International Urology and Nephrology 26 (4), pp. 399–404 (1994)

Splenic Injury: A Rare Complication of Percutaneous Nephrolithotomy

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(Accepted January 3, 1994)

Splenic injury in the course of percutaneous nephrolithotomy is extremely rare. We report on a splenic perforation and subcapsular haematoma of a female patient who was treated for staghorn stone in the left kidney by percutaneous nephrolithotomy. The splenic injury without external bleeding was diagnosed by ultrasonography and computed tomography. The patient was subjected to splenectomy.

Potential complications of percutaneous intrarenal surgery include traumatic injuries to adjacent organs. Injuries to the colon, liver, lung, pleura, duodenum, gallbladder and spleen have been described; of these perforation of the spleen is the most uncommon [4, 5]. Parenchymal organs of substantial size – the liver on the right and spleen on the left – lie very close to the kidneys. Due to the relatively thin capsule and abundant blood supply of these organs, their intraoperative injury may lead to severe haemorrhage. Symptoms of injury may arise during the operative procedure itself as well as in the early or late postoperative period.

There is a greater risk of traumatization of the spleen in the course of access to the upper pole or to the middle portion of the left kidney and in the case of splenomegaly.

Case report

A 68-year-old woman was admitted to our Department with blunt left flank pains. Laboratory findings including bleeding time and clotting time were within normal limits except for marked pyuria. A staghorn calculus filling the pyelon, lower calyx and the branches of the middle calyx of the left kidney was demonstrated on plain X-ray film (Fig. 1).

Excretory urography revealed good renal function on both sides and mild renal ptosis on the right. No significant dilation could be observed around the staghorn calculus, and ureteric passage was without obstruction (Fig. 2).

Percutaneous removal of the staghorn calculus was planned via the stone-free upper calyx.

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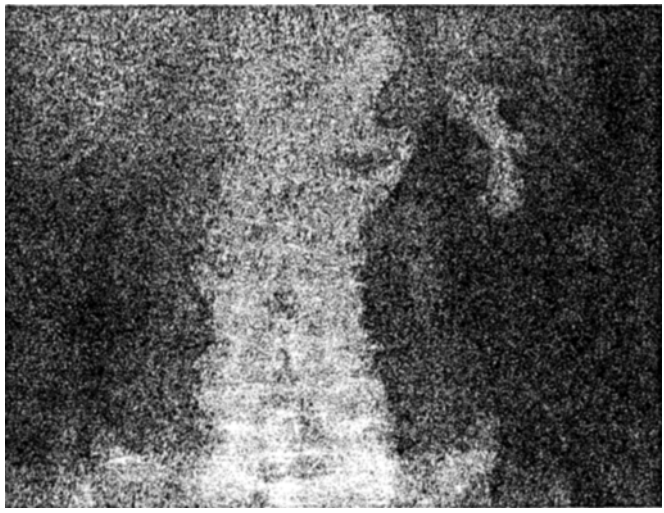

Fig. 1. Plain film shows a staghorn calculus on the left side

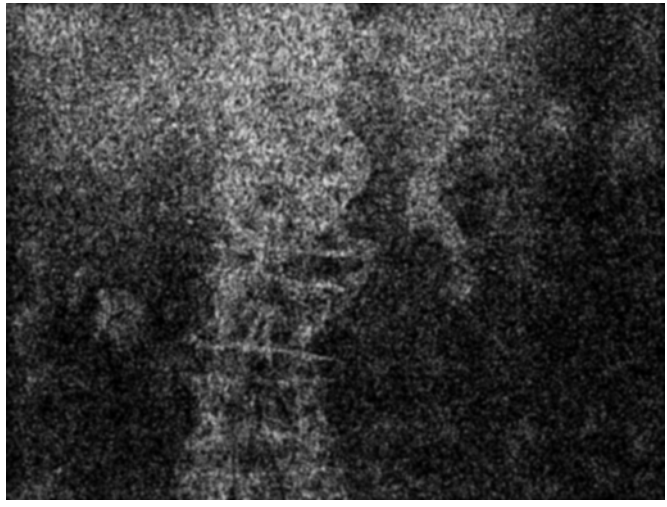

Fig. 2. Excretory urography: The cavity system is not significantly dilated around the staghorn calculus; free ureteric passage

The patient was operated on in the prone position and under general anaesthesia. Puncture of the left upper calyceal end was performed under fluoroscopic control below the XIth rib in the posterior axillary line. The puncture channel was dilated with metallic telescopic dilators over a guidewire. A 26 F nephroscope was inserted through the upper calyx, and the stone occupying the renal pelvis was fragmented with an ultrasound probe. Larger fragments were extracted with forceps, while the debris was evacuated by suction. Stone particles were pulled out of the middle calyceal branches and were completely eliminated in the same way, just like the stone load of the lower calyx. No bleeding was observed during the manipulation and a 22 F drain was left in the pyelon after removal of the nephroscope.

Prophylactic subcutaneously administered heparin was initiated in the postoperative period. The patient continued to be well until the 4th postoperative day. Stone fragments in the upper ureter ("steinstrasse") could be seen on an X-ray film on the first postoperative day, but larger stone particles could not be visualized (Fig. 3). Antegrade pyelography performed on the following day demonstrated free passage in the ureter without extravasation (Fig. 4).

The patient suddenly became anaemic on the 4th day after the operation: haemoglobin decreased from 7.8 mmol/l to 5.3 mmol/l. She developed mete-

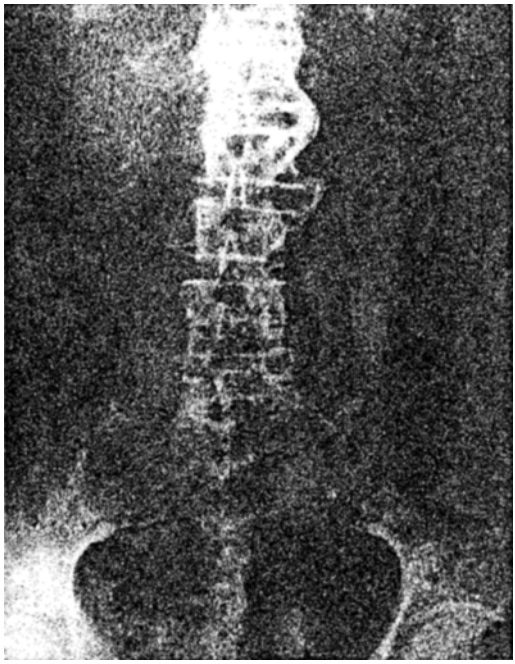

Fig. 3. Plain film taken on the first postoperative day shows small stone fragments in the upper ureter

Fig. 4. Antegrade pyeloureterogram performed through the drain in the upper calyx provides mild dilatation of the collecting system and unimpaired flow of contrast medium into the ureter

orism and a tenderness appeared under the left costal arch. Blood count was restored to normal temporarily after the administration of 3 units of blood. Abdominal distension did not cease significantly despite defecation.

Sonography revealed the cause of the patient's blood loss and abdominal symptoms, showing normal sized kidney without perirenal haematoma and an extremely enlarged, inhomogeneously structured spleen (Fig. 5). Computed tomography demonstrated a subcapsular haematoma about 12×10 cm in size inside the spleen (Fig. 6). Splenectomy was done from an upper median laparotomy. A penetrating perforation was discovered on the lower pole of the removed organ, but no blood was found in its vicinity. The patient's further postoperative period was uncomplicated.

Fig. 5. Ultrasonography reveals an enlarged, inhomogeneously structured spleen

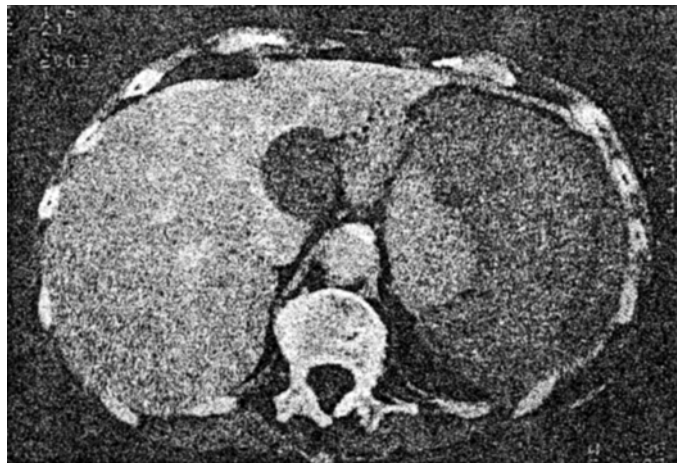

Fig. 6. Abdominal computed tomography scan shows subcapsular haematoma inside the spleen

Discussion

In planning the puncture of the upper calyx of the left kidney special care is required in view of the danger of accidental splenic injury. Hopper and Yakes suggested that at full expiration in the prone position the risk of puncturing the spleen is minimal when the needle is inserted via the posterior XIth–XIIth rib intercostal approach [3]. In such a situation puncture of the pleura may occur. In the course of higher intercostal puncturing, in the Xth and XIth rib intercostal space, the chance of injury to the spleen is greater on expiration. A more lateral puncturing includes a higher risk to the spleen [2].

It is recommended to control the puncture by ultrasound in order to keep away from the spleen, especially when it is enlarged.

Perforation of the spleen generally produces severe haemorrhage, but it can occur without bleeding, too. In our case the nephroscope and later the thick percutaneous nephrostomy drain could prevent bleeding from the spleen. Postoperative anaemization may be due to splenic injury even when no outward haemorrhage can be observed.

Percutaneous nephrostomy tube placement through the spleen with infection can lead to splenic abscess [7].

Splenic trauma, subcapsular haematoma can be detected with great certainty by echography and computed tomography.

Puncture of the spleen without haemorrhage and haematoma seldom requires any treatment [6]. On the other hand, in the case of a large haematoma inside the spleen or rupture of the spleen with haemorrhage around the organ immediate exploration and often splenectomy are necessary.

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