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ACUTE RENAL FAILURE IN CHOLANGIOCARCINOMA - A CASE REPORT

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Abstract : Acute renal failure occurs in 8-10 percentage of patients requiring surgery for relief of obstructive jaundice leading to eventual mortality of 70-80 percentage. Studies have indicated that the retention of bile during cholestatic jaundice affect the integrity of cardiovascular function by reducing peripheral vascular resistance which results in systemic hypotension, by depressing myocardial performance, by causing profound natriuresis and diuresis that may lead to volume depletion and ultimately result in pre-renal failure. Studies have also demonstrated that kidney functions are affected by causing tubular cell toxicity leading to acute tubular necrosis. The above mentioned complications can be prevented by simple judicious management of the patients preoperatively by adequate hydration and oral bile salts. Herewith is presented a case of cholangiocarcinoma, where the patient developed acute renal failure postoperatively, and was taken up for haemodialysis with very little improvement.

Keyword : Cholangiocarcinoma, Cholestasis, Acute renal failure, Peripheral vascular resistance, Endotoxemia

CASE HISTORY:

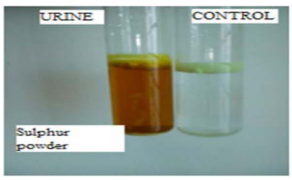
56 year old man was admitted with complaints of high coloured urine, abdominal pain, pale stools and itching of two weeks duration. He was investigated and diagnosed as a case of cholangiocarcinoma. Patient was taken up for endoscopic retrograde cholangiopancreatographyand stenting was done to relieve the obstruction and to reduce the intensity of jaundice. On the second postoperative day patient developed fever, hiccup and abdominal distension. Subsequently the patient developed increased serum levels of urea and creatinine with hyponatremia and was diagnosed to have acute renal failure. He was taken up for haemodialysis twice with very little clinical improvement.

INVESTIGATIONS:

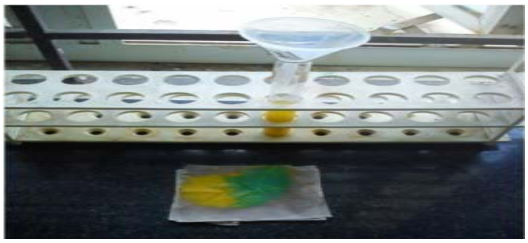
1) Complete blood count: Normal.

2) Urine:

i) Bilesalts: Hay's test positive. Bile salts present.



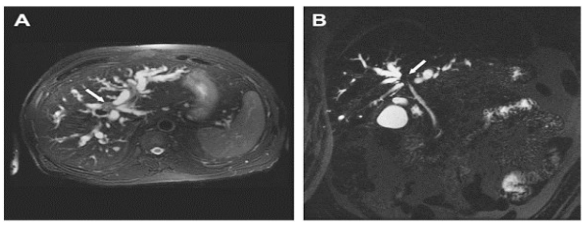
ii) Bile pigments: Fouchet's test positive. Bile pigments present.



3) Ultrasound abdomen: Common bile duct growth.

4) Magnetic Resonance Imaging Abdomen: Growth involving biliary confluence and obstruction with dilated intrahepatic and extrahepatic biliary radicles. Lesion infiltrating portahepatis.(A)

5) Magnetic Resonance CholangioPancreatography: Cholangiocarcinoma.(B)



6) Serial biochemical investigations:

Days	T.Bilirubin mg/dL	SGOT IU/L	SGPT IU/L	ALP IU/L	S.Urea mg/dL	S.Creatinine mg/dL	S.Sodium mEq/L	S.Potassium mEq/L
Admission	10.5	104	158	452	25	0.6	142	4.8
Preoperative	19.8	171	183	480	32	0.6	139	4.8
Postoperative	25.2	213	225	492	273	5.3	128	3.6
Post dialysis	29.4	241	708	950	276	3.7	131	3.9

The above investigations show that the patient had cholangiocarcinoma with obstructive jaundice. The admission time and preoperative serum urea, creatinine and sodium levels were normal. Patient was taken up for stenting and postoperatively the serum levels of urea and creatinine raised sharply and patient went into acute renal failure. Haemodialysis was done but there was not much improvement.

DISCUSSION:

Major factor that may underlie the susceptibility to renal failure in patients with obstructive jaundice is cardiovascular instability manifested as systemic hypotension and defective vascular reactivity. Studies indicate that bile constituents like bile acids, bilirubin and bile salts exert deleterious effects on cardiovascular function, blood volume and kidneys causing prerenal failure and acute tubular necrosis.1 Moreover studies also indicate that the incidence of postoperative renal failure was directly related to degree of jaundice. The overall mortality rate for patients undergoing surgery for obstructive jaundice is 16-18%. Acute renal failure occurs in approximately 8-10% of patients requiring surgery for relief of obstructive jaundice and contributes to eventual mortality in 70-80% of those who develop it.1 The following mechanisms have been postulated in the development of acute renal failure in cases of obstructive jaundice:

1)Altered systemic hemodynamics in obstructive jaundice – Hypotension and Impaired vascular reactivity: Both in vivo and in vitro animal and human studies of the isolated effect of cholestasis have demonstrated development of hypotension and reduced total peripheral resistance due to vasodepressor effect of bile constituents. A blunted pressor response to vasoactiveagents and to volume expansion was also observed. 2 Thus the overall effect of obstructive jaundice on the peripheral vasculature in humans and animals are those of decreased vascular resistance with normal or low bloodpressure and an exaggerated hypotensive response to volume depletion.

2)Impaired cardiac performance in obstructive jaundice – The Jaundiced Heart:

The association of jaundice with bradycardia has been known for over a century. Many in vivo and in vitro studies have established the negative chronotropic and ionotropic effects of bileacids. Some of the studies have shown the following could be the mechanism of action:

i) Mechanical interference of bile acids with membrane function by forming a monolayer on the surface of the cell membrane.

ii) Negative chronotrophic effect of bileacidswhich is mediated by vagal stimulation .

iii) Negative ionotropic effect of bile acids – by the reduction in the duration of the action potential due to suppression of the slow inward current of calcium.

iv) In jaundice induced cardiac myopathy, the cellular mechanism for this abnormality may be due to a depletion of intracellular glycogen and defective energy metabolism.1

3) Effect of obstructive jaundice on kidney function: Prolonged exposure of kidneys to the bile constituents like bile acids and bilirubin causes oxidative damage to the tubular cell integrity and function by stimulating the generation of oxygen free radicals, thereby affecting the kidneys.3 Moreover studies have demonstrated that the bile granules in the cytoplasm of tubular epithelial cells and bile thrombi in the dilated tubules could also be a potential cause for acute tubular necrosis causing renal failure.4

4) Diuretic and natriuretic effect of bilesalts – a potential cause for hypovolemiain obstructive jaundice: The retained bile acids in obstructive jaundice have a diuretic and natriuretic effect by inhibiting the proximal convoluted tubular reabsorption of sodium leading to increase in sodium excretion and urine flow. 5

5) Endotoxemia and obstructive jaundice: Endotoxemia occurs in 25-85% of patients with obstructive jaundice. There is considerable evidence that endotoxemia is the underlying cause of some complications seen in this condition eg. renal failure, coagulation disorders, gastrointestinal haemorrhage and depressed cellular immunity. The absence of bile acids in the gut allows enhanced absorption of endotoxin from the gut. In addition the high level of circulating bile acids brings about impaired detoxifying effect by the kupffer cells.6Moreover studies have shown that orally administered bile salts can protect the kidneys.1

6) Nitric oxide and obstructive jaundice: The endotoxemia observed in obstructive jaundice triggers nitric oxide(NO) synthesis thereby leading to systemic hypotension. There are two NO synthase enzymes. One is always present in the vascular endothelium generating low concentration of NO and regulating physiologic vascular tone, blood pressure and tissue perfusion. The second NO synthase is induced in vascular endothelium and smooth muscle cells by endotoxin and some cytokines. The induction of this second enzyme causes prolonged NO synthesis which leads to sustained vasodilatation and resistance to vasoconstriction. Studies have also shown that NO produced by kupffer cells and hepatocytes in response to endotoxin inhibits hepatocyte protein synthesis including coagulation factors.7NO produced by activated macrophages may mediate endotoxin or drug induced hepatotoxicity. 1

Clinical assessment and management of patients with obstructive jaundice: The risk of post operative renal failure and mortality in patients with obstructive jaundice appears to be directly related to the degree of jaundice.8So several studies have attempted to lower the morbidity and mortality by performing preoperative percutaneous biliary drainage. The internal drainage is more beneficial than external drainage as the bile acids and bile salts reduce endotoxemia and partially reduce the incidence of renal failure and mortality.7Several studies have shown that preoperative administration of sodium deoxycholate prevents systemic and portal endotoxemia, and also prevents postoperative renal dysfunction.9 Patients with obstructive jaundice are prone to develop hypotension, blunted vascular response to blood loss and impaired myocardial function. Hence the maintenance of circulatory extracellular volume is the mainstay of treatment and prophylaxis in jaundiced patients undergoing surgery. 1,9

CONCLUSION:

Hence in this case study, the patient had cholangiocarcinoma with a high degree of obstructive jaundice. Patient was taken for surgery and he went into acute renal failure postoperatively. The probable causes for the renal failure can be long standing high degree of obstructive jaundice causing multiple deleterious effects on the cardiac and kidney function. Therefore precautionary measures like biliary drainage, fluid management and oral bile salts can be considered to prevent postoperative Acute Renal Failure in patients with obstructive jaundice thereby reducing the morbidity and mortality.

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