



Evaluation of Hyperbilirubinemia as an Indicator for Appendicitis: A Approaching Study

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ABSTRACT

The focus of this research was to determine the link among hyperbilirubinemia and severe appendicitis, as well as to analyse its reliability as a predictive biomarker for acute pancreatitis and its empirical model in the identification of complex appendicitis. From April 2018 to April 2019, a one-year cross-sectional research was done. The researchers looked at 100 cases that had been identified with appendicitis. All of the cases had their blood bilirubin and liver function tests done. Mens dominated women in this survey (58 percent to 42 percent), and the 29 as average age. The average total blood bilirubin of all 100 cases was 1.4911.0319 mg/dl, which was higher than the usual range (>1.0 mg/dl) used in the research, suggesting hyperbilirubinemia. Direct bilirubin had a mean of 1.2900.7483 mg/dl, while indirect bilirubin had a mean of 0.5040.2494 mg/dl. There were 26 individuals (34.66 percent) with high bilirubin (>1.0 mg/dl) amongst some of the individuals with inflamed appendix. In a group of 25 individuals with appendicular perforation, 19 (76%) had increased bilirubin levels (>1.0 mg/dl), whereas only 6 (24%) had average range (1.0 mg/dl). Bilirubin had a sensitivity and accuracy of 76 percent and 65.33 percent in identifying acute appendicitis and appendiceal perforation, correspondingly. Bilirubin had a good prognosis of 42.22 percent and an accuracy of 89.09 percent, respectively. Serum bilirubin, which is commonly included to blood tests, can be a helpful laboratory test in the treatment of bacterial appendicitis. It is simple to accomplish and inexpensive. Individuals with a bilirubin level three times the average with clinical indications of appendicitis and appendicular perforation are more likely to have complex appendicitis.

Keywords: appendicular perforation, hyperbilirubinemia, acute appendicitis, bilirubin.

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INTRODUCTION

Among the most prevalent cases appearing as a surgical emergency is severe appendicitis [1,2]. Appendicitis has evolved over time, demonstrating the necessity of early identification and treatment. Even with the most recent breakthroughs in diagnostic technologies, appendicitis diagnosis is still primarily clinical. Even in the hands of an expert surgeon, appendicitis is misdiagnosed 15.3% of the time [3]. According to main got, 36 negative appendicectomies are performed globally to avoid one incidence of appendicitis. If the patient's identification is late or prolonged, it can result in perforation, peritonitis, abscess, or sepsis, which can be fatal. To reduce unnecessary surgical morbidity. Surgical investigation can result in anaesthesia difficulties, future hernias as a result of muscle weakness, adhesion, and fetal loss in expectant mothers, as well as an abdominal scar.

Even the most skilled physicians base their diagnoses on the patient's condition, diagnostic tests and observations, and laboratory tests, which are only 80% positive [4]. There is a gap in accessible diagnostic indicators since ultrasonography and CT are not accessible in rural locations, and there is a plan to reduce negative appendicectomies and the time it takes to diagnose complex appendicitis. Even if Alvarado scoring is employed, laboratory indicators. Research on the rise in bilirubin levels suggests that it has a higher specificity and sensitivity than previous laboratory markers [5,6].

Acute appendicitis is a polymicrobial infection that results in bacterial translocation into the intestine. Endotoxins are released by the bacterium, which induces the production of pro-inflammatory cytokines such as TNF and IL1. These chemicals enter the liver through the portal vein, causing hepatocyte malfunction and preventing bilirubin release, resulting in cholestatic jaundice. Based on the finding, the latest study was conducted to better understand the prognostic usefulness of hyperbilirubinemia in appendicitis and it's able to discern complex appendicitis [7-9].

Abscess is a polymicrobial infection that results in pathogens into the intestine. Endotoxins are released by the bacteria, which induces the synthesis of pro-inflammatory cytokines such as TNF and IL1. These

chemicals enter the liver through the portal venous system, causing hepatocyte malfunction and preventing bilirubin excretion, resulting in cholestatic jaundice. Based on these findings, the current study was conducted to better understand the predictive usefulness of hyperbilirubinemia in appendicitis and it's able to detect complex appendicitis.

MATERIAL AND METHODS

The current research was performed at Sri Lakshmi-Narayana Institute of Medical-Sciences during the period of June 2019 To April 2020.

Source of data:

During the observation period, people were admitted with clinical diagnoses and were scheduled for immediate surgery at Sri Lakshmi Narayana Institute of Medical Sciences' department of general surgery.

Sample size:

A total of 100 individuals are included in study, all of whom had a pre-operative medical assessment of appendicular disease.

SELECTION CRITERIA

Inclusion criteria

All of the individuals were admitted to hospital appendicitis or gangrenous appendicitis and were transferred to the surgical department for immediate treatment. The histopathology reports of both groups were taken into account.

Exclusion criteria

If you have a record of jaundice, If you have a record of liver illness, Pancreatitis is a condition in which the pancreas is inflamed. Alcoholism that has been there for a long time Patients with hepatitis B, A, or C who are taking rifampicin or other medications that increase liver parameters

Procedure

Following receiving ethics committee approval from hospital the research was performed out. Patients who were admitted to Sri Lakshmi Narayana Institute of Medical Sciences and had an emergency appendectomy for acute and acute appendicitis were documented. The study's goal and utility were explained to all eligible patients. Then, using the written consent attached as an annexure, acquire informed consent. In an annexure, all pertinent clinical findings and history are recorded and all cases of acute or complex appendicitis underwent a battery of blood tests, followed by an emergency appendectomy with a histological report.

STATISTICALANALYSIS

IBM was used to evaluate the information gathered. Version 23.0 of the SPSS program. For explanatory data, frequency distribution and percentage distribution were utilised. Sensitivity, Specificity, PPV, and NPV were used to evaluate the tools' efficacy. The Chi-Square test was employed to find significance in categorical data, and the Fisher's exact test was utilised if the anticipated cell frequency was less than 5 in 22 tables. The probability value of.05 is regarded significant in all of the following statistical techniques.

RESULTS

Our research took place at Sri Lakshmi Narayana Institute of Medical Sciences, Chennai, from June 2019 to April 2020. Our study comprised 100 patients of acute appendicitis requiring emergency appendectomy. Patients in our study were given sufficient resuscitation before being admitted into the study. The usual proforma was used to gather and record the patient's information. Following observations were made.

The majority of participants in our research were young people between the ages of 21 and 30. This age demographic accounts for 43% of all patients. Average age of patients was 29 years.

The average age of the 100 patients included in the study was 29 years of age, with a standard deviation of 9.9747. Males had a mean and standard deviation of 29 and 11.3814, respectively.

FIGURE 1:AGE DISTRIBUTION

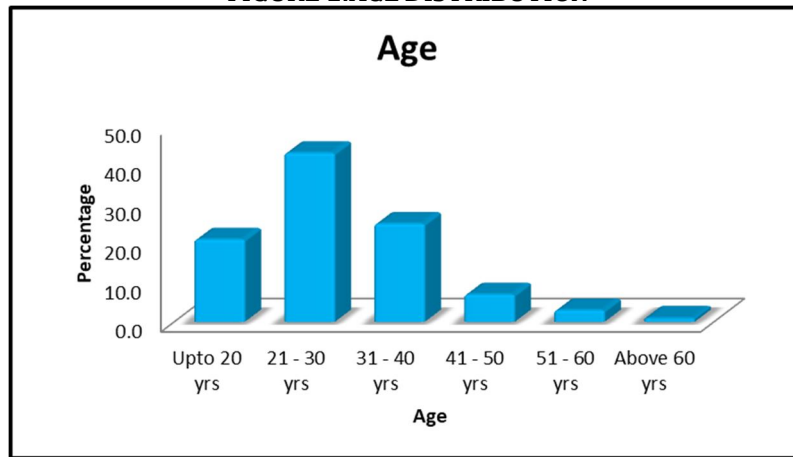


FIGURE2. AGE DISTRIBUTION STATISTICS

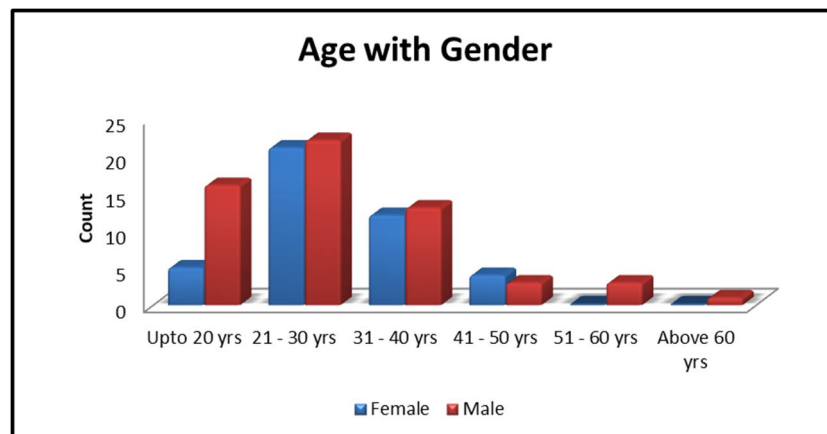
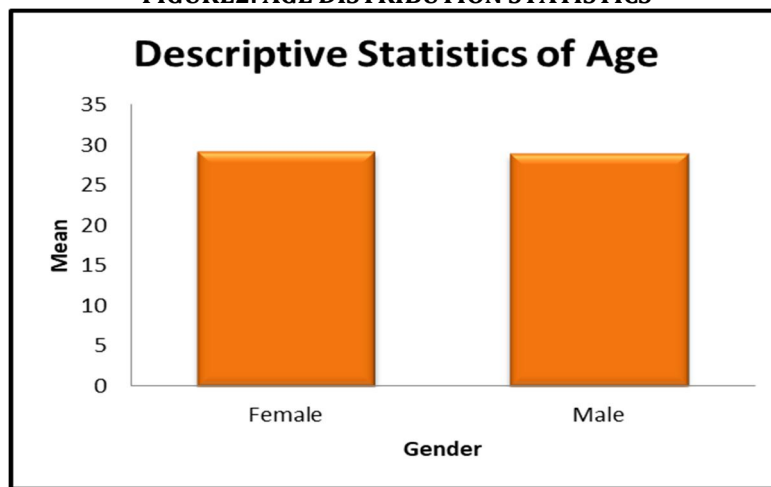


Figure 3: Sex Distribution Statistics

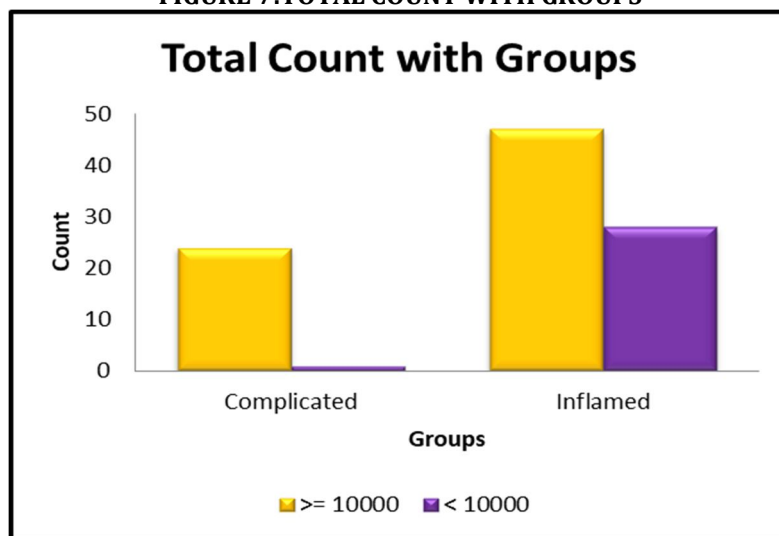
On the basis of ultrasonography, 59 individuals were diagnosed with severe appendicitis, 25 with complex appendicitis, and 16 with typical appendicitis.

TABLE 1. DIFFERENTIAL LEUCOCYTE COUNT

DLC	N	Minimum	Maximum	Mean	S.D
TOTAL COUNT	100	6800.0	18700.0	11784	2718.798
NEUTROPHILS	100	54.0	91.0	73.260	8.8929
LYMPHOCYTES	100	8.0	44.0	21.890	7.8159
MONOCYTES	100	0.0	11.0	3.990	2.8832
EOSINOPHILS	100	0.0	5.0	1.060	1.1443

In our study mean TLC count of all patients was 11784/mm³, with SD 2718.798 in which majority of cells are neutrophils 73.26 ± 8.89 % followed by lymphocytes 21.890 ± 7.81 %.

FIGURE 7: TOTAL COUNT WITH GROUPS



DISCUSSION

The much more common clinical surgical ailment of the stomach is still severe appendicitis, which is also the greatest frequently misdiagnosed disease. The most common incident response plan for acute appendicitis in the globe is an appendectomy. People in Western countries have an 8% lifelong risk of suffering acute appendicitis. Acute appendicitis is more common in the second and third decades of life. It is most frequent in youth and early adulthood, with only a few cases occurring in infancy. Before puberty, it affects both boys and females equally. In adults, the male-to-female ratio rises to 3:2 by the age of 25 [10]. Males have a lifelong appendectomy rate of 12 percent, while females have a lifetime rate of 25 percent, accounting for around 7% of all patients who have an appendectomy for acute appendicitis. Appendicular luminal blockage is thought to be the most common cause of appendicitis. The most common cause of luminal blockage is fecolith. The bacterial flora of the appendix is generally comparable to that found in the large intestine. The most prevalent microorganisms found in healthy appendix, acute appendicitis, perforated appendicitis, and gangrenous [11,12] However, a wide range of facultative and anaerobic microorganisms may be found. Acute appendicitis is mostly detected by a clinical assessment. It might be hard to diagnose because not all individuals have the characteristic signs or symptoms of acute appendicitis. A variety of presenting symptoms and clinical indications, particularly in women, might be mistaken for acute appendicitis. In 15 to 50 percent of instances, operating solely on clinical suspicions can result in the elimination of the normal appendix. Further tests, expectant care, or both can be used to provide a precise diagnosis. The aforesaid delayed diagnosis may result in appendix perforation or gangrene, resulting in increased morbidity. Appendectomy as soon as the problem is detected is a safe alternative, although this technique results in unneeded appendectomy. [13] The best way to treat acute appendicitis is still up for debate, with many studies recommending conservative and nonoperative treatment options. Many more tests, grading can be used to get an accurate and early assessment. None of the tests listed above can identify risk in patients on their own; they are always inferior to a physical exam and indicators when used in combination. [14] Hyperbilirubinemia is a newly proposed new identifying the skills for perforated and gangrenous appendicitis. This is caused by an imbalance in the liver's bilirubin synthesis and excretion. This study is intended to confirm the link between hyperbilirubinemia and severe appendicitis and its consequences.

In our 100-patient study, 58% males, with the remaining 42% being girls. This finding was consistent with previous research. [15] Of the 71 patients, 37 were male (52.10 percent) and 34 were female (47.90 percent). [16-19] 'Of the 50 cases, 40 were male and ten were female,' he stated in his study. The young people between the ages of 21 and 30. This age group accounts for 43% of all patients. The average age of the presenters was 29 years.

Males had a mean and standard deviation of 29 and 11.3814, respectively. Our study population's mean age of distribution matches those of other research. 'The average was 27.1 years,' according to [20]. - 26.939.33' is the average age. 'The average age reported for the 964 patients included in the study was 28.7 years [21, 22]. The male-female ratio rises to 3:2 in teenagers and young adults by the age of 25,

after which the male–female ratio falls. In our investigation, we discovered that out of 100 individuals, 55 had a normal total bilirubin value of less than 1.0 mg/dL (55%) and 45 had hyperbilirubinemia (45 percent).

This is consistent with the findings of the following studies: [13] found that "Total serum bilirubin was elevated in 41 (57.70 percent) of the 71 patients [20, 24]. All 100 patients had a total serum bilirubin level of 1.4911.0319 mg/dL, which is somewhat higher than the usual range (1.0 mg/dL). In individuals with acute appendicitis, the directly and indirectly bilirubin levels were 1.040.041mg/dl and 0.440.1941mg/dl, correspondingly. In individuals with complicated appendicitis, direct and indirect bilirubin levels were 2.041.011 mg/dL and 0.700.30 mg/dL, correspondingly.

The total serum bilirubin was considerably higher (P0.001) than in acute appendicitis. This was in line with previous research [25,26], which reported a mean serum bilirubin level of 2.38 mg/dL in his sample cohort. In his research of complex appendicitis, he discovered a mean of 3.62 mg/dL. Our exclusion criteria were met because all of the patients' SGOT and SGPT levels were within normal ranges. The average SGOT and SGPT values were 27.080 9.6804 U/L and 26.870 9.1537 U/L, respectively. ALP levels averaged 97.16023.4373/L. In our study, all patient received ultrasound imaging, with 59 (59%) individuals identified with severe appendicitis, 25 (25%) individuals diagnosed with ruptured or gangrenous appendix, and 16 (16%) patients identified with normal annexure. For detecting complex appendicitis, ultrasound was quite sensitive.

In our investigation, we discovered that the total leucocyte count was raised in 71% of all appendicitis cases. The mean TLC count of all individuals was 117842718/mm³, with neutrophils accounting for the majority of cells (73.260 8.8929%), followed by lymphocytes (21.890 7.8159%). These findings were in line with those of previous studies, such as [27,28], which stated. Mean WBC was 16.4 10³/L (SD, 5.2; 3.1 to 32.0 10³/L) for all patients,' according to the TLC. The average WBCs in the basic and complicated categories were both raised, with the complicated community having significantly higher levels.' The total blood bilirubin levels of 49 patients (65.33 percent) with uncomplicated acute appendicitis (n=75) were normal (1.0mg/dL), while 26 patients (34.66 percent) had higher total serum bilirubin values. As a result, most individuals with perforated or gangrenous appendicitis have hyperbilirubinemia (76 percent).

With the help of the 22 table, the specificity, precision, positive predictive value, and negative predictive value of total serum bilirubin as a diagnostic for diagnosing gangrenous or perforated appendix were determined. Serum bilirubin's sensitivity and specificity in detecting perforated or gangrenous appendicitis were 76 percent and 65.33 percent, correspondingly. Similarly, the test has a negative predictive value of 89.09 percent and a positive predictive value of 42.22 percent. The area under the curve (AUC) for the ROC curve was 0.707. The negative predictive value was 89.09 percent, and the positive predictive value was 100 percent [29]. Researcher found that patients with hyperbilirubinemia (>1.0 mg/dL) were three times as likely to have a ruptured or gangrenous appendix. Hyperbilirubinemia exhibited an 86 percent specificity for appendiceal perforation or gangrene, according to [29].

CONCLUSION

The total blood bilirubin level was substantially higher among patients with complex appendicitis than in those with severe abdominal pain, according to the findings. The total serum bilirubin level is a very sensitive, but less specific, test for diagnosing complex (gangrenous or perforated) appendicitis, with a strong negative predictive value. As a result, it's a good predictor of complex (gangrenous or perforated) appendicitis in patients. The total serum bilirubin should be utilised in conjunction with a clinical examination and additional laboratory findings.

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