



DIAGNOSTIC VALUE OF HYPERBILIRUBINEMIA IN ACUTE APPENDICITIS AND APPENDICULAR PERFORATION

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ABSTRACT

Introduction: Misdiagnosis or delayed diagnosis of acute appendicitis may result in perforation and will increase the mortality and morbidity of patients. Serum Bilirubin may be an aid in the diagnosis of appendiceal perforation.

Methods: A study was conducted in the Department of Surgery, Assam Medical College, from November 2019 to November 2020. A total of 50 patients with clinical diagnosis of acute appendicitis or appendicular perforation were studied. The serum bilirubin estimation was carried out in all the patients.

Result: Serum Bilirubin was elevated in the patients with both acute appendicitis and appendicular perforation.

Conclusion: Serum Bilirubin has a predictive potential for the diagnosis of acute appendicitis and appendicular perforation. Patients who present with clinical signs and symptoms of appendicitis and a raised bilirubin level should be identified as having a higher probability of appendicular perforation.

KEYWORDS : Acute Appendicitis Serum Bilirubin Appendicular Perforation

INTRODUCTION

Acute appendicitis is the most common cause of an 'acute abdomen' in young adults and appendicectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training.¹ To supplement the clinical diagnosis and to reduce the frequency of unnecessary appendicectomy, the importance of laboratory investigations like White Blood Cell (WBC) counts and C-reactive protein (CRP), etc values have been stressed.² However up to date there is no confirmatory laboratory marker for the pre-operative diagnosis of acute appendicitis and appendicular perforation. An elevation in serum bilirubin was reported, but the importance of the raised total bilirubin has not been stressed in acute appendicitis and appendicular perforation.³ Bacterial invasion in the appendix leads to transmigration of bacteria and the release of pro-inflammatory cytokines such as TNF-alpha, IL6 and cytokines. These reach the liver via Superior mesenteric vein (SMV) and may produce inflammation, abscess or dysfunction of liver either directly or indirectly by altering the hepatic blood flow.⁴ Given the above-mentioned context, the present study was undertaken to see if a relationship exists between hyperbilirubinemia and acute appendicitis and to evaluate its factualness as a diagnostic marker for acute appendicitis and whether elevated bilirubin levels can predict the diagnosis of appendicular perforation.

MATERIALS AND METHODS

The study was conducted in the Department of General surgery, Assam Medical College and Hospital, Dibrugarh. Patients coming with acute abdominal pain in the OPD and Casualty Department were examined. A careful history was taken from the patient or a responsible attendant. Then general and systemic examination of the patient was performed. Finally, relevant blood examinations and radiological examinations were done.

Serum Bilirubin, Total Leucocyte counts and differential counts were done in every patient. Abdominal Ultrasonography was done in every case to confirm the diagnosis and rule out other causes of pain abdomen. A total of 50 patients with confirmed diagnosis of acute appendicitis with or without appendicular perforation were included in the study. Patients below 10 years were not included in the study.

No special preparation of the patient was done before taking

blood samples for analysis. Serum Bilirubin level was analysed using VITROS fully automated auto analyser 5600 orthoclinical diagnostics USA system. The range of the machine is between 0mg/dl - 27mg/dl. The serum was collected from the patient and processed within 4 hours. Values more than 1mg/dl total bilirubin will be considered raised whereas values below it will be considered normal.

Patients with a clinical diagnosis of acute appendicitis will be subjected to emergency appendicectomy after obtaining proper consent from the patient or Patient party. The appendicectomy specimens were sent for histopathological examination. The histopathology report was considered as the final diagnosis.

Statistical analysis was performed and the data collected were tabulated and analysed.

- Patients with a clinical diagnosis of acute appendicitis with hyperbilirubinemia were expressed in percentage as

$$\frac{\text{Patients with the clinical diagnosis of acute appendicitis with elevated Serum bilirubin level}}{\text{All patients with the clinical diagnosis of acute appendicitis}}$$

- Mean level of elevated Serum bilirubin was calculated for patients with the diagnosis of acute appendicitis.

- Patients with the clinical diagnosis of appendicular perforation having hyperbilirubinemia were expressed in percentage as

$$\frac{\text{Patients with the clinical diagnosis of appendicular perforation with elevated Serum bilirubin}}{\text{All patients with the clinical diagnosis of appendicular perforation}}$$

- Mean of the level of elevation of serum bilirubin were calculated for patients with the diagnosis of appendicular perforation.

- Sensitivity, specificity, positive predictive value, negative predictive value, and Odds ratio were determined.

RESULTS

Table 1: Distribution of patients by age

AGE DISTRIBUTION					
11-20	21-30	31-40	41-50	51-60	60 and above
2	25	12	6	2	3

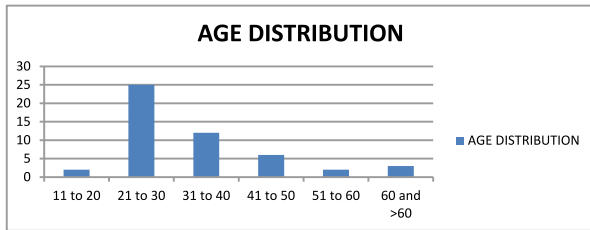


Figure 1: Distribution of patients by age

Table 2: Sex distribution of patients

SEX	NUMBER
MALE	34 (68%)
FEMALE	16 (32%)
TOTAL	50

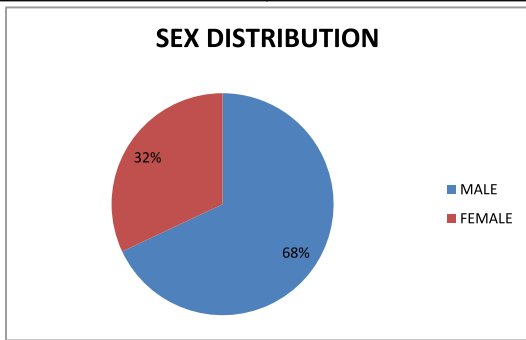


Figure 2: Sex Distribution of Patients

Table 3: Total bilirubin levels in acute appendicitis and perforated appendicitis

TOTAL BILIRUBIN (mg/dl)	TOTAL NUMBER OF CASES (%)	ACUTE APPENDICITIS (%)	PERFORATED APPENDICITIS (%)
>1	38 (76%)	27 (54%)	11 (22%)
<1	12 (24%)	10 (20%)	2 (4%)
TOTAL	50	37	13

Table 4: Histopathological diagnosis

DIAGNOSIS	DISTRIBUTION OF CASES	
	NUMBER	PERCENTAGE
ACUTE APPENDICITIS	39	78%
APPENDICULAR PERFORATION	11	22%
TOTAL	50	100%

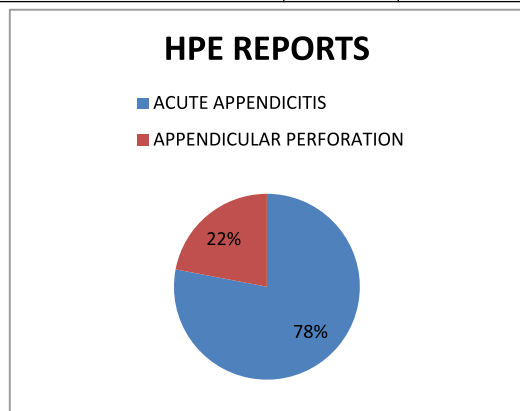


Figure 3: Histopathological report

Table 5 Comparison of mean serum bilirubin levels in patients with acute appendicitis and appendicular perforation

BILIRUBIN LEVELS (mg/dl)	DIAGNOSIS			
	ACUTE APPENDICITIS		APPENDICULAR PERFORATION	
	MEAN	SD	MEAN	SD
TOTAL BILIRUBIN	1.37	0.65	1.84	1.14
DIRECT BILIRUBIN	0.87	0.57	1.10	1.06
INDIRECT BILIRUBIN	0.50	0.21	0.74	0.33

DISCUSSION

This study was conducted in the Department of General Surgery, Assam Medical College and Hospital, Assam over a period of one year from November 2019 to November 2020 on 50 patients with clinical diagnosis of acute appendicitis and appendicular perforation. In the present study of the 50 patients enrolled for the study, 34 patients (68%) were males while the remaining 16 patients (32%) were females. The mean age in our study population (50 patients) was 23.1 ± 11.99 years. Hyperbilirubinemia (> 1.0 mg/dl) in our study was found in 38 patients (76%) of all the 50 patients (n=50) enrolled in the study, while 12 patients (24%) had normal bilirubin levels (≤ 1.0 mg/dl).

Amongst the patients diagnosed with Acute appendicitis without perforation (n=37), 27 patients (72.97%) were found to have elevated bilirubin (>1.0 mg/dl) while 10 patients (27.02%) had normal bilirubin levels (≤1.0 mg/dl). In patients diagnosed with Appendicular perforation (n=13), 11 patients (84.61%) had bilirubin elevated (>1.0 mg/dl), while only 3 patients (15.38%) had normal levels (<1.0 mg/dl). Thus, hyperbilirubinemia was found in most of the patients diagnosed with acute appendicitis (72.97) and appendicular perforation (84.61%).

The mean bilirubin levels in patients diagnosed with acute appendicitis was 1.37 ± 0.65 mg/dl while in patients diagnosed with appendicular perforation was 1.84 ± 1.1 mg/dl. Hence, we see that patients with appendicular perforation had higher levels of bilirubin as compared to that of acute appendicitis. So we infer that, patients with features suggestive of appendicitis with higher values of bilirubin, are more susceptible of having appendicular perforation than those with normal or slightly elevated total serum bilirubin.

The Sensitivity, Specificity, Positive predictive value, Negative predictive value and Odds ratio was calculated. Sensitivity and Specificity of bilirubin in predicting acute appendicitis and appendicular perforation diagnosis was 72.97% and 84.61% respectively. Similarly Positive predictive value and Negative predictive value of bilirubin in predicting acute appendicitis and appendicular perforation diagnosis was 71.05% and 16.66% respectively. The Odds ratio was calculated to be 0.49.

CONCLUSION

From the present study, we came to the conclusion that

- Serum bilirubin levels can be used for the diagnosis of acute appendicitis. An increase in the level will be a credible aid in the diagnosis of acute appendicitis and would guide us in further decision making.

- Patients who present with clinical signs and symptoms of appendicitis and a raised bilirubin level should be identified as having a higher probability of appendicular perforation. This suggests that serum bilirubin levels have a predictive value in the diagnosis of appendicular perforation.

LIMITATION OF THE PRESENT STUDY

Due to COVID 19 pandemic during the study period the number of cases was less.

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