Case Reports

Lower Limb Ischaemia Complicating Transcatheter Embolization of Arteriovenocaliceal Fistula


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Femoral artery thrombosis is described following successful transcatheter control of haematuria due to an arteriovenocaliceal fistula following percutaneous renal biopsy in a 9-year-old girl. Emergency embolectomy and profundoplasty was required to salvage the affected limb. Peripheral embolization is a serious potential complication of transcatheter embolization. The possible mechanism of distal thrombosis, other than reflux of embolic material is also discussed.

The most frequent complication of percutaneous kidney biopsy is haemorrhage, which has been reported in 7-50% of the procedures. Haematuria is usually transient; however, when it occurs massive and protracted renal bleeding is undoubtedly a major event. Surgical exploration is required to control the bleeding from the kidney or to obliterate the post-traumatic renal arteriovenous fistula. Partial or complete nephrectomy is often required.

Recently, selective transcatheter embolization in association with diagnostic arteriography has been used to control renal bleeding with minimal loss of renal parenchyma.

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Figure 1. Arteriovenous fistula, inferior vena cava (IVC), arrow pseudoaneurysm (Ps).
Case Report

A 9-year-old girl was admitted to King Khalid University Hospital for investigation of systemic connective tissue disease.

On examination, skin rash, swelling of major joints and pitting oedema of her feet were observed. Laboratory studies showed a haemoglobin level of 11.2 g/dl, with a white blood cell count of 5.9/mm³. Coagulation parameters, serum electrolytes, blood urea and serum creatinine were normal. Urinalysis showed 3+ proteinuria. A DPTA radioactive renal scan showed mild impairment of the function of both kidneys with normal drainage. Ten hours after percutaneous biopsy of the left kidney the patient experienced gross haematuria and her haemoglobin dropped to 8.1 g/dl. The patient continued to have significant haematuria despite conservative management.

Two weeks later, a selective left renal arteriogram showed narrowed main and segmental arteries, with a moderate size arteriovenous fistula. In addition, two intrarenal contrast-filled cavities (pseudoaneurysms) with no venous or caliceal communications were outlined (Fig. 1).

Transcatheter embolisation of the arteriovenous fistula was achieved. Immediately after the second run, fluoroscopy revealed direct passage of the contrast medium from the lower segmental artery to the lower caliceal system (Fig. 2). This was followed by the injection of another 1 ml of Gelfoam solution with successful obliteration of the arteriovenous connection. Five hours later, the patient’s right lower limb showed signs of severe ischaemia. Emergency right femoral artery exploration was performed. A large thrombus which consisted of blood clot and Gelfoam particles was removed (Fig. 3). Profundoplastic was performed to improve the blood flow, after which a full recovery of the ischaemic limb was observed.

Discussion

Percutaneous renal biopsy was first reported by Iversen & Brun in 1951.6 The success rate of biopsies varies between 20% and 90% of needle insertions.2

The most common complication after kidney biopsy is haematuria. However, complications involving other organ systems, such as pneumothorax, gall bladder perforation, liver, spleen or pancreatic laceration as well as inadvertent biopsy of the bowel have been reported.7,8

Selective renal arteriography has become the diagnostic procedure of choice in the evaluation of postrenal biopsy injuries and bleeding.9 Severe renal laceration, large intrarenal pseudoaneurysms and arteriovenous malformations may present as gross haematuria and/or expanding perirenal haematoma necessitating surgical treatment.10

Selective transcatheter embolization has been used for controlling renal bleeding, for preoperative embolization of renal malignancies, in cases of arteriovenous fistulae and for gastrointestinal or pelvic haemorrhage.11

Our patient developed gross haematuria following percutaneous renal biopsy. Pre-embolization, selective renal angiography demonstrated an arteriovenous fistula (AVF) as the source of bleeding. However, after AVF closure was accomplished a direct communication between the lower segmental artery and the caliceal system

Figure 2. Disappearance of pseudoaneurysm. Direct flow of the contrast to the lower caliceal system and ureter (U).

Figure 3. Histopathological examination of the thrombus. Eosin/hæmatoxylin stain. Gelfoam particle (G), blood clot (b).
appeared (arteriocaliceal fistula). The pathogenesis of such a complex finding may be that the pseudoaneurysmal wall ruptured at its weakest point as a result of the increased intraneurysmal pressure following the injection of contrast medium.

Postembolization syndrome has been reported after 43% of procedures.12

Other reported complications are massive visceral infarction, abscess formation,13 incidental pulmonary embolism, spinal artery thrombosis, as well as gangrene of the feet.14-16

Thrombosis of the femoral artery, as encountered in our case may have been secondary to intimal injury from a needle puncture or from catheter manipulation. Alternatively, pieces of gelfoam may have adhered to the vessel wall at the puncture site and formed a nidus for the thrombosis.

The presence of an intrarenal pseudoaneurysm requires a small volume and slow injection of contrast media or embolic particles to avoid rupture. To avoid reflux of embolic materials, the use of a balloon catheter to occlude the target artery is advisable. Finally, flushing the catheter to eliminate any embolic substance before its removal may help to reduce potential embolic complications.

References