



HYPERBILIRUBINEMIA EVALUATION AS A NEW DIAGNOSTIC MARKER FOR ACUTE APPENDICITIS

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Editor(s):

(1) Dr. Luis Enrique Ibarra Morales, University of Sonora, Mexico.

Reviewers:

(1) Danny Faturachman, Dharma Persada University, Indonesia.

(2) Abdullahi Yahaya, Kano University of Science and Technology, Nigeria.

Received: 29 August 2020

Accepted: 04 November 2020

Published: 21 November 2020

Original Research Article

ABSTRACT

Acute appendicitis is very usual common surgery emergency and early surgical action increases result. Treatment of appendicitis may be difficult and it is necessary to provide a strong index of concern to avoid severe problems from this condition. In order to test its efficacy as a diagnostic marker for acute appendicitis, this study was performed to examine the association among hyperbilirubinemia and acute appendicitis. This was a retrospective, single-center cohort research performed by the Surgery Department at KMIS, Karad. Duration of the study was from November 2013 to June 2015. Serum bilirubin is a major complement to the treatment of gangrene / perforated appendicitis. Our results indicate there is a strong sensitivity in hyperbilirubinaemia to differentiate acute appendicitis.

Keywords: Hyperbilirubinemia; appendix; acute appendicitis; serum bilirubin; evaluation; diagnosis.

1. INTRODUCTION

The most usual general surgical emergency is acute appendicitis and early surgical action enhances results [1]. Regardless of the improved usage of ultrasonography, CT Screening and laparoscopy, the incidence of appendicitis misdiagnosis has stayed static (15.3 percent), as has the incidence of appendicitis [2]. Acute appendicitis is a mystery challenge and is reminiscent of the clinical procedure

process in an age used to early and accurate detection [3]. Inflamed appendix occurs in severe appendicitis, known as the surgical condition. The study on the association of hyper-bilirubinemia with Appendicitis is being carried out recently and there are only a few studies in this regard. The Patho-physiology (in brief) behind the elevation of Serum Bilirubin in Acute Appendicitis: A non-specific host immune reaction that results in oedema, elevated intraluminal pressure and ischemic mucosal necrosis that induces gangrene

and perforation. Transmigration/trans-location of bacteria/toxins / cytokines either by direct invasion or through portal vein.

2. AIM AND OBJECTIVES

2.1 Aim

To determine that elevated levels of bilirubin provide a predictive potential to detect appendiceal perforation.

2.2 Objectives

In a specific position to evaluate other factors such as symptom length, clinical history, white blood cell count, Alvarado ratings, other parameters such as Alanine aminotransferase (ALT), Aspartate aminotransferase (AST) and Alkaline phosphatase (ALP).

3. REVIEW OF LITERATURE

Sand et al. [4] investigated the clinical value of hyperbilirubinemia as a prognostic factor for appendiceal variance in acute appendicitis.

Patel et al. [5] studied the role of hyperbilirubinemia as a potential diagnostic test for acute appendicitis and its function in the diagnosis of complicated appendicitis.

Abdellaa et al. [6] evaluated the role of increased serum bilirubin as a preoperative precise indicator of complicated childhood appendicitis. The study included 417 children presenting with right iliac fossa pain. All patients underwent clinical examination and gave blood sample on admission for estimation of serum TB and C-reactive protein and total leukocytic count (TLC) and underwent surgical exploration and management according to operative findings. Surgical exploration defined 134 cases of complicated appendicitis (CA), 219 cases of simple appendicitis, and 64 cases of non inflamed appendix. Mean preoperative TLC and serum showed high sensitivity (88.7 and 83.6%, respectively) for detection of acute appendicitis (AA), despite the lower specificity of for diagnosis (57.8%), whereas the specificity rate of elevated TLC was 71.9%. For discrimination between simple appendicitis and CA, elevated serum showed higher specificity compared with elevated TLC (70.3 vs. 65.8%) despite the higher sensitivity of elevated TLC compared with elevated serum (91.8 vs. 80.6%).

Serum TB showed the highest specificity rate for denying cases of AA and CA (79.7 and 86.3%, respectively) despite the low sensitivity for both. Receiver operating characteristic curve analysis defined the severity of rebound tenderness in the form of significant, sensitive, and elevated TLC as the most significant specific predictor for AA. Serum TB greater than 1 mg/dl was the most significant specific predictor for the diagnosis of CA.

Wani et al. [7] prospectively evaluated the role of hyperbilirubinaemia, and ultrasonography (USG) as predictors for appendiceal perforation. The study included a group of those 100 patients who had histologically proven appendicitis. Small percentage of patients with appendiceal perforation were raised compared with patients with serum bilirubin and non-perforation appendicitis. Bilirubin and ultrasound are effective for differentiation of perforated from non-perforated appendicitis. Bilirubin and USG are important preoperative biochemical and sonographic markers of perforation, respectively in appendicitis.

Studies analyzing elevated serum bilirubin were analyzed by Burcharth et al. [8] studied as a predictor for appendiceal perforation. Reports assessing elevated bilirubin in the treatment of perforated appendicitis have been scanned for Medline, Embase, and Cochrane literature. Over all number of 189 abstracts were reviewed for competency, of which five clinical trials were used in this study. Bilirubin was slightly higher in appendix perforation patients relative to non-perforation appendicitis patients.

4. MATERIALS AND METHODS

This was a prospective single-center cohort study performed at the Krishna Institute of Medical Sciences, Karad, by the Department of Surgery. Duration of the study was from November 2013 to June 2015. 125 consecutive cases of acute appendicitis admitted in general surgery department of Krishna Hospital, Karad were recruited in the study.

5. OBSERVATIONS AND RESULTS

Table 1 indicates gender distribution, for 125 participants, 95 were males and 30 females. Duration of symptoms varies from 1-5 days.

Table 1. Distribution of cases according to gender

Gender	No. of cases	Percent
Males	95	76%
Females	30	24%

Table 2. Histopathological diagnosis distribution

Histopathological diagnosis	No. of cases
Acute appendicitis	105
Gangrenous appendix	8
Perforated appendix	12
Normal appendix	0
Total	125

In Table 2 shown, the number of 125 patients officially identified as preoperative acute appendicitis, the number of severe appendicitis cases are 105, gangrenous appendix cases are 8 in count, 12 cases had perforated appendixes and no one had regular appendix.

According to Table 3, for gangrenous/perforated appendicitis, sensitivity of serum bilirubin was 100% which is quite significant than other parameters.

As shown in Table 4, for the gangrenous/perforated appendicitis, the specificity of serum bilirubin was 92.9% which is quite significant than other parameters.

6. DISCUSSION

In this study, hyperbilirubinemia throughout 70 out of 105 patients with acute appendicitis and in total 20 patients with gangrene / perforated appendicitis was reported from 125 cases. For certain cases, hyperbilirubinemia was mixed for form (conjugated and non-conjugated). In the majority of instances, ALT and AST had no height or minimum height (<100 U / L). Likewise, ALP was just below the usual range, or was only minimally to medium altitude. For gangrenous/perforated appendicitis, the positive predictive value of serum bilirubin was 72.7% which is quite significant and the negative predictive value of serum bilirubin was 100% which is quite significant compared to other parameters.

Table 3. Sensitivity of different parameters

Parameter	Sensitivity (%)
Serum Bilirubin	100 %
Total leukocytic count (TLC)	37.5 %
Aspartate aminotransferase (AST)	50 %
Alanine aminotransferase (ALT)	75 %
Alkaline phosphatase (ALP)	87.5 %
Alvarado Score	62.5 %

Table 4. Specificity of different parameters

Parameter	Specificity (%)
Serum Bilirubin	92.9 %
Total leukocytic count (TLC)	78.6 %
Aspartate aminotransferase (AST)	69 %
Alanine aminotransferase (ALT)	64.3 %
Alkaline phosphatase (ALP)	40.5 %
Alvarado Score	95.2 %

A retrospective study carried out in the General & Visceral Surgery Section, Ruhr University, Academic Teaching Hospital, Bochum, Germany found elevated bilirubin in all patients in the range of 0.1 - 4.3 mg/dl, while patients with Appendiceal perforation had Bilirubin in the range of 4.0 - 4.3 mg/dl [4]. Study conducted by Dept. of Surgery, Nepalgunj Teaching Hospital, Nepal found elevated Total Serum Bilirubin (TSB) in 87% of cases. Elevated serum bilirubin mean was 2.26 mg / dl and was observed to be significantly greater in patients with gangrenous or perforated appendix; TSB increase [9]. The range of hyperbilirubinemia ranged from 1.2mg - 8.4 mg/dl with mixed type of Serum Bilirubin [10].

Acharya et al. [11] have reported that, if all measures are standard, acute appendicitis seems to be very rare thus, 100% predictive validity could be exempted. The NG Kim-Choy, Lai Panagiotopoulou et al. [12], found a respectable accuracy and favourable predicting benefit for acute appendicitis when a mixture of abnormal leukocytes, C-reactive protein, and increased neutrophil counts had been used. In their research Adams & Jaunoo [13] reported, the markers are both inflammatory as well as non-inflammatory. In their analysis Boshnak & Elgohary [14], observed that it was exceedingly rare in individuals exhibiting normal outcomes to also have acute appendicitis, however, such patients should be tested with care and consideration prior operation. They reported that usefulness serum bilirubin could also be a valuable marker when assessed collectively with other parameters. Consequently, in this study for gangrenous / perforated appendicitis, sensitivity of serum bilirubin was 100% while specificity of serum bilirubin was 92.9% which is quite significant than other parameters.

7. SUMMARY & CONCLUSION

From our study it is concluded that elevated TSB (without serious abnormalities in the liver enzyme

value) is a well sign of acute appendicitis. If TSB may be applied to current laboratory procedures, so it is possible to prevent the diagnosis of Acute Appendicitis of clinically indicative symptoms with a reasonable level of specificity and an excessive or pause of appendectomy. Complete serum bilirubin seems to be a recent effective test for appendicular perforation diagnosis in laboratory. Patients of clinical indications and effects of appendicitis and hyperbilirubinemia will be classified as at greater risk of appendic perforation, indicating that overall serum bilirubin rates provide a predictive potential for diagnostics of appendicular perforation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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