

Original Research Article


# To study the role of hyperbilirubinemia as a marker of gangrenous/ perforated appendicitis

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## Abstract

**Background:** Acute appendicitis is the most common cause of acute abdomen in young adults requiring Emergency Surgery. Diagnosing Acute Appendicitis clinically still remains a common surgical problem. Accurate diagnosis can be aided by additional testing or expectant management or both. These might delay surgery and lead to appendicular perforation with increased morbidity and hospital stay.

**The aim of the study:** To study the incidence of hyperbilirubinemia in cases of acute appendicitis and its complications (Gangrenous/ Perforated).

**Materials and methods:** This Prospective study was done in the Department of General Surgery, Madras Medical College and Rajiv Gandhi Government General Hospital in 2017. Patient admitted with clinical diagnosis of acute appendicitis or its complications (Perforated/ Gangrenous) in the Emergency. Final HPE was considered as a gold standard for diagnosing and categorizing patients as having Normal Appendix, Acute appendicitis and Acute appendicitis with Perforation/Gangrene.

**Results:** Out of 246 cases of Acute appendicitis 42 Cases were Gangrenous/ Perforated Appendix (17.07%). Out of 42 cases of Gangrenous/ Perforated appendix maximum cases seen in the Age group 21-30 years (31%) and least seen in below 10 years (0.0%). Above 50 years no of cases of Gangrenous/ Perforated appendix were 3 (7.1%). Rebound tenderness predominantly present in cases of Gangrenous/ Perforated Appendicitis than Acute appendicitis cases and its statistically significant. Among 246 cases minimum age was 9 and the maximum age was 65 years and the mean age was 24 years. Mean Total leukocyte count was 12687 and Mean polymorph count was 75. Serum mean total

bilirubin was .92 and maximum was 2.4 Alvarado's score maximum seen was 10 and least was 5 with mean about 7.

**Conclusion:** Patients with clinical signs and symptoms of Acute appendicitis with raised serum bilirubin should be considered as having high predictive potential for Appendicular gangrene/ Perforation. Serum Bilirubin is an important adjunct in diagnosing the presence of Gangrenous/ Perforated Appendicitis along with other diagnostic aids.

## Key words

Hyperbilirubinemia, Perforated Appendix, Alvarado's Score Maximum, Leucocyte Count.

## Introduction

Acute appendicitis is the most common cause of acute abdomen in young adults requiring Emergency Surgery. Diagnosing Acute Appendicitis clinically still remains a common surgical problem [1]. Accurate diagnosis can be aided by additional testing or expectant management or both. These might delay surgery and lead to Appendicular perforation with increased morbidity and hospital stay [2]. A safe alternative seems to be appendectomy as soon as the condition is suspected a strategy that increases the no. of unnecessary Appendectomies. Accurate diagnosis has been attempted by the employment of additional lab tests Scoring systems Ultrasound imaging CT scan and Laparoscopy. None of these methods stands alone as they all come in support of and are secondary to a primary clinical assessment [3]. In recent years studies emerge that showed that elevated serum Bilirubin levels would indicate a Gangrenous/Perforated Appendicitis. An elevated serum Bilirubin that is not explained by liver disease or Biliary obstruction can be present in many patients of Acute Appendicitis [4]. The present study has been designed to study the Incidence of Hyperbilirubinemia in cases of Acute Appendicitis and its complications (Gangrenous / Perforated). The significance of other parameters such as Age, Symptoms, Total Leukocyte count, USG, Alvarado's score has also been evaluated in these cases [5].

## Materials and methods

This prospective study was done in the Department of General Surgery, Madras Medical College and Rajiv Gandhi Government General

Hospital in 2017. Patient admitted with clinical Diagnosis of Acute Appendicitis or its complications (Perforated/ Gangrenous) in the Emergency. Final HPE was considered as a gold standard for diagnosing and categorizing patients as having Normal Appendix, Acute appendicitis and Acute appendicitis with Perforation/ Gangrene.

## Inclusion

- All patients with positive HBsAg.
- All patients with cholelithiasis.
- All patients with cancer of Hepato Biliary system.
- All patients with past H/O Jaundice/ Liver disease, Hemolytic disease, Congenital or Acquired Biliary disease.
- Patients with Appendicular Lump.
- Patients undergoing interval Appendectomies or Appendectomies for other Indications.

## Statistical analysis

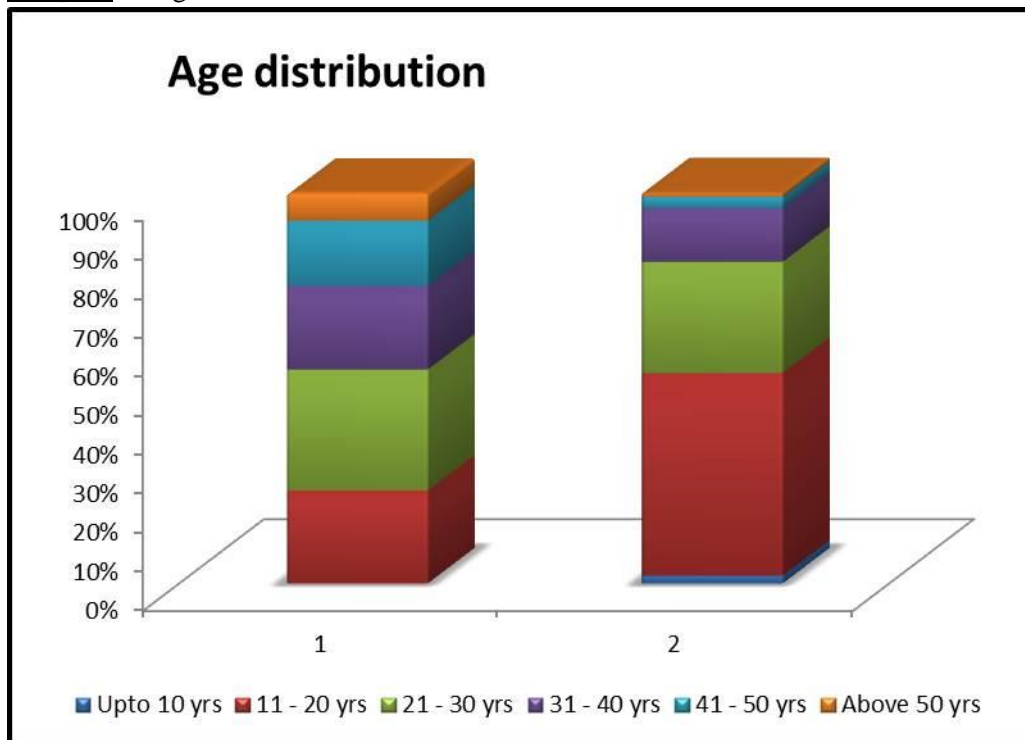
The collected data were analyzed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean and S.D were used for continuous variables. To find the efficacy of the tools the Receiver Operating Curve (ROC) with Sensitivity, Specificity, PPV and NPV were used. To find the significance in categorical data Chi-Square test was used in the above statistical tool the probability value  $P < 0.05$  was considered as significant.

## Results

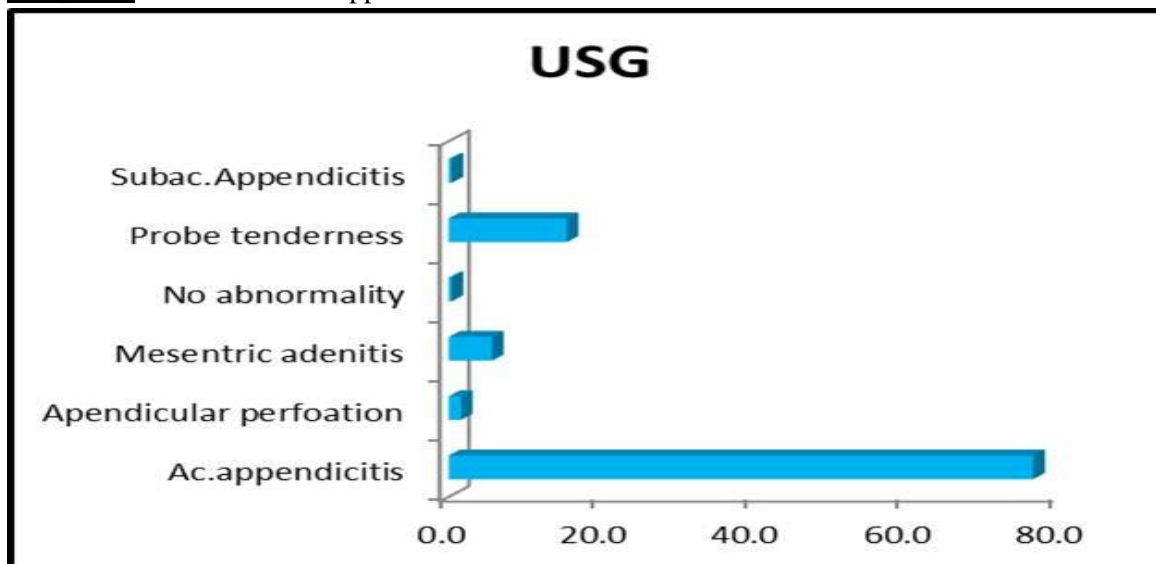
Out of 246 cases of Acute appendicitis 42 Cases were Gangrenous/ Perforated Appendix (17.07%). Out of 42 cases of Gangrenous/ Perforated appendix maximum cases seen in the

Age group 21-30 years (31%) and least seen in below 10 years (0.0%). Above 50 years, no of cases of Gangrenous /Perforated appendix was 3 (7.1%) as per **Graph – 1**.

**Graph – 1:** Age distribution.



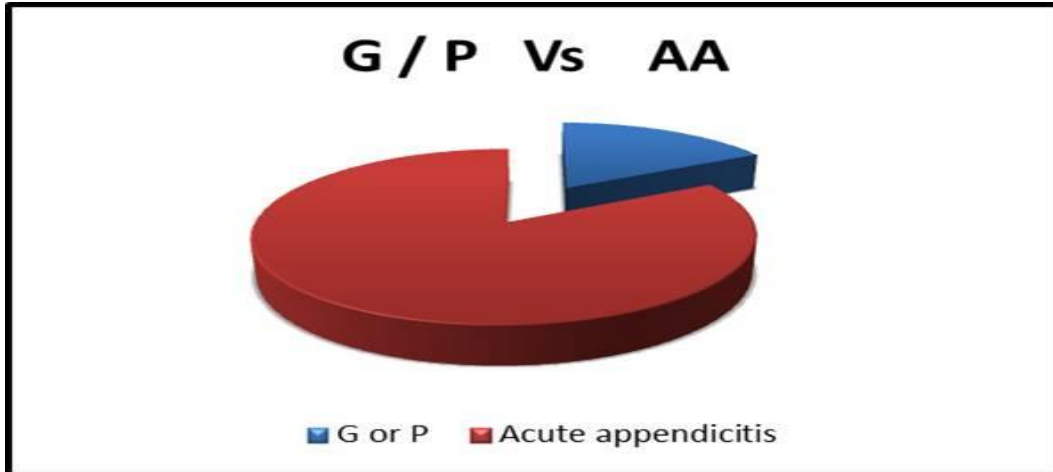
**Graph – 2:** USG and acute appendicitis.



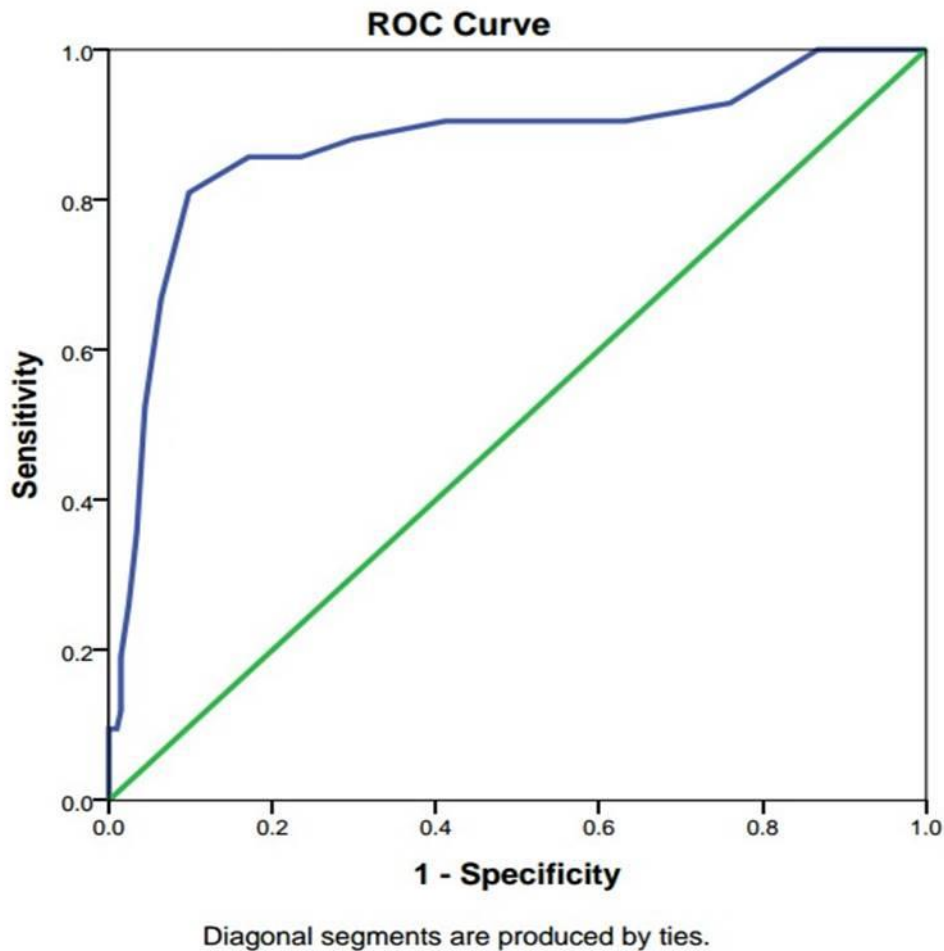
Out of 246 cases of Histologically confirmed cases of Acute appendicitis and Gangrenous/ perforated appendix USG able to identify the 193 cases (78.46%) as per **Graph – 2**.

Among 246 cases, 42 (17.1%) were Gangrenous/ Perforated Appendix and rest of the 204 cases (82.9%) were Acute appendicitis. Hence Frequency was 17 cases of G/P per 100 AA (**Graph – 3**).

**Graph – 3:** Gangrenous/ Perforated appendix vs acute appendicitis.



**Graph – 4:** Receiver operating curve (ROC).



The test result variable(s): LFT- Total Bilirubin has at least one tie between the positive actual state group and the negative actual state group.

Statistics may be biased

- a. Under the nonparametric assumption
- b. Null hypothesis: true area = 0.5 (**Graph – 4**)

Hyperbilirubinemia was found both in Suppurative Acute appendicitis and Gangrenous/ Perforated Appendicitis. Among 246 cases of HPE confirmed cases of Acute appendicitis 42 were Gangrenous/ Perforated Appendix and 204 were Acute Suppurative appendicitis.

Within the 204 cases of Acute suppurative appendicitis 35 cases had Hyperbilirubinemia (17.16%) Among 42 cases of Gangrenous / Perforated Appendix cases 36 cases had Hyperbilirubinemia (85.71%). Hyperbilirubinemia most commonly associated with Gangrenous/ Perforated Appendix followed by Acute suppurative appendicitis. Here the cut off value for Hyperbilirubinemia was 1.15 mg and its supported by statistical analysis. To describe about the data descriptive statistics Frequency analysis, percentage analysis was used for categorical variables and the mean and SD were used for continuous variables. To find the efficacy of the tools the Receiver Operating Curve (ROC) with Sensitivity, Specificity, PPV and NPV were used. To find the significance in categorical data Chi-Square test was used. In the above statistical tool the probability value  $P < 0.05$  was considered as significant.

## Discussion

Out of 246 cases, Fever is present in 143 cases (58.1%) and absent in 103 cases (41.9). Out of 246 cases Rebound Tenderness present in 83 cases (33.7%) and not present in 163 cases (66.3%). Among 42 cases of Gangrenous/ Perforated appendicitis, Rebound tenderness was present in 31 cases (73.8%). Among 204 cases of Acute appendicitis, Rebound tenderness was present in 52 cases (25.5%). Rebound tenderness predominantly present in cases of Gangrenous / Perforated Appendicitis than Acute appendicitis cases and its statistically significant [6]. Out of 246 cases of Histologically confirmed cases of Acute appendicitis and Gangrenous/perforated appendix, USG can able to identify the 193 cases (78.46%). Among 246 cases, 42 (17.1%) were Gangrenous / Perforated Appendix and rest of the 204 cases (82.9%) were Acute appendicitis

[7]. Among 246 cases minimum age is 9 and the maximum age is 65 years and the mean age is 24 years. Mean Total leukocyte count is 12687 and Mean polymorph count is 75. Serum means total bilirubin is .92 and maximum is 2.4. Alvarado's score maximum seen is 10 and least is 5 with mean about 7 [8]. Hyperbilirubinemia was found both in Suppurative Acute appendicitis and Gangrenous/ Perforated Appendicitis [9]. Among 246 cases of HPE confirmed cases of Acute appendicitis 42 were Gangrenous /Perforated Appendix and 204 were Acute Suppurative appendicitis. Within the 204 cases of Acute suppurative appendicitis 35 cases had Hyperbilirubinemia (17.16%) Among 42 cases of Gangrenous /Perforated Appendix cases 36 cases had Hyperbilirubinemia (85.71%) Hyperbilirubinemia most commonly associated with Gangrenous / Perforated Appendix followed by Acute suppurative appendicitis. Here the cut-off value for Hyperbilirubinemia is 1.15 mg. and it's supported by statistical analysis [10]. To find the efficacy of the tools the Receiver Operating Curve (ROC) with Sensitivity, Specificity, PPV and NPV were used [11]. To find the significance in categorical data Chi-Square test was used the above statistical tool the probability value  $P < 0.05$  was considered as significant [12]. In our study Sensitivity 85.7%, Specificity 82.8 Positive predictive value 50.7 %, Negative predictive value 96.6% and Overall Accuracy 84.25%. Therefore Serum bilirubin estimation is a simple and easily available test in every lab and can be added to the routine investigation list of clinically suspected cases of acute appendicitis for confirmation of the diagnosis. Because the raised serum bilirubin level was significantly higher in Gangrenous/ Perforated appendix patients [13]. Hence, therefore, obtaining serum bilirubin values on admission can be used as a marker for Gangrenous/ Perforated Appendix along with other tests such as USG, CT scan to determine the presence of Perforation and thus aid in prompt appropriate clinical management [14, 15].

## Conclusion

Total serum bilirubin appears to be a new promising marker for diagnosing Gangrenous/ Perforated Appendicitis. Patients with clinical signs and symptoms of Acute appendicitis with raised serum bilirubin should be considered as having high predictive potential for Appendicular gangrene/ Perforation. Serum Bilirubin is an important adjunct in diagnosing the presence of Gangrenous/ Perforated Appendicitis along with other diagnostic aids. Therefore Hyperbilirubinemia may consider as a marker for Gangrenous / Perforated appendix.

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