

Postoperative Renal Impairment in Patients with Obstructive Jaundice

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ABSTRACT

Objective To determine the frequency of postoperative renal impairment in patients with obstructive jaundice.

Study design Descriptive case series.

Place & Duration of study Surgical Unit II Civil Hospital Dow University of Health Sciences Karachi, from March 2011 to April 2014.

Methodology Patients of obstructive jaundice, with age more than fifteen year, serum bilirubin levels above 3 mg/dL, admitted for surgical procedure were selected. Data containing details of age, etiology of jaundice, duration of jaundice, preoperative liver function tests, coagulation profile, procedure, pre and postoperative renal function, urine output, complications and mortality were collected. Creatinine clearance (C24) was done. If the patient had postoperative serum creatinine levels of >1.3 mg/dL or urine output < 800 ml in 24 hours then C24 was also done. Renal impairment was labeled if C24 was < 40ml/min. All the data was analyzed on SPSS 17.

Results A total of 38 patients were included. Majority of the patients had history of jaundice for more than six week (mean=6.1±5.8 weeks). Ten (26%) patients developed renal impairment post-operatively out of which 4 (10%) had benign disease and 6 (15%) had malignant condition. No patient developed acute renal failure in immediate postoperative period.

Conclusion Postoperative renal impairment in obstructive jaundice patients occurred in quarter of the cohort studied despite adequate volume expansion.

Key words Renal impairment, Obstructive jaundice, Postoperative.

INTRODUCTION:

Patients with obstructive (surgical) jaundice are more prone to develop complications during surgery as compared to those without it.¹ One such apprehensive complication observed during surgical procedures in patients with obstructive jaundice is acute renal failure with a high mortality rate.^{1,2} This complication was first observed by Clairmont in 1910. Zollinger and William observed that patients with obstructive jaundice are more prone to acute renal failure when hemorrhage is encountered during surgery.³ It was also observed that this complication can be prevented

by optimizing the plasma volume during the perioperative period.³ Despite improvement in anesthesia and perioperative care, a large number of patient with obstructive jaundice still develop impairment of renal function during the surgical procedure.⁴⁻⁶ The rate of renal impairment in these patients ranges from 10 to 22 percent in different studies.^{2,7-9} Out of these 4-10% patients develop acute renal failure with high mortality rate.^{10,11}

Complications related to gall stones and obstructive jaundice are common in developing countries and procedures for relief of surgical jaundice are frequently performed.¹²⁻¹⁴ Nevertheless, very limited data is available from Pakistan addressing the issue of renal impairment in patients who undergo surgery for obstructive jaundice. A study from Pakistan included patients with preoperative renal impairment as well as those patients who developed renal

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impairment/compromise after surgery. It was reported that overall rate of renal impairment was 30 percent.¹⁵

The purpose of this study was to determine the frequency of renal impairment in patients with obstructive jaundice who underwent surgical exploration for the relief of jaundice so as to emphasize the need of proper assessment and monitoring of renal function in the perioperative period in order to reduce rate of complication.

METHODOLOGY:

This descriptive study was carried out from March 2011 to April 2014 at the Surgical unit II of Civil Hospital Karachi. Patients who were admitted with obstructive jaundice having serum bilirubin levels above 3 mg/dL and required surgical procedure, were selected. Patients with preexisting renal or liver pathology were excluded from the study. Patients receiving general anesthesia in preceding six weeks were also excluded.

Preoperative assessment of renal function included estimation of serum urea, creatinine and electrolytes. These tests were carried out two days prior to surgery and on first 2 consecutive days after the operation. All patients were optimized with 5% dextrose and normal saline preoperatively. All the patients received third generation cephalosporin antibiotic from the day of admission and were continued in the postoperative period for 5-10 days. Injection vitamin K (10mg) was administered intramuscularly for three days to correct prothrombin time. Type of surgical procedure, blood loss during surgery, duration of surgery, vitals signs and urine output during surgery were also recorded.

Postoperatively patients were either transferred to Intensive Care Unit or ward for immediate postoperative care and strict input and output charting was maintained. Renal functions were assessed on first two consecutive postoperative days. If the patient had creatinine of >1.3 mg/dl or urine output < 800ml/ day, then 24 hour creatinine clearance (C24) was done to establish renal impairment.

Impairment of renal function was defined as a postoperative C24 value of <40 ml/min. Renal failure was defined as a urine volume <400 ml/day. All patients were monitored for development of any complication till the day of discharge. Total hospital stay was recorded. The software program SPSS for Windows Version 17 was utilized for all statistical analyses. Range, mean ± (standard deviation) were used to analyze numerical data, whereas categorical

variables were expressed as percentages and frequencies

RESULTS:

Thirty eight patients with obstructive jaundice were included in this study. There were 12 (34%) males and 26 (66%) females. The age ranged from 22 year to 65 year (mean=41±10 year). Duration of jaundice was from one week to 26 weeks (mean=6.1±5.8 weeks). The commonest cause of obstructive jaundice was choledocholithiasis (n=22, 57%) followed by carcinoma head of pancreas (n=6, 15%). Other causes included the bile duct stricture (n=4), Mirizzi syndrome (n=4) and carcinoma ampulla of Vater (n=2).

Surgical procedures performed are shown in table I. The operation time ranged from 75 to 300 minutes (mean=150±92 min). The duration of hospital stay ranged from 12 to 58 days (mean=24±10 days). Preoperative serum bilirubin value was between 4-13 mg/dl (mean=11±6 mg/dl). Preoperative and postoperative blood urea values were 4-26 mg/dl (mean= 12±5mg/dl) and 9-82 mg/dl (mean= 32±17 mg/dl), while preoperative and postoperative values for serum creatinine were 0.6-1.3 mg/dl (mean= 0.9±0.2 mg/dl) and 0.58-2.5 mg/dl (mean = 1.2±0.4 mg/dl).

Table I: Operative Procedures Performed to Relieve Biliary Obstruction

Procedure	n	%
Common bile duct exploration	24	65
Whipple's procedure	3	7.5
Tripple bypass	5	13
Hepatico-jejunostomy	4	10
Cholecystectomy + choledocho-duodenostomy	2	5

Table II: Postoperative Complications

Complications*	n	%
Wound infection	10	26
Respiratory tract infection	3	8
Diarrhea	3	8
Anastomotic leak	2	5
Urinary tract infection	2	5
Prolonged ileus	1	2.5
Death	2	5

*Some patients had more than one complication

Overall 10 patients (26%) in our study developed renal impairment [benign pathology (n= 4, 10%), malignant condition (n=6, 15%)]. Two patients developed renal failure postoperatively. The most frequent complication noted was wound infection in 10 patients (table II). One patient died in second week after Whipple's procedure and another developed anastomotic leak after choledochoduodenostomy. He also died in second postoperative week due to sepsis and multi-organ failure.

DISCUSSION:

This study highlighted the fact that acute renal failure is an associated complication of surgery in patients with obstructive jaundice and fall in glomerular filtration rate is observed in majority of patients after surgery for correction of obstructive jaundice.^{9,15,16} Dawson was the first to observe that majority of patients undergoing surgery for obstructive jaundice have a greater fall in glomerular filtration rate when compared to patient who undergo surgery for other reasons.⁹ Number of studies were conducted in order to confirm the validity of the findings made by Dawson and showed that rate of renal impairment ranged from 10 to 22 percent.⁷⁻⁹ In our study the percentage of patients who developed renal impairment was 26% which is slightly higher. The findings in our study can be attributed to prolonged history of and severity of jaundice in the patients. In a local study, renal impairment was observed in 33% of the patient with obstructive jaundice. However, investigators in that study included the rates of preoperative renal impairment along with the renal impairment after the surgery resulting in higher rates of renal impairment and renal failure.¹⁵

Dawson used a mean postoperative C24 fall of more than 20 percent as a criterion of renal impairment.⁹ In our study creatinine clearance was done when a fall in postoperative urine output to < 800ml and or rise in creatinine >1.3 mg/dl were observed. This criteria has been used in earlier studies for evaluation for renal impairment.¹⁷ We find it cost effective when compared to criteria used by Dawson.

Endotoxemia is an important complications associated with obstructive jaundice and is due to absence of bile salts in gastrointestinal tract.¹⁸ Taking this fact into consideration some researches have tried to introduce bile salts in patients with obstructive jaundice prior to surgery to prevent renal impairment.^{19,20} Yet, some researches have used mannitol and dopamine in perioperative period to

ensure diuresis and improve glomerular filtration rate in these patients but have produced equivocal results.^{6,9,21} However the benefits of intravenous volume expansion have been validated by earlier studies.^{5, 21} By expanding the intravenous volume with normal saline prior to surgery, renal impairment can be prevented after surgery in patients with obstructive jaundice. Again it was Dawson who found the association of renal impairment with degree of jaundice.⁹ Studies also suggest that rate of renal impairment is more in patients with obstructive jaundice due to malignant pathology as compared to the patients who develop renal impairment due to benign pathology.¹²⁻¹⁴ Our finding are in consistent with the finding of earlier studies. Sitprijia and colleagues found that renal impairment is not only related to the degree of jaundice but also to the duration of jaundice and the level of malnutrition present in patients with obstructive jaundice due to malignant pathology.²³

The overall mortality reported in patients with obstructive jaundice undergoing surgery ranges from nil to 27 percent.^{6,8,11-14} Patients who develop acute renal failure after surgery for obstructive jaundice have mortality rate as high as 80 %.^{10,11} In our study we did not observe acute renal failure in patients immediately after surgery. Nonetheless, two of our patients developed acute renal failure in second week after surgery due to septicemia as a result of anastomotic leak.

The major limitation to our study is the absence of control group which if added would have given more precision to our results. Another limitation is that factors like preoperative status of nutrition, sepsis and coagulation status should have been taken into account to have accurate assessment.

CONCLUSION:

Postoperative renal impairment occurred in 26 percent of patients undergoing surgery for obstructive jaundice despite adequate volume expansion and antibiotic coverage.

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