Renal failure in obstructive jaundice—clinical aspects

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Summary

The patient with obstructive jaundice has an increased risk of developing renal failure. The commonest clinical situations in which this is seen is after surgical operation, as a result of percutaneous cholangiography or in association with severe ascending cholangitis. The risk of acute renal failure is decreased by ensuring adequate hydration and maintaining a high urine flow, if necessary using mannitol or some other osmotic diuretic. In patients undergoing percutaneous cholangiography, prophylactic antibiotics are probably indicated. Early surgery to control severe ascending cholangitis may be life saving and also prevent the development of renal failure.

Introduction

The association between obstructive jaundice and acute renal failure has been recognized for well over a century. One of the first descriptions was of a patient with fulminating ascending cholangitis who became oliguric and died (Dewey, 1843), whilst later it was postulated that surgical exploration of the jaundiced patient might precipitate acute renal failure (Clairmont and Von Haberer, 1911). It must be emphasized that this association had nothing to do with the 'hepato-renal syndrome' (Heyd, 1924), a term which is best discarded.

Incidence

In a survey of 107 patients undergoing operation for the relief of obstructive jaundice, seven deaths were due to acute renal failure (Dawson, 1965); this incidence is many times that anticipated in a comparable group of non-jaundiced patients. The deeper the jaundice the greater the risk, thus six of the seven deaths occurred in patients whose immediate pre-operative bilirubin was over 20 mg%. It is of interest that in the same period that the survey was taking place, two patients were admitted, to the same hospital, with fulminating ascending cholangitis and they both died of oliguric renal failure.

Aetiology

Experiments were devised in rats to compare the effects of renal ischaemia in jaundiced and non-

jaundiced animals (Dawson, 1964). The results showed that the presence of obstructive jaundice sensitizes the renal parenchyma to damage by ischaemia. A solute diuresis (using mannitol), initiated before the renal clamping, offered considerable protection in the experimental animals (Dawson, 1965). Later, comparable experiments in Gunn rats (a species unable to conjugate bilirubin) showed no difference between those animals with and those without their bile ducts ligated (Baum, Stirling and Dawson, 1969). These findings suggest that it is probably the circulating conjugated bilirubin which was responsible for the increased sensitivity of the renal parenchyma to damage. Injected endotoxin has been shown to produce renal damage much more readily in jaundiced animals (Wardle and Wright, 1970); furthermore, clearance of endotoxin in jaundiced animals was impaired.

Clinical aspects

Acute renal failure may be precipitated in patients with obstructive jaundice either by operation or septicaemia or a combination of both. Septicaemia is commonly associated with severe ascending cholangitis. Occasionally, percutaneous cholangiography may initiate septicaemia in the deeply jaundiced patient.

Surgical operation

A conventional 'preparation' for surgical operation in this country is a combination of starvation and dehydration. These effects are best avoided in the ill jaundiced patient. For 12 hr before operation all patients should be given 1-1.5 l of intravenous glucose saline. A solute diuresis using 200-300 ml of 10% mannitol is initiated before induction of anaesthesia and a catheter is passed once the patient is asleep. An infusion of 5% mannitol is then given as necessary to maintain the urine output at 40-60 ml/hr over the next 48 hr.

Percutaneous cholangiography

There is no doubt that percutaneous cholangiography may precipitate Gram-negative septicaemia. It is most likely to occur in those patients with gall-

stones or stricture rather than tumour, as a positive bacterial culture of the bile in stones or stricture is found in more than 60% of patients, whereas in those with tumours the incidence is less than 10%. Thus, before percutaneous cholangiography, intravenous glucose should be given for 12 hr together with ampicillin 500 mg q.d.s. prophylactically for the same period, the ampicillin is maintained for at least 48 hr after operation.

Ascending cholangitis

The development of severe ascending cholangitis sets the scene for the development of renal failure because the increasing pigment load is associated with the worsening of the septicaemia. There is good evidence that obstructive jaundice interferes with the ability of the reticulo-endothelial system to deal with endotoxin (Wardle and Wright, 1970), so that as the jaundice deepens the body's ability to deal with the infection is progressively impaired. Furthermore, the penetration of antibiotics into the obstructed biliary system is poor (Mortimer, Mackie and Haynes, 1969). The clinical management of these patients may be difficult. The principles of treatment are adequate intravenous fluids. A central venous catheter is invaluable, for assessing the colloid requirements, if the patient shows signs of septic shock. A urinary catheter is necessary to monitor the urine output and mannitol should be administered to maintain this at 40–60 ml/hr as required. Massive doses of chemotherapy should be given from the onset once blood for bacterial culture has been taken.

If the patient does not improve within 12–24 hr, then urgent exploration may be required to drain the biliary tree. The more ill the patient, the greater the need for operation. Once bile drainage is established the pigment load is relieved and antibiotic penetration of the bile is then possible, thus allowing control of septicaemia and prevention of renal failure. The rapid improvement of such patients after operation is very striking. Even if renal failure has developed, exploration is still indicated because, until the septicaemia is controlled and further hepatic damage prevented, treatment for the acute tubular necrosis is extremely difficult.

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