Original Article

Hepatic Dysfunction and Biochemical Abnormalities in Typhoid Patients

Naveed Khan[1], Subhan Uddin[2], Shah Zeb[2] and Habib Ur Rehman[3]

ABSTRACT

Objective: To study hepatic dysfunction and biochemical abnormalities in typhoid patients.
Study Design: Observational/Analytical Study.
Place and Duration of Study: This study was conducted at the Medical Department of Mardan Medical Complex (MMC) Teaching Hospital Mardan and Pathology Department of Bacha Khan Medical College Mardan from June, 2016 to June, 2017.
Materials and Methods: This study included a total of 100 patients of typhoid fever and 50 individuals as control group. Typhoid positive serum was taken as that with visible agglutination at 1:320. To exclude false positive we used rising titer for widal test. Typhi dot was also positive in these patients. Moreover they had step ladder rising pattern of the fever. Alanine transaminase (ALT), aspartate transaminase (AST), bilirubin and serum albumin were performed on samples of these patients by a chemical analyzer.
Results: In present study fifty five patients had elevated ALT, mean value was 100 ±12.265U/L. Fifty percent of the patients had raised AST with mean value of 110 ±15.233 U/L. Serum bilirubin was raised in 20% of the patients and mean value was 4.5 ±2.623 mg/dl. Serum albumin was low in 25% of the patients. Mean value was 2.5 ±1.532g/dl. ALT, AST and serum bilirubin were significantly high and serum albumin was significantly low in typhoid patients as compared to control group.
Conclusion: The study concluded that typhoid fever is associated with elevated transaminases and bilirubin level as well as low serum albumin levels. As typhoid fever is common in our setup along with other infections, so any patient presenting with fever and the above mentioned biochemical abnormalities must be screened for typhoid fever for effective and prompt treatment and to reduce the morbidity and mortality associated with the disease.
Key Words: Typhoid fever, elevated ALT, AST, bilirubin.

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INTRODUCTION

Typhoid fever is a systemic bacterial infection caused by Salmonella typhi. It develops following ingestion of food or water that is contaminated with the organism. Incubation period is 6-14 days[1]. It is a serious health problem in the developing countries and globally it affects about 16 million people and cause 69000 deaths annually[2]. Typhoid fever is a multi-organ affecting disease and is associated with hematological abnormalities, gastrointestinal perforation and hepatitis with cholestasis[3]. Hepatic involvement in typhoid fever has been reported in 23-60% of patients[4]. Hepatic involvement can vary from mild elevation of amino transferases to a level indistinguishable from acute viral hepatitis[5]. Fulminant Hepatitis has also been reported in typhoid fever[2]. Few cases of hepatic granulomas have also been detected[6]. Typhoid fever is associated with significant hematological and biological changes and hepatic dysfunction as evidenced by elevated liver enzymes[7]. Complications in typhoid fever occur in 10-15% of cases, among these gastro intestinal bleeding, perforation and typhoid encephalopathy are the most serious[8]. Other complications include septicemia, peritonitis, metastatic abscesses, cholestasis, endocarditis, osteomyelitis and rash[9]. Mortality is 1% if treatment is started before the onset of complications and up to 15% if treatment is started after the onset of complications[10].The aim of the study is to evaluate hepatic dysfunction and biochemical abnormalities in patients presenting with typhoid fever. As typhoid fever is a major health problem in developing countries and people are at high risk of contracting the disease so any patient presenting with deranged liver enzymes and clinically having sign and symptoms of typhoid fever should be screened for typhoid fever for immediate diagnosis and prompt treatment to reduce the complications of the disease and so reduce the morbidity and mortality: The biochemical changes are transient and disappear if the patient is treated in time.

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MATERIALS AND METHODS

The study was conducted in Medicine department of Mardan Medical Complex Teaching Hospital Mardan in collaboration with pathology department of Bacha Khan Medical College from June, 2016 to June, 2017. A total of 100 patients were included in the study. Fifty individuals were taken as a control group. Typhoid fever was diagnosed by widal test, Typhi dot test and clinically on the basis of step ladder pattern of fever. Typhoid positive serum was taken as that with visible agglutination at 1:320. To exclude false positive we used rising titer for widal test. Temperature of 100 °f was defined for fever.

Patients having temperature due to malaria, acute viral hepatitis, urinary tract infection and pneumonia were excluded from the study on the basis of history, examination and laboratory investigations.

Blood samples were collected from patients with typhoid fever in a geltube. Serum ALT, Serum AST, Serum Albumin and serum bilirubin were determined. All these teste were performed by Microlab 300. Results were subjected to statistical analysis. P Value less than .005 was considered as significant.

RESULTS

A total of 100 patients of typhoid fever were included in the study. Male to female ratio was 60:40. Fifty individuals were included in the study as a control group. Alanine Transaminase (ALT), Aspartate Transaminase (AST), Serum bilirubin and Serum Albumin were determined of all the patients.

Fifty five percent of the patients showed elevated ALT level. Mean ALT level was 100 ±12.265 u/L which was significantly higher than the control group. Fifty out of 100 patients (50%) showed elevated AST Level, mean AST level was 110 ±15.233 u/L which was significantly higher as compared to control group. Twenty out of 100 typhoid patients (20%) had elevated bilirubin level. Mean bilirubin was 4.5 ±2.623 mg/dL and twenty five out of 100 patients (25%) had low albumin level, mean albumin level was 2.5±1.532 g/dL.

Table No.1: Frequency of biochemical changes in typhoid fever.

S. No	Biochemical Parameters in Typhoid Fever	
1	ALT	55%
2	AST	50%
3	Bilirubin	20%
4	Albumin	25%

The present study showed that hepatic dysfunctions are significant findings in typhoid fever and ALT, AST and Bilirubin level were significantly higher and serum albumin was low as compared to control group. P value for ALT, AST, bilirubin and albumin is P<.00302, P<.00326, P<.0042 and P<.00322 respectively.

Table No.2: Mean value of Biochemical Parameters in Typhoid Fever

S. No	Mean value of Biochemical Parameter in Typhoid Fever	Mean Value of Control Group	P Value
1	ALT	100 ±12.265 U/L	P<.00302
2	AST	110 ±15.233 U/L	P<.00326
3	Bilirubin	4.5 ±2.623 mg/dl	P<.0042
4	Albumin	2.5 ±1.532g/dl	P<.00322

DISCUSSION

Typhoid fever is a systemic bacterial infection caused by salmonella typhi. Poor hygienic condition and under estimation of the disease are two main causes of this major public health problem in the developing countries[1]. Typhoid fever presents with a lot of clinicopathological features. It may sometime present as fever of unknown origin as well[11].

Liver is commonly involved in patients with typhoid fever and significant hepatic dysfunction occurs. In the present study patients with typhoid fever were evaluated for hepatic dysfunction. ALT was raised in 55% of the patients while AST and serum bilirubin values were raised in 50% and 20% respectively.

A similar study has been conducted by Rasoolin Jad et all, that typhoid fever is associated with elevated ALT and AST levels, who reported 60% and 72% increase in the level of these enzymes[12]. Enemchuk Ben et all also reported elevated ALT and AST in their study. which is similar to our study[13]. Korohi et all also reported that typhoid fever is associated with hepatomegaly and mildly deranged liver functions as evidenced by elevated levels of ALT and AST[14].

In the present study bilirubin was elevated in 20% of cases and serum albumin was low in 25% of cases. The same observations have also been reported by Kayode et al that typhoid fever is associated with elevated bilirubin and low albumin levels[15]. Similar observations have also been reported by Bernard et all in their study[16]. Hepatomegaly, splenomegaly and moderate elevation of transaminase level are common findings that occur in 21-60% of cases of typhoid fever[17]. However severe hepatic derangement is a very rare incidence. It varies from less than 1% - 26%. Hepatic involvement in typhoid fever was initially reported by William[18]. The mechanism of hepatic damage is unknown but it is suggested that biochemical derangement of liver dysfunction results from invasion of the liver by salmonella or from high concentration of endotoxin which damage the hepatocytes[19]. The

bacteria may also proliferate in hepatocytes and produce cytokines which damage the liver[20].

Hepatitis with jaundice, hyperbilirubinemia and low albumin level have also been reported invariably in typhoid fever[21,22]. The same observations have also been reported in our study in which 25% of patients had low albumin level. Rise in bilirubin level is mainly due to canaliculi occlusion by swollen hepatocytes leading to rupture of bile canaliculi and resulting in raised conjugated bilirubin[23].

CONCLUSION

The study concluded that typhoid fever is associated with significant hepatic dysfunction as evidenced by elevated levels of ALT, AST, serum bilirubin and low serum albumin.

In the developing countries like Pakistan typhoid fever along with viral hepatitis, malaria, tuberculosis etc. is the major public health problem. Any patient presenting with hepatitis and elevated liver enzymes should be screened for typhoid fever and all clinicians must have high suspicion for immediate diagnosis and prompt treatment of typhoid fever. It will help to reduce its complication and will further reduce its morbidity and mortality.

Author's Contribution:

Concept & Design of Study:	Naveed Khan
Drafting:	Naveed Khan
Data Analysis:	Subhan-Uddin, Shah Zeb
Revisiting Critically:	Naveed Khan, Habib Ur Rehman,
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Original Article

Inguinal Hernia Repair

Comparison of Medium Weight Versus Light Weight Mesh in Patients with Unilateral Inguinal Hernia Undergoing Lichtenstein's Repair in Terms of Postoperative Pain Relief and Hospital Stay

Tahira Islam, Sajid Malik, Farwa Tariq and Habib Ahmad

ABSTRACT

Objective: To compare medium weight versus light weight mesh in patients with unilateral inguinal hernia undergoing Lichtenstein's repair in terms of postoperative pain relief and hospital stay

Study Design: Randomized controlled trial study.

Place and Duration of Study: This study was conducted at the Department of Surgery, Unit-III, Jinnah Hospital Lahore from: September 2016 to February 2017.

Materials and Methods: Two hundred cases (100 in each group) between 16-70 years of age of either sex presenting with unilateral, primary, reducible inguinal hernia determined by clinical examination were included in the study. All the operations carried out by same consultants on operative list under general anesthesia. Included patients were randomly divided into two groups using random table i.e. one group A in which hernia repaired by Lichenstein technique using standard medium-weight composite mesh and second group (group B) using titanium-coated lightweight mesh. Data of all patients regarding postoperative pain relief and hospital stay was recorded.

Results: Mean age in Light weight and medium weight groups were recorded as 44.10+16.44 and 44.26+14.71 years respectively, 97%(n=97) in Light weight and 89%(n=89) in Medium weight group were male, patients who stayed two days in hospital were 89 [light weight=52, Medium weight=37], the patients who stayed three days in hospital were 81 [light weight=48, Medium weight=33] and the patients who stayed four days in hospital were 30 and all were from medium weight group. Mean value of hospital stay of the patients in light weights group was 2.48±0.502 days and its mean value in medium weight group was 2.93±0.820 days. Statistically significant difference was found between the hospital stay with study groups i.e. p-value=0.000

Conclusion: According to our study results light weight mesh in patients with unilateral inguinal hernia undergoing Lichtenstein's repair in terms of postoperative pain relief and hospital stay showed better outcome compared to medium weight mesh patients.

Key Words: Unilateral inguinal hernia, Lichtenstein's repair, Postoperative pain relief, Hospital stay, Medium weight, Light weight

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INTRODUCTION

Inguinal hernias by far are the most common types of hernias seen in our tertiary care settings.[1-4] The estimated lifetime risk for inguinal hernia is 27% for men and 3% for women. The Lichtenstein operation for inguinal hernia repair using mesh is one of the commonest operations done and the choice of the mesh to be used depends on the surgeon. However, the ideal mesh should be simple, cost effective, safe and free from complications.[2]

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The conventional mesh has its shortcomings which include chronic groin pain, foreign body sensation and seroma formation.[5,6] We have different types of mesh available like standard medium-weight composite mesh and titanium-coated lightweight mesh.[7] In a study, comparing above mentioned meshes, pain measured at 1 month was significantly different between the two groups (80.3% vs 94.1% were pain free, P = 0.029), with the lightweight group giving better results.

The average consumption time for analgesics also differed significantly between the two treatment groups (6.1±6.3 days versus 1.6±2.5 days for those with the lightweight mesh (P<0.001). Hospital stay was not significantly different (2.3 ± 0.7 days versus 2 ± 0.8 days).[8]

In our setting we currently using both meshes only taking into account the affordability of patients. If quality of life is found better with either mesh in terms of postoperative pain profile and hospital stay, we may

find an evidence for better and cost effective technique. More over there is no local study available and all international articles have addressed laparoscopic repair only. So current study may provide an evidence for open surgeries for this common issue.

MATERIALS AND METHODS

In this randomized controlled trial, we included 200 cases (100 in each group), from the department of surgical unit-III, Jinnah Hospital Lahore. The cases were between
16-70 years of age of either sex and all patients presenting with unilateral, primary, reducible inguinal hernia determined by clinical examination were included in the study whereas we excluded all cases with immune compromised (history of steroid intake and diabetes), and those suffering from any connective tissue disorder and having any history of previous surgery. Patients' informed consent was also obtained. All the operations carried out by same consultants on operative list under general anesthesia. Included patients were randomly divided into two groups using random table i.e. one group A in which hernia repaired by Lichenstein technique using standard medium-weight composite mesh and second group (group B) using titanium-coated lightweight mesh. All the data was entered and analyzed in the SPSS (version 17). The descriptive statistics like age and hospital stay was presented in the form of mean + standard deviation while sex, postoperative pain relief, smoking history as frequency and percentage. The difference between postoperative pain profile and hospital stay was determined using chi square test and independent sample t test respectively.

RESULTS

In our study the patients who stayed two days in hospital were 89 [light weight=52, Medium weight=37], the patients who stayed three days in hospital were 81 [light weight=48, Medium weight=33] and the patients who stayed four days in hospital were 30 and all were from medium weight group (Table 1). The study results showed that the mean value of hospital stay of the patients in light weight group was 2.48±0.502 days and its mean value in medium weight group was 2.93±0.820 days. Statistically significant difference was found between the hospital stay with study groups i.e. p-value=0.000 (Table 2).
In our study the pain free outcome was noted in 176 cases in which 96 were from light weight group and 80 were from medium weight group, similarly the pain free outcome not found in 24 cases in which 4 were from light weight group and 20 were from medium group patients. Statistically significant difference was found between the study groups with pain free status i.e. p-value=0.001 (Table 3).

Table No.1: Basic Demographics of the patients

Variables	Light weight	Medium weight
Mean age	44.10+16	44 44.26+14.71
Gender		
Male	97(97%)	89(89%)
Female	3(3%)	11(11%)
Mean Height(m)	1.64+0.08	1.65+0.09
Weight (kg)	70.65+10.37	71.33+11.12
BMI(kg/m2)	26.12+4.09	26.34+5.02

Table No.2: Comparison of hospital stays with study groups (n = 200)

Hospital stay (days)	Light weight	Medium weight	No. %	No. %
Two	52	52.0	37	37.0
Three	48	48.0	33	33.0
Four	-	-	30	30.0

Mean±SD 2.48±0.50 2.93±0.82 P value 0.000

Table No.3: Comparison of pain free with study groups

Hospital stay (days)	Light weight	Medium weight	No. %	No. %
Yes	96	96.0	80	80.0
No	4	4.0	20	20.0

P value p-value=0.001

DISCUSSION

History of hernia repair is very rich and since ancient times surgeons have tried to improve it bit by bit. Herniorrhaphy is one of the commonest general surgical procedures performed and about 700,000 hernia operations are performed each year in the United States which is still on rise. Post-operative pain, prolonged hospital stay and recurrence are a common problem associated with hernia surgery. Failure rate of less than 1% is reported from centers specialized in hernia surgery in contrast to much higher recurrence form non-specialized centers.[9-10]
Lichtenstein recommends always preserving the nerve to minimize the incidence of chronic pain. Some studies recommend that nerve ends be ligated to reduce the risk of chronic pain, but there were no studies on the outcome of these recommendations.[11-12] A meta analysis conducted at Aberdine, UK conclude that the open and laparoscopic hernia repair are equally effective procedures and choice between them should be made on a case to case basis depending on patient preference and other characteristics such as age, work, health status etc.[13]
In this study the mean value of hospital stay of the patients in light weight group was 2.48±0.502 days and its mean value in medium weight group was 2.93±0.820

days. Statistically significant difference was found between the hospital stay with study groups. i.e. p-value=0.000.

A study by Pradeep Prakash et al[14] showed that the mean post-operative hospital stay was 1.05 ± 0.2 days, and there was no significant difference in hospital stay between the two groups (P = 0.24). An audit published in 2009 have shown over all averaged 3.7 days hospital stay, averaging 3.3 and 3 days for bilateral and unilateral repairs respectively and any added procedures lengthened the hospital stay from 4 to 10.6 days.[15]

In our study free outcome was noted in 176 cases in which 96 were from light weight group and 80 were from medium weight group. Statistically lightweight patients significantly showed better pain free outcome compared to medium weight patients. i.e. p-value=0.001. There was not studies on comparison of light weight and medium weight with Lichtenstein's repair technique in past. However with laparoscopic technique few studies are available. Studies have also reported decreased early post-operative pain in LW mesh group because of less acute inflammatory response.[16-17]

In a study, comparing above mentioned meshes, pain measured at 1 month was significantly different between the two groups (80.3% vs 94.1% were pain free, P = 0.029), with the lightweight group giving better results. The average consumption time for analgesics also differed significantly between the two treatment groups (6.1±6.3 days versus 1.6±2.5 days for those with the lightweight mesh (P<0.001). Hospital stay was not significantly different (2.3 ± 0.7 days versus 2 ± 0.8 days).[8]

One study by PradeepPrakash et al14 demonstrated that one hundred and thirty-one completed follow-up of 3 months, 66 in heavyweight mesh group and 65 in LW mesh group. Early post-operative convalescence was better in LW mesh group in terms of early return to walking (P = 0.01) and driving (P = 0.05). The incidence of early post-operative pain, chronic groin pain and QOL and recurrences were comparable.

Shah et al.,[18] conducted a retrospective analysis of 67 patients who undergone LIHR with either heavyweight polypropylene mesh or LW polyester mesh and they reported a 3 times higher rate of chronic pain (18.7% vs. 5.7%, P = 0.05 in polypropylene mesh group as compared to LW mesh group at 1-year follow-up.

Agarwal et al[16] in a prospective double-blind randomised controlled study comparing LW and heavyweight polypropylene mesh in TEP repair of inguinal hernia, showed that LW polypropylene mesh was associated with significantly better pain scores, patient comfort, and sexual functions.

CONCLUSION

According to our study results light weight mesh in patients with unilateral inguinal hernia undergoing Lichtenstein's repair in terms of postoperative pain relief and hospital stay showed better outcome compared to medium weight mesh patients.

Author's Contribution:

Concept & Design of Study:	Tahira Islam
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Final Approval of version:	Tahira Islam

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