



THE DIAGNOSTIC VALUE OF PREOPERATIVE HYPERBILIRUBINEMIA IN PERFORATED APPENDICITIS

General Surgery

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ABSTRACT

Introduction: Acute appendicitis is most common surgical emergency in developed countries and is most common in second decade of life. Acute appendicitis presents the surgeon with little by way of a diagnostic challenge. Delays in diagnosis may results in perforation often with gangrene leading to diffuse peritonitis. The aim of this study was to determine the sensitivity, specificity and the diagnostic value of total serum bilirubin levels as a predictor of perforated appendicitis.

Materials and methods: A retrospective analysis of emergency open appendicectomies performed in tertiary hospital during 2014-2017. Data were collected included laboratory and histopathological reports. Patients were grouped according to histopathological reports and comparisons were made between them.

Results : Hyperbilirubinemia had a specificity of 88.42%, sensitivity 64.28% positive predictive value 71.05% negative predictive value 84.84% and accuracy value was of 81.02% for perforated appendicitis.

Conclusions: Preoperative serum bilirubin levels are reliable, sensitive and specific to diagnosis and a prediction of perforated appendicitis.

KEYWORDS

Perforated appendicitis, Diagnosis, Hyperbilirubinemia

INTRODUCTION

Acute appendicitis is most common surgical emergency in developed countries and is most common in second decade of life. Numerous attempts have been made to find tests to improve diagnostic accuracy but there is no reliably specific marker for acute appendicitis has been identified. Leucocytosis is not specific for appendicitis and, although C-reactive protein (CRP) is commonly used in the assessment of suspected appendicitis, its specificity varies markedly between studies(1) and may only be significantly raised once appendiceal perforation takes place.(2,3) Jaundice has been associated with appendicitis(4) and studies have shown Hyperbilirubinemia to be a useful predictor of appendiceal perforation.(5,6) However, these studies did not focus on the value of bilirubin as a specific marker for acute appendicitis. The aim of this study was to determine the value of Hyperbilirubinemia as a marker for acute appendicitis.

MATERIAL AND METHODS

Our study was a retrospective analytical study. Approval was obtained from the ethical committee of Government medical college Haldwani. Medical record of all appendectomies during July 2014 to June 2017 for acute appendicitis at department of surgery of Dr Susheela tiwari government hospital were retrospectively analysed.

Inclusion criteria

The patients who were operated for acute appendicitis and whose complete medical record was available, were included.

Exclusion criteria

- 1) hepatobiliary diseases associated with hyperbilirubinemia,
- 2) hemolytic diseases,
- 3) history of alcoholism,
- 4) certain infectious diseases,

The patients particulars such as age, gender, preoperative clinical examination, laboratory information, Alvarado's score and serum bilirubin and serum liver enzyme level were recorded from files.

Hyperbilirubinemia is defined as bilirubin level more than 1 mg/dl and elevated liver enzymes alanine aminotransferase (AST, SGPT) > 40 U/L and aspartate aminotransferase (AST, SGOT) >40 U/L. Patient who underwent open appendectomy were grouped into two groups: simple appendicitis and perforated appendicitis based on intra operative findings. All the samples obtained during the appendectomy were sent to the pathology department for histopathological analysis.

RESULTS

Of the 137 patients studied, 98 (71.5%) were male and 39 (28.5%) were females.

TABLE 1 AGE DISTRIBUTION

Years	Number	Percentage
<20	39	28.46%
20-29	64	46.71%
30-39	24	17.51%
40-49	6	4.37%
50-59	3	2.18%
>60	1	0.72%

Maximum number of patients 64 were between 20-29 years old, followed by <20 years of age 39 patient and 24 patient lies in age group of 30-39 years. The male to female ratio in present study is 2.5:1.

Pain in abdomen is present in all patients. Fever was present in 120 patients, 112 had nausea and 108 had anorexia.

TABLE 2 CLINICAL FEATURES

Symptoms	No of patients	Percentage
Pain	137	100%
Anorexia	108	78.83%
Nausea	112	81.75%
Tenderness	126	91.9%
Rebound tenderness	110	80.29%
Fever	120	87.59%

Total leukocyte count was elevated in 98 patients and normal in 39 patients. However, 130 of patients had normal levels of liver enzymes (ALT/AST) and only 7 patients had elevated enzymes levels. Raised total serum bilirubin level (>1mg/dl) was reported in 38 patients and normal in 99 patients.

Of all clinically diagnosed cases of acute appendicitis, Alvarado score was 7 or above in 122 (89.05%) cases and 15 (10.94%) have below 7. Intra-operatively 42 patients had perforated appendix and 95 had inflamed appendix.

TABLE 3 TOTAL LEUCOCYTE COUNT, LIVER ENZYME AND S.BILIRUBIN LEVELS

	Normal	Raised
Total leucocyte count	39 (28.46%)	98 (71.5%)
Liver enzymes (AST/ALT)	130 (94.89%)	7 (5.10%)
S.Bilirubin	99 (72.26%)	38 (27.73%)

Of the 42 perforated appendicitis patients 27 (64.28%) patients had elevated bilirubin levels whereas 95 patients with simple appendicitis only 11(11.57%) patients had elevated bilirubin levels.

TABLE 4 S.BILIRUBIN LEVELS IN PERFORATED AND SIMPLE APPENDICITIS.

	S.bilirubin Elevated	S.bilirubin Normal	Total
Perforated	27 (64.28%)	15 (35.71%)	42
Simple	11 (11.57%)	84 (88.42%)	95
Total	38	99	137

The sensitivity, specificity, and accuracy of hyperbilirubinemia in predicting perforated appendicitis is 64.28%, 88.42% and 81.02% respectively.

DISCUSSION

In this study of 137 patients, hyperbilirubinemia was found in 27 of 42 patients with perforated appendicitis. This hyperbilirubinemia was mixed in type in most of the patients and at the same time there was no elevation or minimal elevation (<100 U/L) in ALT and AST in most of the cases. The level of serum bilirubin was higher than 1 mg/dL in cases of perforated appendicitis while in cases with acute appendicitis it was lower than 1mg/dL. For perforated appendicitis specificity 88.42%, sensitivity 64.28%, positive predictive value 71.05% and negative predictive value was 84.84% and accuracy value of 81.02%. Since these findings were documented at the time of admission, it is unlikely that liver injury because of anaesthetic agents, blood transfusion, or medication was the cause of elevated bilirubin levels. Moreover, as per our exclusion criteria patients with alcoholic liver disease, viral hepatitis, haemolytic or congenital liver diseases were excluded from the study. The circulating endotoxemia following appendiceal infection may be reason for rise in serum bilirubin level. Experimental invitro studies have shown dose-dependent decrease in bile salt excretion from the liver following endotoxin infusion.(7) In the early phase of appendicitis mucosal ulceration occurs and this facilitates invasion of bacteria into the muscularis propria of the appendix thereby causing classical acute suppurative appendicitis. Subsequent events lead to edema, elevated intraluminal pressure, and ischemic necrosis of mucosa, causing tissue gangrene and perforation.(8) The number of organisms isolated from patients with gangrenous appendicitis is greater than those with acute suppurative appendicitis.(9) This higher level of bacteria in perforation of appendix reaches the portal circulation which in turn reaches the liver and interfere with bilirubin secretion into biliary canaliculi. The mechanism behind interference with the bilirubin secretion thought to be due to the action of many pro inflammatory factors.(10-11) This study shows that isolated hyperbilirubinemia without much elevation in the liver enzymes is a significant predictor of appendiceal perforation. The positive predictive value of elevated serum bilirubin level is comparable with the reported studies. This was demonstrated by a study by Estrada et al and other studies showing nearly a threefold risk of perforated appendicitis in patients with total bilirubin levels greater than 1 mg/dL.(12-15)

CONCLUSION

Serum bilirubin is significantly elevated in cases of appendiceal perforations. So, this can be included in routine investigation list of clinically suspected case of acute appendicitis and has high potential in predicting perforation of appendix.

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