Histopathological Analysis of Cases Presenting with Acute Appendicitis

Nadir Mehmood¹, Huma Mushtaq² and Saeed Alam³

¹Associate Professor, Department of Surgery, Rawalpindi Medical College, Rawalpindi
²Assistant Professor of Histopathology, Department of Pathology, Islamabad Medical & Dental College, Islamabad
³Professor of Histopathology, Department of Pathology, Islamabad Medical & Dental College, Islamabad (²³Bahria University, Islamabad)

Abstract

Introduction: Acute appendicitis is a common surgical emergency. Amongst those who undergo appendectomy, about 20% are misdiagnosed and actually have some other underlying cause. Therefore, for accurate diagnosis, histopathological evaluation of appendectomy specimens is mandatory.

Objective: To analyze different histopathological findings seen in cases diagnosed as acute appendicitis and to see the rate of negative appendectomies in our setup.

Methodology: A total of 219 appendectomy cases with clinical diagnosis of appendicitis were included in this study. Various parameters were recorded from the patient's files, and histopathology reports were reviewed and different histopathological patterns were categorized.

Results: Out of 219 cases of appendectomy, 131 were females and 88 were males. The mean age was 23 years ± 9.93 SD with a range of 2-59 years. Most of the cases were found in 2nd and 3rd decades. Most frequent findings were of acute appendicitis (30.6%) and resolving appendicitis (26%). Negative appendectomies were seen in 6.8% of cases. Other diagnoses included tuberculous appendicitis (1.8%), carcinoid (0.5%) and Entrobius vermicularis infestation (3.7%). There were 1% cases containing fecolith and 9.1% cases presenting with lymphoid hyperplasia.

Conclusion: Definitive diagnosis of appendicitis is established by histopathological evaluation and various etiological factors are simultaneously highlighted. Negative appendectomies provide a lead to surgeons' clinical judgement.

Key Words: Appendectomy, Histopathology, Appendicitis

Introduction

Acute appendicitis is a very common general surgical emergency.¹ Now a days it is not considered as an interesting topic for research but it still remains a very important disease. It is important to have timely surgery in order to prevent morbidity and mortality, 2% of which is associated with perforation.² Acute appendicitis is more frequent in late teens and twenties. Whereas male to female ratio is 1:1 before puberty and 2:1 at puberty.³ The most common cause of acute appendicitis is obstruction. Obstruction is mainly due to fecoliths but there are some unusual factors too, such as lymphoid hyperplasia, intestinal worms, tumors, fruit seeds, foreign bodies, strictures, gall stones and tuberculosis.⁴

Acute appendicitis is one of the most common surgical emergencies encountered in clinical practice; yet 20% of the patients who undergo appendectomies are misdiagnosed and actually have some other underlying cause.⁵ The conditions that have similar clinical features to acute appendicitis especially in females are Urinary tract infections, pelvic inflammatory disease, ureteric colic, ovarian diseases, ectopic pregnancy and many more.⁶ If proper evaluation is not done, appendectomies of patients suffering from the above conditions can be performed accidently. It has been noticed that many resected specimens of appendix are not sent for histopathological analysis; due to this various significant findings remain undetected, such as tumors of appendix, tuberculosis, worms etc.

This study was conducted to analyze different histopathological findings in cases diagnosed as acute appendicitis and to see the rate of negative appendectomies in our setup.

Materials and Methods

This retrospective study was carried out at surgical unit, DHQ Hospital Rawalpindi. Previous 1 year record (Dec 2012- Dec 2013) of patients who underwent appendectomy was reviewed.

A total of 219 patients with clinical diagnosis of appendicitis were admitted for appendectomy during the study period. Various parameters were recorded from the patients’ files. Patient’s age, gender, lab investigations, clinical features and operative findings were noted. The histopathological reports were reviewed and different histopathological
patterns were categorized. Statistical analysis was done by using SPSS version 16.

Results

A total of 219 appendectomy cases that presented in the last 1 year were included in this study. All of these patients clinically presented with clinical features suggestive of acute appendicitis.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>05</td>
<td>2.3</td>
</tr>
<tr>
<td>11-20</td>
<td>102</td>
<td>46.6</td>
</tr>
<tr>
<td>21-30</td>
<td>76</td>
<td>34.7</td>
</tr>
<tr>
<td>31-40</td>
<td>21</td>
<td>9.6</td>
</tr>
<tr>
<td>41-50</td>
<td>09</td>
<td>4.1</td>
</tr>
<tr>
<td>51-60</td>
<td>06</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 2: Histopathological Patterns seen in Appendectomy Cases (n=219)

<table>
<thead>
<tr>
<th>Histopathological findings</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early acute appendicitis</td>
<td>67</td>
<td>30.6</td>
</tr>
<tr>
<td>Acute suppurative appendix</td>
<td>18</td>
<td>8.2</td>
</tr>
<tr>
<td>Resolving appendicitis with eosinophilia</td>
<td>57</td>
<td>26</td>
</tr>
<tr>
<td>Fibrosed appendix</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Appendix showing congestion</td>
<td>5</td>
<td>2.3</td>
</tr>
<tr>
<td>Normal appendix</td>
<td>15</td>
<td>6.8</td>
</tr>
<tr>
<td>Appendix showing fecolith</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Entrobius vermicularis</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>Carcinoid</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Lymphoid hyperplasia</td>
<td>20</td>
<td>9.1</td>
</tr>
</tbody>
</table>

Therefore on the basis of clinical and laboratory findings surgery was performed. Among these patients 131 were females and 88 were males. The mean age was 23 years ± 9.93 SD with a range of 2-59 years. Age distribution of patients who underwent appendectomy is shown in table 1. Various histopathological findings seen in the appendectomy specimen are shown in table 2. Total number of cases of acute appendicitis was 67 (30.6%) and there were 15 (6.8%) cases showing normal appendix on histopathological evaluation. Out of these 15 cases, 10 were females and 5 were males. This may be due to various diseases of female genital tract clinically mimicking acute appendicitis.

Discussion

Acute appendicitis is the commonest surgical emergency since many decades and appendectomy is the most frequently performed abdominal operation. The incidence of appendicitis varies in different countries. This variation is based on various factors such as sex, age, race, region, dietary habits, hygiene, socioeconomic status and season.7 According to the current concept acute appendicitis is more common in Europe and USA and is less common in African and Asian countries.8 This variation is based on dietary habits; more risk is associated with high protein and low fiber diet.9 Even after so many advancements there is no confirmatory laboratory test or technique available for the diagnosis of appendicitis except for histopathological examination. Almost 7% of the population suffers from appendicitis in their life time and peak incidence is between 10 to 30 years of age. Histopathological examination not only confirms the diagnosis of acute appendicitis, but also discloses many additional pathological lesions that may not be evident intra-operatively and has an impact on patient’s management.3 It has also been noticed that patients’ symptoms disappear post operatively even if they are found not to have appendicitis on histopathological evaluation. The underlying cause in this situation may be an early sub clinical appendicitis at micro cellular level. Therefore accurate diagnosis of appendiceal inflammation cannot be made by macroscopic assessment, emphasizing more on the importance of histopathological analysis.10 In this study the highest number of appendectomy cases were seen in the 2nd and 3rd decades. This is similar to findings of Zulfikar et al11, whereas in a study by Makaju in Nepal it was more frequently observed in 11-40 years age group.2 In the present study females were more commonly affected than the males, with a male: female ratio of 3:2. The results are almost similar to a study done by Shrestha et al12 as 52.6% of their patients were females. But this is in contrast to the findings of most of the other studies such as in a study by Makaju et al, 60.42% of their cases were males and 39.58% cases were females.2 The negative appendectomy rate varies from 15 to 30 %.13 In the present study there were 15 (6.8%) cases that showed normal appendix on histopathological examination. Similar findings have been reported by Khairey (9.2%)14 and Vriesman et al.15 Almost 67% of patients in the present study who had negative appendectomies were females which is similar to the results of Khairey (70%).14 Shrestha et al reported 10.8% of negative appendectomies12 whereas Khan et al reported 11.5% cases.16 However one study showed very low frequency i.e.
only 1.4% cases whereas Hobler et al and Morrison et al reported a higher frequency i.e. 17.8% and 20% cases of negative appendectomies. The rate of negative appendectomies is more in females most likely due to misdiagnosis in reproductive age group. The underlying reason is that various diseases of the female genital tract have signs and symptoms mimicking acute appendicitis such as ovarian cysts, pelvic inflammatory disease and ectopic pregnancy. Therefore histopathological specimens of appendix should be audited in order to improve the clinical evaluation in females.

In this study there were 67 (30.6%) cases of acute appendicitis which is similar to the results of Makaju et al (34.75%) and Nabipour et al (35.33%). Shrestha reported 45.6% cases of acute appendicitis. In contrast results of Subedi et al showed 92% cases with acute appendicitis. There were 18 (8.2%) cases of acute suppurative appendicitis in this study similar to the results of Zulfikar et al who reported 20.7% cases of acute suppurative appendicitis and Shrestha et al reported 20.8% cases of the same. Other studies have reported 51% and 48.26% cases of acute suppurative appendicitis. Entrobius vermicularis, known as pin worm affects almost 200 million people worldwide. This parasite is usually found in appendices ranging from 0.18 to 4.1% of cases. The patients in whom this worm is found are either reported with a normal appendix on histology or with chronic inflammation. In present study there were 8 (3.7%) cases in which Entrobius vermicularis was found. Another study by Duzgun et al reported 4 (0.4%) cases of Entrobius vermicularis. The commonest tumor seen in appendices is Carcinoid tumor. Carcinoids are usually firm, small, well circumscribed and yellowish brown lesions and are mostly diagnosed incidentally. According to different studies, the reported incidence of Carcinoids found in Appendices ranges from 0.02 to 1.5%. In the present study there were 0.5% cases of Carcinoid tumor. This result is similar to that reported by Zulfikar et al (0.6%) and Collin’s (0.7%) whereas Duzgun et al and Makaju et al reported it in 0.1% cases. Tuberculous appendicitis is also a rare condition, as it occurs only in 0.1 to 3% of appendectomy cases. In this study cases of tuberculous appendices were 4 (1.8%), as compared to some previous studies that reported tuberculous appendices in 0.58 and 3%. It is generally believed that obstruction of the lumen in appendices is one of the major causes of acute appendicitis and fecoliths along with presence of lymphoid hyperplasia are the main underlying reasons for obstruction. Lymphoid hyperplasia is considered as an important initiating factor for acute appendicitis, therefore it is important to highlight its role in appendectomy cases. There is variation regarding this finding in different studies. In this study lymphoid hyperplasia was present in 20 (9%) cases but in another study there were 2.6% of cases with lymphoid hyperplasia. One study showed very high frequency i.e. 57.8% cases presenting with lymphoid hyperplasia. Fecolith accumulation is also one of the main causes of luminal obstruction. It is formed by inspissations of faecal matter surrounding vegetable fibers. It is commonly associated with cases of acute and gangrenous appendicitis. In the present study there were 1% cases containing fecolith; this is similar to the results of Makaju et al (1.5%). In this study there were a large number of cases presenting with resolving appendicitis 57 (26%). However in one study this finding has been reported in only 3.5% of cases. In this study there were a large number of cases presenting with resolving appendicitis 57 (26%). In one study this finding was present in 3.5% of cases.

**Conclusion**

Acute appendicitis is clinically suspected on the basis of clinical features and physical examination by the surgeon. Definitive diagnosis is established by histopathological evaluation and various etiological factors are simultaneously highlighted. Negative appendectomies provide a lead to surgeons’ clinical judgement. It is mandatory to submit all specimens for histopathological evaluation to exclude incidental findings such as tumours.

**References**