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Original Research Article

A Clinicopathological Study of Emergency Appendectomies to Evaluate Negative Appendectomy Rate in a Tertiary Care Hospital

Dr. Rashmi Aithmia*, Shagufta Choudhary, Saloni Mahajan

Resident, GMC Jammu, India

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***Corresponding author:** Dr. Rashmi Aithmia
H.no 1 sector D, Civil lines Sainik Colony Jammu, India

Abstract

Background*:** Acute appendicitis is the most common cause of acute surgical abdomen worldwide. This clinicopathological study aims to determine the negative appendectomy rates of the surgically removed appendix in our centre and to determine the diagnostic accuracy of acute appendicitis by considering HPE as the gold standard. ***Method: A retrospective study was undertaken to review the histopathology reports of all the emergency appendicectomy specimens submitted to the Department of Pathology Government medical college and Hospital, Jammu; from 30th June 2020 to 1st July 2021. Patient's biodata, clinical signs and symptoms were extracted from the request forms. *Result*: A total of 250 appendices were received during the 1-year study period. The male to female ratio was 3.1:1 with age ranging from 5 to 75 years of age. Acute appendicitis was found in 50.4%, followed by suppurative appendicitis (20%), perforated appendix (15.2), gangrenous appendix (6.4%), acute on chronic appendicitis (8%) and 2 cases of carcinoid tumor (0.8%). NAR was calculated as 4.8%. The diagnostic sensitivity was calculated to be 95.2%. ***Conclusion:*** *HPE* is the gold standard test and helps to determine the negative appendectomy rates which is regarded as the quality indicator of the treating centre.

Keywords: Appendectomy, Alvadro's score, NAR.

INTRODUCTION

Acute appendicitis is the most common causer of surgical emergencies, throughout the world. Peak incidence is during the second and third decades, but acute appendicitis can occur at any time from early infancy to old age. The lifetime risk of developing appendicitis is approximately 9% in males and 7% in females. The initial misdiagnosis rate for appendicitis range from 28% to 57% for older children and may reach up to 100% for those 2 years or younger. Current strategies to help diagnose acute appendicitis include clinical scoring system, inflammatory markers and diagnostic imaging studies like ultrasound or CT. Clinically, appendicitis usually present with colicky paraumbilical pain radiating to lower quadrant followed by anorexia, tenderness, nausea, vomiting, fever, leucocytosis, increased ESR, increased CRP (Flum DR 2015).Children and elderly present with atypical clinical findings and hence are misdiagnosed clinically. Delayed diagnosis of appendicitis could lead to complications like perforated appendix, peritonitis, sepsis, increased morbidity and mortality (Hale DR *et al.,* 1997, Zoarets I *et al.,* 2014). Few conditions can clinically mimic appendicitis especially among females. Hence, false positive diagnosis is twice common in females s compared to males. Histopathological examination is the gold standard test and helps to determine the negative appendectomy rate which is regarded as a quality indicator of a treating centre. Increased use of ultrasonography and CT scan have been widely used as adjunct to clinical examination in typical and complicated cases especially in females. Routine histopathological examination of appendectomy specimen is of value for identifying unusual pathologies requiring further post operative management and to correlate histopathological findings with clinical diagnosis of appendicitis.

AIMS AND OBJECTIVES

To determine the diagnostic sensitivity of appendicitis by Alvadro's score and histopathological findings.

To determine the negative appendectomy rate in clinically diagnosed acute appendicitis presenting in emergency.

MATERIAL AND METHODS

Retrospective data of the patients who had appendectomies done during the study period between 30 June 2020 to 1st July 2021 was retrieved from the department of pathology, GMC Jammu. Patient's biodata, clinical signs and symptoms were extracted from the laboratory request form. Gross features of all the appendectomy specimen weas noted and sectioning of the specimen was done. Routine haematoxylin and eosin (H&E) staining was carried out. The clinical diagnosis was correlated with the histopathology report. Acute appendicitis was defined histologically as inflammation of the appendix identified by the presence of infiltrating neutrophil polymorphs. This also included necrotic, gangrenous, suppurative and perforated appendices. Negative appendectomy was defined as a post-operative appendix specimen for suspected appendicitis that was however microscopically normal on histopathological examination without evidence of inflammation, tumours and parasitic infestation (Charfi S *et al.*, 2014, Marudanayagam R *et al.*, 2006, SCOAP Collaborative *et al.*, 2008, Raja AS *et al.*, 2010 -7). Fibrous obliteration of the lumen of the appendix and reactive lymphoid hyperplasia without evidence of inflammation was not included as abnormal findings (Marudanayagam R *et al.*, 2006, SCOAP Collaborative *et al.*, 2008, Raja AS *et al.*, 2010, Webb EM *et al.*, 2011).

Inclusion Criteria

- All emergency appendectomy clinically diagnosed as acute appendicitis

Exclusion Criteria

- All elective appendectomies.

RESULTS

Age of the patients ranged from 5 year to 75 year with the majority of the patients in the 10-19 years of age (23.6%) followed by 30-39 years of age (20.4%) (Table-1). Out of 250 patients, 190 (76%) were male and 60 (24%) were female. Clinically males were more susceptible than female with a male-female ratio of 3.1:1 (Table-2). All the specimen of total 250 operated cases were sent to laboratory for histopathological examination. The reports showed features of acute appendicitis in 126 (50.4%) cases, suppurative appendicitis (20%), perforated appendix (15.2%), gangrenous appendicitis (6.4%), acute on chronic appendicitis (8%), histologically normal appendix (4.8%) and 2 patients had carcinoid tumour (0.8%). In this series the negative appendicectomy rate was 4.8% (Table 4). Out of total 12 histologically normal appendix 10 were females and 2 were male child patients. Out of 10 females,6 female patient had ovarian cyst, 2 had endometriosis,1each presented with mesenteric lymphadenitis and malignant ovarian disease respectively. Both the male patients had obliteration of lumen with faecolith. The sensitivity of acute appendicitis using Alvadro's scoring is 96.52% with score range of 8-10, 93%with score range of 5-7 and 100% with score of 1-4. The overall sensitivity of Alvadro's score is found to be 95.2% (Table 3).

Table 1: Distribution of patients as per age group (n=250)

Age (in years)	Number of patients	%age
<10	23	9.2
10-19	59	23.6
20-29	47	18.8
30-39	51	20.4
40-49	19	7.6
50-59	19	7.6
60-69	26	10.4
>70	5	2

Table 2: Distribution of patients as per sex group

Sex	Number of patients	%age
Male	190	76
Female	60	24
Total	250	100

Table 3: Sensitivity of different score range groups (Alvadro's scoring)

Total score	Number of patients	Acute appendicitis	Normal appendix on HPE	Sensitivity (% age)
8-10	144	139	5	96.52
5-7	100	93	17	93
1-4	6	06	00	100
Total	250	238	12	95.2

(1-4=acute appendicitis very unlikely)
(5-7=acute appendicitis probable)
(8-10=acute appendicitis)

Table 4: Distribution of various Histopathological lesions in clinically diagnosed Acute Appendicitis (n=250)

Histopathological diagnosis	Number of patients	%age
Acute appendicitis	126	50.4
Suppurative appendicitis	50	20
Perforated appendicitis	38	15.2
Acute on chronic appendicitis	20	8
Gangrenous appendicitis	16	6.4
Normal appendix	12	4.8
Carcinoid tumour	2	0.8

DISCUSSION

It is common in the literature for people to interchange the terms 'normal appendix' and 'negative appendectomy'. Many reports do not provide clear pathological definitions for either appendicitis or NA on which they base their calculation of NAR. Acute appendicitis is defined histologically as inflammation of the appendix, identified by the presence of infiltrating transmural neutrophil polymorphs. A negative appendectomy is defined as the removal of an appendix without any signs of inflammation. In our study presence of faecolith and lymphoid hyperplasia in appendix was considered normal on histology. The National Surgical Quality Improvement Project (NSQIP) utilizes hospital negative appendectomy rates in combination with computed tomography (CT) rates as a measure of hospital quality, suggesting a centre with low CT utilization along with a low NAR is a high performing centre (Wray CJ *et al.,* 2013). Historically, surgical dogma justified a NAR as high as 15%– 25% (Detmer DE *et al.,* 1981) and up to 40% in female patients (Lewis FR *et al.,* 1975) to avoid negative outcomes such as perforation, peritonitis, abscess, and prolonged hospitalizations. In children the acceptable rate has been even higher, perhaps considering the difficulty in obtaining an accurate clinical history and physical examination in young patients. With the advent of advanced imaging modalities such as ultrasound and cross-sectional imaging, and therefore the increased accuracy of diagnosis of appendicitis, reported NARs have decreased substantially over the last decade, DeArmond GM *et al.,* 2003, Kim SH *et al.,* 2014, Seetahal SA *et al.,* 2010, Lee J *et al.,* 2016, Wagner PL *et al.,* 2008, Doria AS *et al.,* 2006).

CONCLUSION

Negative appendectomy rates have been regarded as the quality indicator of a treating care centre. With the use of clinical scoring system and radiological techniques negative appendectomy rates has declined in the present era. Routine histopathological examination of appendectomy specimen is of value for indentifying unsuspected pathologies requiring further post-operative management.

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