Case Report

Embolicion of lumbar artery due to retroperitoneal bleeding following renal biopsy

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Introduction

Percutaneous renal biopsy is considered to be a relatively safe method routinely used for the diagnosis, prognosis and treatment of renal parenchymal diseases. Common complications are well known and mostly self-limiting [1–6]. Among them is a very rare complication, the laceration of the lumbar artery causing severe retroperitoneal haemorrhage [7–9].

If the biopsy needle hits a lumbar artery, selective angiography with embolization has become an effective procedure for causing the immediate cessation of active bleeding. In such a case, the tip of the embolization catheter has to be placed into the anterior branch of the lumbar artery, behind the origin of the radicular medullary artery, which supplies the regional part of the spinal cord, and its occlusion can cause significant neurological deficits and paraspinal muscle infarction. Our case presents a reliable diagnostic and therapeutic algorithm.

Case

A 70-year-old man underwent a right kidney biopsy due to the sudden progression of a previously minor renal failure. His plasma creatinine rose to 470 μmol/l, he had proteinuria 10 g/24 h and microscopic haematuria with red cell casts. The standard 16-G Tru-Cut biopsy needle was used with guidance by a linear ultrasonic biopsy probe. The procedure was carried out without any complications and the diagnosis of focal segmental immunoglobulin-A glomerulonephritis with cellular crescents was established histologically. Treatment with daily doses of cyclophosphamide and steroids was initiated and regular haemodialysis was commenced.

A day later the patient complained of peritonism and he presented signs of anaemia. An ultrasound study proved the existence a retroperitoneal haematoma of 105 × 55 × 100 mm in a ventrocaudal direction under the right kidney. The patient was administered a transfusion of five units of packed red cells and some fresh frozen plasma. Cyclophosphamide treatment was interrupted and the dosage of steroids was reduced.

The next day an ultrasound imaging found the progression of the haematoma to 250 × 100 × 100 mm. The patient’s clinical condition worsened, he suffered from acute pains in his right loin and hypogastrium and he had no bowel peristalsis.

An abdominal aortography was first obtained and showed no signs of extravasation. Following the aortography, a selective right renal angiography showed two deposits of contrast solution (5 mm in diameter) in the lower pole of the kidney, corresponding to pseudoaneurysmas after the preceding biopsy punctures (Figure 1). Since there was no evidence of extravasation or intrarenal arteriovenous fistula, a 4-F catheter was inserted into the first right-sided lumbar artery. Selective angiography revealed extravasation of contrast solution from the middle part of the anterior branch of the lumbar artery with irregular and gradually extending contrast deposition in the laterocaudal direction (Figure 2). The tip of the catheter was then placed behind the origin of the radicular medullary artery and its lumen was occluded by approximately 20 Gelfoam emboli of 3 × 3 × 2 mm and IMWCE 35 [10 × 3 mm (Cook)] metallic coil. The following angiography showed complete occlusion of the anterior branch of the first right lumbar artery and no signs of further extravasation into the retroperitoneum were noted (Figure 3).
Shortly after the embolization the patient’s condition and full blood count stabilized, the pain gradually ceased and peristalsis was resumed. No complications, in the sense of spinal cord impairment or muscular infarction, were noted. He was discharged home with residual asymptomatic retroperitoneal haematoma 2 weeks later and he continued in regular haemodialysis on an outpatient basis.

Discussion

Injuries of extra-renal arteries by renal biopsy needles are very rare complications of the procedure. Up to the present only three cases of lumbar artery impairment with subsequent massive bleeding have been reported [7–9]. A solitary case of mesenteric artery laceration has been the exception [10].

The lumbar arteries are usually paired vessels, which arise from the dorsal aspect of the aorta. After arising from the aorta, the lumbar arteries encircle the vertebral bodies and divide into small branches to the psoas muscle and to the radicular medullary artery, which parallels the spinal nerve roots to divide into anterior and posterior spinal arteries. Then, they divide into anterior and posterior branches. The posterior branch supplies the branches going to the sacrospinalis muscle and skin of the back. The anterior branch passes under the musculus quadratus lumborum dorsally from the kidney and supplies the quadratus lumborum, sacrospinalis muscles and skin of the flank. These muscular branches, running dorsally to the kidney, seem to be quite vulnerable during any kidney puncture or biopsy.

A case of massive retroperitoneal haemorrhage following renal biopsy was reported by Jamison and Coward [7]. During the first surgical revision they removed 4 l haematoma but failed to localize the bleeding site. Three hours after, because of continued bleeding from the drains, the second revision identified and ligated the lacerated lumbar artery. Kim et al. [8] localized the post-biopsy haemorrhage by means of repeating the aortography and the subsequent selective angiography of the affected lumbar artery.
artery. The bleeding was stopped by two straight microcoils placed by a 3-F Tracker catheter into the extravasating branch of the lumbar artery. Wall et al. [9] localized angiographically the post-biopsy bleeding from an arteriovenous fistula. The involved lower pole segmental artery was occluded by the placement of a metallic coil. Despite continued blood transfusions, the patient failed to stabilize and remained hypotensive. Two days later, a repeated selective left renal angiography revealed that the lower pole artery was occluded. Abdominal angiography then revealed an active bleeding site from the left fourth lumbar artery. This artery was selectively occluded with Gelfoam particles and metallic coils. Despite the successful embolization, the patient succumbed 5 days after the second embolization, due to further complications. The three cases document that the localization of an extra-renal source of massive haemorrhage following percutaneous renal biopsy is quite complicated.

In case the selective renal angiography fails to find the post-biopsy bleeding site, both aortography and selective angiography of lumbar arteries at the level of biopsy puncture have to be performed. Kim et al. [8] found the extravasation site by repeated aortography and had to confirm the bleeding spot by subsequent selective angiography of the lumbar artery. Also, Wall et al. [9] had to perform the selective angiography of the lumbar artery after the embolization of the renal artery branch failed to lead to the patient’s stabilization. We have also proceeded with the selective angiography of the first lumbar artery only after the angiographic examination of the renal artery failed to show any extravasation.

When compared with surgical revision, angiographic procedures facilitate not only a fast and minimally invasive diagnosis, but also an immediate therapeutic effect — embolization of the bleeding artery [7]. The lumbar artery angiography can be associated with a spinal cord injury in case the catheter tip has been directed into the radicular medullary artery, which supplies the regional part of the spinal cord. Then, forceful injection of a larger amount of contrast solution into the catheter wedged in this artery can lead to an ischaemic lesion of the spinal cord segments [11]. Also, the tip of the embolization catheter has to be placed behind the origin of the radicular medullary artery posterior. In the case of tortuous or an excessively small lumbar artery or if the artery of Adamkiewicz has been displayed during angiography, the use of a coaxial 3-F Tracker catheter for secure tip placement into the anterior branch has been recommended by Kim et al. [8]. In the case of the patient referred to, sufficient width of the right anterior branch of the lumbar artery enabled placing of the 4-F catheter tip (Terumo) behind the origin of the radicular medullary artery. We were able to easily visualize the bleeding spot and, subsequently, embolized the impaired vessel by Gelfoam particles. To prevent a possible reflux of Gelfoam fragments into the radicular medullary artery and an eventual later recurrence of the haemorrhage, we closed its embolization by the placement of a metallic coil.

Appropriate embolization agents are Gelfoam or Ivalon particles and metallic coils [8–10]. In view of the risk of spinal cord impairment, the use of liquid embolization materials is contraindicated.

In conclusion, bleeding from a lumbar artery after percutaneous renal biopsy is a rare complication; however, it may present a major diagnostic and therapeutic problem. In cases where aortography or renal angiography has not established the location of active bleeding, selective lumbar artery angiography at the level of the puncture site is indicated. Its following embolization with mechanical particles has to avoid the radicular medullary artery to prevent spinal cord damage. The procedure is then safe and effectively stops the bleeding.

Conflict of interest statement. None declared.

References