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Original Research Paper

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# HYPERBILIRUBINEMIA- A MARKER FOR GANGRENOUS AND PERFORATED APPENDICITIS

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**ABSTRACT** Appendicitis is the most common acute surgical condition of the abdomen. Simple case of appendicitis can progress to perforation within 48hrs of attack of acute appendicitis, which increases both morbidity and mortality. Cholestasis and portal pyemia form the basis for sepsis in cases of appendicitis and the present study aimed to evaluate the co-relation of hyperbilirubinemia and severity of appendicitis.

**KEYWORDS :** Appendicitis, Hyperbilirubinemia, Gangrenous, Perforated

## INTRODUCTION-

Appendicitis remains the most common acute surgical condition of the abdomen. Hyperbilirubinemia (elevated serum bilirubin) is accumulation of bilirubin above physiological level in blood stream.

Elevated serum bilirubin levels in acute appendicitis can either appear as a result of bacteremia, or endotoxaemia, both possible in the catarrhal and phlegmonous forms as well as in the gangrenous or perforated cases.

The bacteria present in the portal blood are usually cleared by detoxification and immunological action of reticuloendothelial system of liver that act as first line defence in clearing toxic substances, bacteria and their products. But when bacterial load overwhelms the Kupffer Cell function, the damage to hepatocytes is reflected in serum bilirubin levels alone or in combination with liver enzymes depending upon the type, severity and site of lesion.[1]Jaundice has been associated with appendicitis and studies have shown hyperbilirubinemia as a predictor of appendiceal perforation. [2,3]

## MATERIAL & METHODS-

The study included 100 patients diagnosed to have acute appendicitis clinically, with raised white blood cell count ( >= 10,000 /cmm) warranting emergency, operative intervention. The liver enzymes and bilirubin levels were noted.

Subsequently these cases were operated and clinical diagnosis was confirmed intra-operatively and post-operatively by histo-pathological examination.

Their clinical and investigative data were compiled and analysed.

## RESULTS & DISCUSSION-

Out of the 100 patients recruited in the study, all had appendiceal inflammation on histo-pathological analysis. Of the 100, histo-pathological analysis of 25 (25%) revealed a gangrenous appendicitis and 3 (3%) cases revealed perforated appendicitis. Of the 25 patients of gangrenous appendicitis, 20 (80%) patients had elevated bilirubin levels and/or liver enzymes. 1 (33.33%) of the 3 patients of appendiceal perforation had elevated bilirubin levels. Remaining 72 cases had normal or marginally elevated levels of bilirubin. Overall sensitivity was 75% and specificity was 72%.

The mechanism outlined is invasion of the Gram-negative bacteria through the muscularis propria of the appendix, leading to direct invasion or translocation of the germs in the portal system and the liver, interfering with bilirubin excretion through bile ducts by endotoxin action.

The presence of jaundice in sepsis is well documented, especially associated with Gram-negative pathogens [4,5,6].

The hemolysis produced by certain bacteria (including E. coli), produces an increase in indirect and total serum bilirubin [7]. Also, some endotoxins released in the peripheral blood stream are responsible for impeding the liver's mechanism for bilirubin uptake and canalicular excretion [8,9]. Endotoxins produce cholestasis by damaging biliary salt transport through cytokine mediated mechanisms [10,11].

Estrada et al. have formulated the hypothesis that jaundice can be associated with perforation of the appendix, serving as a severity marker [12]. They explain the elevated STB by the invasion of the Gram-negative bacteria through the muscularis propria of the appendix, leading to direct invasion or translocation of the germs in the portal system and the liver, interfering with bilirubin excretion through bile ducts by endotoxin action. Emmanuel et al. find that STB has a specificity of 88% and a positive predictive value of 91% for perforated acute appendicitis [13], while Sand et al find an 86% specificity for gangrenous or perforated forms, compared with only a 35% specificity of the C reactive protein. Hong, on a large series of 1195 patients, also finds as significant the value of STB in the identification of perforation [14].

## CONCLUSION-

Broadly, we can say that hyper-bilirubinemia is a sensitive and specific, cheap pre-operative marker of gangrenous, perforated appendicitis.

**Table 1- Type of Appendicitis and Frequency with Hyperbilirubinemia**

| HISTO-PATHOLOGY | FREQUENCY | DAY OF PRESENTATION AFTER ONSET OF PAIN | NO. OF CASES WITH HYPERBILIRUBINEMIA |
|---|---|---|---|
| Appendicitis (without gangrene/perforation) | 72 | 1st-4th day | 0 |
| Gangrenous Appendicitis | 25 | 5th-7th day | 20 (80%) |
| Perforated Appendicitis | 3 | 8th-12th day | 1 (33.33%) |

**Table 2- Bilirubin Levels in Cases of Gangrenous & Perforated Appendicitis**

| LIVER FUNCTION TEST | REFERENCE VALUES | GANGRENOUS APPENDICITIS | PERFORATED APPENDICITIS |
|---|---|---|---|
| Total Bilirubin | 0.2-1.2 | 1.6-2.4 | 2.8 |
| Direct Bilirubin | 0.0-0.2 | 0.4-1.0 | 1.4 |
| Indirect Bilirubin | 0.2-1.0 | 0.8-1.2 | 1.4 |
| SGOT | Upto 45 | 45-56 | 59 |
| SGPT | Upto 45 | 45-56 | 62 |
| ALP | 53-128 | 55-156 | 154 |

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