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ORIGINAL RESEARCH

Hyperbilrubinemia: A diagnostic tool for acute appendicitis & its complication

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ABSTRACT

Background: Acute appendicitis is the most common cause of acute abdomen and its clinical diagnosis still remains a mystery due to its vast range of differential diagnosis. The diagnosis of acute appendicitis is based on clinical history and physical examination. It is difficult to diagnose in cases of retrocaecal or retroileal appendix. **Material and methods:** This study includes patients of acute appendicitis diagnosed on the basis of clinical features like pain in right iliac fossa, migration of pain to RIF, nausea/vomiting, anorexia, fever, and signs of peritoneal inflammation like right iliac fossa tenderness, rebound tenderness and guarding and supportive investigations like ultrasound abdomen, TLC, DLC, CRP and other routines. Then blood venous samples (3ml) were collected from all patients before any surgical procedures, and were sent for biochemical analysis using photometric testing with reagent 3,5-Dichlorophenyldiazoniumtetrafluroborate. Preanesthetic fitness was taken and patient was taken for emergency appendectomy. Excised appendix specimen was sent for histopathological examination. And final diagnosis was made on the report of histopathological examination seen on follow up. After completion of study, observations obtained were tabulated. Various means and distribution charts were formulated. Sensitivity, specificity, positive predictive value and negative predictive value were determined by 2 x 2 table. Various graphs and pie-charts have been used for visual aids. **Results**: Most of the 24 (48%) patients belong to age group 21 -30. There were only 4 (8%) patients in age group of 41 – 50. 39 (78%) patients were males while 11 (22%) were females. 43 (86 %) patients–Acute appendicitis, 7(14 %) patients - Gangrenous/ Appendicular perforation.Total serum bilirubin was found maximum in range of 1.1 – 1.5 among 21 (42%) patients followed by range of 1.6 – 2.0 which was among 13 (26%) patients. **Conclusion**: Levels of total serum Bilirubin is having significance in aiding the diagnosis of Acute Appendicitis and thus would be helpful investigation in decision making. Higher total Serum Bilirubin levels also have a predictive potential for the diagnosis of Gangrenous/ Appendicular perforation.

INTRODUCTION

Acute appendicitis is the most common cause of acute abdomen and its clinical diagnosis still remains a mystery due to its vast range of differential diagnosis.[1] The diagnosis of acute appendicitis is based on clinical history and physical examination. It is difficult to diagnose in cases of retrocaecal or retroileal appendix. Appendecetomy is the most commonly performed emergency abdominal surgery and is often the first major procedure performed by a surgeon in training.[2] A simple appendicitis if not diagnosed can progress to perforation, which increases morbidity and mortality and therefore surgeons, prefer to operate when diagnosis is probable rather than waiting till it become obvious.[3] 20-30% of appendectomy specimen are found to be normal.

The appendix usually perforates around 48 hours after the onset of acute appendicitis and the delay in presentation is mainly responsible for the majority of perforated appendices.[4] Obstruction of appendicular lumen by fecoliths is the most common cause of acute appendicitis.[5] The other causes reported for appendicular lumen obstruction are hypertrophy of lymphoid tissue, inspissated barium from previous X-ray studies, tumors, vegetable and fruit seeds, and intestinal parasites.[6]

This luminal obstruction leads to multiplication of Gram-negative bacteria along with continued secretion of mucus leading to intraluminal distension and increased wall pressure. As a result, lymphatic and venous drainage gets impaired leading to mucosal ischemia with progression to gangrene and perforation.[6]

Hyperbilirubinemia has not been considered as a potential marker for pre operative diagnosis of Acute Appendicitis and Appendicular perforation until now.

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Despite the use of various methods to clinically diagnose the Appendicitis, role of Blood Investigation, role of radiological investigations and scoring system, this study is an attempt to discuss the role of Hyperbilirubinemia in aiding the diagnosis of Acute Appendicitis & its complications.

MATERIAL AND METHODS

This study includes patients of acute appendicitis diagnosed on the basis of clinical features like pain in right iliac fossa, migration of pain to RIF, nausea/vomiting, anorexia, fever, and signs of peritoneal inflammation like right iliac fossa tenderness, rebound tenderness and guarding and supportive investigations like ultrasound abdomen, TLC, DLC, CRP and other routines. Then blood venous samples (3ml) were collected from all patients before any surgical procedures, and were sent for biochemical analysis using photometric testing with reagent 3,5-Dichlorophenyldiazoniumtetrafluroborate.

Preanesthetic fitness was taken and patient was taken for emergency appendectomy. Excised appendix specimen was sent for histopathological examination. And final diagnosis was made on the report of histopathological examination seen on follow up. After completion of study, observations obtained were tabulated. Various means and distribution charts were formulated. Sensitivity, specificity, positive predictive value and negative predictive value were determined by 2 x 2 table. Various graphs and pie-charts have been used for visual aids.

RESULTS

Table 1: Distribution of patients by age

Age group (Years)	Number of patients	Percentage	Mean
15-20	14	28 %	17.2
21-30	24	48 %	25.9
31-40	8	16 %	36
41-50	4	8 %	43.25

Most of the 24 (48%) patients belong to age group 21 -30. There were only 4 (8%) patients in age group of 41 – 50.

Table 2: Sex Distribution

Sex	Number of Patients	Percentage
Male	39	78%
Female	11	22%
Total	50	100

39 (78%) patients were males while 11 (22%) were females.

Table 3: Intra- operative Diagnosis

Intra- operative Diagnosis	Number Of patients	Percentage
Acute appendicitis	43	86 %
Gangrenous/Appendicular Perforation	7	14 %
Total	50	100

43 (86 %) patients–Acute appendicitis, 7(14 %) patients - Gangrenous/ Appendicular perforation.

Table 4: Histopathological Diagnosis

Histopathological Diagnosis	Number Of patients	Percentage
Acute appendicitis	43	86 %
Gangrenous/Appendicular Perforation	7	14 %
Total	50	100

43 (86 %), 43 patients – Acute Appendicitis
7 (14 %), 7 patients – Gangrenous/ Appendicular perforation

Table 5: Distribution of Total serum Bilirubin among all cases

Range of distribution of Bilirubin	Number of patients	Percentage
0- 0.5	-	-
0.6 - 1.0	08	16 %
1.1 - 1.5	21	42 %
1.6 - 2.0	13	26 %
2.1 - 2.5	02	04 %
2.6 - 3.0	03	06 %
3.1 - 3.5	01	02 %
3.6 - 4.0	-	-

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4.1 - 4.5	02	04 %

The distribution of Total serum bilirubin was found maximum in range of 1.1 – 1.5 among 21 (42%) patients followed by range of 1.6 – 2.0 which was among 13 (26%) patients.

Table 6: Bilirubin levels in patients with Gangrenous/Appendicular perforation as diagnosis

Total bilirubin(mg/dl)	Number of patients with Gangrenous/Appendicular perforation	Percentage
>1.0	6	85.8%
<1.0	1	14.2%
Total	7	100

6 (85.8 %) patients had > 1.0 total serum bilirubin
1 (14.2 %) patients had < 1.0 total serum bilirubin

Table7: Bilirubin levels in patients with uncomplicated acute appendicitis as diagnosis

Total bilirubin(mg/dl)	Number of patients with Gangrenous/Appendicular perforation	Percentage
>1.0	36	83.7%
<1.0	7	16.3%
Total	43	100

36 (83.7 %) patients had > 1.0 total serum bilirubin
7 (16.3 %) patients had < 1.0 total serum bilirubin

DISCUSSION

The diagnosis of acute appendicitis is essentially clinical; however, a decision to operate based on clinical suspicion alone can lead to the removal of a normal appendix in 15 to 50% of cases.[7] The notion that it is better to remove a normal appendix than to delay diagnosis does not stand up to proper research, particularly in the elderly as such procedures are associated with complications in 50% cases.[8,9]

Hence, the diagnosis of Appendicitis still remains a mystery in spite of the advances in various laboratory and radiological investigations. A new tool to help in the diagnosis of acute appendicitis would be very helpful in aiding the operative management. Total Serum Bilirubin level elevation will help in the accuracy of clinical diagnosis of acute appendicitis and more importantly help in foreseeing and preventing impending complications of acute appendicitis.Hyperbilirubinemia (> 1.0 mg/dL) in our study was found in 42 (84%) patients of all the 50 patients, while 8 (16%) patients had normal bilirubin levels (≤ 1.0 mg/dL). Estrada et al[10]had found hyperbilirubinemia in 59 (38%) of 157 patients studied with acute appendicitis.

The mean total serum bilirubin of all 50 patients was 2.6, which was above the normal range (≤1.0 mg/dL) considered for the study, hence indicating the occurrence of hyperbilirubinemia. Our finding was consistent with hyperbilirubinemia found in a study conducted by Khan S[11], who found average level of serum bilirubin in his study population to be 2.38 mg/dL.Sand et al[12] in his study found the mean bilirubin levels in patients with Appendicular perforation to be significantly higher than those with a non- perforated appendicitis.

Sensitivity and Specificity of bilirubin in predicting acute appendicitis and Appendicular perforation diagnosis was 83.7% and 84.2% respectively. Similarly Positive predictive value and Negative predicative value of bilirubin in predicting acute appendicitis and Appendicular perforation diagnosis was 85.7% and 12.5% respectively.

CONCLUSION

Levels of total serum Bilirubin is having significance in aiding the diagnosis of Acute Appendicitis and thus would be helpful investigation in decision making. Higher total Serum Bilirubin levels also have a predictive potential for the diagnosis of Gangrenous/ Appendicular perforation.

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