RENAL DYSFUNCTION IN RELATION TO CAUSES OF OBSTRUCTIVE JAUNDICE

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ABSTRACT
Objective: *To determine the frequency of renal impairment and its relation with the type of obstructive jaundice.*
Study Design: *Descriptive case series.*
Setting & Duration: *Department of Surgery, Unit II and Unit VI, Dow University of Health Sciences and Civil Hospital, Karachi from July 2007 to December 2008.*
Methodology: *Forty three consecutive patients with obstructive jaundice were admitted and subjected to routine investigations and imaging for diagnostic evaluation. Outcome of interests were type of obstructive jaundice (benign or malignant) and renal impairment. Renal impairment was categorized into renal compromise and failure. Creatinine clearance (Cr24) was used to identify renal compromise. Renal failure was recognized if BUN to creatinine ratio was <20:1 and/or urine output <400 ml/day. The SPSS version 11 was applied to the data.*
Results: *The overall rate of renal impairment was 30.2% including (18.6%) renal compromise and (11.6%) frank failure. Majority of renal compromise (16.3%) was noticed in pre-interventional period whereas most of the renal failure (7%) observed in post-interventional period. Renal impairment had a significant association with malignant pathology as compared to benign cause (p=0.013).*
Conclusion: *Renal impairment is one of the major complications of obstructive jaundice and has high chance of occurrence if the cause of jaundice is malignant.*

KEY WORDS: *Obstructive Jaundice, Renal Impairment, Renal Failure*

INTRODUCTION

Obstructive jaundice is a clinical manifestation of intra- or extrahepatic blockage of bile flow.[1] When diagnosed, surgical, endoscopic or radiological intervention is usually recommended. However, despite advances in pre-operative evaluation, intervention and postoperative care, this clinical entity still carries high morbidity and mortality rates mainly due to sepsis and renal failure.[2,3] Various homeostatic disturbances have been observed in cholestatic jaundice, including delayed wound healing and infection,[4] renal failure,[5] biliary sepsis and endotoxemia,[6] and coagulopathies.[7] Acute renal failure is one of the major causes of mortality before/after surgical or endoscopic procedure in patients with obstructive jaundice.[2] Numerous predictive risk factors are attributed to renal impairment like age of patient,[8] duration of jaundice,[9] biliary sepsis,[6] and biochemical parameters (raised bilirubin and alkaline phosphatase levels).[10] Jaundice associated with malignancy has been considered a significant risk factor.[11]

Although most of the literature documented the occurrence of renal failure in obstructive jaundice,[2,5,9,11] but there is limited published data available addressing the issue of renal impairment in this surgical malady. The aim of this study was to determine the frequency of renal impairment and its relation with the type of obstructive jaundice.

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METHODOLOGY

This prospective case series was conducted at Department of Surgery, Unit II and Unit VI of Civil Hospital, Karachi from July 2007 to December 2008. Non-probability sampling technique was used. Inclusion criteria comprised of patients, above 20 years of age, having

obstructive jaundice with written consent of participation in this study. Obstructive jaundice was diagnosed on the basis of serum bilirubin > 5mg/dl in association with dilated intra and/or extrahepatic biliary tract on ultrasonography. Patients who had co-morbidities like chronic liver failure, cardiac failure, liver disease and ascites were excluded from the study.

At admission, all patients underwent baseline investigations including CBC, RBS, blood urea nitrogen (BUN), creatinine and electrolytes levels, PT (INR) and chest X-ray. Conservative management was instituted which consists of foley's catheterization (to monitor urine output per 24 hours), adequate hydration, high carbohydrate diet, vitamin K and FFP supplementation as needed (in case of deranged PT) and parenteral cefuroxime (to prevent biliary sepsis). Furthermore, for diagnostic evaluation of cause of obstructive jaundice, CT-scan/MRCP was carried out followed by definitive management i.e. endoscopic (ERCP) or surgical intervention depending upon the nature of disease process. Patients who had endoscopic biliary intervention were also subsequently managed in ward.

A proforma was designed to document patient's demographics (age and gender) and main outcome measures like type of obstructive jaundice (benign and malignant) and renal impairment. Impairment in renal function (both pre and post-interventional) was categorized into renal compromise and failure. Renal compromise was identified when values of creatinine clearance (Cr24) were less than 40 ml/minute. This was subjected only to those patients in whom serum creatinine and urea levels were found above 1.5mg/dl and 50 mg/dl respectively and /or urine output < 1000ml/ 24 hours. Frank renal failure was recognized when BUN to creatinine ratio being <20:1 and/or urine output < 400ml/day.

The software program SPSS for Windows (Version 11, 2002, SPSS Inc., Chicago, IL, USA) was utilized for all statistical analyses. Mean ± SD (standard deviation) was used to compute numerical variables, whereas categorical variables were expressed as percentages and frequencies. The Fischer's exact test was employed to assess differences in proportions and associations between categorical variables. A p-value less than 0.05 was considered statistical significance.

Table I. Etiology of obstructive jaundice

Causes	No.	%
Common Bile Duct Calculus	28	65.1
Bile Duct Stricture	1	2.3
Carcinoma Head of Pancreas	6	14
Carcinoma Gallbladder	3	7
Cholangiocarcinoma	4	9.3
Metastatic Carcinoma	1	2.3

	Compromise	Failure
Pre-interventional	7 (16.3%)	2 (4.7%)
Post-interventional	1 (2.3%)	3 (7%)

Table II. Renal impairment in relation to interventional period

RESULTS

A total of forty three consecutive patients of obstructive jaundice were selected during study period. Of these, there were 16(37.2%) males and 27(62.8%) females. The ages of the patients ranged from 21-85 years with mean (± SD) age as 47.21 (± 15.81) years. The etiology of obstructive jaundice was benign in 29(67.4%) cases whereas 14(32.6%) patients had malignant cause. Table I indicates the different causes of obstructive jaundice. Overall 13(30.2%) patients in this study developed impairment in renal function. Out of these, 8(18.6%) had renal compromise and 5(11.6%) showed failure. Majority of patients with renal compromise 7(16.3%) were noticed in pre-interventional period (Table II). All of them were managed conservatively by optimization of their hydration status. However, one patient with metastatic carcinoma at porta-hepatis developed renal failure and did not survive. Another patient with renal failure due to prolong history of CBD stone responded well to intermittent hemodialysis before intervention and recovered. CBD exploration was performed soon after recovery and no further complication were noticed. Most of the renal failure observed in post-interventional (7%) period and all were related to malignant etiology. There was significant association observed when comparing renal impairment with the type of obstructive jaundice; with more impairment encountered in patients having malignant jaundice as compared to benign one. (p=0.013) (Table III).

Table III. Renal impairment in relation to type obstructive jaundice

	Present	Absent
Benign disease	5 (17.2%)	24 (82.8%)
Malignant disease	8 (57.1%)	6 (42.9%)

** p-value 0.013*

DISCUSSION

This study showed that statistical difference and association exist in renal impairment with the type of obstructive jaundice. Moreover, there was significant number of patients having renal dysfunction. Acute renal failure is now recognized as a well established clinical phenomenon in obstructive jaundice. Green and better[12] documented its occurrence in 8% to 10% of cases. However, not much work has been done on renal impairment. About 20% of patients with obstructive jaundice have evidence of renal impairment as previously mentioned by Assimakopoulos.[2] Blamey and colleagues[13] reported the incidence of renal impairment in 22% of their cases. In this study, renal impairment was observed in thirteen (30.2%) patients, which seems unacceptably high. This discrepancy is probably due to delayed presentation of patients to surgeons.

This study also revealed eight (18.6%) patients with renal compromise and five (11.6%) with frank renal failure. Majority of the renal compromise were observed in pre-interventional period (16.3%). They were all managed conservatively by correction of hydration status and recovered. This fact was previously highlighted by Uslu[14] in their series. Although, role of bile salts alone in prevention of renal failure has been discussed previously by many studies[15,16] but adequate hydration is now considered a key factor in avoidance of renal impairment as mentioned by Pain and associates in their study.[17]

In this study, 67.4% of cases had a benign etiology in contrast to malignant cause (32.6%). This is comparable to the study conducted by Ahmad.[18] Critical review of etiology revealed twenty eight (65.1%) had CBD stones. Lucas and Chuttani[19] also documented gall stones as a major cause of obstructive jaundice.

Frequency of renal impairment is higher if the primary pathology of obstructive jaundice is malignant in origin. Moghimi and colleagues[20] found its relation with malignant cause in their study. Therefore, strong association of renal dysfunction is considered with the etiology of obstructive jaundice. In this study, 8(57.1%) patients having malignant cause developed renal impairment as compared to 5(17.2%) patients with benign etiology ($p=0.013$). Hussain and Fatima[11] in their study also observed high rates of renal failure with malignant jaundice.

There are several limitations of this study. Firstly, other complications like endotoxemia and coagulopathies, which are contributing factors in development of renal impairment in cases of obstructive jaundice, were not highlighted. Secondly, occurrence of post-interventional renal failure in cases of pre-interventional renal impairment was not determined. Finally, mortality associated with renal failure was not demonstrated also.

CONCLUSION

Renal impairment is one of the foremost causes of morbidity in obstructive jaundice. Furthermore, patients with cholestatic jaundice as a result of malignancy have a high chance of developing this complication.

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