



SERUM DIRECT INDIRECT AND TOTAL BILIRUBIN LEVEL AS A DIAGNOSTIC MARKER OF ACUTE APPENDICITIS AND APPENDICULAR PERFORATION: A PROSPECTIVE HOSPITAL BASED STUDY

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ABSTRACT

Background: Acute appendicitis is the most common disease in abdomen. Any delay in the diagnosis and initiation of treatment can lead to appendicular perforation which can lead to mortality. **Materials And Methods:** This prospective study was done in the department of General Surgery, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu. The study was done during the period of January 2023-December 2023. A total of 50 patients were admitted in the hospital with clinical diagnosis of acute appendicitis during the above mentioned period. All the patients were explained about study procedure and informed consent was obtained from them. Direct, Indirect and Total bilirubin levels were estimated and correlated clinically. Statistical Package for Social Sciences (SPSS 20.0) version was used for analysis. **Results:** The study was included 50 patients. Maximum patients had age between 41-50 years. Males are more in number than females. Out of 50 patients 40 had acute appendicitis and 10 had appendicular perforation. 32 patients had more than 1.0 and 8 had less than 1.0 total bilirubin levels in acute appendicitis patients. Maximum number of patients had more than 1.0 total bilirubin in appendicular perforation. 36 in acute appendicitis and 8 in appendicular perforation had direct bilirubin more than 0.3 mg/dL. Maximum number of patients with acute appendicitis and appendicular perforation had indirect bilirubin less than 0.8 mg/dL. **Conclusion:** This study results concluded that serum bilirubin levels appear to be an important marker for diagnosing acute appendicitis and appendicular perforation.

KEYWORDS : Acute appendicitis, Acute appendicular perforation, Abdomen, Bilirubin, Liver, Hyperbilirubinemia

INTRODUCTION

Acute appendicitis is the most common cause of pain in abdomen. The initial diagnosis of this condition is based on physical and clinical examination.¹ The confirmation of the diagnosis with new methods are challenging especially in the early stages and in cases of retrocaecal appendix. Nowadays lab reports plays a major role in assessing the diseases which is free from subjective variations. Appendicitis is the emergency condition can be treated with appendectomy.^{2,4} It is the most common abdominal surgery diagnosed based on subjective clinical and radiological tests, some studies have proved that upto 30% of cases will be having normal tissue without signs of inflammation in histopathological reports postoperatively. Inorder to avoid unnecessary surgical intervention a robust laboratory investigation is the need of the hour. Appendectomy which is done primarily based on subjective tests, if proved to be a normal appendix can lead to economic burden and unnecessary post operative complications for a patient.^{5,6} The other side of negative diagnosis will also prove costly as delayed initiation of treatment can lead to perforation of appendix which exponentially increases the mortality rate. From decades modern medical fraternity is in search of a robust laboratory investigation which is highly specific for confirming the diagnosis of appendicitis after the initial physical and clinical examination.⁷ As the search is still on unfortunately till date no laboratory tests with 100% accuracy with high specificity has been discovered. Some studies have found a fair relationship between acute appendicitis and its prognosis with rise in bilirubin levels.⁸ In thirst of a marker for early diagnosis of appendicitis our present study aimed to evaluate relationship between increased bilirubin levels and in diagnosis of appendicitis and appendicular perforation.

MATERIALS AND METHODS

Study design: This a prospective observational study

Study settings: Study was conducted in the department of General Surgery, Sree Mookambika Institute of Medical

Sciences, Kulasekharam, Kanyakumari (Dist), Tamil Nadu.

Study period: This study was conducted from January to December 2023 (One year)

Inclusion criteria

- Age above 18 years
- Both gender
- Patients diagnosed with acute appendicitis
- Patients diagnosed with acute appendicular perforation

Exclusion criteria

- Liver disease
- Cholelithiasis
- HbaAG positive
- Alcoholics
- On paracetamol, anti-TB drug medication

Procedure

This study was conducted in the department of General Surgery, Sree Mookambiaka Institute of Medical Sciences, Kulasekharam, Kanyakumari (Dist), Tamil Nadu. This study was approved by Institutional Research Committee and Institutional Human Ethics Committee. Based on inclusion and exclusion criteria 50 patients were included in the study. Study protocol and purpose was explained to all the patients and informed consent was obtained. Demographic data like age, gender and clinical data diagnosis, levels of total, direct and indirect bilirubin were collected. The data was recorded in the excel sheet.

Statistical analysis

The data was expressed in number and percentage. Statistical Package for Social Sciences (SPSS 20.0) version used for analysis. Chi square test applied to find the statistical significant. p value less than 0.05 consider statistically significant with 95% confidence interval.

RESULTS

This study was included 50 patients. Patients had age of range between 20-60 years. Maximum number of patients had age between 41-50 years. 12 patients had age between 31-40 years. Males (n=35) were more than female (n=15). In 50 patients 40 diagnosed with acute appendicitis and 10 had appendicular perforation (Table-1). In acute appendicitis 32 had more than 1.0mg/dl and 8 had less than 1.0 mg/dL total bilirubin levels. In appendicular perforation 6 had more than 1.0 and 4 had less than 1.0 mg/dL total bilirubin levels (Table-2). 36 had more than 0.3mg/dl and 4 had less than 0.3 mg/dL direct bilirubin levels in acute appendicitis. In Appendicular perforation patients , 8 had more than 0.3mg/dl and 2 had less than 0.3 mg/dL direct bilirubin (Table-3). Maximum number (n=31) of patients had less than 0.8 mg/dL and 9 had more than 0.8mg/dl indirect bilirubin levels in acute appendicitis. 7 had more than 0.8mg/dl and 3 had more than 0.8 mg/dL indirect bilirubin levels in patients with appendicular perforation (Table-4).

DISCUSSION

The study was done in 50 patients. Our main objective of the study is to evaluate the relationship between bilirubin levels with appendicitis and also its accuracy as a diagnostic marker for diagnosing acute appendicitis. Acute appendicitis is the most common cause of the right iliac fossa pain and it is an emergency condition.⁹ Detailed history and clinical observation is very important to diagnose appendicitis. Having arrived at primary diagnosis of acute appendicitis and battery of tests are then performed to arrive at a final diagnosis. Among the blood tests serum bilirubin levels appears to be a promising marker for diagnosing acute appendicitis.¹⁰ The relationship between the increased bilirubin level in acute appendicitis is multifactorial and is imagined that elevated bilirubin is a result of portal sepsis leading to hepatocyte dysfunction or damage. This damage can be seen more in children and younger children. As age progress mortality and morbidity increase. This study also showed patients with age between 40-50 years more in number than other age group.¹¹

The study done by Mazzei et.al., observed that the older patients are at high risk both in the preoperative diagnosis and severity, intra operative complications and postoperative recovery.¹² Another study done by Moola B et.al., observed that the increased bilirubin for prediction of perforation in acute appendicitis with sensitivity 0.58 and specificity of 0.82. The present study showed that increased bilirubin levels were observed in patients with acute appendicitis with perforation.¹³ Paajanen H et.al., studied all the liver function tests and increased serum bilirubin levels as an independent indicator of appendicular perforation. In our study also patients with appendicular perforation had high levels of bilirubin.¹⁴ Siewert B et.al., observed that the mean bilirubin levels are significantly higher among the appendicitis.¹⁵ Presents study results also showed increased direct, indirect and total bilirubin in patients with acute appendicitis and appendicular perforation.

CONCLUSION

The study results concluded that values of total, indirect, and direct bilirubin among acute appendicitis and perforation were significantly higher than the corresponding value among patients without appendicular perforation. Increased bilirubin levels can be used as diagnostic marker to diagnose acute appendicitis and acute appendicular perforation.

Table-1: Distribution of patients based on demographic data

Demographic data		Number	Percentage (%)
Age (Years)	20-30	5	10.00
	31-40	12	24.00

	41-50	25	50.00
	51-60	8	16.00
Gender	Male	35	70.00
	Female	15	30.00
Diagnosis	Acute appendicitis	40	80.00
	Appendicular perforation	10	20.00

Table-2: Comparison of number and percentage of patients based on total bilirubin

Total bilirubin (mg/dL)	Diagnosis				Total	p value
	Acute appendicitis		Appendicular perforation			
	n	%	n	%		
>1.0	32	80.00	6	60.00	38	0.15
<1.0	8	20.00	4	40.00	12	
Total	40	100.00	10	100.00	50	

(p>0.05 no significant difference)

Table-3: Comparison of number and percentage of patients based on direct bilirubin

Direct bilirubin (mg/dL)	Diagnosis				Total	p value
	Acute appendicitis		Appendicular perforation			
	n	%	n	%		
>0.3	36	90.00	8	80.00	44	0.17
<0.3	4	10.00	2	20.00	6	
Total	40	100.00	10	100.00	50	

Table-4: Comparison of number and percentage of patients based on indirect bilirubin

Indirect bilirubin (mg/dL)	Diagnosis				Total	p value
	Acute appendicitis		Appendicular perforation			
	n	%	n	%		
>0.8	9	22.50	7	70.00	16	0.17
<0.8	31	77.50	3	30.00	34	
Total	40	100.00	10	100.00	50	

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