

Hyperbilirubinemia is a New Diagnostic Marker for Acute Appendicitis and its Role in Prediction of Complicated Appendicitis

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Abstract

Background: Elevation in serum bilirubin is reported to have a predictive potential for the diagnosis of complicated appendicitis, the pro inflammatory mediators tend to reach liver via superior mesenteric vein and may directly or indirectly produce liver dysfunction thus implying a credibility of serum bilirubin as the biological marker to predict and differentiate Appendicitis. **Aims & Objectives:** To Study the relationship between hyperbilirubinemia and acute appendicitis and to evaluate whether elevated bilirubin level are of predictive value in diagnosis of complicated appendicitis. **Methods:** This comparative clinical study of 100 patients who attended surgical outpatient department/admitted to tertiary care hospital presenting with pain at RIF region with fever & vomiting were included. After admission, the data collected regarding clinical history, examination, diagnosis, investigations, and details of previous operative procedure. Post operative follow up done to note the complications both in hospital and after discharge for 3 months. **Result:** Out of 100 patients, 69 patients had raised bilirubin levels (>1.0 mg/dL). 32 patients diagnosed as complicated appendicitis. Among them 29 patients (90.62%) had raised bilirubin levels (>1.0 mg/dL). 40 (58.82%) patients of the total patients diagnosed with Acute uncomplicated appendicitis were found to have elevated bilirubin levels (>1.0 mg/dL). **Conclusion:** We concluded that Hyperbilirubinemia found to be a new predictor of acute appendicitis, also found that Bilirubin level significantly (>1.0)

raised in acute Uncomplicated Appendicitis & Complicated Appendicitis.

Keywords: Serum Bilirubin (SB); Total Serum Bilirubin (TSB); Ultrasonography (USG); Computed Tomography (CT).

Introduction

Acute appendicitis comes under one of most frequently encountered cause of "Acute abdomen." Appendicectomy is most frequently performed abdominal operation and is often first major operation performed by a surgeon in training. Experienced clinician accurately diagnosed appendicitis based on a combination of history, physical examination and laboratory study about 80% of the time.

In spite of advances in the radiological and laboratory investigations the diagnosis of appendicitis still remains a dilemma. Although most patients with acute appendicitis can be easily diagnosed, in some case sign and symptoms are variable and a firm diagnosis can be difficult. This is particularly true where appendix is retrocaecal or retroileal. The percentage of appendicectomy performed where appendix subsequently found to be normal varies 15-50% and post operative complication can occur in up to 50% of these patients. Delay in diagnosis of acute appendicitis leads to perforation and peritonitis ranges 50-90% in various series.

To supplement clinical diagnosis and to reduce the frequency of unnecessary appendicectomy, the importance of laboratory investigation like White blood cell (WBC) count and C-reactive protein (CRP) values has been stressed. The use of ultrasonography (USG) as a diagnostic tool for appendicitis has been widely known and studied. However up to date there

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is no confirmatory laboratory marker for the preoperative diagnosis of acute appendicitis and appendicular perforation. Recently serum bilirubin was reported, but the importance of raised total bilirubin has not been stressed in appendicitis. It is well established that when microbes invade the body, leukocyte defend it.

These leads to increase in leukocyte count. Bacterial invasion in the appendix leads to transmigration of bacteria and the release of pro-inflammatory cytokines such as TNF-alpha, IL 6, and cytokines. These reach the liver via superior mesenteric vein (SMV) and may produce inflammation, abscess or dysfunction of liver either directly or indirectly by altering the hepatic blood flow.

In view of above context, the present study was undertaken to assess relationship between marker for acute uncomplicated appendicitis and also, to see whether elevated bilirubin level have a predictive potential for the diagnosis of complicated (gangrenous and perforated) appendicitis.

Aims and Objective

1. To Study the relationship between hyperbilirubinemia and acute appendicitis
2. Evaluate whether elevated bilirubin level are of predictive value in diagnosis of complicated appendicitis.

Materials and Methodology

This comparative clinical study of 100 patients presenting with pain at RIF region with fever & vomiting in OPD /admitted to various surgical units of Sir T. Hospital, Bhavbagar during the study period Dec. 2015 to Sep. 2017.

Method of Collecting Data

In this study, patients presenting with acute appendicitis were selected.

Inclusion Criteria

- 1 All patients diagnosed as acute appendicitis clinically on admission.
- 2 All patients diagnosed as appendicular perforation clinically on admission.

Exclusion Criteria

- 1 All patients with positive HBsAg.
- 2 All patients with cholelithiasis.
- 3 All patients with cancer of hepato-biliary system.
- 3 All patients documented to have a past history of; o Jaundice or Liver disease.
- 4 Chronic alcoholism (that is intake of alcohol of > 40 g/day for Men and > 20 g/day in Women for 10 years).⁷²
- 5 Hemolytic disease.
- 6 Acquired or congenital biliary disease.
- 7 Viral hepatitis

Methodology

After admission, patients fulfilling the inclusion & exclusion criteria taken in to study after obtaining written informed consent and the data collected regarding clinical history, examination, diagnosis, investigations, details of previous operative procedure. Post operative follow up done to note the complications both in hospital and after discharge.

Observations & Results

Out of 100 patients enrolled for the study, 64 patients (64%) were males while the remaining 36 patients (36%) were females. Out of 100 patients, 31 were found to have normal bilirubin levels (≤ 1.0 mg/dL), while 69 patients had raised bilirubin levels (> 1.0 mg/dL). Out of 100, 32 patients diagnosed as complicated appendicitis 29 patients (90.62%) had raised bilirubin levels (> 1.0 mg/dL), while the remaining 03 patients (9.37%) had normal levels (≤ 1.0 mg/dL). The Direct bilirubin and Indirect bilirubin in patients diagnosed with Acute uncomplicated appendicitis were 0.52 ± 0.20 mg/dL and 0.31 ± 0.16 respectively. The Direct bilirubin and Indirect bilirubin in patients diagnosed with complicated Appendicitis were 1.43 ± 0.62 mg/dL and 0.80 ± 0.32 mg/dL respectively. 40 (58.82%) patients of the total patients diagnosed with Acute uncomplicated appendicitis were found to have elevated bilirubin levels (> 1.0 mg/dL) while 28 patients (41.17%) had normal bilirubin levels (≤ 1.0 mg/dL). Similarly, 29 (90.62%) patients of the total patients diagnosed with complicated Appendicitis were found to have elevated bilirubin levels (> 1.0 mg/dL) while 03 patients (9.37%) had normal bilirubin levels (≤ 1.0 mg/dL).

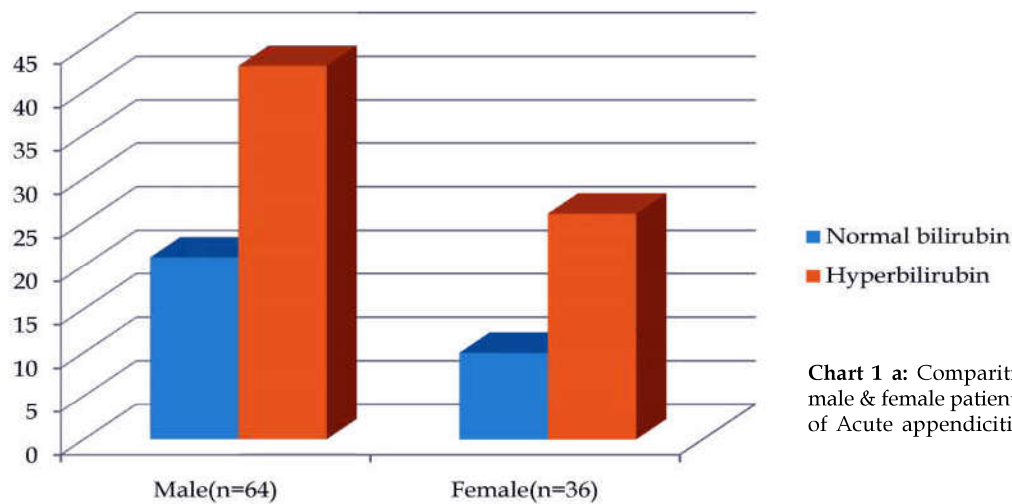
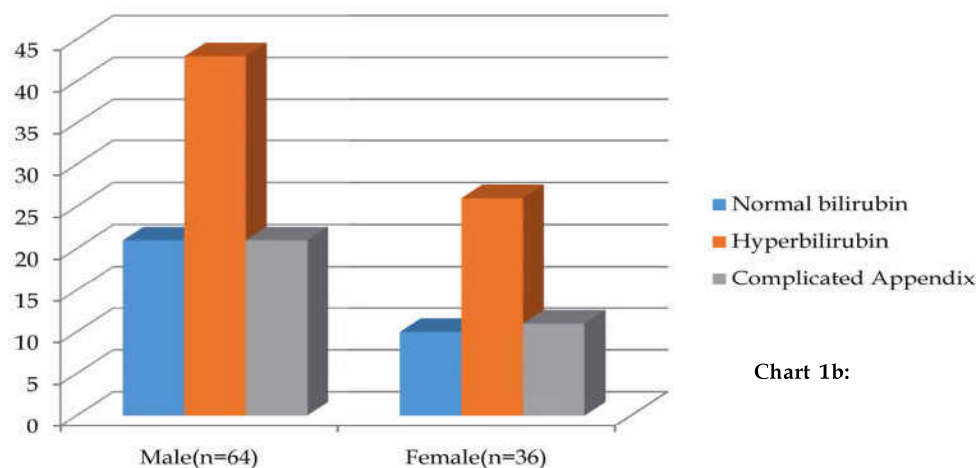
Table 1: Study of Acute appendicitis of the study participants, as per bilirubin level (N=100)*

Variables	Normal bilirubin level (n=31)	Hyperbilirubinemia (n=69)	p Value
Age (years)	24.96 ±10.29	26.31 ± 13.14	0.8551
Gender			
Male (n=64)	21	43	0.6577
Female (n=36)	10	26	
Direct bilirubin level	0.52±0.20	1.43±0.62	0.0001
Indirect bilirubin level	0.31±0.16	0.80±0.32	0.0001
Intra operative findings			
Complicated	3	29	
Uncomplicated	28	40	0.0011

* Values are shown as mean ± standard deviation or number of patients, unless otherwise specified. p Value was calculated by Chi square test or Mann-Whitney U test/ unpaired t test.

Table 2: Frequency of Bilirubin level in Complicated & in Uncomplicated Appendix

Variable	Frequency
Complicated appendix (n=32)	
Normal Bilirubin (n=3)	9.37%
Hyperbilirubinemia (n=29)	90.62%
Uncomplicated Appendix (n=68)	
Normal Bilirubin (n=28)	41.17%
Hyperbilirubinemia (n=40)	58.82%

**Chart 1 a:** Comparison of bilirubin level in male & female patient out of 100 patient study of Acute appendicitis**Chart 1b:**

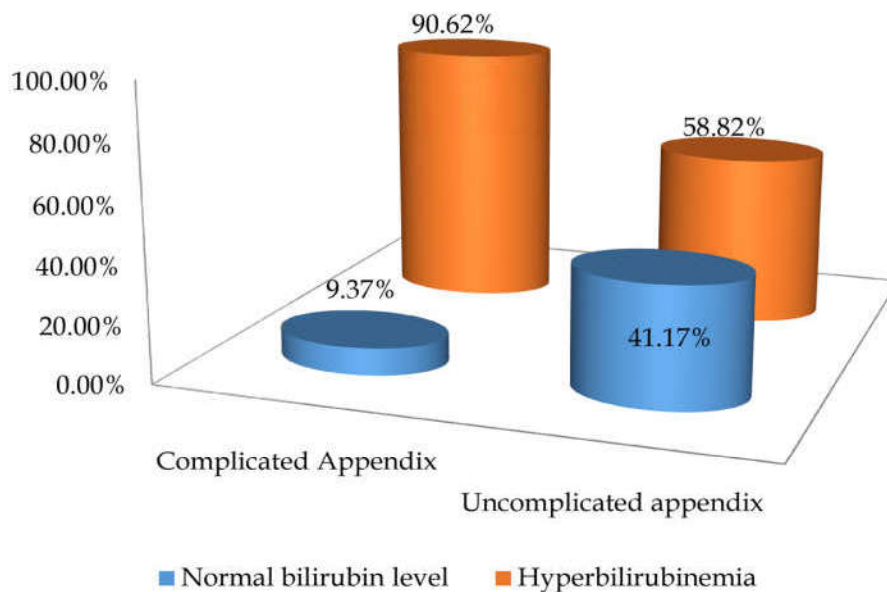


Chart 2: Frequency of Bilirubin level in Complicated & in Uncomplicated Appendix

Table 3: Comparison b/w my study of Acute appendicitis as per bilirubin level with other study of Acute appendicitis as per bilirubin level in 100 patient

	My Study		Other Study (Dipen Patel et al ¹)	
	Complicated Appendix (32)	Uncomplicated Appendix (68)	Complicated Appendix (25)	Uncomplicated Appendix (75)
Normal Bilirubin	03	28	02	26
Hyperbilirubinemia	29	40	23	49

Out of 100 patient 32 patients have complicated appendix in which 29 patients have Hyperbilirubinemia & 3 patients have normal bilierubin and 68 patients have uncomplicated appendix in which 40 have Hyperbilirubinemia & 28 patients have normal bilirubin, In oher study (Dr. Dipen patel et al [1]) Out of 100 patient 25 patients have complicated appendix in which 23 patients have Hyperbiliruninemia & 2 patients have normal bilierubin and 75 patients have uncomplicated appendix in which 49 have Hyperbilirubinemia & 26 patients have normal bilirubin.

Discussion and Summary

This was a study indicating that hyperbilirubinemia is a new dignostic marker for acute appendicitis and its role in prediction of complicated appendicitis.

Which was carried during the period of december 2015 to september 2017 in dept of surgery, Govt. Medical College & Sir T. Hospital Bhavnagar.

In acute appendicitis, the importance of laboratory investigations like White Blood Cell (WBC) counts and C-reactive protein (CRP) values has been stressed. The use of Ultrasonography (USG) as a diagnostic tool for appendicitis has been widely known and studied. However up to date there is no confirmatory laboratory marker for the pre-operative diagnosis of acute appendicitis and appendicular perforation. Recently, elevation in serum bilirubin was reported, but the importance of the raised total bilirubin has not been stressed in appendicitis. It is well established that when microbes invade the body, leukocytes defend it. This leads to increase in the leukocyte count. Bacterial invasion in the appendix leads to transmigration of bacteria and the release of pro-inflammatory cytokines such as TNF-alpha, IL6 and cytokines. These reach the liver via Superior mesenteric vein (SMV) and may produce inflammation, abscess or dysfunction of liver either directly or indirectly by altering the hepatic blood flow. In view of the above context, the present study was undertaken to assess relationship between hyperbilirubinemia and acute appendicitis and to evaluate its credibility as a diagnostic marker for acute

uncomplicated appendicitis and also, to see whether elevated bilirubin levels have a predictive potential for the diagnosis of complicated (necrotising and perforated) appendicitis.

In this study Out of 100 patients enrolled, 64 patients (64%) were males while the remaining 36 patients (36%) were females.

Out of 100 patients, 31 were found to have normal bilirubin levels (≤ 1.0 mg/dL), while 69 patients had raised bilirubin levels (> 1.0 mg/dL).

Out of 100, 32 patients diagnosed as complicated appendicitis 29 patients (90.62%) had raised bilirubin levels (> 1.0 mg/dL), while the remaining 03 patients (9.37%) had normal levels (≤ 1.0 mg/dL).

The Direct bilirubin and indirect bilirubin in patients diagnosed with acute uncomplicated appendicitis were 0.52 ± 0.20 mg/dL and 0.31 ± 0.16 respectively.

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In this study Out of 100 patient 32 patients have complicated appendix in which 29 patients have Hyperbilirubinemia & 3 patients have normal bilirubin and 68 patients have uncomplicated appendix in which 40 have Hyperbilirubinemia & 28 patients have normal bilirubin, In other study (Dr Dipen patel et al [1]) Out of 100 patient 25 patients have complicated appendix in which 23 patients have Hyperbilirubinemia & 2 patients have normal bilirubin and 75 patients have uncomplicated appendix in which 49 have Hyperbilirubinemia & 26 patients have normal bilirubin.

Conclusion

From the above study Hyperbilirubinemia found to be a new predictor of acute appendicitis, also found that Bilirubin level significantly (> 1.0 mg/dl) raised in acute Uncomplicated Appendicitis & complicated Appendicitis.

References

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