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Prevalence of Negative Appendectomy Based On Gross Assessment

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Abstract: ***Introduction:*** *Negative appendectomy based on gross assessment of appendix is the removal of the normal appendix, which is not in any of its gross pathology's stages, such as catarrhal, phlegmonous and gangrenous, when the primary diagnosis is acute appendicitis. acute appendicitis is still the most common acute surgical diseases. While negative appendectomy is unavoidable, one of the important challenges faces when treating patients with a primary diagnosis of acute appendicitis is to decrease negative appendectomy without increasing the morbidity and mortality rates.* ***Objectives:*** *To know the prevalence of negative appendectomy based on gross assessment of appendix among patients who underwent open appendectomy in general surgery ward of Aliabad Teaching Hospital.* ***Methods:*** *In a cross-sectional study, 163 patients with primary diagnosis of acute appendicitis who underwent open appendectomy in general surgery ward of Aliabad Teaching Hospital were evaluated over one-year period.* ***Results:*** *The mean age was 26, 3±0, 82 years. There were 141 males (86, 5%) and 22 females (13, 5%) with primary diagnosis of acute appendicitis who underwent open appendectomy. Gross inspection of appendix during surgery revealed it to be, phlegmonous in 100 cases (61, 3%), catarrhal in 28 cases (17, 2%), perforated in 15 cases (9, 2%), gangrenous in 14 cases (8, 6%), and; while in 6 cases (3, 7%) the appendix had normal shiny appearance. One important finding in our study was a higher percentage of negative appendectomy in females than males.* ***Conclusion:*** *prevalence of negative appendectomy according to gross assessment of appendix is more common in female's gender and more frequent among reproductive-age women.*

Keywords: Acute appendicitis, Negative appendectomy, Epidemiologic features, prevalence

1. Introduction

Negative appendectomy based on gross assessment of appendix is the removal of the normal appendix, which is not in any of its gross pathology's stages, such as catarrhal, phlegmonous and gangrenous, when the primary diagnosis is acute appendicitis [1], [2].

The most common cause of acute abdomen is acute appendicitis; it is estimated about 6% of the world population will be affected by acute appendicitis during their lifetime and universally accepted procedure for acute appendicitis is appendectomy [3].On a patient with suspected acute appendicitis the decision to perform operation is based mainly on diseases history and physical finding, but sometimes it can appear with unusual symptoms, however, acute appendicitis remains a clinical diagnosis [4].Decision making is a clinical challenge in cases of this diseases, especially in developing countries where advanced radiological investigations are not widely used, and do not appear cost effective [3].

A high diagnostic precision is required in patients suspected with acute appendicitis because, negative appendectomy carries significant morbidity from associated complications including wound sepsis, infertility from fimbrial damage, and greater risk of iatrogenic abdominal adhesion after laparotomy for healthy appendix compared with that for acute appendicitis [3]. Beside, a negative appendectomy is not without of risk during pregnancy to the fetus [[2], [5].The national cost of hospitalizations with negative appendectomy is significant [6].

The aim of this study to know the prevalence of negative appendectomy based on gross assessment of appendix among patients who underwent open appendectomy in general surgery ward of Aliabad teaching hospital.

2. Patients and Methods

This cross-sectional study was performed by reviewing the medical records (In-patient File) of 163 patients who admitted for suspected acute appendicitis between September 2017 and September 2018 in Aliabad Teaching Hospital. There were 141 males (86, 5%) and 22 females (13, 5%) with primary diagnosis of acute appendicitis who underwent open appendectomy and the age range was 18-87 years. They were admitted in the surgical wards through emergency or outdoor clinics. A special data collection sheet designed to collect the variables from profile of patients retrospectively. The variables include; negative appendectomy, age, sex, clinical presentation (pain and associated symptoms like nausea, vomiting, urinary symptoms, etc.), physical examination results.

Data entry was performed by using Microsoft Excel 2016 and all the data were analyzed by SPSS (version 21.0)for frequency, mean, standard error and statistical tests, including Chi-square and t-test. Logistic regression model was employed to predict negative appendectomy with SPSS 21.0 software. For all the tests the P value was considered statistically significant if it was<0.05.

3. Results

The study is based on data collected from 163 patients who underwent open appendectomy between September 2017 and September 2018, including 141 males (86, 5%) and 22 females (13, 5%). Mean (±SE) age was 26, 3 (±0, 82) years, and the age range was 18-87 years. Highest number of

patients were in 18-27 years of life (n=116, 71, 2%) followed by the 28-37 years of life (n=24, 14, 7%).

Table 1: Age and gender distribution

Age group	Female, n (% of gender)	Male, n (% of gender)	Total, n (% of total)
18-27 years	15 (68, 2%)	101 (71, 6%)	116 (71, 2%)
28-37 years	4 (18, 2%)	20 (14, 2%)	24 (14, 7%)
38-47 years	3 (13, 6%)	13 (9, 2%)	16 (9, 9%)
48-57 years	0 (0%)	2 (1, 4%)	2 (1, 2%)
58-67 years	0 (0%)	4 (2, 8%)	4 (2, 4%)
68-77 years	0 (0%)	0 (0%)	0 (0%)
78-87 years	0 (0%)	1 (0, 796%)	1 (0, 6%)
Total	22 (100%)	141 (100%)	163 (100%)

Gross inspection of appendix during surgery revealed it to be phlegmonous in 100 cases (61, 3%), catarrhal in 28 cases (17, 2%), perforated in 15 cases (9, 2%), gangrenous in 14 cases (8, 6%), and; while in 6 cases (3, 7%) the appendix had normal shiny appearance.

Out of 6 patients with normal appendix removed, 2 patients were females and other 4 were males. While the overall prevalence of negative appendectomy based on gross assessment was 3, 7%; it was higher among females.[Table 2].

Table 2: Prevalence of negative appendectomy

Gender	Total cases	Cases with normal appendix	Percentage
Females	22	2	9.09%
Males	141	4	2.83%
Total	163	6	3.7%

The prevalence of negative appendectomy based on gross assessment in males and females were 4 (2, 83%) and 2 (9, 09%), respectively, but this difference is considered to be not statistically significant (P=0.1473, x^2 test).

A retrospective search was made for probable alternate diagnosis in those with negative appendectomy. Male group had three cases and female group had one case of mesenteric lymphadenitis, one case of right ovarian cyst's torsion was present in female's group, and one case of peptic ulcer perforation was present in male's group.

The age, symptoms and signs in the patients with acute appendicitis and those with negative appendectomy are compared in table 3.

Localization of pain in the right lower quadrant (P=0.00191, x^2 test) was significantly higher in cases with acute appendicitis and suprapubic tenderness was significantly higher in cases with negative appendectomy (P=0.000001, x^2 test).

The regression model revealed that among the factors with significant difference between negative appendectomy and acute appendicitis, having higher percentage of suprapubic tenderness (P=0, 04), and lower percentage of psoas sign (P=0, 032), lower guarding sign (P=0, 006) and lower percentage of shift of pain in right lower quadrant (P=0, 005) could be regarded as independent predictors of negative appendectomy.

Table 3: Comparison of age, symptoms and signs between patients with acute appendicitis and negative appendectomy

	AA (n=157)	NA (n=6)	Sig.
Age (mean +_SE), year	26,4±0.83	24,33±5.22	NS (P=0,7268)
Anorexia	97 (61,8%)	2 (33,3%)	NS (p=0,16135)
Nausea	126 (80,3%)	4 (66.7%)	NS (p=0,4162)
Vomiting	98 (62,4%)	4 (66,7%)	NS (p=0,832)
Urinary symptoms	0 (0%)	0 (0%)	
Diarrhea	5 (3,2%)	0 (0%)	
Constipation	4 (2,5%)	0 (0%)	
Vagina discharge	0 (0%)	0 (0%)	
Right lower quadrant tenderness	155 (98,7%)	6 (100%)	
Suprapubic tenderness	2 (1,3%)	2 (33.3%)	Sig (p=0,000001)
Periumbilical tenderness	2 (1,3%)	0 (0%)	
Left lower quadrant tenderness	0 (0%)	0 (0%)	
Rebound tenderness	43 (27,4%)	1 (16,7%)	NS (p=0,561)
Cough sign	66 (42%)	2 (33,3%)	NS (0,671)
Rowsing sign	35 (22,3%)	0 (0%)	
Psoas sign	51 (32,5%)	0 (0%)	
Obturator sign	11 (7%)	0 (0%)	
Guarding sign	74 (47%)	0 (0%)	
Shift of pain in right lower quadrant	147 (93,6%)	3 (50%)	Sig (p=0,00191)

AA= acute appendicitis NA= negative appendectomy Sig=significant NS=none significant

4. Discussion

Prevalence of negative appendectomy based on gross assessment of appendix, was 3.7% in the current study, comparing with many other studies prevalence of negative appendectomy is low [3], [5], [9], [10]- [18].May be for several reasons fewer cases of negative appendectomy have been found, first; a number of patients have not been referred to the hospital at an early stage, when they have come in hospitals; symptoms and signs of illness appear clearly and diagnosis is simple and definite, second; may be, suspected patients placed under observation until final diagnosis, third; a number of surgeons despite having negative appendectomy are reluctant to tell the truth because, they think their professional knowledge is being questioned, fourth; considering other diagnosis during which alternatively an appendectomy can be performed and non-availability of CT scan and laparoscopy at the time of need.

In this study one important finding was a higher percentage of negative appendectomy in females than that in males and negative appendectomy is more frequent among reproductive-age women, which is similar with the results of other studies [4], [10], [12], [16]. Consequently, the authors believe that negative appendectomy is more frequently seen in females because of ovary and fallopian tube diseases and other gynecological disorders that can mimic appendicitis [4], [19], [20]. Many authors have maintained that abdominal pain will finally localize in the right lower quadrant [10].Likewise, final localization of pain in the right lower quadrant was significantly higher in cases with acute appendicitis in this study when comparisons were made with that in other studies.

The chief complaint (Abdominal pain) and the most common clinical sign (Right lower quadrant tenderness) were completely similar with the other studies [4], [12], [21].Anorexia, nausea and vomiting have a clinical importance in acute appendicitis, However, some studies confirm that nausea and vomiting do not have a diagnostic value for differentiation between acute appendicitis and negative appendectomy and they have mentioned that when they are absent, acute appendicitis cannot be ruled out [4], [22], [23].This study supports this idea as well.

5. Conclusion

The prevalence of negative appendectomy based on gross assessment is more common in female's gender especially among women that are in their reproductive ages. Comparing with many other studies the prevalence of negative appendectomy based on gross assessment is low and Further researches need to be conducted to know the reasons behind the low prevalence of negative appendectomy. If a patient with a primary diagnosis of acute appendicitis is a female with having higher percentage of suprapubic tenderness, and lower percentage of psoas sign, lower percentage of guarding sign and lower percentage of shift of pain in right lower quadrant the surgeon should find more acceptable reasons for appendectomy because of the significantly high probability of negative appendectomy in such a situation.

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