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RESEARCH ARTICLE

EVALUATION OF HYPERBILIRUBINEMIA AS A PREDICTIVE MARKER IN ACUTE APPENDICITIS AND APPENDICEAL PERFORMATION

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Acute Appendicitis, Appendiceal Perforation, Hyperbilirubinemia

Abstract

Background: Appendicitis is one of the most common surgical emergency in general surgical practices. Early and prompt diagnosis is necessary to avoid life-threatening complications associated with it. Hence this study was conducted to evaluate the hyperbilirunemia as predictive marker in acute appendicitis and appendiceal perforation.
Methods: Al cases of acute appendicitis and appendicecal perforation fulfilling inclusion and exclusion criteria taken up for this prospective observational single center study which were confirmed histopathologically in per operative setting.
Results: Total 100 patients were in the study of which 33 patients had appendicecal perforation of which 23 patients had hyperbilirubinemia (70%) . 67 patients had acute appendicitis of which 42 patients had hyperbilirubinemia , 37%. Hyperbilirubinemia with a cutoff point of 0.9 mg% for appendicitis patients has a sensitivity of 85.3%, a specificity of 77.2%, a positive predictive value of 36%, and a negative predictive value of 91%. Hyperbilirubinemia with a cutoff point of >1.3 mg% for appendiceal perforations has a sensitivity of 75%, a specificity of 81.2%, a positive predictive value of 83%, and a negative predictive value of 88%.
Conclusion: Hyperbilinemia is seen in acute appendicitis predominantly in appendiceal perforation hence evaluation of serum bilirubin level preoperatively can predict possibility of appendiceal perforation as it is easily available , cheap and simple laboratory test.

Introduction:-

Appendicitis is one of the most common surgical emergency in general surgical practices. Early and prompt diagnosis is necessary to avoid life-threatening complications associated with it. The diagnosis is mainly clinical aided by imaging techniques. The physiological obstruction of the bile flow associated with appendicular pathology leads to hyperbilirubinemia, which can be used as a predictive factor of appendicular perforation. Recent studies have shown that elevated bilirubin levels are associated with acute appendicitis and appendiceal perforation. These studies emphasized that hyperbilirubinemia can be used as a marker for both acute appendicitis and appendicular perforation . (1)(2)(3)

This study was conducted in the general surgery department of Diphu Medical College and Hospital, Diphu , Assam, from july 2022 to june 2023. A total number of 100 patients was included, and the criteria for the selection

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of cases were based on clinical history, physical finding, and radiological, hematological, and biochemical investigations.

Inclusion criteria:
All patients diagnosed with acute appendicitis or appendicular perforations clinically on admission , underwent appendicectomy and whose intraoperative findings as well as histo-pathological evaluation suggestive of appendicitis were included.

Exclusion criteria:
Patients managed conservatively for appendicitis were excluded. Patients with documented past history of liver disease, positive hepatitis B virus surface antigen (HBsAg), cholelithiasis, a malignancy of the hepatobiliary system, jaundice, chronic alcoholism, hemolytic disease, congenital or acquired biliary disease, and drug intake causing cholestasis were excluded. Patients less than 13 years of age were also excluded from the study.

Results:-

The normal bilirubin range in adults was taken as direct bilirubin 0.1–0.3 mg%, indirect bilirubin 0.2–0.8 mg%, and total bilirubin 0.3–1.0 mg%. Patients were diagnosed clinically, aided by imaging studies, and were taken for emergency appendicectomy by either the open or laparoscopic method.

Condition	Age (Years)	Bilirubin >1	Bilirubin <or = 1	Total
Acute Apeendicitis	11-20	2	5	7
	21-30	8	9	17
	31-40	9	14	23
	41-50	3	5	8
	51-60	2	5	7
	61+	1	4	5
	Total	25	42	67

Appendicular perforation	11-20	3	1	4
	21-30	7	2	9
	31-40	6	3	9
	41-50	1	2	3
	51-60	3	1	4
	60+	3	1	4
	Total	23	10	33

Correlation between bilirubin levels

Condition	No. of patients	Mean biliruibn	SD
Acute Appendicitis	67	0.836	.23
Appendicular Perforation	33	1.403	1.16

Hyperbilirubinemia with a cutoff point of 0.9 mg% for appendicitis patients has a sensitivity of 85.3%, a specificity of 77.2%, a positive predictive value of 36%, and a negative predictive value of 91%. Hyperbilirubinemia with a cutoff point of >1.3 mg% for appendicular perforations has a sensitivity of 75%, a specificity of 81.2%, a positive predictive value of 83%, and a negative predictive value of 88%.

In a majority of the cases, direct bilirubin is much more elevated than the indirect bilirubin. Even in patients with normal total bilirubin, direct moiety is elevated (>15% of the total bilirubin). This supports the postulated physiological bile flow obstruction.

Discussion:-

A majority of patients in our study population was between the ages of 11–30 years which is comparable to the study conducted by Panagiotopoulou et al., which showed that the age group 17-39 years had acute appendicitis (2) and Kumar et al. showed an age group of less than 30 years(3) . In the present study, men were more affected than women in sex distribution which is comparable to the study conducted by Hong et al. who got similar result with men 51.38% and women 48.61% (1)

Most patients with perforated appendicitis have hyperbilirubinemia (70%), whereas in patients with appendicitis, only 37% had elevated bilirubin. These findings were comparable to the study conducted by Kumar et al. with 63% and 33%, respectively (3) . These findings suggested hyperbilirubinemia was more commonly associated with appendicular perforation than with non-suppurative appendicitis, that too with a significant elevation..

In our study, the mean value of bilirubin in appendicular perforations is 1.4 mg%, which was comparable to Kumar et al., who found that more than 1.5 mg/dl was predictive of appendicular perforation (3) Motie et al. found that bilirubin >0.85 mg/dl was the cutoff value for the prediction of perforated appendicitis (4) . Mir et al. found that increased bilirubin levels (≥1.5 mg/dl) were found to have a high positive predictive value for detecting perforated appendicitis (5) .

The outcomes of bilirubin our study (1.4 mg% in perforation versus 0.84 mg% in acute appendicitis) matches the result of the retrospective study conducted by Bechara et al. with the mean value of all patients at 0.9 mg/dl. Those with appendiceal perforation, however, had a mean bilirubin level of 1.5 mg/dl , which was significantly higher than that without appendiceal perforation (6) .

The specificity of Appendiceal perforation in our study was 81% which is similar to a study by Mir et. al. 87% (5) and another study by Ramu et. al. (7)

This would suggest considering hyperbilirubinemia for its clinical implication in improving precision in preop diagnosis and planning.

Conclusions:-

Patients with hyperbilirubinemia at a cutoff of >1.3 mg% and having clinical symptoms of appendicitis should be identified as having a higher probability of appendiceal perforation than those with normal bilirubin levels since clinical diagnosis and hyperbilirubinemia complement each other.

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