

Evaluation of Hyperbilirubinaemia as a New Diagnostic Marker for Acute Appendicitis and Its Role in the Prediction of Appendicular Perforation

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Received: April 2020

Accepted: April 2020

ABSTRACT

Background: As association of hyperbilirubinemia with acute appendicitis has been well documented and this study tries to assess relationship between hyperbilirubinemia and acute appendicitis and to evaluate its credibility as a diagnostic marker for acute appendicitis. **Methods:** This is a prospective analysis on 50 patients admitted in Department of General Surgery, Rajindra hospital, GMC Patiala from November 2012 -2014 with clinical diagnosis of Acute appendicitis and Appendicular perforation. The diagnosis was confirmed post-operatively by histopathological reports and those differing from the pre-operative diagnosis were excluded from the study. **Results:** In study population of 50 patients, 48 patients (96%) were diagnosed as acute appendicitis pre-operatively while 2 patients (4%) were diagnosed with appendicular perforation. Hyperbilirubinemia (>1.0 mg/dl) in this study was found in 29 patients(58%), while 21 patients(42%) had normal bilirubin levels(<1mg/dl). Amongst the patients diagnosed with acute appendicitis without perforation (n=48), 28(58.33%) patients were found to have elevated bilirubin while only 20(41.67%) patients had normal bilirubin levels. In patients diagnosed with appendicular perforation (n=2), 1 patient (50%) had elevated bilirubin and 1 patient (50%) had normal levels. Hence we see that patients with appendicular perforation had higher levels of bilirubin as compared to that of acute appendicitis. **Conclusion:** This study 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.

Keywords: Appendicitis, Appendicular perforation, Jaundice, Bilirubin.

INTRODUCTION

Acute appendicitis is the commonest cause of "Acute Surgical abdomen."^[1,2] In 1886 Reginald Fitz of Boston correctly identifies the appendix as the primary cause of right lower quadrant inflammation. He coined the term APPENDICITIS and recommended early surgical treatment of the disease.^[3] It has been suggested that delay in presentation is responsible for the majority of perforated appendices. Children <5 years and patients >65 years of age have highest rates of perforation. The principal organisms seen in normal appendix, acute appendicitis and in perforated appendicitis are Escherichia Coli and Bacteroids fragilis. However a wide variety of facultative and anaerobic bacteria and mycobacteria may be present.^[4,5] During acute appendicitis, a non specific host immune response leading to oedema, increased intraluminal pressure and ischemic necrosis of mucosa causing gangrene and perforation of appendix leading to transmigration/translocation of bacteria/toxins/cytokines which leads to endotoxemia/bacteremia (sepsis) either by their direct invasion or through portal vein. Invasion of

bacteria into the hepatic parenchyma interferes with the physiology of excretion of bile leading to hyperbilirubinemia. Elevated serum bilirubin level can help us in the early and accurate diagnosis of acute appendicitis and in predicting its serious complications, most importantly the perforation.^[6]

The present study was undertaken to assess relationship between hyperbilirubinemia and acute appendicitis and to evaluate its credibility as a diagnostic marker for acute appendicitis and also, to see whether elevated bilirubin levels have a predictive potential for the diagnosis of appendicular perforation.

MATERIALS AND METHODS

This is a prospective study conducted on 50 patients admitted in Department of General Surgery, Rajindra hospital, GMC Patiala from November 2012 -2014 with clinical diagnosis of Acute appendicitis and Appendicular perforation. The diagnosis was confirmed post-operatively by histopathological reports and those differing from the pre-operative diagnosis were excluded from the study.

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Exclusion criteria:

- All patients documented to have a past history of
 - Jaundice or Liver disease
 - Chronic alcoholism
 - Hemolytic disease

- Acquired or Congenital biliary disease.
- All patients with positive HBsAg
- All patients with cholelithiasis
- All patients with cancer of hepato-biliary system

RESULTS

In the present study of 50 patients, 23 patients (46%) were males while the remaining 27 patients (54%) were females.

Hyperbilirubinemia (>1.0 mg/dl) in this study was found in 29 patients (58%), while 21 patients (42%) had normal bilirubin levels (<1mg/dl). In study population of 50 patients, 48 patients (96%) were diagnosed as acute appendicitis pre-operatively while 2 patients (4%) were diagnosed with appendicular perforation.

Amongst the patients diagnosed with acute appendicitis without perforation (n=48), 28(58.33%) patients were found to have elevated bilirubin while only 20(41.67%) patients had normal bilirubin levels. In patients diagnosed with appendicular perforation (n=2), 1 patient (50%) had elevated bilirubin and 1 patient (50%) had normal levels.

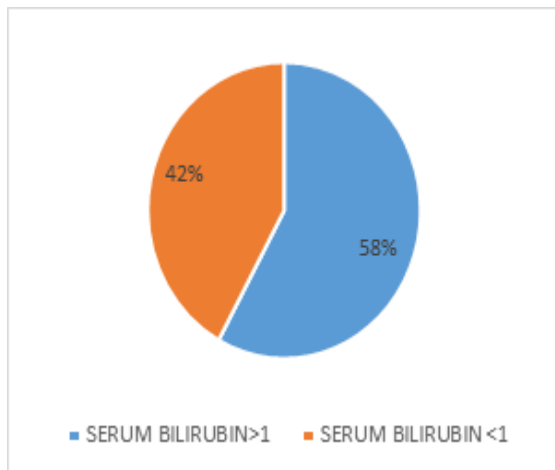


Figure 1: Distribution in Patients with Uncomplicated Acute Appendicitis

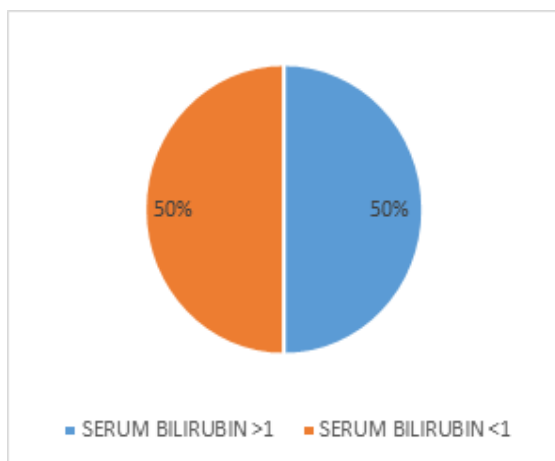


Figure 2: Distribution in Patients with Appendicular Perforation

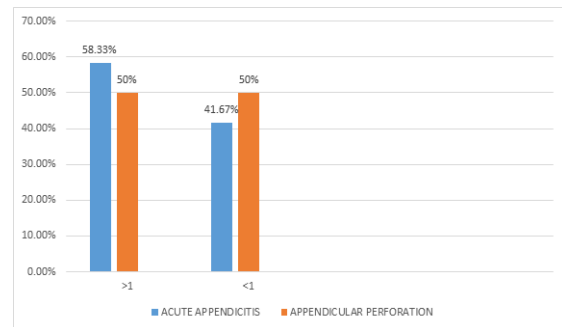


Figure 3: Bilirubin Levels among Patients with Acute Appendicitis and Appendicular Perforation

The mean bilirubin levels in patients diagnosed with acute appendicitis was 1.34±0.90 mg/dl while in patients diagnosed with appendicular perforation was 4.45±5.03 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.

Sensitivity and specificity of bilirubin in predicting acute appendicitis and appendicular perforation diagnosis was 58.33% and 50% respectively. Similarly positive predictive value and negative predictive value of bilirubin in predicting acute appendicitis and appendicular perforation diagnosis was 96.55% and 4.76% respectively.

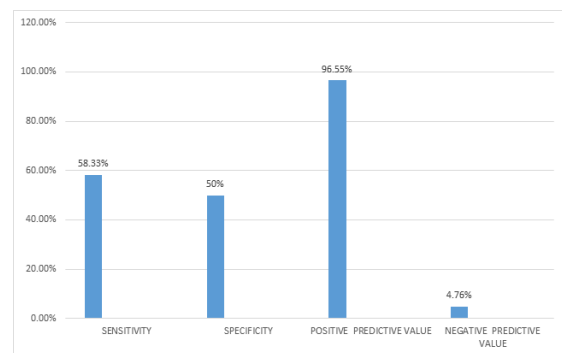


Figure 4: Accuracy of Serum Bilirubin as a Marker in Predicting Appendicular Perforation

DISCUSSION

Acute appendicitis is the most common cause of “acute abdomen” in young adults. The diagnosis of acute appendicitis is essentially clinical; but its diagnosis still remains a dilemma in spite of the advances in various laboratory and radiological investigations. A new tool to help in the diagnosis of acute appendicitis would thus be welcome. Serum bilirubin level elevation will help in the accuracy of clinical diagnosis of acute appendicitis and more importantly help in foreseeing and preventing impending complications of acute appendicitis.

So it can be concluded 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. Sand et al in his study found the mean bilirubin levels in patients with appendicular perforation to be significantly higher than those with a non-perforated appendicitis.^[7]

CONCLUSION

Serum bilirubin levels appears to be a promising new laboratory marker for diagnosing acute appendicitis from this study, however diagnosis of appendicitis remains essentially still clinical. Appendicular perforation leads to transmigration/translocation of bacteria/toxins/cytokines either by direct invasion or through portal vein which leads to endotoxemia/bacteraemia (sepsis) and invasion of bacteria into hepatic parenchyma which interferes with physiology of excretion of bile ultimately leading to hyperbilirubinemia. Patients with clinical signs and symptoms of appendicitis and with hyperbilirubinemia higher than the normal range should be identified as having a higher probability of appendicular perforation suggesting serum bilirubin levels have a predictive potential for the diagnosis of appendicular perforation.

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How to cite this article: Rekhi HS, Mittal S, Singh G, Kaur H, Ekta S. Evaluation of Hyperbilirubinaemia as a New Diagnostic Marker for Acute Appendicitis and Its Role in the Prediction of Appendicular Perforation. Ann. Int. Med. Den. Res. 2020; 6(3):SG05-SG07.

Source of Support: Nil, **Conflict of Interest:** None declared