higher expense of the procedure as a whole. There have been recent studies which delineated the advantages of LA to include shorter recovery times and less wound infections. Additionally, laparoscopy advocators state that; it may benefit certain populations such as those with unclear diagnosis, female, elderly and obese patients and on the other hand, open appendectomy (OA) has been associated with fewer intraabdominal infections and lower institutional cost [25].

CONCLUSION

Acute appendicitis was about 12.4% in infancy, 86% between 10 and 30 years and 15.1% at 31-85 years of age. Appendicular mass as a complication represented very low percentage (1.93%) of the total appendicitis cases. Perforation of appendix is a common complication of acute appendicitis. Out of 258 appendicitis cases, 34 patients underwent perforation (13.1%). However, the perforation rates were about 11.7% in infancy, 61.7% between 10 and 30 years and 26.4% at 31-85 years of age. Delay in the diagnosis of acute appendicitis and surgical intervention causes increasing incidence of perforated appendicitis.

RECOMMENDATION

The diagnostic means like U/S must be continuously improved by presenting the advanced equipments and training the technical team. Computer tomography (CT) routine use for abdominal pain in the right lower quadrant would probably reduce surgeries and hospital stays. Therefore, such deficiency of CT in our hospitals would be managed. LA has lesser rate of wound infection and re-admission of patients. The availability of laparoscopic equipments and training of the team in our hospitals on the technique of LA to be an alternative choice offered for the patients with acute appendicitis are recommended.

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