

A Comparative Study between Pre-Operative and Intra-Operative Findings among Patients with Acute Appendicitis

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Abstract

Original Research Article

Background: Acute appendicitis could be due to a bacterial, viral or parasitic infection in the digestive tract, which can enlarge the tissue of the appendix wall, stools causing a blockage in the tube between the large intestine and the appendix tumors, inflammatory bowel disease, injury or trauma to the abdomen. It is a sudden and severe inflammation of the appendix. The symptoms of acute appendicitis occur suddenly and are usually severe. In severe cases, appendectomy is often needed. **Aim of the study:** The aim of this study was to compare between pre-operative and intra-operative findings among patients with acute appendicitis. **Methods:** This cross-sectional study was conducted in the department of Surgery, North East Medical College Hospital, Sylhet, Bangladesh during the period from July 2008 to June 2009. In total 100 clinically diagnosed cases of acute appendicitis were enrolled in this study as study subjects. Proper written consents were taken from all the participants before data collection. All the pre-operative and intra-operative findings among patients were recorded and analyzed. All data were processed, analyzed and disseminated by using SPSS version 16.0 program as per necessity. **Results:** In this study, among total 100 cases, clinically acute appendicitis was found in 78% and burst appendix in 22% of cases. Appendix was found retrocaecal in 67%, pelvic in 30% and pracaecal, subcaecal and postileal each comprises 1% of the patients. Finally, we found a significant correlation of pre-operative diagnosis with luminal contents ($P < 0.0001$). Besides this, the findings of this study indicated that, the clinical diagnosis was concordance with intra-diagnosis in 84% of cases and discordant in 16% of cases. **Conclusion:** In this current study, pre-operative clinical diagnosis was concordance with intra-operative diagnosis in majority of the cases. So, we can conclude that, the surgeon should be careful about the pre-operative assessment of the cases in diagnosis of acute appendicitis and thereby minimize the number of unnecessary appendectomy. **Keywords:** Acute appendicitis, Intra-operative findings, Burst appendix, Pain, Intestine.

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1. INTRODUCTION

Worldwide, acute lower abdominal pain is the commonest cause of surgical admission in hospitals [1]. Acute appendicitis is the most common acute abdominal condition the surgeon is called on to operate or requiring emergency surgery [2]. In the recent year the incidence has fallen dramatically such that the individual lifetime risk of appendectomy was 8.6% and 6.7% among males and females respectively [3]. This disease is common in the young males and the majority of patients are below 30 years of age [2]. The diagnosis of appendicitis is mostly clinical and straight forward, sometimes supported by laboratory test and ultra-

sonogram [4]. Despite its known clinical presentation [5], the diagnosis of acute appendicitis is quite often a diagnostic dilemma. There is great difference in presentation due to variable position and length of appendix. Approximately 20% of those undergoing appendectomies are found not to have acute appendicitis at surgery with being more common in females than male approaching a ratio of 3:1 in the age group of 15-19 [6]. The rate of unnecessary appendectomy was found 25% in our country [7]. Recent thinking of the role of appendix in immune mechanism and its possible use in reconstructive urological surgery makes this an important issue [1].

Several attempts have been taken in multiple centers around the world to develop a diagnostic scoring system for early diagnosis and to reduce the rate of negative appendicectomy. Delay in diagnosis and surgical intervention carries a higher complication rate [5]. In order -to reduce the incidence of negative appendicectomy appropriate measures should be taken in every step in the management of appendicitis patients [8]. The present study was designed to evaluate acute appendicitis to correlate between pre-operative diagnosis and intra-operative findings.

2. METHODOLOGY

This cross-sectional study was conducted in the department of Surgery, North East Medical College Hospital, Sylhet, Bangladesh during the period from July 2008 to June 2009. In total 100 clinically diagnosed cases of acute appendicitis were enrolled in this study as study subjects. The study was approved by the ethical committee of the mentioned hospital. Proper written consents were taken from all the participants before data collection. The whole intervention was conducted in accordance with the principles of human research specified in the Helsinki Declaration [9] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [10]. As per the inclusion criteria of this study, only clinically diagnosed cases of acute appendicitis of both sexes from several age groups were included. On the other hand, according to the exclusion criteria of this study, patients with recurrent appendicitis, appendicular lump and those who refused consent for operation were excluded. All the demographic and clinical data of the participants were recorded. Routine investigations like haemoglobin, total count of WBC, differential count of WBC, urine R/M/E will be done in all cases. X-Ray KUB and USG of KUB and pelvic organ were done. Emergency appendicectomy were performed in all cases by maintaining a standard operating procedure. Condition of the peritoneal cavity and appendix was recorded after opening the abdomen. Position of the appendix was noted. All operated specimens were examined macroscopically, split longitudinally; content of the lumen was noted and fixing immediately in formalin prior transport to the pathology laboratory for histopathological examination. Post-operative period was followed to note any complication and mortality. In this study, the primary variables were clinical diagnosis, pre-operative diagnosis and intra-operative diagnosis. On the other hand, secondary variables were age, sex, marital status, socioeconomic condition, clinical presentations, clinical findings, laboratory findings WBC count and neutrophil count. After collecting data, editing was done manually and was analyzed with the help of computer software program such as SPSS version 16.0 (Statistical package for social science). Mean and standard deviation were calculated for continuous data and percentage for categorical data. To test the significance, Chi-square (χ^2) test and Fisher's Exact test were applied where necessary for all analytical tests the

level of significance was $p=0.05$ or $p<0.05$ was considered significant.

3. RESULT

In this study, age of the patients was ranging from 15 to 59 years with the mean of 29.06 ± 12.02 years. Thirty-four percent of our patients were between the age of 10 and 19 years, 32% were between the age of 20 and 29 years, 17% were between the age of 30 and 39 years, 10% were between the age of 40 and 49 years and the rest 7% were between the age of 50 and 59 years. In this study 62% of the patients were male and rest of the patients were female (38%). Pulse rates were found as $\leq 100/\text{min}$ in 79% and $>100/\text{min}$ were found in 21% of our patients. Temperature was normal in 15% of cases. Tenderness was found localized in 72% and diffused in 28% of patients. Other positive signs were muscle guard (63%), pointing sign (81%), rebound tenderness (74%), Rovsing's sign (70%), Psoas test (65%) and Obturator test (43%). Among three quarter (75%) of our patients, WBC count was $>11,000/\text{mm}^3$ of blood and in one quarter of the patients (25%) it was $\leq 11,000/\text{mm}^3$ of blood. Neutrophil count was found $>70\%$ in 79% cases and $<70\%$ was found in 21% cases. In this study, clinically acute appendicitis was found in 78% and burst appendix in 22% of cases. Appendix was found retrocaecal in 67%, pelvic in 30% and pracaecal, subcaecal and postileal each comprises 1% of the patients. Acute inflamed appendix was found in 62% of patients, inflamed and perforated appendix in 15%, gangrenous appendix in 7% and normal looking appendix in 16% of patients. As the luminal content, in 33% cases fecolith and in 27% cases purulent material were found which were noticeable. The difference between the luminal contents and per-operative diagnosis was statistically significant ($p<0.0001$). In this study, we found that, clinical findings were concordance with intra-operative diagnosis in 84% of cases and discordant in 16% of cases.

Table 1: Distribution of patients according to clinical findings, (N=100)

Variables	Percentage (%)
Pulse rate	
<100/min	79%
>100/min	21%
Temperature	
<98.6° F	15%
98-101° F	63%
>101° F	22%
Tenderness	
Localized	72%
Diffused	28%
Other variables	
Muscle guard	63%
Pointing sign	81%
Rebound tenderness	74%
Rovsing's sign	70%
Psoas test positive	65%
Obturator test positive	43%

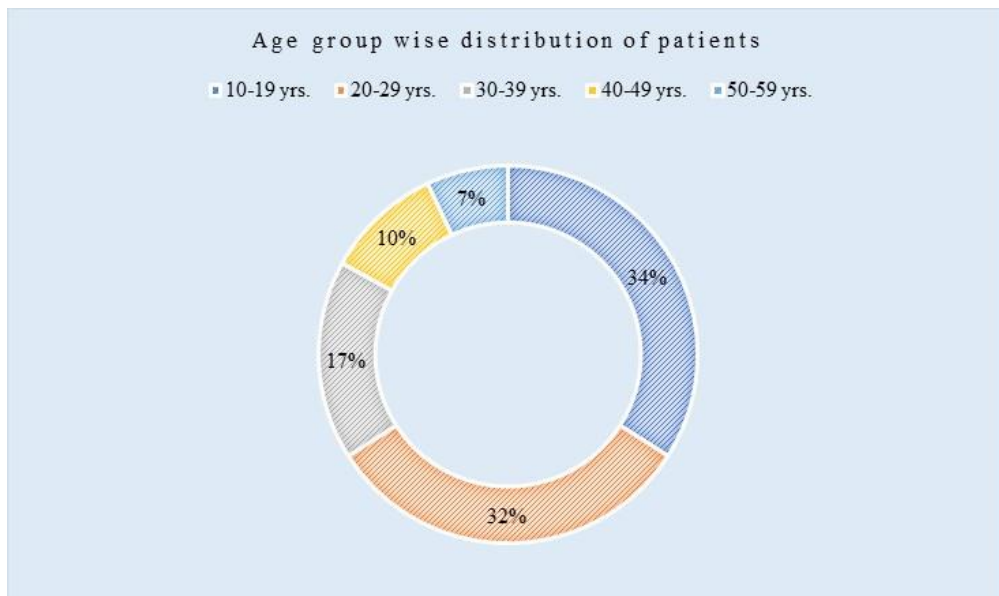


Figure I: Age group wise distribution of the patients in year, (N=100)

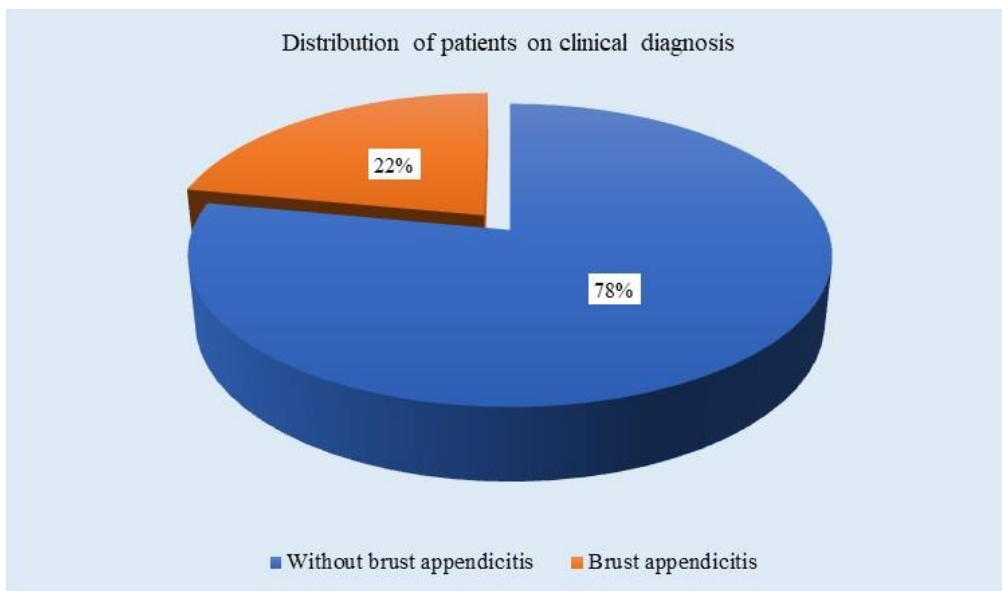


Figure II: Distribution of patients on clinical diagnosis, (N=100)

Table 2: Distribution of patients on the basis of position of appendix, (N=100)

Position of appendix	Frequency (n)	Percentage (%)
Retrocaecal	67	67
Pelvic	30	30
Paracaecal	1	1
Subcaecal	1	1
Postileal	1	1

Table 3: Distribution of patients according to laparotomy findings, (N=100)

According to laparotomy	Frequency (n)	Percentage (%)
Acute inflamed appendix	62	62
Inflamed perforated appendix	15	15
Gangrenous	7	7
Normal looking	10	10

Table 4: Distribution of patients on the basis of luminal content, (N=100)

Luminal content	n	%
Fecolith	33	33
Purulent material	27	27
Faecal material	13	13
Worm	8	8
Empty	19	19

Table 5: Association between luminal contents and laparotomy diagnosis, (N=100)

Luminal contents	Per-operative diagnosis				P value
	Acute	Perforated	Gangrenous	Normal	
Fecolith	18 (18.0)	8 (8.0)	7 (7.0)	0 (0.0)	<0.0001
Purulent material	20 (20.0)	7 (7.0)	0 (0.0)	0 (0.0)	
Faecal matter	13 (13.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Worm	5 (5.0)	0 (0.0)	0 (0.0)	3 (3.0)	
Empty	6 (6.0)	0 (0.0)	0 (0.0)	13 (13.0)	

Table 6: Concordance of clinical diagnosis and intra-operative diagnosis, (N=100)

Variables		Intra-operative diagnosis				
		Acute appendicitis	Inflamed perforated	Gangrenous	Normal appendix	Total
Clinical Diagnosis	Acute Appendicitis	62 (62.0)	0 (0.0)	0 (0.0)	16 (16.0)	78 (78.0)
	Burst appendix	0 (0.0)	15 (15.0)	7 (7.0)	0 (0.0)	22 (22.0)

4. DISCUSSION

The aim of this study was to compare between pre-operative and intra-operative findings among patients with acute appendicitis. 34% of our patients were between the age of 10 and 19 years, 32% were between the age of 20 and 29 years, 17% were between the age of 30 and 39 years, 10% were between the age of 40 and 49 years and the rest 7% were between the age of 50 and 59 years. Appendicitis is a disease of young [11] and this statement was reinforced in this study in which 66% of cases occurred in the second and third decade of life. This finding was also supported by Santacroce and Ochoa (2009) [12] that acute appendicitis affects all ages, with highest incidence occurring during the second and third decades of life. In this study 62% of the patients were male and rest of the patients were female (38%). This study also showed that, there was statistically significant association between the sex of the patients and histopathological diagnosis ($p = 0.019$). This result was supported by Gauf (2000) [13] that, male was affected more often than women with a ratio 1.5 to 10. Mahbub *et al.*, (1991) [14] and Sigal *et al.*, (2007) [11] also found that male was affected more often than women with a ratio of male to female was 2.2:1 and 2.6:1 respectively. But the incidence of primary appendectomy is approximately equal in both sexes was reported by Craig in the year of 2009. In the present study about half (49%) of the patients had peri-umbilical pain shifted to the right iliac fossa (RIF), 29% had pain in the right iliac fossa, 14% had epigastric pain shifted to the right iliac fossa and 8% had pain in the whole abdomen. Migration of pain from the peri-umbilical area to the right lower quadrant is the most discriminating feature of the patient's history in acute appendicitis [15]. Kazarian *et al.*, (1970) [16] stated that, the most common constant

symptom was abdominal pain localized to the right lower quadrant. This study showed that, pulse rate was 100/min or less in 79% and more than 100/min was in 21% of patients. Temperature was normal in 15% of cases, 98.6 to 101° F in 22% and more than 101° F in 15% of cases. Tenderness was localized in 72% and diffused in 28% of patients. Other positive signs were muscle guard (63%), pointing sign (81%), rebound tenderness (74%), Rovsing's sign (70%), Psoas test (65%) and Obturator test (43%) (Table 3). In a study, Khan (2006) [17] found pulse was 90/min or less in 85% and more than 90/min was 15% of patients; temperature around 100 °F in 90% and above 100 °F in 10%; tenderness in 100% of cases, pointing sign 90%, rebound tenderness in 76%, Rovsing's sign (78%), Psoas test (70%) and Obturator test (15%). In the present study three quarter (75%) of the patients, WBC count was more than 11,000/mm³ of blood and in one quarter of the patients (25%) WBC count was less than 11,000/ mm³ of blood. This study result was supported by Azad (2003) [18] and Khan (2006) [17] that total count of WBG was more than 1000/mm³ in 66% and 67% respectively. In this study, it was found that more than 70% neutrophil count was in 79% of the patients and below 70% was in 21% of the patients. Khan (2006) [17] and Azad (2003) [18] had also reported similar result of 88% and 12 % respectively (Khan 2006) [17] and 71 % and 29% respectively (Azad 2003) [18]. In the laparotomy findings appendix was found inflamed in 62% of patients, inflamed and perforated appendix in 15%, gangrenous appendix in 7% and normal looking appendix in 16% of patients. Mahbub *et al.*, (1991) [19] found inflamed appendix-including perforated and gangrenous in 63% of cases and normal looking appendix in 36% of cases. Fecolith was found in 33%, purulent materials in 27%, faecal matter

in 13%, worm in 8% and empty in 19% of patients in the present study as the luminal content of resected appendix. Hosain and Haq 2001 [8] found fecolith in 5%, purulent materials in 24%, faecal matter in 32%, worm in 8% and empty 25% of patients. Azad (2003) [18] found fecolith in 37%, purulent in 24%, materials in 24%, faecal matter in 25%, worm in 2% and empty in 26% of patients. Khan (2006) [17] found fecolith in 32%, purulent materials in 25%, faecal matter in 12% worm in 3% and empty in 28% of patients.

Limitation of the study:

This was a single centered study with small sized samples. Moreover, the study was conducted at a very short period of time. So, the findings of this study may not reflect the exact scenario of the whole country.

5. CONCLUSION & RECOMMENDATION

In this current study, pre-operative clinical diagnosis was concordance with intra-operative diagnosis in majority of the cases. So, we can conclude that, the surgeon should be careful about the pre-operative assessment of the cases in diagnosis of acute appendicitis and thereby minimize the number of unnecessary appendectomy. For getting more specific results we would like to recommend for conducting similar more studies in several places with larger sized samples.

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