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Original Research Article

Liver function trends after biliary decompression in obstructive jaundice: a clinico-pathological-biochemical study

Mohan Lal, Prabhu Dayal*

Department of General Surgery, Government Medical College, Pali, Rajasthan, India

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***Correspondence:**
Dr. Prabhu Dayal,
E-mail: prabhudayal689@gmail.com

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ABSTRACT

Background: Liver functions tests suggest the underlying cause, estimate the severity, assess prognosis and monitor efficacy of therapy. Severity of liver dysfunction when performed serially may predict prognosis and may be helpful in assessing response to medical therapy or a surgical intervention.
Methods: The data was collected in thirty cases of surgical obstructive jaundice in terms of age, sex, etiology, clinical presentation, surgical intervention for biliary drainage and the laboratory liver biochemical and coagulation profiles on a day prior to surgical intervention and post-operatively on 1st week and 4th week were recorded.
Results: Of total 30 patients 56.66% were females. Patients with 73.68% of benign disease and 100% of malignant disease were of age more than 40 years. 63.33% of patients had benign cause for biliary obstruction. Choledochoithiasis and periampullary carcinoma were two most common causes of obstructive jaundice. The commonest complaints were; yellowish discolouration of sclera and skin, high colored urine (100%) and acholic stool (70%). Hepatomegaly, palpable gallbladder and ascites were observed in only malignant conditions. Serum bilirubin and transaminases were significantly higher in patients with malignant lesions on pre-operative and postoperative assessment. After decompression the rate of fall of serum bilirubin, serum glutamic-oxaloacetic transaminase and serum glutamic pyruvic transaminase were almost identical in both benign and malignant biliary obstructions. However, a better biochemical recovery profile was observed in patients with benign lesions, as they returned to normal by 4 weeks but remained at 2 to 3 times of the normal in malignant lesions.
Conclusions: Sequential biochemical assessment of liver functions has diagnostic as well as prognostic value in surgical obstructive jaundice.

Keywords: Biliary-decompression, Liver function trends, Obstructive jaundice

INTRODUCTION

Liver function includes carbohydrate, lipid and protein metabolism, production of bile, storage of vitamins, detoxification and excretion of endotoxins and xenobiotics. In clinical practice, type and kind of surgical intervention, especially, in patients with neoplastic disorders of hepatobiliary system is guided by altered liver biochemical tests and its co-relation with clinical status. Presence of liver disease, underlying cause, and estimation of severity, assessment of prognosis and monitoring of efficacy of therapy may be guided by LFT. Prolonged jaundice leads to progressive liver functions impairment and liver parenchyma damage causing biliary cirrhosis.[1] Surgical jaundice causes increased exposure to endotoxins by transocation of endotoxin through gut mucosa and suppuration of reticuloendothelial system lrading to low clearance of endotoxins.[2,3] Liver functions can be restored timely by early biliary decompression.[1]

There is lack of data or scrimpy data on trends in liver function tests after biliary drainage in obstructive jaundice. Our aim in this study was to get progressive data on liver function parameter after complete biliary drainage and to draw progressive graph of each parameter and compare it with previous study. So that these data can be used in management of cases of obstructive jaundice after biliary drainage and to intervene as soon as possible when patient's liver function parameter deviates from graph obtained by this study.

METHODS

We conducted a prospective study at S.M.S. medical college and attached S.M.S. hospital, Jaipur over a period of three years from June 2006 to June 2009. In this study thirty patients of surgical obstructive jaundice admitted in the department of general surgery were included and assessed in terms of age, sex, clinical presentation, etiology, surgical intervention carried out for biliary decompression. These patients were categorized on the basis of etiology of surgical obstructive jaundice (benign vs. malignant). The liver biochemical and coagulation profiles were assessed and compared amongst these groups prior to biliary decompression and subsequently on 1st week and 4th week post-operatively.

This study was approved by the Institutional Ethics Committee. An informed and written consent of the patients was taken prior to the biliary decompression; including the biopsy of tissue leading to biliary obstruction. The tissue was sent for histopathology examination to the department of pathology.

Standard pre-operative preparation for obstructive jaundice patients includes vitamin K injections, low protein/high carbohydrate/no fat diet, bowel preparation, procurement of mannitol infusion and rehydration with normal saline infusion, antibiotics, fresh frozen plasma and fresh whole blood for use in theatre. Post-operatively antibiotics and adequate pain control was maintained. Adequate hydration was ensured for satisfactory hourly urine outputs.[2]

Procedure

Following modes of intervention were done in these two groups of patients:

In benign group (group I, n=19):

For choldocholithiasis with (n=13)

- Cholecystectomy with choledocholithotomy with T-tube drainage (n=10).
- Endoscopic stone extraction with cholecystectomy (n=3).

For benign biliary stricture after cholecystectomy (n=6)

- Roux-en-y hepatico-jejunostomy (n=2).
- Endoscopic CBD stenting (n=4).

In malignant group (group II, n=11):

Carcinoma gall bladder (n=1)

- Radical / extended clolecystectomy and hepatico-jejunostomy (n=1).

Cholangiocarcinoma (n=3)

- Roux-en-y hepatico-jejunostomy (n=2).
- Choledochoduodenostomy (n=1).

Periampullary carcinoma (n=4)

- Whipple's procedure (n=1).
- Triple by-pass (n=3).

Carcinoma head of pancreas (n=3)

- Whipple's procedure (n=2).
- Triple by-pass (n=1).

Selection criteria of the patients

All patients with surgical obstructive jaundice, who were amenable to surgical decompression, were included in study. Exclusion criteria includes: Pregnancy, medical jaundice, advanced stage of the tumor/terminally ill patients, patients unfit for biliary decompression, patients with severe cholangitis and all emergency decompressions.

Statistical analysis

LFT parameter in a group at different time was compared by paired Student-t test to get p values. LFT parameter in two groups at same time was compared by unpaired Student-t test to get p values.

RESULTS

Patient profile

A total of 30 patients were included in the study, of these 43.33% were males and 56.66% were females with a male to female ratio of 4:5. Mean age of patients of benign and malignant cases of obstructive jaundice was 48.36 years and 55.36 years respectively. Mean age of patient population was 51 years. 73.68% of benign disease patients and 100% of malignant disease patients were of age more than 40 years. Of the thirty patients 63.33% had a benign cause and 36.66% had malignant cause for obstruction. Choledochoithiasis and periampullary carcinoma are two common causes of obstructive jaundice in present study. The commonest complaints seen were: yellowish discoloration of sclera and skin, high colored urine (100%) and alcoholic stool (70%) in both benign and malignant conditions. Hepatomegaly and palpable gallbladder and ascites were observed in only malignant conditions and distinguished them clinically from the benign conditions. Alcoholic stools, pruritis and weight loss were more frequent in patients with underlying malignancy as compared to patients with benign conditions. Most common management modality used was common bile duct exploration with T-tube insertion (Table 1).

Table 1: Patient profile in obstructive jaundice.

Characteristics	No. of cases		Percentage (%)		
Sex					
Male	13		43.33		
Female	17		56.66		
Age group (in years)	**No. of cases**				
	Benign		**Malignant**		**Total**
<20	1		0		1
20-29	1	26.31%	0	0%	1
30-39	3		0		3
40-49	4		5		9
50-59	5		1		6
60-69	2	73.68%	4	100%	6
70-79	2		1		3
≥80	1		0		1
Average age	48.36		55.36		50.93
Symptoms and signs	**No. of cases**				**Total (%)**
	Benign (%)		**Malignant (%)**		
Abdominal pain	11(57.9)		7 (63.6)		60
Yellow discoloration	19 (100)		11 (100)		100
Dark colour urine	19 (100)		11 (100)		100
Acholic stool	12 (63.1)		9 (81.8)		70
Pruritis	10 (52.6)		11 (100)		70
Anorexia, weight loss	8 (42.1)		8 (72.7)		53.3
Hepato-megaly	Nil		7 (63.6)		23.3
Lump abdomen	Nil		8 (72.7)		26.6
Ascities	Nil		2 (18.1)		6.6
Fever	8 (42.1)		7 (63.6)		50
Diseases	**No. of cases**		**Percentage (%)**		
Malignant	11		36.66		
Benign	19		63.33		
Etiology					
Periampullary CA	7		23.33		
CA head of pancreas	3				
CA distal CBD	0				
CA ampulla of vater	4				
Duodenal CA near ampulla	0				
Advanced stage CA GB	1		3.33		
Perihilar Cholangio CA	3		10		
Choledocholithiasis	13		43.33		
Post-op biliary stricture	3		10		
Choledochal cyst	0		0		
Benign stricture CBD	3		10		
Management modality					
CBD Exploration + T tube	10		33.33		
ERCP guided CBD stenting	4		13.33		
ERCP guided Stone extraction	3		10		
Whipples procedure	3		10		
Tripple by pass	4		13.33		
Hepaticojejunostomy	5		16.66		
Choledochoduodenostomy	1		3.33		

Table 2: Serum bilirubin and serum alkaline phosphatase trends.

	Benign diseases group I (n=19)			Malignant diseases group II (n=11)			P value
Serum bilirubin							
Time	**Range (mg/dl)**	**Mean (mg/dl) (%)**	**SD**	**Range (mg/dl)**	**Mean (mg/dl) (%)**	**SD**	**I vs. II**
Pre op (D0)	3.9-16.2	8.61 (100)	3.532	6.1-26.3	13.97 (100)	6.4190	0.02200<α
Post op 1 week (D1)	0.6-4.2	2.263 (26.28)	1.2619	1.8-10.9	6.3 (45.09)	2.7842	0.00067<α
Post op 4 week (D4)	0.2-1.6	0.615 (7.14)	0.367	0.6-4.2	2.5 (17.89)	1.3326	0.00077<α
P values	D0 vs D1=0.000 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			D0 vs D1=0.000 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			
Serum alkaline phosphatase							
Time	**Range (IU/l)**	**Mean (IU/l) (%)**		**Range (IU/l)**	**Mean (IU/l) (%)**		
Pre op (D0)	210-2276	1067.52 (100)	577.2145	765-1876	1111.72 (100)	317.678	0.788>α
Post op 1 week (D1)	150-1236	559.105 (52.37)	361.232	185-1260	565.818 (50.89)	293.652	0.956>α
Post op 4 week (D4)	128-505	258.210 (24.18)	116.559	150-665	298.090 (26.81)	183.295	0.525> α
P values	D0 vs D1=0.000 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			D0 vs D1=0.000 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			

α=0.05. SD=standard deviation. D0, D1, D4=LFT parameter value at pre op, 1st week, 4th week respectively; serum bilirubin: 0.2 to 1.2 mg/dl; serum alkaline phosphatase: 70-220 IU/l.

Patient biochemical profile and their recovery patterns

In both the groups, patients were assessed for complete liver biochemical parameters including their coagulation profile on a day prior to surgery (D0), and 1st week (D1), 4th week post operatively (D4) [α=0.05].

Serum bilirubin

The pre and post-operative comparative analysis of serum bilirubin levels between group I (n=19) and group II (n=11) is shown in Table 2 and their recovery patterns in Figure 1.

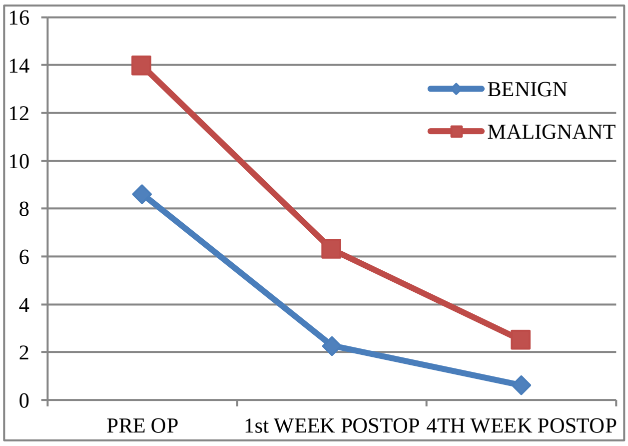

Figure 1: Recovery pattern of serum bilirubin.

Pre-operative day (D0)

The pre-operative (D0) serum bilirubin levels ranged between 3.9 to 16.2 mg/dl in group I patients and 6.1 to 26.3 mg/dl in group II with mean values of 8.61 mg/dl and 13.97 mg/dl in Group I and Group II respectively. Statistically it was found to be significant with p value of 0.022<α, indicating its discriminatory significance between benign and malignant conditions.

Postoperative 1st week (D1), 4th week (D4)

The bilirubin levels dropped to 26.28% and 45.09% of the pre-operative values at 1st week (D1) in benign and malignant conditions respectively. These levels further dropped to 7.14% and 17.89% of the pre-operative values at 4th week (D4) in benign and malignant conditions respectively. At 4th week bilirubin mean lies within normal range in benign group but it remain 2.5 times of upper limit in malignant group. The drop rate in bilirubin levels at 1st week (D1) and 4th week (D4) postoperative were found statistically significant with p value 0.000<α (D0 vs. D1) and 0.000<α (D0 vs. D4) in both Group I and II when compared to the respective pre-operative levels.

Bilirubin levels at 1st week (D1) and 4th week (D4) postoperative were higher in group II as compared to Group I patients with p values of 0.000<α (B vs. M) and 0.000 <α (B vs. M) on these two different days indicating an early and better patient recovery in group I as compared to Group II.

Serum alkaline phosphatase

The pre and post-operative comparative analysis of serum alkaline phosphatase levels between Group I (n=19) and Group II (n=11) is shown in Table 2 and their recovery patterns in Figure 2.

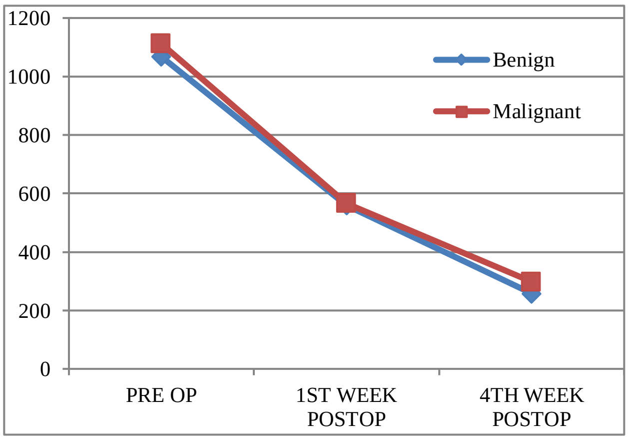

Figure 2: Recovery pattern of serum alk. phosphatase.

Pre-operative day (D0)

The pre-operative (D0) serum alkaline phosphatase levels ranged between 210 to 2276 IU/l in group I patients and 765 to 1876 IU/l in Group II with mean values of 1067.52 IU/l and 1111.72 IU/l in group I & Group II respectively. Statistically it was not significant with p value of 0.788>α indicating its non-significance between benign and malignant conditions.

Postoperative 1st week (D1), 4th week (D4)

The serum alkaline phosphatase levels dropped to 52.37% and 50.89% of the pre-operative values at 1st week (D1) in benign and malignant groups respectively. These levels further dropped to 24%.18 and 26.81 of the pre-operative values at 4th week (D4) in benign and malignant conditions respectively. The drop rate in serum alkaline phosphatase levels at 1st week (D1) and 4 week (D4) postoperative were found statistically significant with p value 0.000<α (D0 vs. D1) and 0.000<α (D0 vs. D4) in both Group I and II when compared to the respective pre-operative levels.

On comparing the serum alkaline phosphatase levels between the two groups (Group I & II) at 1st week (D1) and 4th week (D4) postoperative, they were found to be more or less similar and statistically insignificant with p values 0.956>α & 0.525>α respectively. This indicates that serum alkaline phosphatase assessment alone in patients with obstructive jaundice has low diagnostic value.

Serum serum glutamic-oxaloacetic transaminase

The pre and post-operative comparative analysis of serum serum glutamic-oxaloacetic transaminase (SGOT) levels between Group I (n=19) and Group II (n=11) is shown in Table 3 and their recovery patterns in Figure 3.

Table 3: SGOT/ SGPT trends.

Time	Benign diseases group I (n=19)			Malignant diseases group II (n=11)			P value
	Range (IU/l)	Mean (IU/l) (%)	SD	Range (IU/l)	Mean (IU/l) (%)	SD	I vs II
SGOT							
Pre op (D0)	32-261	125.578 (100)	65.8797	91-320	191.18 (100)	79.49	0.0326 <α
Post op 1 week (D1)	28-130	75.421 (60.05)	36.3139	50-150	107.90 (56.43)	33.64	0.0215 <α
Post op 4 week (D4)	30-108	42.63 (33.94)	12.7288	28-100	64.09 (33.52)	22.78	0.0122 <α
P values	D0 vs D1=0.000 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			D0 vs D1=0.000 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			
SGPT							
Pre op (D0)	28-271	109.105 (100)	80.4472	70-272	172.454 (100)	73.3667	0.0382 <α
Post op 1 week (D1)	20-130	56.947 (52.19)	33.0764	44-167	100 (57.98)	39.5929	0.0069 <α
Post op 4 week (D4)	21-96	45.631 (41.82)	22.9618	21-120	68.454 (39.69)	26.2578	0.0268 <α
P values	D0 vs D1=0.000 <α D1 vs D4=0.011 <α D0 vs D4=0.000 <α			D0 vs D1=0.001 <α D1 vs D4=0.000 <α D0 vs D4=0.000 <α			

α=0.05. SD=Standard deviation. D0, D1, D4=LFT parameter value at pre op, 1st week, 4th week respectively; SGOT/ SGPT: 10-40 IU/l.

Table 4: Serum albumin trends.

Albumin	Benign diseases group I (n=19)			Malignant diseases group II (n=11)			P value
Time	Range (mg/dl)	Mean (mg/dl) (%)	SD	Range (mg/dl)	Mean (mg/dl) (%)	SD	I vs II
Pre op (D0)	2.8-4.2	3.526 (100)	0.4604	3.0-4.3	3.4363 (100)	0.3854	0.572 >α
Post op 1 week (D1)	3.1-4.4	3.821 (108.36)	0.4090	3.2-4.0	3.545 (103.16)	0.2544	0.030 <α
Post op 4 week (D4)	3.4-4.3	3.826 (108.50)	0.2902	3.0-3.8	3.6181 (105.29)	0.3124	0.086 >α
P values	D0 vs D1=0.053 >α D1 vs D4=0.910 >α D0 vs D4=0.026 <α			D0 vs D1=0.066 >α D1 vs D4=0.245 >α D0 vs D4=0.068 >α			

α=0.05. SD=standard deviation. D0, D1, D4=LFT parameter value at pre op, 1st week, 4th week respectively.

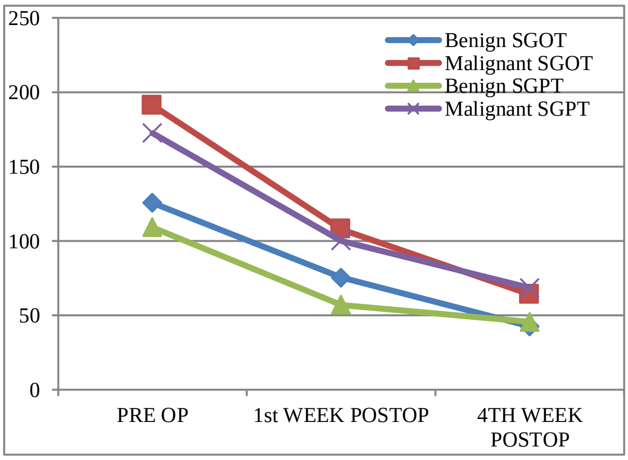

Figure 3: Recovery pattern of serum SGOT and SGPT.

Pre-operative day (D0)

The pre-operative (D0) serum SGOT levels ranged between 32 to 261 IU/l in group I patients and 91 to 320 IU/l in Group II with mean values of 125.578 IU/l and 191.18 IU/l in group I and Group II respectively. Statistically it was found to be significant with a p value of 0.0326<α, indicating its discriminatory significance between benign and malignant conditions.

Postoperative 1st week (D1) and 4th week (D4)

The SGOT levels dropped to 60.05% and 56.43% of the pre-operative values at 1st week (D1) in benign and malignant conditions respectively. These levels further dropped to 33.94% and 33.52% of the pre-operative values at 4th week (D4) in benign and malignant conditions respectively. The drop rate in SGOT levels at 1st week (D1) and 4th week (D4) postoperative were found statistically significant with p value 0.000<α (D0 vs. D1) and 0.000<α (D0 vs. D4) in both group I & II when compared to the respective pre-operative levels.

SGOT levels at 1st week (D1) and 4th week (D4) postoperative were higher in group II as compared to Group I patients with p values of 0.0215<α (B vs. M) and 0.0122<α (B vs. M) on these two different days indicating an early and better patient recovery in group I as compared to group II.

Serum serum glutamic pyruvic transaminase

The pre and post-operative comparative analysis of serum glutamic pyruvic transaminase (SGPT) levels between Group I (n=19) and Group II (n=11) is shown in Table 3 and their recovery patterns in Figure 3.

Pre-operative day (D0)

The pre-operative (D0) serum SGPT levels ranged between 28 to 271 IU/l in group I patients and 70 to 272 IU/l in Group II with mean values of 109.105 IU/l and 172.454 IU/l in group I and Group II respectively. Statistically it was found to be significant with a p value of 0.0382<α, indicating its discriminatory significance between benign and malignant conditions.

Postoperative 1st week (D1) and 4th week (D4)

The SGPT levels dropped to 52.19% and 57.98% of the pre-operative values at 1st week (D1) in benign and malignant conditions respectively. These levels further dropped to 41.82% and 39.69% of the pre-operative values at 4th week (D4) in benign and malignant conditions respectively. The drop rate in SGPT levels at 1st week (D1) postoperative were found statistically significant with p value 0.000 and 0.001<α (D0 vs. D1) in Group I and II respectively when compared to the respective pre-operative levels. The drop rate in SGPT levels at 4th week (D4) postoperative were found statistically significant with p value 0.000<α (D0 vs. D4) in both group I and II when compared to the respective pre-operative levels.

SGPT levels at 1st week (D1) and 4th week (D4) postoperative were higher in group II as compared to Group I patients with p values of 0.0069<α (B vs. M) and 0.0268<α (B vs. M) on these two different days indicating an early and better patient recovery in group I as compared to group II.

Serum albumin

The pre and post-operative comparative analysis of serum Albumin levels between Group I (n=19) and Group II (n=11) is shown in Table 4 and their recovery patterns in Figure 4.

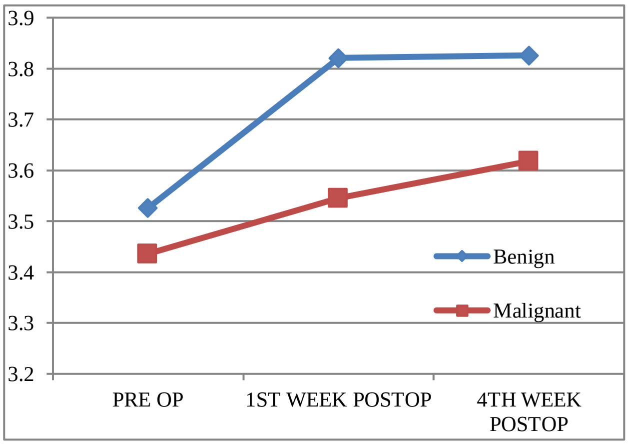

Figure 4: Recovery pattern of serum albumin.

Pre-operative day (D0)

The pre-operative (D0) serum Albumin levels ranged between 2.8 to 4.2 mg/dl in group I patients and 3.0 to 4.3 mg/dl in Group II with mean values of 3.526 mg/dl and 3.4363 mg/dl in Group I and Group II respectively. Statistically it was found to be non-significant with a p value of 0.572>α, indicating its non-significance between benign and malignant conditions.

Postoperative 1st week (D1) and 4th week (D4)

The albumin level rose to 108.36% and 103.16% of the pre-operative values at 1st week (D1) in benign and malignant conditions respectively. These levels further rose to 108.50% and 105.29% of the pre-operative values at 4th week (D4) in benign and malignant conditions respectively.

The rise in albumin levels at 1st week (D1) postoperative were found statistically non-significant with p values 0.053>α and 0.066>α (D0 vs. D1) in Group I and II respectively when compared to the pre-operative levels. The rise in Albumin level at 4th week (D4) postoperative was found statistically significant in group I with p value 0.026 <α (D0 vs. D4) and statistically non-significant in group II with p value 0.068>α (D0 vs. D4) when compared to the respective pre-operative levels.

Albumin levels at 1st week (D1) postoperative was lower in group II as compared to Group I patients with p values of 0.030<α (B vs. M) statistically significant. Albumin levels at 4th week (D4) postoperative was lower in group II as compared to Group I patients with p values of 0.086>α (B vs. M) statistically non significant.

Prothrombin time

Pre-operative day (D0)

Prothrombin time values were slightly deranged and ranged between 10-19 seconds with mean of 13.672 seconds in both the Groups. As these values were within one and a half times of the control values therefore these patients did not have any significant coagulation abnormality pre-operatively and found to be statistically insignificant on comparison between the two groups.

Postoperative 1st week (D1) and 4th week (D4)

Postoperative coagulation profile in Group I and II patients did not show much alteration as compared to the pre-operative values indicating a normal hepatic synthesis of coagulation factors.

Combined relative recovery pattern of liver function

To compare all liver function biochemical parameters, each parameter is divided by its' upper limit of normal range as shown in Table 5. Combined relative liver biochemical function parameters trend is shown in Figure 5.

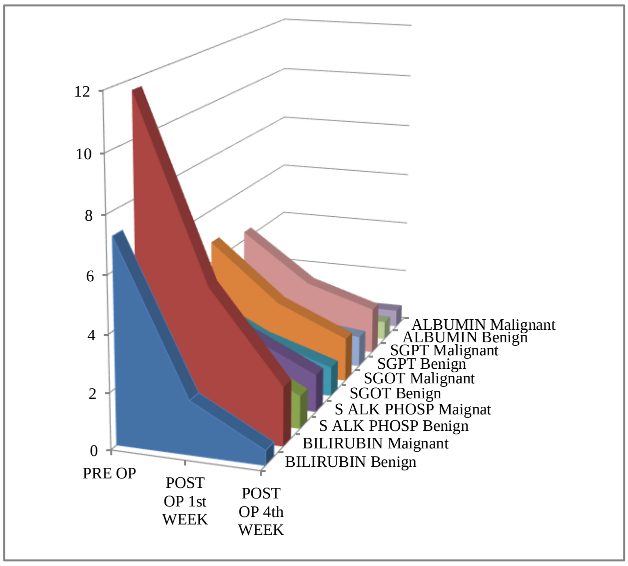

Figure 5: Combined relative recovery pattern of liver function.

Rt (relative LFT at time't')=Value of a particular LFT parameter at time't'/ upper limit of normal range of that particular LFT parameter.

Table 5: Combined relative recovery pattern of liver function.

Liver function trends			Liver function result					
			Pre op (L0)	**RL0= L0/Ln**	**Post op 1 week (L1)**	**RL1= L1/Ln**	**Post op 4 week (L4)**	**RL4= L4/Ln**
Bilirubin	Benign	Range	3.9-16.2		0.6-4.2		0.2-1.6	
		Mean	8.61	7.175	2.263	1.885	0.615	0.512
	Malignant	Range	6.1-26.3		1.8-10.9		0.6-4.2	
		Mean	13.97	11.64	6.3	5.25	2.5	2.08
Serum alkanine phospho-tase	Benign	Range	210-2276		150-1236		128-505	
		Mean	1067.52	4.852	559.105	2.541	258.210	1.173
	Malignant	Range	765-1876		185-1260		150-665	
		Mean	1111.72	5.053	565.818	2.571	298.090	1.354
SGOT	Benign	Range	32-261		28-130		30-108	
		Mean	125.578	3.139	75.421	1.885	42.63	1.065
	Malignant	Range	91-320		50-150		28-100	
		Mean	191.18	4.779	107.90	2.697	64.090	1.602
SGPT	Benign	Range	28-271		20-130		21-96	
		Mean	109.105	2.727	56.947	1.423	45.631	1.140
	Malignant	Range	70-272		44-167		21-120	
		Mean	172.454	4.311	100	2.500	68.454	1.711
Albumin	Benign	Range	2.8-4.2		3.1-4.4		3.4-4.3	
		Mean	3.526	0.64	3.821	0.694	3.826	0.695
	Malignant	Range	3.0-4.3		3.2-4.0		3.0-3.8	
		Mean	3.4363	0.624	3.545	0.644	3.618	0.657

L0, L1, L4 = Liver function value pre op, at 1 week, 4 week respectively; RL= Relative liver function value. Ln= Normal liver function value.

DISCUSSION

It is difficult to diagnose and manage a patient of jaundice for treating physicians and surgeons. The surgical jaundice can be evaluated and managed by understanding, sequential recording and analysis of essential liver biochemical and coagulation abnormalities.[1]

Transabdominal ultrasonography is the initial imaging modality and screening test to distinguish between surgical and medical jaundice with limited assessment of the distal common bile duct (CBD) and pancreas. Endoscopic ultrasound provides remarkably detailed images of the pancreas and biliary tree allowing diagnostic tissue sampling, evaluation of distal CBD and small pancreatobilary mass. CT scan has limited value in helping diagnose CBD stones. CT cholangiography by the helical CT technique used to image the biliary system and makes possible visualization of radiolucent stones and other biliary pathology. Magnetic resonant cholangiopancreatography (MRCP) is a non-radiating, non-invasive and highly sensitive method of investigating obstructive lesions of the biliary tract. It is accurate and accepted means of imaging pancreatobiliary diseases without therapeutic application. Endoscopic retrograde cholangiopancreatography (ERCP) has a therapeutic application because obstructions can potentially be relieved by the removal of stones, sphincterotomy, and the placement of stents and drains. The addition of cholangioscopy to the ERCP allows for biopsies and brushings within the ducts and better identification of lesions seen on cholangiogram. Percutaneous cholangiopancreatography (PTC) is especially useful for lesions proximal to the common hepatic duct.[4]

Surgically-treatable hepatobiliary disease can be easily diagnosed preoperatively but post-operative assessment of adequacy of entero-biiary anastomosis for treated patients of obstructive jaundice is difficult. Radio isotopic HIDA scan is appropriate imaging modality to assess adequacy of biliary-enteric anastomosis but it is expansive and very few centre possess it. Through serial LFT estimations post operatively, one can assess the adequacy of biliary-enteric drainage and may pick up in time those who will require re-operation before they deteriorate.[5]

In present study we tried to get progressive data on liver function parameter after complete biliary drainage and to draw progressive graph of each parameter and compare it with previous study thus determining the number of days needed for liver function to return to normal after biliary tract decompression.[6] and understand the importance of liver function trends to distinguish between benign conditions from malignant conditions leading to surgical jaundice.

Patient profile and their clinical presentation

While comparing the other studies done elsewhere, the observation in present study too implies that the overall incidence of obstructive jaundice was more in females compared to males.[7] The ratio of benign versus malignant causes of obstructive jaundice in our study is 3:2. This reflects that the benign lesions are more common in patients with surgical obstructive jaundice. But all patients of obstructive jaundice with malignant etiology were of age more than 40 years. This reflects that the malignant lesions are more common in patients with surgical obstruction with progression of age. Therefore, it is essential to workup patients with surgical obstructive jaundice for underlying malignant lesions in and after the 5th decade of their life as has been reported previously in the literature.[1] Choledocholithiasis is most common benign cause of obstructive jaundice.[7-9]

The typical complaints of obstructive jaundice in our patient population were in the form of yellowish discoloration of sclera (100%), high colored urine (100%) and alcoholic stool in 70% in all the patients. However, hepatomegaly, lump abdomen and ascites were found only in patients with malignant lesions. Alcoholic stools, pruritis, anorexia and weight loss were more frequent in patients with underlying malignancy (82%) as compared to patients with benign conditions (52%). Presence of a palpable gall bladder along with enlarged liver and clay colored stools in patient with surgical obstructive Jaundice indicates underlying malignant disease as reported previously in the literature.[1]

Liver biochemical profile and its trends after biliary decompression

Serum bilirubin: Serum bilirubin values were statistically significantly higher in patients with malignant lesions as compared to patients with underlying benign conditions ($p=0.000<\alpha$) on all the postoperative days i.e. 1st week and 4th week. These values returned to near normal in patients with benign conditions whereas they were two and half times the upper limit in patients with underlying malignant conditions even after 4 weeks of surgery similar to Sharma et al. Serum Bilirubin levels proved to be of highly discriminative and diagnostic value between benign and malignant conditions preoperatively and their recovery patterns were also quite distinct between the two Groups (I and II). In patients with obstructive jaundice serum bilirubin provide clue about underlying pathology along with clinical signs & symptoms. The significance of serum bilirubin value in discriminating between benign and malignant obstructive jaundice has also previously been proved in literature and support our findings.[1,10]

Serum alkaline phosphatase: The serum alkaline phosphatase (ALP) levels were raised upto 10 times the normal in our patient population. They were not statistically different in these two groups and so they were of less discriminative value in benign and malignant conditions. Elevated serum alkaline phosphatase of hepatic origin may result from variety of disorders such as granulomatous liver disease, abscess and infiltrative disorders. Mechanism of serum ALP elevation in obstructive jaundice is complex. Accelerated de-novo synthesis of the enzyme in the liver and subsequent regurgitation into serum, leads to ALP elevation. Hence alkaline phosphatase assessment alone in patients with obstructive jaundice is of low diagnostic value in our observations as found in previous literature.[1,11] The recovery patterns of serum ALP in both benign and malignant conditions were similar with significant decline following decompression in some and while remained persistently elevated in others.

Serum transaminases: All liver disorders have elevation to some extent of serum levels of SGOT and SGPT carrying low prognostic significance due to lack of correlation with the level of elevation and the extent of liver necrosis or severity of disease. In the present study the serum transaminase levels (SGOT and SGPT) were significantly higher in malignant conditions as compared to benign disorders both in pre-operative and post-operative period. However following decompression, both the patient groups showed a similar pattern of enzymatic recovery with enzyme levels approaching near normal at 4 weeks' time in benign group and were almost one and half times the upper limit in malignant conditions. Similar patterns of enzymatic recovery have also been previously documented in the literature.[1]

Serum proteins and prothrombin time: Total protein and serum albumin were not much altered in our study without intergroup variation. Coagulation protein synthesis was also not much altered in our study as shown by prothrombin time trends. Thus there was preservation of total serum protein, albumin and coagulation protein synthesis in our study.

CONCLUSION

Pre-operative serum bilirubin levels gave an indication towards the nature of obstructive lesion (benign or malignant). Rate of fall of serum bilirubin, SGOT and SGPT were almost identical in both benign and malignant biliary obstructions after decompression. They returned to normal by 4 weeks in benign but they remained at $1^1/_2$ to $2^1/_2$ times of the normal in malignancy. The other biochemical markers were of little value in discriminating these groups in our study such as ALP, total proteins, albumin and coagulation proteins as in previous literature.

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REFERENCES

1. Sharma R, Patnaik PK, Pujari PS; Pattern of liver biochemical profile restoration following biliary decompression in benign and malignant conditions. Sch J App Med Sci. 2015;3(2):833-42.
2. Bari S, Malik AA, Wani KA. Role of pre-opreative biliary drainage in benign surgical obstructive jaundice. JK-Practitioner. 2014;19(1-2):11-20.
3. Assimakopoulos SF, Scopa CD, Vagianos CE. Pathophysiology of increased intestinal permeability in obstructive jaundice. World J Gastroenterol. 2007;13(48):6458-64.
4. Bhargava SK, Usha T, Bhatt S, Kumari R, Bhargava S. Imaging in Obstructive Jaundice: A review with our experience. JIMSA. 2013;26(1):43-6.
5. Irabor DO. The pattern of fall of serum bilirubin after operative relief of obstructive jaundice. A preliminary report. Rev Cienc Salud Bogotá (Colombia). 2009;7(2):8-14.
6. Fiori E, Atella F, Gazzanelli S, Masi ED, Lamazza A, Cangemi V, et al. The usefulness of biliary drainage for restoring liver function in obstructive jaundice. Panminerva Med. 1994;36:171-8.
7. Shukla S, Kharat PR, Patbamniya N, Kumar K. Clinicopathological study on patients presenting with obstructive jaundice. Int Surg J. 2018;5(2):705-10.
8. Gupta AK, Singh A, Goel S, Tank R. Profile and pattern of obstructive jaundice cases from a tertiary care teaching hospital of Uttar Pradesh. Int Surg J. 2017;4(2):743-6.
9. Saddique M, Iqbal SA. Management of obstructive jaundice: experience in a tertiary care surgical unit. Pakistan J Surg. 2007;23(1):23-5.
10. Athlin L, Blind PJ, Eriksson S. The value of biochemical tests in disriminating between malignant and benign pancreatic tumors. HPB Surg. 1994;4(2):147-55.
11. Wiwanitkit V. High serum alkaline phosphatise levels, a study in 181 Thai adult hospitalized patients. BMC Family Practice. 2001;2:2.

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