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PEDIATRIC IMAGING

CASE REPORT

Traumatic lumbar artery pseudoaneurysm: the role of CT angiography in diagnosis and treatment

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ABSTRACT

Pseudoaneurysm of lumbar artery is a rare and late complication of penetrating trauma. We report the Doppler ultrasonography and multidetector computed tomography angiography findings and endovascular embolization treatment of a pseudoaneurysm of lumbar artery in a 14-year-old girl following a gunshot wound.

Key words: • *lumbar artery* • *aneurysm, false* • *trauma* • *embolization, therapeutic*

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Pseudoaneurysm of the lumbar artery is extremely rare and usually occurs after penetrating trauma (1–5). Delayed diagnosis is common and can be catastrophic. This case is presented for its rarity and to emphasize the importance of radiological methods in rapid diagnosis and treatment.

Case report

During a laparotomy performed on a 14-year-old girl for gunshot wound, it was found that the bullet just passed near the liver and entered the antrum of the stomach, then penetrated the head of the pancreas, passed through the retroperitoneum, and exited the back of the body. The injured antrum and pancreatic head were repaired, and operation ended. During the postoperative follow-up period, a 2-cm pseudocyst of the pancreas was found and followed with ultrasonography (US). The pseudocyst regressed and disappeared during follow-up. One month later, the patient was readmitted for abdominal and right thigh pain. Doppler US revealed a pseudoaneurysm on the right and anterior side of the abdominal aorta, approximately 5 cm in diameter, surrounded by thrombus.

Multidetector computed tomography (MDCT) angiography examination was then performed. On multiplanar and 3 dimensional images, a fragmented fracture at the right part of the L3 vertebral body next to a 5 × 6 × 7 cm pseudoaneurysm arising from the right lumbar artery was shown (Figs. 1, 2). There was only one feeder vessel for the pseudoaneurysm, and the length of involved lumbar artery between the origin from the aorta and neck of pseudoaneurysm was sufficient to allow safe performance of endovascular embolization; this course of treatment was planned. On preoperative diagnostic abdominal aortography with a 5 F 100 cm pigtail catheter (Cook, Bloomington, Indiana, USA) aneurysmatic dilatation of the right lumbar artery following about a 1 cm healthy segment at the level of L3 was detected. Selective catheterization of the lumbar artery by 5 F 65 cm glide cobra catheter (Cordis, Brentford, Middlesex, UK) advanced over a 0.035 inch 150 cm glidewire (Terumo, Somerset, New Jersey, USA) showed an aneurysmal sac (Fig. 3). Using the cobra catheter as a guide, a microcatheter (135 cm 2.8 F, Renegade, Boston Scientific, USA) was advanced to the proximal area of the involved lumbar artery, and a controlled 50% n-butyl-2 cyanoacrylate (Histoacryl, B. Braun Melsungen AG, Melsungen, Germany) injection under fluoroscopic guidance was performed. Subsequent angiograms revealed total exclusion of the aneurysm from circulation (Fig. 4). No complication occurred during or after the procedure. Follow-up serial Doppler US showed gradual resorption of residual hematoma in a one-month period.

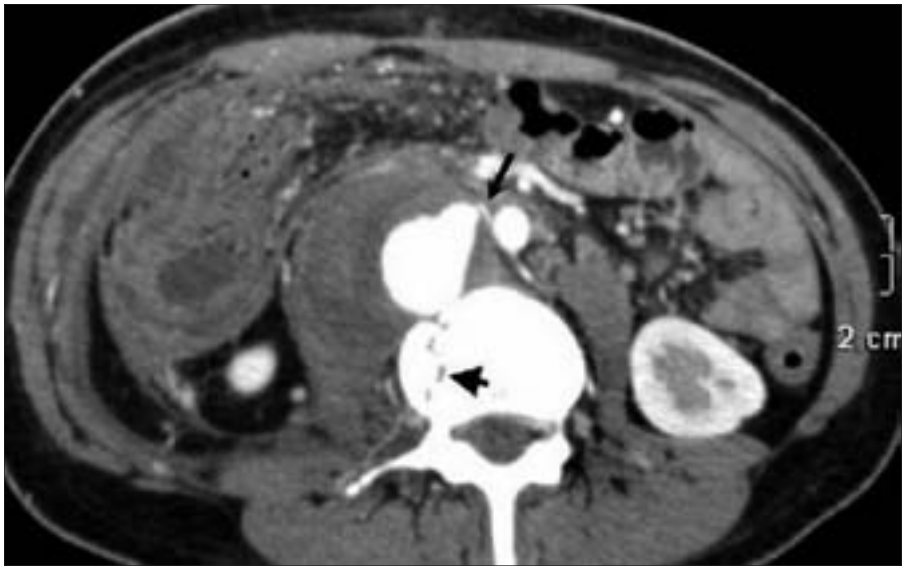

Figure 1. Axial CT image shows aneurysmal sac continuous with the right lumbar artery *(long arrow)* with a surrounding thrombosis. Fracture line *(short arrow)* at the right of lumbar vertebral body is also seen.

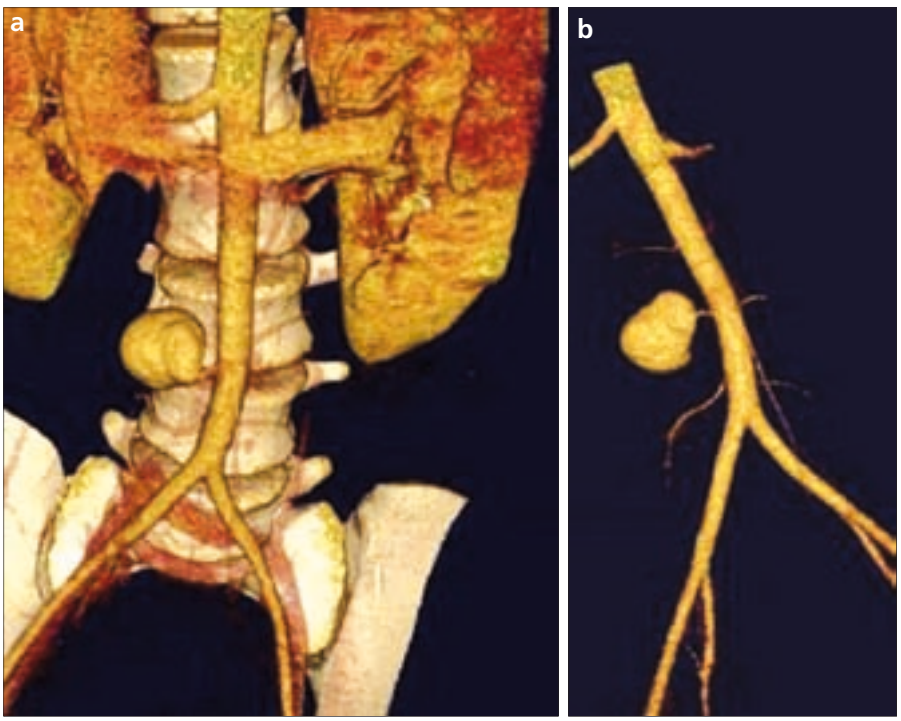

Figure 2. a, b. 3D volume rendering reconstructions of CT images show pseudoaneurysm at the level of L3 vertebral body and its relation to the lumbar artery.

Discussion

Pseudoaneurysm of the lumbar artery is rare in the medical literature and is usually described after penetrating injuries. It is also reported following blunt trauma, percutaneous renal interventions (6, 7), laparoscopic splenectomy (8), or spontaneously (9). In most reported cases, lumbar artery injury was not detected during first examination and was diagnosed because of symptoms caused by the mass effect of pseudoaneurysm. In our case, injury of the lumbar artery was not seen in the initial examination or in the surgery; it was diagnosed during the workup for abdominal and thigh pain in the second admission.

Pseudoaneurysm of the lumbar artery can present as increased density or as soft tissue thickening in the psoas muscle region on unenhanced CT scans. The lumen of the aneurysm can be demonstrated on CT scan following bolus contrast injection. MDCT angiography is very helpful in depicting the extension of the aneurysm, its relation to the feeding vessel, and in planning the treatment. Embolization treatment in our case was decided according to the CT angiographic findings. CT angiography showed the level and diameter of the feeding artery of pseudoaneurysm. Because there was only one feeder vessel for the pseudoaneurysm and no other collateral branches, and because the length of involved lumbar artery between the origin from the aorta and neck of pseudoaneurysm was safe enough to embolize the artery, we performed endovascular treatment.

Surgical treatment of lumbar artery pseudoaneurysm is difficult because of anatomic location of the artery and difficulty controlling intraoperative bleeding (1, 4, 10). Intraarterial embolization is a more appropriate treatment approach in these patients, since it is minimally invasive, does not require general anesthesia, leads to minimal blood loss, and has a higher success rate (6, 9). Sofocleous et al. evaluated the angiographic findings and embolization results of 11 patients with lumbar artery injury in a retrospective study of 255 patients (11). Pseudoaneurysm was detected in four patients; all were treated successfully with coil or Gelfoam embolization. Risks of the procedure were infarction of muscle or peripheric nerve, and the more serious infarction of the spinal cord infarct, caused by occlusion of the great anterior radicular artery (12). Care must be taken not to injure major spinal branches, particularly the great anterior radicular artery, during angiography. For an effective selective embolization, the catheter must be in the correct position, and the size of the embolic particles must be suitable for the procedure (6, 13).

In conclusion, although it is rare, pseudoaneurysm of the lumbar artery can occur following penetrating injuries. Doppler US is useful in depicting typical flow pattern inside the aneurysm, whereas CT angiography is helpful in determining the origin and dimensions of an aneurysm and plan-

Figure 3. Selective digital subtraction angiography (DSA) image shows the catheter inside the third lumbar artery and the lumen of the aneurysm.

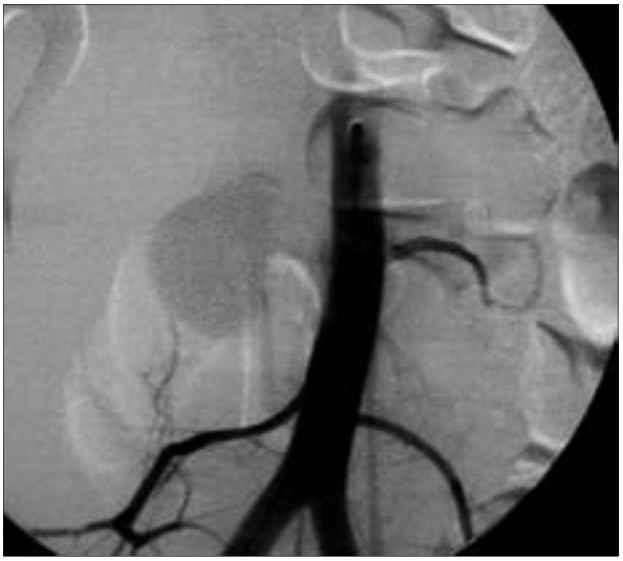

Figure 4. After selective embolization, the aneurysmal sac shows no filling on the DSA image.

ning the therapeutic approach. Since endovascular embolization is minimally invasive, it should be considered as the first choice of treatment.

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