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ORIGINAL ARTICLE

SELF LIMITING POSTOPERATIVE HYPERBILIRUBINEMIA IN ACUTE ABDOMINAL CONDITIONS: A STUDY AT RIMS, KADAPA, ANDHRA PRADESH

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ABSTRACT: Self-limiting postoperative hyperbilirubinemia is seen in most of patients who undergo surgery for acute abdominal conditions like acute appendicitis, peritonitis, blunt injury abdomen, penetrating injury abdomen, intestinal obstruction etc. **MATERIALS AND METHODS:** Prospective study of 200 cases who were operated for acute abdominal conditions from June 2012 to June 2015 were included in the study. **RESULTS:** Out of 200 patients included in the study around 158 patients had postoperative hyperbilirubinemia which is around 79% of total patients which is significant. **CONCLUSION:** Postoperative hyperbilirubinemia is seen in most of cases of acute abdomen and these is found to be clue to circulating endotoxins which may impair the excretion of bilirubin by bile canaliculi and also bacterial load overwhelms kupffer cells function and may cause hepatocyte dysfunction. This hyperbilirubinemia is self-limiting and no specific management is necessary. By 5th to 7th postoperative day serum bilirubin levels are coming to normal level.

KEYWORDS: Hyperbilirubinemia, Acute abdominal conditions, Postoperative cases.

INTRODUCTION: An acute abdomen is an acute intra-abdominal condition of abrupt onset usually associated with severe pain due to inflammation, perforation, obstruction, infarction or rupture of intra-abdominal organs and usually requiring emergency surgical intervention. Early diagnosis and prompt surgical intervention in the form of laparotomy/laproscopy is required in these patients to reduce post-operative mortality and morbidity.[1]

Post-operative hyperbilirubinemia is most commonly seen in patients undergoing emergency surgery. The incidence of abnormal post-operative liver functions tests range from 25% to 75%.[2] Hyperbilirubinemia is the result of imbalance between production and excretion of bilirubin by the liver.

It may be because of hepatocellular, cholestatic or hemolytic diseases. Liver receives blood mainly through the portal venous system, which receives blood from abdominal organs. Portal blood carries nutrients and other substances absorbed from gut including bacteria and its product (toxins). In a small percentage, even in normal healthy people, bacteria are found in portal blood.

It is commonly cleared by detoxification and immunological action of the reticuloendothelial system of the liver that acts as first-line defence in clearing toxic substances, bacteria and its products. But when bacterial load overwhelms the Kupffer cell function, it may cause dysfunction or damage the hepatocytes (Liver parenchyma).

It reflects a rise in serum bilirubin (SB) alone or in combination with liver enzymes depending upon the type, severity and site of the lesion. Recently, another substance known as cytokines e.g. interleukin (IL)-6, tumor necrosis factor (TNF), has also been considered to be responsible for depressed excretory function of the liver and may lead to increase in SB levels without a rise in liver enzymes.[3]

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The association between the elevated SB levels and the variety of infectious diseases has been noted in few studies. It has also been described in patients with severe intra-abdominal infection. The pathogenesis is thought to be because of bacteremia or endotoxinemia causing impaired excretion of bilirubin from the bile canaliculi.

Diagnosing the cause of postoperative jaundice include taking History, Physical examination, Biochemical tests, Hepatobiliary Imaging and family history or known cause of jaundice i.e., Cirrhosis, Hepatitis, Gilbert syndrome, Dubin-Johnson syndrome etc. Type of surgery (Upper abdominal surgery higher risk for iatrogenic injury to bile ducts) and Type of anaesthesia (General or spinal).

History of hypotension during surgery or if the patient likely to be on patient on vasopressors, Phenytoin, Anti-TB drugs etc. The history of onset of the jaundice is very much helpful if the onset is within days after surgery in a previously healthy patient can be due to hemolysis due to drugs, breakdown of fragile transfused red blood cells, resorption of hematoma.

Blood tests include Unconjugated hyperbilirubinemia in prehepatic causes, Increased reticulocyte count and reduced haptoglobin levels indicate hemolysis, Aspartate aminotransferase AST and lactate dehydrogenase LDH elevated with hemolysis, Alanine aminotransferase ALT and alkaline phosphatase ALP not significantly elevated with hemolysis, Peripheral blood smear may reveal abnormal red cell morphology, Coombs-test can help diagnose immune hemolytic anemia,

Conjugated hyperbilirubinemia and posthepatic causes of jaundice, In general, LFT's do not correlate with disease severity and do not help with the diagnosis in this group of patients. However, the ALT and AST are elevated much more than the ALP and gammaglutamyl transpeptidase GGT levels with hepatitis and the opposite usually occurs with posthepatic biliary obstruction.

Ultrasound -abdominal or endoscopic- is the first-line imaging to be done sensitivity over 90% for detecting dilated extrahepatic bile ducts, non-invasive, inexpensive.[4] It will also demonstrate gallbladder wall thickness and is the imaging technique of choice for the detection of stones within the gallbladder, but often misses stones in the common bile duct.

MATERIALS AND METHODS:

Study Design: This is a prospective study conducted by the department of Surgery at Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh from June 2012 to June 2015. 200 post-operative cases of acute abdomen admitted in surgical unit 2 were included in the study. These cases were subjected to investigation to support the diagnosis. Investigations included total leukocytes count, differential leukocytes count, ultrasound scan abdomen, plain X- ray abdomen and liver function tests (LFT).

Participants: The patients were selected from those attending the emergency department in RIMS, Kadapa. The age of the patients varied from 12 to 67years with most of the patients falling within the age ranging from 12-24 years. Inclusion criteria were: patients above 12years of age and posted for emergency laparotomy.

History is taken from the patients to exclude any pre-operative hyperbilirubinemia Totally 200 patients were examined and were subjected to the following investigations on the first post-operative day: liver function test (LFT) (Table 1), (serum bilirubin) was repeated on 3rd and 5th post-operative days .

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Test	Normal Range
Serum Bilirubin	
Total	1.2 mg/dl
Direct	0.2mg/dl
Liver Enzymes	
AST	< 50 U//L
ALT	<50 U/L
AKP	50-300U/L

Table 1

AST - Aspartate aminotransferase ALT - Alanine aminotransferase
AKP - Alkaline phosphatase

Table 1: Reference range of serum bilirubin and liver enzymes

Routine LFT results were compared with laboratory reference values given in Table 1.

RESULTS:

General characteristics: Out of 200 cases, 145cases were male and 55 female. Their age ranged from 15-67 years. The average was 27.1 years (Table 3). Duration of symptoms ranged from 1-5 days. Among them 124 cases were clinically diagnosed as acute appendicitis preoperatively.in these 124 cases; 102 cases had acute inflamed appendix, 16 had gangrenous appendix and in 6 cases perforated appendix was present.[5]

Intra operative Diagnosis	Number of Patients
Acute Appendicitis (Infected and gangrenous and perforated)	124
Peritonitis (Perforation of stomach duodenum and ileum)	34
Blunt injury abdomen (Polytrauma like RTA, fall from height, assault etc.)	20
Perforating injuries abdomen	10
Intestinal obstruction	12
Total	**200**

Table 2: Distribution of cases according to intraoperative diagnosis

Age Group	Number of Patients
12-25	26
25-35	60
35-45	72
45-55	22
55-65	18
>65	2
Total	**200**

Table 3: Distribution of cases according to age group

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INTRA OPERATIVE DIAGNOSIS	MALE	FEMALE
Acute Appendicitis	84	40
Peritonitis	28	6
Blunt injury abdomen	15	5
perforating injury abdomen	9	1
Intestinal obstruction	9	3
Total	**145**	**55**

Table 4: Distribution of cases according to sex

S. BILIRUBIN	NUMBER OF PATIENTS	PERCENTAGE
< 1.2mg/dl	42	21%
>1.2mg/dl	158	79%

Table 5: Distribution of the cases according to level of total serum bilirubin (SB)

S. BILIRUBIN	MALE	FEMALE
< 1.2mg/dl	35	7
>1.2mg/dl	110	48

Table 6: Distribution of the cases according to level of total serum bilirubin (SB) and sex

INTRA OPERATIVE DIAGNOSIS	S.BILIRUBIN <1.2	S.BILIRUBIN >1.2
Acute Appendicitis	29	95
Peritonitis	6	28
Blunt injury abdomen	1	19
perforating injury abdomen	4	6
Intestinal obstruction	2	10
Total	**42**	**158**

Table 7: Distribution of the cases according to level of total serum bilirubin (SB) and intra operative diagnosis

AGE GROUP	NUMBER OF PATIENTS S.BILIRUBIN < 1.2	NUMBER OF PATIENTS S.BILRUBIN >1.2
12-25	6	20
25-35	14	46
35-45	16	56
45-55	2	20
55-65	3	15
>65	1	1

Table 8: Distribution of the cases according to level of total serum bilirubin (SB) and age group

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DISCUSSION: In our study of 200 post-operative patients of acute abdomen significant number of patients had post-operative hyperbilirubinemia and this hyperbilirubinemia is self-limiting without any specific treatment for the same. The most likely explanation of the rise in serum bilirubin is therefore circulating endotoxinemia as a result of infection.

Bacteria cause either direct invasion or translocation into the portal venous system. Direct invasion of bacteria into the hepatic parenchyma interferes with the excretion of bilirubin into the bile canaliculi by a mechanism that is thought to be caused by the bacterial endotoxin and is biochemical in nature rather than obstructive.

Indirect evidence of bacterial translocation from inflamed gastrointestinal tract or peritonitis to the liver via the portal vein and the development of hepatitis and pyogenic liver abscess was observed by Dieulafoy.

Two classical findings were described: firstly, simultaneous inflammation of the intestine, peritoneum and development of pyogenic liver abscesses, and secondly, bacteriological similarities of the gastrointestinal tract and pyogenic liver abscesses. These bacteria commonly reach liver from intra-abdominal organs.

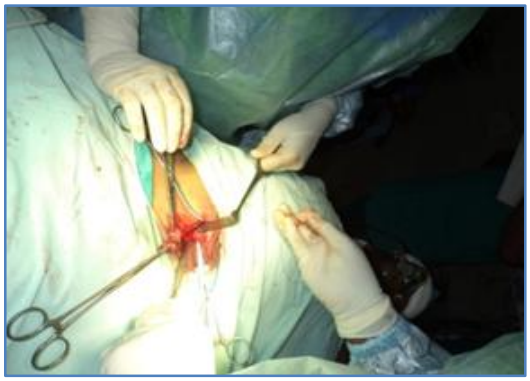
Direct evidence of bacterial translocation from inflamed organs was observed in clinical and experimental studies. These studies suggest that bacteria may transmigrate and produce portal bacteremia, hepatocellular dysfunction or pyogenic liver abscess. It has been shown that liver dysfunction is caused by cytokines released from the gut due to injury/inflammation.

In a study, rats were subjected to intra-abdominal sepsis from caecal ligation and puncture and the following observations were made: 1) the small intestine is an important source of adrenomedullin release during poly microbial sepsis; 2) norepinephrine induced hepatocellular dysfunction in early sepsis, mediated by activation of a-2 adreno-receptors; and 3) TNF produces hepatocellular dysfunction despite normal cardiac output and hepatic microcirculation.

Thus, it is concluded that hepatocellular function is depressed during the early stage of sepsis despite the increased cardiac output and hepatic blood flow and decreased peripheral resistance. The depression of hepatocellular function in the early, hyper-dynamic stage of sepsis does not appear to be due to reduction in hepatic perfusion but is associated with elevated levels of circulating pro-inflammatory cytokines such as TNF and IL-6.

Thus up regulation of TNF and/or IL-6 may be responsible for producing hepatocellular dysfunction during the early hyper-dynamic stage of sepsis.

Appendicular Perforation



Appendicular perforation

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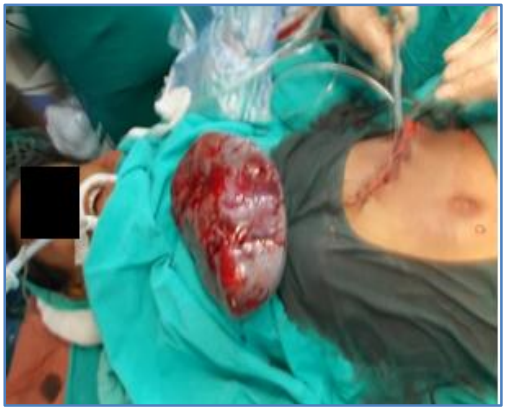
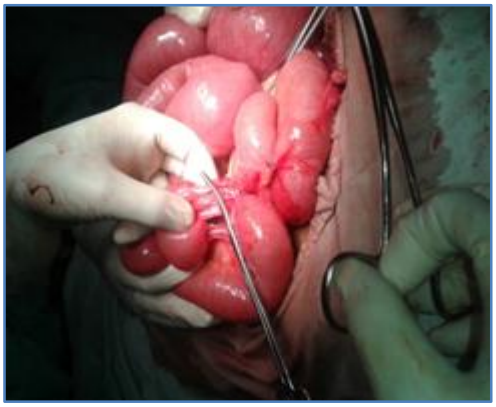
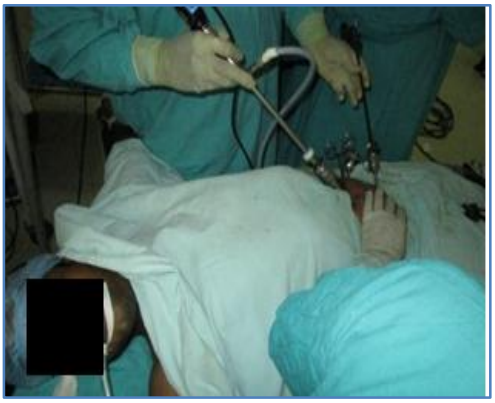


SPLENECTOMY (Blunt Injury abdomen)

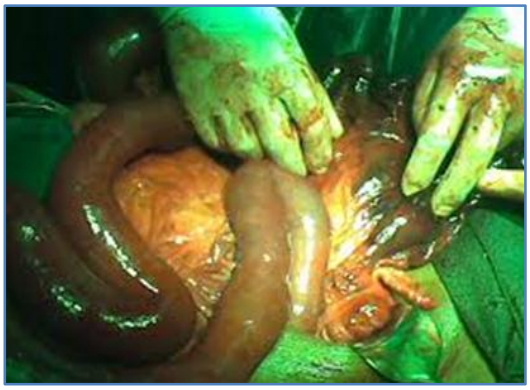
Volvulus (Sigmoid)



Acute intestinal obstruction



Laproscopic appendecectomy



Gangrenous Small Bowel Obstruction

CONCLUSION: Postoperative hyperbilirubinemia is seen in most of cases of acute abdomen and these is found to be clue to circulating endotoxins which may impair the excretion of bilirubin by biliary canaliculi and also bacterial load overwhelms kupffer cells function and may cause hepatocyte dysfunction. This hyperbilirubinemia is self-limiting and no specific management is necessary.

By 5th to 7th postoperative day serum bilirubin levels are coming to normal levels.

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