Original Research Article

Histopathological correlation of resected appendicectomy specimens - a five year study in a tertiary care centre in Kerala

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Abstract

Background: Acute Appendicitis is one of the common cause of acute abdomen leading to appendectomy which is one of the most frequently performed operations all over the world. Being a common surgery, appendicectomy specimens contribute a major part of routine specimens in any pathology laboratory. a large number of medical and surgical diseases can closely mimic appendicitis leading to negative appendicectomy. **Objectives:** To find out the age, sex related incidence and different histopathological lesions seen in resected appendicectomy specimens in a tertiary care centre in south India. We also tried to find out negative appendicectomy rate. **Materials and Method:** This is a retrospective study conducted in the department of pathology, Sree Narayana Institute of Medical Sciences, Kerala. We analyzed the histopathology reports of those patients who had undergone appendicectomy in our hospital during last five year period (January 2014- December 2018). **Results:** During the study period of five years, 597 appendectomies were done. The mean age of the patients undergoing appendicectomy was found to be 25-35 years. Most of the patients were adults between 21-30 years and number of male patients (386) was more compared to females. Acute appendicectomy specimens showed the presence of fecoliths, gangrene, serositis, worms, lymphoidhyperplasia etc. The negative appendectomy rate was 5.6%. **Conclusions:** Detailed histopathological examination is always recommended in appendicectomy specimens not only to confirm the diagnosis, but also to rule outincidental pathologies their by leading tobetter patient outcome.

Keywords: Appendix, Resection, Negative

Introduction

Acute Appendicitis is one of thecommon cause of acute abdomen leading to appendectomy which is one of the most frequently performed operations all over the world [1,2]. While in United States, 250,000 cases of appendicitis are reported annually, incidence is much lower in afro Asian countries probably due to dietary actors [3]. Clinically acute appendicitis presents with fever and pain near the umbilicus which moves toward the lower-right side of the abdomen accompanied by nausea, vomiting, loss of appetite etc.

The diagnosis of appendicitis is made according to the clinical features and surgical removal/ appendectomy is the offered treatment of choice. Complications of acute appendicitis include perforation peritonitis, gangrene and sepsis [4]. The approximate lifetime risk for developing acute appendicitis in a person is found to be around 7-9 % with peak incidence between 10-30 years of age. It is seen that incidence of acute appendicitis varies among different age groups and population. This is thoughtto be caused by different environmental and behavioral factors like general hygiene, parasite and enteric infection leading to lymphoid hyper plasiain GI tract etc. The Right iliac fossa pain can occur due to different pathologies especially in females leading to diagnostic difficulties resulting in negative appendectomies. Histological examination of resected appendix specimens are routinely done in our hospital, so we decidedto correlate the histopathological findings with theclinical diagnosis of appendicitis.

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Objectives

To find out the age, sex related incidence anddifferent histopathological lesions seen in resected appendices-tomy specimens in a tertiary care centre in south India.

Materials andMethods

Studysetting: Department of Pathology, Sree Narayana Institute of Medical Sciences, Kerala.

Type of study: A retrospective study.

Sampling methods: Convenience sampling

Sample collection: We collected the histopathology reports of those patients who had undergone appendicectomy in our hospital during last five year period between January 2014- December 2018 from our computer records. The other relevant data of these patients are collected from medical records. The collected information include age, sex, demographic features, investigation findings and common clinical presentation. Histopathologically acute appendicitis is diagnosed when neutrophils are seen in the muscle layer. We also tried to find outnegative appendectomy rate, which is defined as a post operative appendix specimen for suspected appendicitis that was however microscopically normal on histopathological examination without evidence of inflammation, tumor and parasite infestation.

Inclusion criteria: All patients who had undergone appendicectomy in our hospitalduring last five year period between January 2014- December 2018

Exclusion criteria: We excluded those patients in whom appendicectomy is done as a part of surgery done for malignancy of ileocecal area

Statistical methods: The collected data were analyzed by SPSS version 20 and applied simple statistical tests
Ethical consideration & permission: explained consent was taken before surgery.

Results

During the study period of five years, 597 appendectomies were done in our hospital. The mean age of the patients undergoing appendicectomy was found to be 25-35 years (5-75 years). Most of the patients were adults between 21-30 years and number of male patients (386) was more compared to females (Table 1,2)

Table-1: Distribution of patients according to sex.

Sex	Number
Male	386
Female	211

Table-2: Distribution of patients according to age range [n (%)]

Age	Number
17–20 y	116
21-30	241
31-40	89
41-50	81
51-60	58
>60	12
Total	**597**

Table-3: Distribution of patients according to histopathologic findings.

Histopathologic findings	Number
Acute appendicitis with serositis	371 (62.1%)
Gangrene with perforation	73(12.2%)
Obliterativeappendicitis	37(6.1%)
Parasites	6(1%)
Lymphoidhyperplasia	59(9.8%)
Granulomatous inflammation	4(.67%)
Mucocele	8(1.3%)
Mucinous cystadenoma	2(.3%)
Appendiceal tumors	3(.5%)
Negative appendicectomy	34(5.6%)

Based on the histopathologic findings, specimens were divided into two groups; positive for features of acute appendicitis or negative forfeatures. Acute appendicectomy specimens showed the presence of fecoliths, gangrene, serositis, worms, lymphoid hyperplasia, granulomatous inflammation, mucocele, mucinous cystadenoma, or appendiceal tumors (Table 3). Negative specimens were found to bemicroscopically normal, with no evidence of inflammation or appendiceal tumors. The negative appendectomy rate was5.6% the female sex accounted for 67% of the negative appendectomies

Discussion

Resection of appendix foracute appendicitis is one of the most common surgical interventions performed worldwide [1,2]. The incidence of acute appendicitis is found to roughly parallels the development of lymphoid tissue with peak time between 10 - 30 years. The sex ratio in acute appendicitis is equal before puberty, but by 15 - 25 years of old it has seen shifted to 2:1 in favor of men. Various studies showed the overall incidence of acute appendicitis in life time is approximately is 7.0% with 8.6% for men and 6.7% for women [5,6].

The acute appendicitis is diagnosed by combined evaluation of patient's history, investigation findings and surgeon's subjective judgment. Various other clinical conditions mimicking acute appendicitis can be found out by abdominal ultra sonography (US) or computed tomography (CT). Abdominal ultrasound is a cost-efficient and valuable investigation in the diagnosis of doubtful cases of appendicitis [7]. Still with all these investigation modalities, negative histopathological diagnosis can occurin 9.2% cases and this is found to be higher among females in reproductive age group. The rate of negative appendectomy found in ourstudy (5.6%) is low compared to other similar studies [5,6,8].

Obstruction of the lumen of the appendix caused by fecoliths or lymphoid hyperplasia is thought to be the most important factor in the pathogenesis of acute appendicitis. Extension of inflammation through the walls of appendix will lead to serositis. Persistent ischemia can lead to gangrenous necrosis followed by perforation peritonitis (figure 1,2)

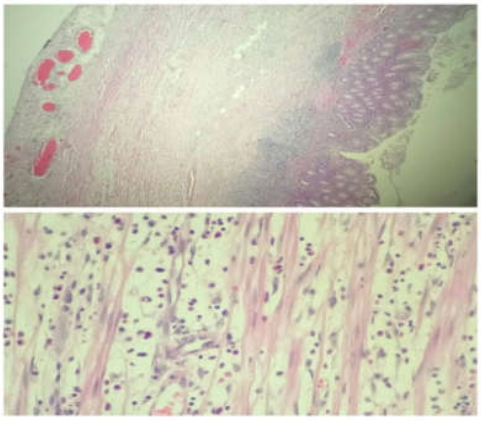

Figure-1: Acute appendicitis showing infiltration by neutrophils, eosinophils and serositis (lowpower (upper) and highpower (lower) appearance H & E

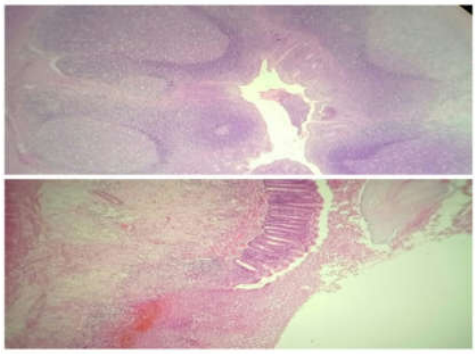

Figure-2: Appendix showing lymphofollicular hyperplasia (upper) and gangrenous perforation (lower)

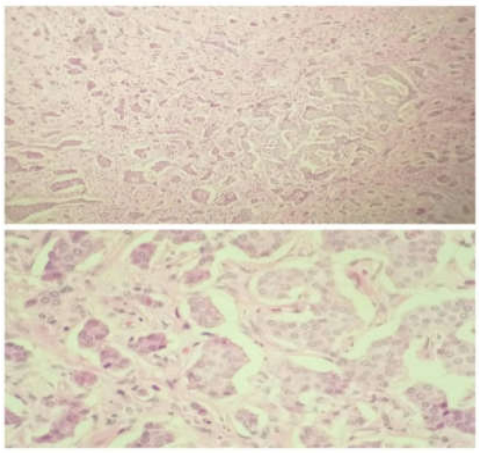

Figure-3: Carcinoid tumor ofappendix showing infiltration bynests of neuroendocrine cells

About 6.1% of resected appendix show obliteration of the lumen by fibrous tissue. This condition is named as, neurogenic appendicopathy/ appendiceal neuroma, develop secondary to hyperplasia of neuroendocrine cells, due to chronic inflammation [9].

Carcinoid tumor accounts for the most common primary malignant lesion of the appendix which accounts for 60% of all appendiceal tumors (figure 3) Usually Carcinoidsare found incidentally during surgery [10]. Most of the carcinoid tumors are found to be less than 1 cm and are seen located at the tip. These small tumors are usually benign, with a near zero rate of calculated risk of metastasis [11]. In our scenario the incidence of appendiceal carcinoidis found to be.5%. Therefore, even when grossly appendectomy specimens appearnormal, histopathologic examination is mandatory. Since early detection and treatment of malignancy will definitely leadto improve patient treatment results by revealing an early stage disease**.**

The parasitic infection by Enterobiusvermicularis /pinworms is very common worldwide and it is found to affect up to 200 million people worldwide. The association of E vermicularisin acute appendectomy specimens have ranged from 0.2% to 41.8% [12]. We also have similar incidence (1%) of pin worm infection in our studies. Other parasites like T saginata, or Entamobahistolitica, are also seen infesting appendix leading to clinical symptoms. After incidental detection of parasites in appendectomy specimens, anti-helminth treatment should be started.

Granulomatous appendicitis is a rare diagnosis (1.3% to 2.3% in developing countries) which may be caused by various infectious and non infectious factors [13,14]. Diagnostic criteria of granulomatous appendicitis include presence of granulomatous inflammation with fissuring-type ulcers and transmural lymphoid aggregates. Systemic diseases like Crohn's disease and sarcoidosis, should be excluded and in countries where tuberculosis is endemic detailed testing should be done to ruleout this infectious condition also. We extensively examined our patients, but no evidence supporting these diagnoses were found. So a diagnosis of granulomatous appendicitis was made in 4 cases (67%).

Mucocele of appendixare often asymptomatic conditionand are usually discovered incidentally during appendectomy which was seen in 8 cases. Mucocele of appendix is an obstructive dilatation resulting from intraluminal accumulation of mucoid material [15]. The reported incidence of this condition in appendectomy specimensis found to be 0.2% to 0.7%. Histopathologically it may be caused by are tention cyst. Or other conditions likemucosal hyperplasia, mucinous cyst adenoma, or amucinous cystadenocarcinoma [16]. Even thoughstudies show endometriosis and diverticular disease can affect appendix, we haven'tsimilar experience [17,18].

Although in most of the cases, clinical features of appendicitis is classical with leading symptoms and signs, a large number of medical and surgical diseases can closely mimic appendicitis. Meckel's diverticulitis, pelvic inflammatory disease, cholecystis is, perforated duodenal ulcer, ectopic pregnancy, kidney diseases, right-sided diverticulitis, and Crohn's can produce similar clinical features. This will result in reaching a false diagnosis in a large number of patients especially in females leading to unwanted removal of the normal appendix. Our study showed a low negative appendicectomy rate which is within the acceptable range but showed similar trend by being high among females.

Conclusion

Being a common surgery, Appendectomy specimens contribute a major part of routine specimens in any pathology laboratory. Detailed histopathological examination is always recommended not only to confirm the diagnosis, but also to rule out incidental pathologies leading to better patient outcome.

We can also find out negative appendectomy rate and try to lower it by combined clinical assessment and usage of appropriate diagnostic imaging modalities.

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Scope of the study: This is one of the first study conducted about the common conditions leading appendicectomy in Kerala population. This study adds the knowledge about common causes of appendicectomy and gives us an idea about the negative appendicectomy rate, even though low it can be further reduced by clinicoradiological correlation.

Findings: Nil; **Conflict of Interest**: None initiated
Permission from IRB: Yes

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