Original article

Non-operative management of haemobilia

J. Moodley, B. Singh, S. Lalloo*, S. Pershad and J. V. Robbs

Departments of General Surgery and *Radiology, University of Natal, Durban, South Africa
Correspondence to: Professor J. V. Robbs, Department of Medicine, University of Natal, Private Bag 7, 4013 Congella, South Africa
(e-mail: moodleyj6@nu.ac.za)

Background: The aim was to evaluate a non-operative approach to the management of haemobilia.
Methods: This was a retrospective analysis of patients presenting over 10 years with haemobilia. All patients had upper gastrointestinal endoscopy, abdominal ultrasonography and digital subtraction angiography. Superselective coil and/or Gelfoam embolization was done as close as possible to the bleeding site. Completion angiography was performed routinely to confirm adequate embolization.
Results: There were 23 patients with liver trauma and six with inflammatory conditions. All patients required resuscitation with fluids and blood transfusion, and had the haemobilia controlled successfully by angiographic embolization. There was one death from fulminant hepatic sepsis.
Conclusion: This series attests to the efficacy of a non-operative approach to haemobilia using radiological diagnosis and intervention.

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Introduction

Francis Glisson introduced the diagnosis of haemobilia in 1654, but Antoine Portal reported the first documented case in 1777[1]. In 1871 Quincke described the cardinal features of the condition, namely gastrointestinal haemorrhage, biliary colic and jaundice. The advent of more sophisticated imaging techniques has culminated in an increased frequency of diagnosis of haemobilia and the potential for its successful management. Optimum therapy remains uncertain because of the small numbers in reported series. While interventional radiological and percutaneous hepatobiliary procedures account for the majority of reported cases in the literature today, trauma and, to a lesser extent, hepatic infection and infestations remain leading aetiological agents in Third World environments[2,3].

Therapeutic options for the management of this condition revolve around surgery[4,5] and interventional radiology. This paper evaluates an experience of a non-operative approach to the management of haemobilia.

Patients and methods

Over 10 years from June 1990 to June 2000, 29 patients with haemobilia presenting to the surgical services at King Edward VIII Hospital in Durban, South Africa were evaluated. There were 28 men. All 29 patients were young and healthy; their mean age was 22 (range 14–40) years.

All patients had blood investigations performed including a full blood count, measurement of urea and electrolytes, partial thromboplastin and prothrombin times, and a liver function profile. All patients had upper gastrointestinal endoscopy, abdominal ultrasonography and, in the presence of persistent upper gastrointestinal haemorrhage, coeliac digital subtraction angiography. Coeliac angiography was performed via femoral artery access using the Seldinger technique. All patients had superselective coil and/or gelfoam (Spongostan®, Johnson and Johnson, Durban, South Africa) embolization as close as possible to the bleeding site to reduce the risk of significant hepatic necrosis. A 5-Fr catheter system sufficed in the majority of cases; a 2·5-Fr microcatheter with coaxial delivery was required on three occasions. Completion angiography was performed routinely to confirm adequate embolization. Once the melaena had stopped and the haemoglobin level was maintained, patients were discharged at least 72 h after radiological intervention.

All patients were followed at 2 weeks, 1 month and then 3-month intervals for 1 year after intervention.

Results

In 23 patients there was a preceding history of abdominal trauma that was managed by laparotomy. Twenty patients had penetrating abdominal trauma: 16 had sustained a gunshot wound and four had stab wounds. Three patients

Table 1 Mechanism and management of hepatic injury

Mechanism of injury	*n*	Drain	Debride and suture	Packs
Gunshot	16	7	6	3
Stab	4	2	1	1
Blunt trauma	3	2	1	–

All hepatic injuries were drained

sustained blunt abdominal trauma following a motor vehicle collision. *Table 1* demonstrates the mechanisms of injury and the management undertaken at operation. The right lobe of the liver was involved in all but two patients. Seven patients had an isolated hepatic injury; other patients had associated injuries to the stomach ($n = 6$), duodenum ($n = 1$), small bowel ($n = 5$) and colon ($n = 6$).

Of six patients who developed haemobilia without a preceding history of hepatic trauma, four had complicated biliary ascariasis, three of whom had previously required surgery for the condition. One patient had complicated peptic ulcer disease and the sixth required drainage of a localized abscess following open cholecystectomy.

Presentation

The earliest presentation was 7 days after surgery (mean 16 (range 7–211) days). All patients were readmitted for this problem after apparent recovery from the preceding surgical procedure. Anaemia with melaena was observed in all patients; haematemesis was noted in only three. Colicky right upper quadrant pain was present in 15 of the 29 patients, but only 11 were jaundiced.

Management

All patients presented with upper gastrointestinal haemorrhage requiring aggressive resuscitation with crystalloids and blood transfusion. Seven patients with preceding hepatic trauma presented in shock. The mean haemoglobin concentration was 6·1 (range 4–8) g/dl. A mean of 4 (range 2–10) units of packed cells was transfused.

The liver function profiles demonstrated a moderate increase in alkaline phosphatase (mean 270 (range 190–510) IU; normal up to 150 IU) and mild increases in bilirubin level (mean 32 (range 26–81) μmol/l; normal up to 17 μmol/l). The level of aspartate aminotransferase was also marginally increased (mean 34 (range 22–42) IU; normal up to 27 IU). This was similar in both trauma-related and unrelated pathology.

Initial diagnostic investigation in all patients comprised upper gastrointestinal endoscopy as well as abdominal ultrasonography. The latter was performed to identify solid visceral pathology that may have indicated the source of bleeding. The endoscopic examination was normal in 22 patients. In seven patients blood was identified in the second part of the duodenum and in one patient an extrinsic pulsatile mass was identified over the duodenum but the source of haemorrhage could not be defined. Abdominal ultrasonography proved useful in only seven patients; three with ascariasis were identified as harbouring worm nests and in two patients an intrahepatic haematoma was identified. Colour Doppler ultrasonography suggested the diagnosis of intrahepatic false aneurysm and arteriovenous fistula in one patient each (*Fig. 1*).

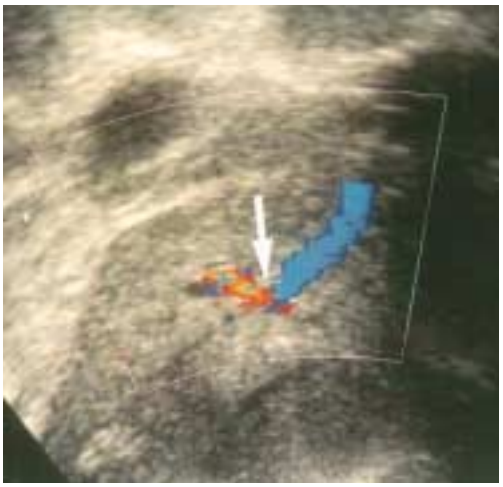

Fig. 1 Longitudinal colour Doppler sonogram demonstrating arteriovenous fistula (arrow)

All 29 patients underwent angiography at which a pseudoaneurysm of either the right or left hepatic artery, or a branch thereof, was identified and embolized (*Fig. 2*). In four patients an associated arteriovenous fistula was detected. In one patient, following a gunshot injury to the right lobe of the liver and the duodenum, a hepaticoduodenal fistula was found.

Complications

There were no complications related to the angiographic procedure; in particular, no bleeding from the puncture site or renal impairment was seen. There was one death in this series of 29 patients. This patient, who had undergone laparotomy for a gunshot injury to the liver, required relaparotomy for sepsis that developed 3 days after successful angiographic embolization. He was found to have fulminant hepatic sepsis and necrosis, and died during the reoperation from intractable bleeding consequent to debridement and a refractory coagulopathy.

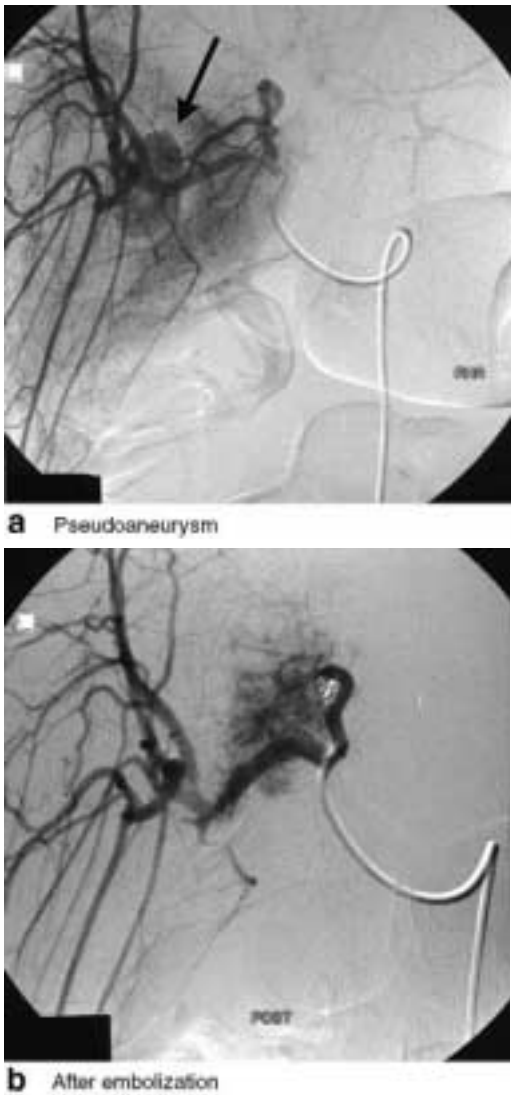

Fig. 2 Selective right hepatic arteriograms demonstrating a pseudoaneurysm (arrow) (**a**) that was successfully obliterated with the use of a Gianturco® (Eastcoast Medical, Denver, Colorado, USA) embolization coil (**b**)

The remaining patients had an uneventful postprocedural course and remained well during follow-up. All patients were able to return to work within 2 weeks of successful angiographic embolization. At 6-month follow-up, all 28 patients were in good health with no recurrent bleeding. This outcome was maintained in the 18 patients reviewed after 1 year. Ten patients were lost to follow-up.

Discussion

Haemobilia is one of the more commonly reported causes of obscure gastrointestinal haemorrhage. This is particularly so in the current era when interventional radiological and percutaneous procedures are increasingly being undertaken to treat or evaluate hepatobiliary disorders and the transplanted liver[6,7]. The increasing prevalence of abdominal trauma following motor vehicle collisions and interpersonal violence predisposes the liver to trauma that may complicate acutely or belatedly as haemobilia[8]. The diagnosis of haemobilia requires clinical suspicion in the appropriate clinical situation, that is gastrointestinal bleeding without a demonstrable intestinal source in the presence of hepatic pathology.

Failure to identify the source of upper gastrointestinal haemorrhage at endoscopy results in a clinical dilemma. The authors' policy has been to perform abdominal ultrasonography to image the liver and the pancreas in order to identify lesions that may bleed into the duodenum. This is particularly pertinent for hepatic conditions that primarily or secondarily predispose to suppuration. In the tropics, biliary ascariasis complicated by a hepatic abscess may be an important cause of haemobilia. This was noted in four patients in the present series.

The origins of haemobilia may be diverse and include the cystic artery, anomalous hepatic artery, and hepatic artery to portal vein fistulas[9,10]. The advent of laparoscopic surgery has seen the emergence of cystic artery aneurysms presenting with haemobilia. This complication must be considered in patients presenting with upper gastrointestinal bleeding following laparoscopic cholecystectomy[11].

Colour Doppler ultrasonography proved diagnostic in the two patients in whom it was undertaken. The value of duplex sonography is largely operator dependent, and remains to be validated as it offers low sensitivity for smaller lesions and there is no potential for therapeutic intervention.

Following ultrasonography, the best diagnostic option, in the authors' experience, is angiography rather than computed tomography (CT). While the role of CT in assessing the extent of hepatic trauma is universally established, its role in the management of haemobilia is less clear. The currently available helical CT enables identification of parenchymal and associated vascular injuries, such as a false aneurysm, which allows subsequent angiography to be targeted. In the present study CT was used to confirm haemobilia only in patients with suspected hepatic trauma who had not undergone laparotomy. Angiography has the capability of therapeutic intervention; it is attractive because vascular disruption can be identified, the pathology of smaller vessels can be defined precisely, and definitive therapy by radiological intervention may be undertaken following diagnosis.

The embolization technique undertaken in this series did not occlude the artery distal to the aneurysm, yet this

approach was consistently successful. The risk of persistent bleeding from collateral vessels following proximal embolization has to be weighed against the possibility of hepatic necrosis when the embolization is done distally as well.

Upper gastrointestinal haemorrhage, jaundice and biliary colic are the triad of symptoms that have been described in surgical texts. The colicky pain associated with haemobilia has been attributed to clot formation in the biliary tree[12]. However, this is controversial as it has been suggested that substances in bile preclude the development of thrombosis[13]. The colicky pain in haemobilia may be due to the sustained distension of the biliary tree by free-flowing blood. This suggests that the symptom would occur only when there is active haemorrhage at the time of presentation. The absence of recognizable pathology at upper gastrointestinal endoscopy and ultrasonography should prompt the use of angiography to localize the source of bleeding if it is clinically significant.

In this series, hepatic artery pseudoaneurysm was the commonest angiographic explanation for haemobilia. Bleeding from pseudoaneurysms is invariably directed into the adjacent disrupted biliary radicle rather than into portal vein radicals. The reasons for this are unclear. It may be a consequence of a pressure gradient, or due to the direction of flow. With respect to arteriovenous fistulas, the liver anatomy favours the development of hepatic artery to portal vein fistulas[14,15]. Communication between the hepatic artery and the hepatic vein consequent to pseudoaneurysm may occur with centrally located lesions, probably owing to the larger-calibre central hepatic veins.

This review attests to the value of a non-operative approach to the management of haemobilia by means of interventional radiological therapy. This approach was invariably beneficial and had an impressive therapeutic success rate coupled with a negligible morbidity and mortality rate. Surgery could be reserved for patients who cannot be managed radiologically.

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