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ORIGINAL ARTICLE

Risk Factors Associated with Peritoneal Involvement in Acute appendicitis in Territory of Punjab, Pakistan

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ABSTRACT

Aim: To study the frequency and factors associated with peritoneal involvement among patients operated for acute appendicitis in a tertiary care hospital.
Place and duration of study: Department of Surgery, Benazir Bhutto Hospital Rawalpindi Pakistan from 1st July 2020 to 30th June 2021.
Methodology: This comparative cross-sectional study 500 patients diagnosed as acute appendicitis and operated by consultant surgeon were included. Peritoneal involvement was defined as signs of inflammation or infection on abdominal lining observed by operating surgeon during the time of surgery. Factors like age, gender, presence of comorbid illnesses and history of previous abdominal surgeries were associated with presence of peritoneal involvement.
Results: There were 305 (61%) males while 195 (39%) were females with mean age was 32.331±4.544 years.Four hundred and forty two (88.4%) did not show any peritoneal involvement at the time of surgery while 58 (11.6%) had peritoneal involvement. Chi-square test revealed that history of previous abdominal surgeries and advancing age had statistically significant association with peritoneal involvement among the study participants (p-value<0.05).
Conclusion: Peritoneal involvement was found in considerable number of patients operated as acute appendicitis by the treating surgeons. Patients with previous history of abdominal surgeries and advancing age were more at risk of having peritoneal involvement in our study.
Keywords: Acuteappendicitis, Peritonitis, Risk factors, Frequency

INTRODUCTION

Epidemiological data suggests that acute appendicitis has been one of the most commonly encountered surgical emergencies in all parts of the world.[1] Appendectomy is usually regarded as bread and butter of surgeons and performed on routine basis in all the surgical centers across the globe.[2] Usually appendicitis is a clinical diagnosis and laboratory and radiological help only support the clinical suspicion.In most of the cases exact clinical picture becomes clear when surgery has been performed and gross physical view of abdomen and appendix is available to surgeon.[3]

Multiple complications have been associated with acute and chronic appendicitis due to anatomical location of this organ or delay in diagnosis by the treating team. Perforation, peritonitis, appendicular abscess, recurrent appendicitis, intestinal obstruction etc have all been associated with appendicitis especially if left untreated for long[4,5]. It has been always difficult to predict clinically associated complications of this surgical emergency before the management of acute condition[6].

This vestigial organ is enclosed in abdominal lining, the peritoneum which gets irritated as soon as there is any inflammation. If appendix gets perforated, peritoneal lining is the first layer which gets affected and makes clinical condition more complex. Assesfa et al[7] published a study in 2014 highlighting the clinical characteristics of pediatric population suffering from acute appendicitis. More the time had passed more was the chances of peritoneal involvement on surgery. Similar experience was shared by Ali et al[8] from Nigerian adult population where peritoneal involvement was found as main cause of mortality and morbidity among the patients operated for acute appendicitis. Boueil et al[9] studied this phenomenon from another angle and revealed that peritoneal lining gets grossly involved in cases of suspected perforated appendix and peritoneal culture becomes useful for targeted antibiotic therapy in these cases.

A local study published by Salahuddin et al[10] in 2012 regarding geriatric patients concluded that around 48% presenting with abdominal pain had acute appendicitis and delay in diagnosis was associated with perforation and peritoneal involvement.

We therefore planned this study with the rationale to study the frequency and factors associated with peritoneal involvement among patients operated for acute appendicitis in our tertiary care hospital, having patients from all over the region of Punjab.

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MATERIALS AND METHODS

This correlational study was conducted at the Department of Surgery Benazir Bhutto Hospital Rawalpindi from 1st July 2020 to 30th June 2021 and comprised 500 patients diagnosed as acute appendicitis. All the patients between the age of 18 and 60 years presenting with symptoms of acute appendicitis, diagnosed and operated at the surgical unit by the consultant surgeon were included in the study. Exclusion criteria were the patients more than 60 years of age or those who did not consent to or those with history of any abdominal surgery in last six months. Patients with any other abdominal illness, autoimmune disorder or haematological or lymphoid malignancy were also excluded from the study. Patients with comorbid sepsis or suspicion of appendicular abscess or peritonitis on ultrasound were excluded.

Patients diagnosed as acute appendicitis on the basis of clinical and laboratory findings were included. A consultant surgeon performed the appendectomy as per standard procedure and examined the peritoneal lining thoroughly in all the cases to look for any signs of peritoneal infiltration[13]. Peritoneal involvement was defined as signs of inflammation or infection on abdominal lining observed by operating surgeon during the time of surgery[14].

The data was entered and analyzed through SPSS-23. Pearson Chi-square test was used to establish the association between age, gender, presence of comorbid illnesses and history of previous abdominal surgeries with peritoneal involvement. Differences between groups were considered significant if p-values were less than or equal to 0.05.

RESULTS

There were 305 (61%) males while 195 (39%) were female with mean age was 32.331±4.544 years. Four hundred and 24(88.4%) did not show any peritoneal involvement at the time of surgery while 58(11.6%) had peritoneal involvement (Table 1). 81.4%) patients had no significant history of past abdominal surgery while 93(18.3%) had significant history of past abdominal surgery in last five years. Chi-square test revealed that history of previous

abdominal surgeries (p=0.002) and advancing age (p=0.008) had statistically significant association with peritoneal involvement among the study participants (Table 2).

Table 1: Characteristics of study participants included in our analysis (n=500)

Variable	No.	%
Age (years)	32.331±4.544	
Gender		
Male	305	61.0
Female	195	39.0
Peritoneal involvement		
Yes	58	11.6
No	442	88.4
Presence of comorbid		
Yes	117	23.4
No	383	72.6
Types of comorbid Illnesses		
Asthma	29	5.8
Diabetes mellitus	26	5.2
Hypertension	23	4.6
Ischemic heart disease	19	3.8
COPD	18	3.6
Others	2	0.4

Table 2: Factors associated with presence of peritoneal involvement in participants

Factors	No peritoneal involvement	Peritoneal involvement	Chi square	P value
Age (years)				
<35	341 (77.1%)	35 (60.3%)	7.746	0.008
>35	101 (22.9%)	23 (39.7%)		
Gender				
Male	270 (61.1%)	35 (60.3%)	0.012	0.913
Female	172 (38.9%)	23 (39.7%)		
Presence of comorbid illnesses				
Yes	108 (24.5%)	9 (15.6%)	2.276	0.116
No	334 (75.5%)	49 (84.4%)		
History of previous abdominal surgery				
Yes	73 (16.6%)	20 (34.5%)	10.923	0.002
No	369 (83.4%)	38 (65.5%)		

DISCUSSION

Appendix is the organ of gastrointestinal system which has been regarded as vestigial in human beings. Despite lack of evidence regarding its physiological role in body, anatomical position of this organ is important as it may predispose the patients towards certain pathologies including surgical emergencies.[15]Surgeons has always been looking for diagnostic and management modalities related to acute appendicitis but limited work has been done to look for anatomical spread of inflammation of this organ which is usually missed clinically and even on radiological investigations and found once the surgeon is physically observing the appendix and organs in the vicinity. This study therefore was conducted with the objective to look for the frequency and factors associated with peritoneal involvement among patients operated for acute appendicitis in our tertiary care hospital during the study period.

Before a surgeon could ascertain anatomical features of appendix and involvement of peritoneum on gross appearance relevant imaging especially CT scan of abdomen may help in certain cases. Kim et al[16] reported that CT scan had high specificity and low sensitivity in this regard and anatomical features especially regarding peritoneal infiltration may be missed on CT scan. We did not perform CT scan but concluded that patients who were managed as simple acute appendicitis before surgery, around 10% of them showed peritoneal infiltration on CT scan.

Gupta et al[17] performed an interesting study regarding complications of acute appendicitis and concluded that almost all the complications occurred in patients with gangrenous appendix or peritoneal involvement. We did not study longitudinally for short term and long term complications but found out that peritoneal infiltration was statistically significantly common in patients with advancing age and history of previous abdominal surgeries. Another local study performed on elderly population also revealed that peritoneal involvement and other complications were more common in elderly patients as compared to young patients[10].

Tartaglia et al[18] in 220 studies 2076 patients to look for the risk factors associated with intra-abdominal abscess in patients managed for acute appendicitis. They revealed that male patients and patients with peritoneal involvement were more at risk of having intra-abdominal abscess as compared to female patients and patients without peritoneal involvement. This shows the importance of early detection of peritoneal involvement in these cases. Considerable number of male patients had peritoneal involvement in our study and if complications among them could be prevented, a lot of health budget and misery could be reduced.

There were few limitations in our study. Peritoneal involvement was ascertained on surgeon's observation which may prone the results towards observer bias. Long term outcome was not studied and it was not ascertained that peritoneal involvement later leads to complications or not. Moreover, peritoneal involvement was not observed in relation to anatomical position of appendix.

CONCLUSION

Peritoneal involvement was found in considerable number of patients operated as acute appendicitis by the treating surgeons. Patients with previous history of abdominal surgery and advancing age were more at risk of having peritoneal involvement in study.

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