

**Original article:**

## **Analysis of Role of Serum Bilirubin in Predicting the Severity of Acute Appendicitis: An Institutional Based Study**

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### **ABSTRACT**

**Background:** Acute appendicitis remains one of the most common acute abdomen and surgical emergency dealt every day in surgery department. The present study was conducted to assess role of serum bilirubin in predicting the severity of acute appendicitis.

**Materials and Methods:** This prospective observational study was carried out to assess role of serum bilirubin in predicting the severity of acute appendicitis. Patients were clinically evaluated by detailed history, routine examination and the routine investigations with inclusion of serum total bilirubin. Based on histopathological examination patients were categorized as positive and negative.

**Results:** A total of 80 patients were admitted with diagnosis of acute appendicitis. Out of 80 patients, 20 were managed conservatively. Acute appendicitis was found maximally in males (63.33%) and in the age group 26-30yrs. The mean total bilirubin was found to be 0.92 mg/dl in acute catarrhal appendicitis and 1.43 mg/dl in acute complicated appendicitis respectively. 44 patients had acute catarrhal appendicitis, 4 patients had gangrenous appendicitis, 12 patients had perforated appendicitis. In acute catarrhal appendicitis group 42 patients showed normal total bilirubin levels, whereas 2 patients showed increase in levels of total bilirubin. In gangrenous appendicitis group all 4 patients showed elevated serum total bilirubin levels. In perforated appendicitis group consisted of 8 patients showed elevated serum bilirubin levels and 4 patients showed normal total bilirubin levels.

**Conclusion:** The present study concluded that serum bilirubin concentration should be considered as one of the possible markers of Acute Appendicitis.

**Keywords:** Serum Bilirubin, Acute Appendicitis, Histopathological.

### **INTRODUCTION**

Acute appendicitis is the most common surgical emergency and early surgical intervention improves outcomes.<sup>1</sup> Approximately 8% of people in the world have had appendicitis at some point of their life with peak incidence between 10-30 years of age. The diagnosis of acute appendicitis is made from the history and clinical examination with the help of laboratory investigations and the role of imaging is still secondary. Despite its high frequency, it still remains elusive in its diagnosis and mimics other abdominal pathologies. Diagnosis becomes more difficult in extremes of ages and females in reproductive age group in which because of a high incidence of genitourinary and gynaecological conditions which present with similar signs and symptoms as of acute appendicitis. A delay

in performing an appendectomy increases the risk of appendiceal perforation and sepsis, which in turn increases morbidity and mortality.<sup>2-4</sup> Elevated serum bilirubin level and jaundice are commonly observed in patients suffering from a septic condition.<sup>5-7</sup> Acute appendicitis is the most common intra-abdominal infectious focus in a surgical patient and *Escherichia coli* and *Bacteroides fragilis* are the most frequent bacterial isolates in this condition. Bacteraemia is known to cause endotoxemia leading to impaired excretion of bilirubin from the bile canaliculi.<sup>8,9</sup> The present study was conducted to assess role of serum bilirubin in predicting the severity of acute appendicitis.

## MATERIALS AND METHODS

This prospective observational study was carried out to assess role of serum bilirubin in predicting the severity of acute appendicitis. The study was conducted over a period of 6 months. Before the commencement of the study ethical approval was taken from the Ethical committee of the institute and informed consent was obtained from the patients. Patients with suspicion of acute appendicitis posted for appendectomy were included in the study. Patients were clinically evaluated by detailed history, routine examination on initial contact with patients and the routine investigations as per surgery and anesthesia requirements with inclusion of serum total bilirubin. Serum total bilirubin results were compared. These cases were operated, and clinical diagnosis was confirmed preoperatively and post-operatively by histopathological examination. Final histopathological examination was considered as a gold standard for diagnosing and categorizing patients as having normal appendix, acute appendicitis and acute appendicitis with perforation and/or gangrene. Based on histopathological examination patients were categorized as positive (acute appendicitis with perforation and/or gangrene) and negative (acute appendicitis without perforation or gangrene).

**Table 1: Demographic data**

Variable	N(%)
<b>Age groups (yrs)</b>	
20-25	13(21.66%)
26-30	25(41.66%)
31-35	14(23.33%)
36-40	8(13.33%)
<b>Gender</b>	
Male	38(63.33%)
Female	22(36.66%)
Total	60(100%)

**Table 2: Comparison of mean serum bilirubin levels in patients with, acute appendicitis and complicated appendicitis.**

Bilirubin	Acute catarrhal appendicitis	Acute complicated appendicitis
Mean total bilirubin	0.92mg/dl	1.43mg/dl

**Table 3: Showing HPE correlation.**

<b>Histopathology</b>	<b>Total bilirubin &lt;1.2mg/dl</b>	<b>Total bilirubin &gt;1.2mg/dl</b>	<b>Total</b>
<b>Acute appendicitis</b>	42	2	44
<b>Gangrenous appendicitis</b>	0	4	4
<b>Perforated appendicitis</b>	4	8	12
<b>Normal appendix</b>	0	0	0
<b>Total</b>	46	14	60

## RESULTS

A total of 80 patients were admitted with diagnosis of acute appendicitis. Out of 80 patients, 20 were managed conservatively. Acute appendicitis was found maximally in males (63.33%) and in the age group 26-30yrs. The mean total bilirubin was found to be 0.92 mg/dl in acute catarrhal appendicitis and 1.43 mg/dl in acute complicated appendicitis respectively. 44 patients had acute catarrhal appendicitis, 4 patients had gangrenous appendicitis, 12 patients had perforated appendicitis. In acute catarrhal appendicitis group 42 patients showed normal total bilirubin levels, whereas 2 patients showed increase in levels of total bilirubin. In gangrenous appendicitis group all 4 patients showed elevated serum total bilirubin levels. In perforated appendicitis group consisted of 8 patients showed elevated serum bilirubin levels and 4 patients showed normal total bilirubin levels.

## DISCUSSION

Appendicitis is one of the commonest causes of abdominal pain requiring emergency surgery. Different clinical signs and symptoms always mimic the diagnosis of acute appendicitis with number of causes leading to pain in right iliac fossa, especially in females. To decrease the morbidity and mortality of perforated appendix, a preoperative diagnosis of perforation should be sought at earliest.<sup>10,11</sup>

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Appendicitis commonly occurs in young adults (the highest incidence, approximately 40%, in 2nd decade of life i.e. 10–19 years and 70% of the subjects are less than 30 years old.).<sup>12,13</sup> S. Khan in 2008 conducted a prospective study of total bilirubin levels in appendicitis with sample size of 110 showed a results of sensitivity 87%, specificity 100%, PPV 100%, NPV 17.3%.<sup>14</sup> A study conducted by Sand M et al and they found that the mean bilirubin levels of all patients were 0.9mg/dl (SD mg/dl), range 0.1-4.3mg/dl, and median 0.7mg/dl. Patients with

appendiceal perforation however had a mean 0.9 SD mg/dl.), range 0.4-4.3, bilirubin level of 1.5mg/dl (median 1.4mg/dl, which was significantly higher than those with a non-perforated appendicitis ( $P<0.05$ ).<sup>15</sup>

## CONCLUSION

The present study concluded that serum bilirubin concentration should be considered as one of the possible markers of Acute Appendicitis.

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