The conservative management of blunt hepatic trauma is well established. Nonetheless, complications such as the development of complicated bile collections and traumatic pseudo-aneurysms can arise following a conservative management course. We present a patient who developed two distinct complications of blunt hepatic injury, both of which were successfully treated with a combination of interventional radiological and endoscopic procedures.

Case report
A 25-year-old man presented with progressive right upper quadrant (RUQ) pain. He had been assaulted and sustained focal blunt abdominal trauma 10 days previously.

On examination he had a pulse rate of 100/min and a blood pressure of 195/90 mmHg. Abdominal examination elicited mild RUQ tenderness. A contrasted abdominal computed tomography (CT) scan confirmed the presence of a large, sub-capsular collection, with a CT number of 18 Hounsfield units, suggestive of a biloma (Fig. 1, a). No features of arterial contrast extravasation were visible on the CT images. Ultrasound-guided percutaneous drainage of the sub-capsular collection was performed, confirming a biloma. Subsequent recorded drainage of bile averaged 500 ml/day without tapering, indicating a persistent biliary fistula. Endoscopic retrograde cholangiopancreatography (ERCP) and papillotomy were therefore performed, and the biliary drainage resolved.

Three days after the endoscopic procedure, the patient had a significant episode of haemobilia, identified by the contents of the pigtail drain. A catheter-directed angiogram was performed. This demonstrated a pseudo-aneurysm involving a segmental branch of the right hepatic artery (Fig. 1, b). Selective angio-embolisation of the segmental branch resolved this complication (Fig. 1, c). The patient subsequently had complete resolution of the biliary fistula and haemobilia.

Discussion
Non-operative management of blunt liver trauma in the haemodynamically stable patient without peritoneal signs has
become the standard of care. Complications of conservatively treated liver injuries are generally related to either ongoing biliary leakage or ongoing haemorrhage. Injury to a major biliary duct may result in significant biliary leakage.

A collection of bile is referred to as a biloma. A biloma may cause pressure symptoms or may become infected. The principles of management of a biloma are to ensure external drainage of the biliary collection. Most bilomas can be drained percutaneously under radiological guidance. This is frequently sufficient to resolve the problem. If there is a persistent biliary leak, the patient may develop an external biliary fistula. If this does not resolve, the next step is to alleviate the functional distal obstruction of a competent sphincter of Oddi. This is relatively easily achieved by ERCP and papillotomy or by biliary stenting. Once the functional obstruction of the competent sphincter is removed, any ongoing biliary fistula generally resolves. If the fistula persists after endoscopic sphincterotomy, the endoscopic placement of a stent across the injury or open exploration are the next steps in the management algorithm.

Traumatic haemobilia is a rare complication with a prevalence of less than 3% of liver injuries. It is potentially life threatening. Selective arterial angio-embolisation is the intervention of choice in the management of this complication. It has been used extensively locally with excellent results. The reported mortality for the operative management of haemobilia is as high as 40%. Our patient is interesting, as he developed both major complications of blunt hepatic trauma and both were treated successfully non-operatively. He is a testament to the success of the serial application of minimally invasive techniques in the treatment of two rare complications of blunt hepatic trauma.

REFERENCES