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Original Research Article

Hyperbilirubinemia: a new diagnostic marker for appendicular perforation

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ABSTRACT

Background: Appendicitis is one of the commonest causes of abdominal pain requiring emergency surgery. Diagnosing acute appendicitis clinically still remains a common surgical problem as the clinical signs and symptoms of other abdominal pathologic conditions mimic the diagnosis of acute appendicitis. Delay in diagnosis and surgery for this condition may lead to various complications like perforation, abdominal abscess etc. By knowing perforation prior to the exploration, we can manage the condition very effectively in terms explaining the prognosis of disease, morbidity of surgery, wound infection, and requirement of emergent nature of surgery. Aim of the study is to determine of role of hyperbilirubinemia as a new diagnostic marker to predict gangrenous/perforated appendicitis.
Methods: It's a retrospective study was conducted in the department of surgery, MMCRI, Mysore during the period of January 2015 to December 2015 total of 100 patients with clinical as well as ultrasonographic diagnosis of acute appendicitis or appendiceal perforation were made. The serum bilirubin test was carried out in all the patients pre-operatively.
Results: In the study, the total 100 patients enrolled for the study, hyperbilirubinemia (> 1.2 mg/dL) in present study was found in 47 patients with 19 acute and 28 patients perforated appendicitis of all the 100 patients while 53 patients had normal bilirubin levels (≤ 1.2 mg/dL) 51 patients acute and 2 patients perforated appendix.
Conclusions: Total serum bilirubin appears to be a new promising laboratory marker for diagnosing appendicular perforation. The patients with clinical signs and symptoms of appendicitis and with hyperbilirubinemia without elevation of liver enzymes should be identified as having a higher probability of appendicular perforation, suggesting total serum bilirubin levels have a predictive potential for the diagnosis of appendicular perforation.

Keywords: Acute Appendicitis, Appendiceal perforation, Hyperbilirubinemia, Liver function test, Serum bilirubin

INTRODUCTION

Appendicitis is one of the commonest causes of abdominal pain requiring emergency surgery. Diagnosing acute appendicitis clinically still remains a common surgical problem as the clinical signs and symptoms of other abdominal pathologic conditions mimic the diagnosis of acute appendicitis. None of the methods stands alone and all come in support of and are secondary to primary clinical assessment. Appendicitis is one of the more accurate diagnosis has been attempted by employment of the additional laboratory tests, scoring systems, and ultrasound abdomen. Appendicectomy commonly performed abdominal surgeries in emergency setting, delay in diagnosis and surgery for this condition may lead to various complications like perforation, abdominal abscess etc.[1-4] By knowing perforation prior to the exploration we can manage the condition very

effectively in terms explaining the prognosis of disease, morbidity of surgery, wound infection, and requirement of emergent nature of surgery.

METHODS

Primary source of data information with observation methodology based on blood sample and tissue samples of registered appendicitis patients posted for surgery during January 2015 to December 2015. The patients presenting to the emergency department of general surgery K. R. hospital Mysore, India, suspected to have acute appendicitis or perforated appendicitis by patient history, clinical examination, complete haemogram, ultrasound abdomen. A 4ml of blood, serum is separated and used for LFTs done by enzymatic method using fully automated chemistry analyzer Erba XL-600.

Inclusion criteria

Patients of 18 years of age and above scheduled for appendectomy for acute appendicitis at emergency unit of our hospital.

Exclusion criteria

- Age below 18 years
- Patient with appendicular lump
- Previous history of chronic alcoholic liver disease
- Hemolytic or liver disease associated with hyperbilirubinemia
- History of drug induced hepatitis
- Previous history of any malignancy
- All patients with positive HBsAg.

Figure 1: Semi-auto clinical chemistry analyser machine (ERBA Chem-5 Plus) used for LFT.

All appendicular perforation cases were managed by lower midline incision, appendicectomy through peritoneal wash with normal saline and no.28 drain in situ and post-operative antibiotics for seven days. Appendicular perforation confirmed by intra operatively as well as histopathological examination.

Figure 2: Acute appendicitis.

Figure 3: Acute appendicular perforation.

RESULTS

In present study total 1OO were included in study, 70 cases were male and 30 females. All the patients' duration of symptoms ranged from 1-5 days.

Table 1 Distribution of cases according to histopathological diagnosis.

Histopathological diagnosis	No. of cases
Acute appendicitis	70
Gangrenous appendicitis	02
Perforated appendicitis	28
Normal appendix	00
Total no. of cases	100

Table 1 shows acute appendicitis 70, gangrenous appendicitis 2, and perforated appendicitis 28 out of 100 patients.

Table 2 shows normal bilirubin level (<1.2mg) in 53 cases, 51 acute appendicitis, 2 perforated appendicitis and increased bilirubin level (>1.2mg) 47 cases perforated appendicitis (28) cases without perforation 19 cases. Among 100 cases, total SB (TSB) was raised in 47 (47%) cases whereas 53 (53%) cases had normal TSB level. TSB was more elevated in gangrenous and perforated appendix than those in acute appendicitis (P<0.001). Liver enzyme ALT was within normal range in 80 (80%) cases, and minimally elevated (<2 times) in 20 (20%)

cases. AST was within normal range in 90 (90%) cases, minimally elevated (<2 times) in 8 (8%) cases.

Table. 2 Correlation of acute appendicitis and appendicular perforation with total serum bilirubin levels (intra operative) or (histopathological examination).

Serum bilirubin levels	Acute appendicitis	Appendicular perforation	Chi square	P-value	Conclusion
	Number	Number			
< 1.2	51	2	0.668	0.0001	Significant i.e. there is high correlation/association between serum bilirubin levels and status of appendicitis.
> 1.2	19	28			
Total	70	30			

DISCUSSION

In the present study of the 100 patients were included in the study, 70 patients (70%) were males while the remaining 30 patients (30%) were females. The mean age in present study population (100 patients) was 29.16 ± 11.21 years.

The average age group in males 29.24±11.64 years was slightly higher than females 28.96±10.33 years. Hyperbilirubinemia (> 1.2 mg/dL) in present study was found in 47 patients (47%) of all the 100 patients (n=100) included in the study, while 53 patients (53%) had normal bilirubin levels (≤ 1.2 mg/dL). Estrada et al, 55 had found hyperbilirubinemia in 59 (38%) of 157 patients studied with acute appendicitis.[6] The association between the elevated SB levels and the variety of infectious diseases has been noted in few studies.[7-15]

Some bacteria including *E. Coli* have been associated with increased levels of total serum bilirubin levels.[16] Amongst the patients diagnosed with Acute appendicitis pre-operatively (n=70), 47 patients (47%) were found to have increased bilirubin (>1.2 mg/dL) while 53 patients (53%) has normal bilirubin levels (≤1.2 mg/dL).

In patients diagnosed with appendiceal perforation (n=30), 28 patients (93.34%) had bilirubin elevated (>1.2 mg/dL) and 2 patients (6.66%) had normal bilirubin (<1.2 mg/dl). Thus, Hyperbilirubinemia was found in most of the patients diagnosed with acute appendicitis (27.14%) or appendiceal perforation (93.34%).

The sensitivity, specificity, positive predictive value and negative predictive value was calculated from a 2x2 table. Sensitivity and specificity of bilirubin in predicting acute appendicitis and appendiceal perforation diagnosis was 93.33% and 72.86% respectively. Similarly, positive predictive value and negative predicative value of bilirubin in predicting acute appendicitis and appendiceal perforation diagnosis was 59.57% and 96.22% respectively.

CONCLUSION

It is concluded from present study that elevated total serum bilirubin without elevation of liver enzymes is a good indicator of appendicular perforation. Total serum bilirubin appears to be a new promising laboratory marker for diagnosing appendicular perforation. The patients with clinical signs and symptoms of appendicitis and with hyperbilirubinemia should be identified as having a higher probability of appendicular perforation suggesting, total serum bilirubin levels have a predictive potential for the diagnosis of appendicular perforation.

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