

Evaluation of Importance of S Bilirubin Level in Cases of Simple and Complicated Acute Appendicitis

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Abstract: ***Introduction:** Acute appendicitis is the commonest cause of “Acute Surgical abdomen”. Delay in diagnosis of acute appendicitis leads to perforation and peritonitis and increased mortality. Perforation ranges 50–90% in various series, Recently elevation in serum bilirubin was reported, but the importance of the raised total bilirubin has not been stressed in acute appendicitis and appendicular perforation. The present study was undertaken to assess relationship between hyperbilirubinemia and acute appendicitis/perforated appendicitis and to evaluate its importance as a diagnostic marker. **Materials and Methods:** Study was conducted in the department of general surgery, Sri Devaraj URS Medical college. A total of 100 patients with clinical diagnosis of acute appendicitis and co relationships with serum bilirubin leading to appendicular perforation were studied. All patients data collected with respect to age, gender, duration of symptoms. surgical procedures were undertaken with the understanding and appropriate informed consent of each patient before surgery. The operations were performed under regional or General anesthesia. **Results:** As per the study, the age group <20years is most commonly affected (24%) followed by age group 20 - 24 (21%). The youngest patients of this study were of 15years old while the oldest patient was a 60 year old, Out of 100 patients enrolled for the study, 68 patients (68%) were males while the remaining 32 patients (32%) were females The overall mean age of all 100 patients was 27 years (range, 15 - 60 years). The average age in males and females was 27.04years and 26.71years respectively, Among the study group 28 patients had serum bilirubin levels >1mg% and 72 patients<1mg%. In this study of 100 patients, hyperbilirubinemia was found in 19 of 29 patients with gangrenous/perforated appendicitis. **Conclusion:** This study suggests Serum bilirubin levels appears to be a promising new laboratory marker for diagnosing acute appendicitis. 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.*

Keywords: Acute appendicitis, perforated appendicitis, serum bilirubin

1. Introduction

Acute appendicitis is the commonest cause of “Acute Surgical abdomen”.

The diagnosis of Appendicitis still remains a dilemma in spite of advances in the radiological and laboratory investigations. Experienced clinicians accurately diagnose appendicitis based on a combination of history, physical examination and laboratory studies about 80% of the time. Although most patients with acute appendicitis can be easily diagnosed, in some cases the sign and symptoms are variable and diagnosis can be difficulty.

This is particularly true where the appendix is retrocaecal or retroileal. The percentage of appendicectomies performed where appendix subsequently found to be normal varies 15–50% and postoperative complications can occur in up to 50% of these patients.

Delay in diagnosis of acute appendicitis leads to perforation and peritonitis and increased mortality. Perforation ranges 50–90% in various series.

To supplement the clinical diagnosis and to reduce the frequency of unnecessary appendicectomy, the importance of laboratory investigations like White Blood Cell (WBC) counts and C - reactive protein (CRP) etc values has been stressed

The use of Ultrasonography (USG) as a diagnostic tool for appendicitis has been widely known and studied.

Various scores combining clinical features and laboratory investigations have also been developed and are good enough to reach the diagnosis.

However, upto date there is no confirmatory laboratory marker for the pre - operative diagnosis of acute appendicitis and appendicular perforation. Recently, elevation in serum bilirubin was reported, but the importance of the raised total bilirubin has not been stressed in acute appendicitis and appendicular perforation.

The present study was undertaken to assess relationship between hyperbilirubinemia and acute appendicitis/perforated appendicitis and to evaluate its importance as a diagnostic marker.

2. Objective of the Study

To evaluate whether elevated Bilirubin level is important in predicting the diagnosis of acute appendicitis (simple and complicated appendicitis).

Study Period: From december 2020 to may 2022 OR 100 cases.

Inclusion Criteria: All clinically diagnosed case with acute appendicitis (simple and complicated).

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Exclusion Criteria:

- 1) Individuals with history of conrmed hepatitis or liver disease or HBsAg positive.
- 2) Individuals with age less than 13 years of age.
- 3) Patients with known congenital liver diseases like gilbert syndrome, Dubin – Johnson, Rotor’s syndrome and Crigler –Najjar syndrome.
- 4) Individuals with intra or extra hepatic cholestasis.
- 5) Individuals with haemolytic anemia.
- 6) Chronic alcoholism (i. e. intake of alcohol of >40g/day for Men and >20g/day in Women for 10 years).

The average age in males and females was 27.04years and 26.71years respectively

Table 4: Serum bilirubin levels in study population

Serum bilirubin levels	Frequency	Percent
Elevated	28	28.0
Normal	72	72.0
Total	100	100.0

Among the study group 28 patients had serum bilirubin levels >1mg% and 72 patients<1mg%.

3. Material and Methods

Study was conducted in the department of general surgery, Sri Devaraj URS Medical college

A total of 100 patients with clinical diagnosis of acute appendicitis and co relationships with serum bilirubin leading to appendicular perforation were studied. All patients data collected with respect to age, gender, duration of symptoms. surgical procedures were undertaken with the understanding and appropriate informed consent of each patient before surgery.

The operations were performed under regional or General anesthesia.

Table 5: Intra - Operative findings in study population

Intra operative finding	Frequency	Percent
Perforated	29	29.0
Simple	71	71.0
Total	100	100.0

Among the study population 29 patients were diagnosed of having perforated appendicitis.

Table 6: Bilirubin levels in perforated and simple appendicitis

Intra operative findings	Serum bilirubin levels				Total	
	Elevated		Normal		N	%
	N	%	N	%		
Perforated	19	65.5	10	34.5	29	100
Simple	9	12.7	62	87.3	71	100
Total	28	28	72	72	100	100

$X^2=28.517$ $df= 1$ $P<0.001$

4. Results

Table 1: Distribution of patients by age

Age	Frequency	Percent
<20	24	24.0
20- 24	21	21.0
25- 29	19	19.0
30- 34	17	17.0
≥ 35	19	19.0
Total	100	100.0

As per the study, the age group <20years is most commonly affected (24%) followed by age group 20 - 24 (21%). The youngest patients of this study were of 15 years old while the oldest patient was a 60 year old

Table 2: Sex distribution

Sex	Frequency	Percent
Female	32	32.0
Male	68	68.0
Total	100	100.0

Out of 100 patients enrolled for the study, 68 patients (68%) were males whilethe remaining 32 patients (32%) were females

Table 3: Mean Age distribution among sex

Sex	Age (yrs)	SD
Male	27	10.30
Female	26	7.96
Overall	27	9.58

The overall mean age of all 100 patients was 27 years (range, 15 - 60 years).

Table 7: Accuracy of serum bilirubin as a marker in predicting Appendicular perforation

Serum bilirubin levels	Intra operative findings	
	Perforated	Simple
Elevated	19	9
Normal	10	62
Total	29	71

Sensitivity: sensitivity of bilirubin in predicting acute appendicitis and Appendicular perforation diagnosis was 65.5%

Specicity: Specicity of bilirubin in predicting acute appendicitis and appendicular perforation diagnosis was 87.3%

Positive predictive value: Positive predictive value of bilirubin in predicting acute appendicitis and Appendicular perforation diagnosis was 67.9.

Negative predictive value: Negative predictive value of bilirubin in predicting acute appendicitis and Appendicular perforation diagnosis was 76.5%.

Odds ratio: Odds ratio is 13

5. Discussion

In this study of 100 patients, hyperbilirubinemia was found in 19 of 29 patients with gangrenous/ perforated appendicitis. This hyperbilirubinemia was mixed in type (both conjugated and unconjugated) 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.

For gangrenous/perforated appendicitis,

The P - value of SB was <0.001,
Specificity 87.3%,
Sensitivity 65.5%,
Positive predictive value 67.9%
Negative predictive value was 86.1% and accuracy value of 81%.

The level of Serum bilirubin was higher than 1 mg/dL in cases of gangrenous/perforated appendicitis while in cases with acute appendicitis it was lower than 1mg/dL (P<0.05).

The most likely explanation of the rise in SB is therefore circulating endotoxemia as a result of appendiceal infection.

It was demonstrated by **Sisson et al** in 1971 and was observed by **Dieulafoy**

Recently, in one study, blood samples from the superior mesenteric vein in acute appendicitis showed bacteria in 38% of patients. These findings suggest that bacteria may transmigrate and produce portal bacteremia, hepatocellular dysfunction or pyogenic liver abscess.

Our study shows that isolated hyperbilirubinemia without much elevation in the liver enzymes is a significant predictor of appendiceal perforation.

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.

Therefore, in suspected cases of appendicitis elevation of Serum bilirubin can be used as a criterion to diagnose and manage acute appendicitis, especially when there is doubtful differential diagnosis were considered like right uretric colic, mesenteric adenitis, right salphingitis

6. Conclusion

This study suggests Serum bilirubin levels appears to be a promising new laboratory marker for diagnosing acute appendicitis.

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.

Therefore, obtaining Serum bilirubin values upon admission can be used in conjunction with more modern diagnostic tests such as CT scan, ultrasonography to help determine the presence of perforation and thus aid in prompt clinical management.

Serum bilirubin levels may be considered as one more positive factor for strong suspicion of appendicitis or

perforated appendix in differential diagnosis of right iliac fossa pain.

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