Case Report

Pseudoaneurysm of the thyrocervical trunk complicating percutaneous internal jugular-vein catheterization for haemodialysis

Ramon Peces, Rafael A. Navascués, Jose Baltar, Ana S. Laurés and Jaime Alvarez-Grande

Servicio de Nefrología, Instituto Reina Sofía de Investigación Nefrológica, Hospital Central de Asturias, Oviedo, Spain

Key words: arterial injury; catheter associated; haemodialysis; pseudoaneurysm; thyrocervical trunk

Introduction

In patients with end-stage renal disease, cannulation of the central venous system with large-bore double-lumen catheters is often necessary until a functioning vascular access can be created. However, the technique of placing a dual-lumen catheter is not without complication. Patients undergoing haemodialysis carry a high risk of arterial lesions related to vascular access [1]. The most frequent iatrogenic vascular lesions after accidental puncture are pseudoaneurysms and arteriovenous fistulae. Recent series have reported an incidence of pseudoaneurysms of 0.05–2% [2]. Most cases follow diagnostic or therapeutic catheterizations through the femoral artery. Pseudoaneurysms developing at other sites do occur but are rare [3,4]. In these patients several factors increase the risk of complications: atherosclerosis, hypertension, obesity, diabetes, coagulopathy, and systemic heparinization.

We report an unusual case of pseudoaneurysm of the thyrocervical trunk complicating an attempt of internal jugular-vein catheterization which was successfully treated by surgery.

Case report

A 57-year-old woman with a diagnosis of autosomal dominant polycystic kidney disease (ADPKD) had mild renal failure (serum creatinine 1.7 mg/dl and creatinine clearance 57 ml/min) and several hepatic cysts. She had arterial hypertension that was managed with an ACE inhibitor. The patient was admitted to the hospital because of fever, diarrhoea, and abrupt worsening of the renal function requiring emergency dialysis. At admission she presented focal seizures. A blood film showed schistocytes compatible with intravascular haemolysis. The clinical picture of intravascular haemolysis, thrombocytopenia, and worsening renal function was compatible with the diagnosis of haemolytic–uraemic syndrome/thrombotic thrombocytopenic purpura.

A double-lumen 11.5 Fr Quinton catheter was thought to be positioned in the right internal jugular vein. According to the referring physician, placement of the catheter was difficult. While on haemodialysis the blood flow was adequate, but high venous pressures were observed and the catheter was removed. On catheter removal, arterial bleeding was observed and was arrested by prolonged manual compression. Another catheter was placed in the right femoral vein and haemodialysis was performed without complications. On the third hospital day the patient developed confusion, seizures and coma requiring mechanical ventilation. A computed tomographic (CT) scan of the head was normal. On the following 8 days the patient remained oliguric and haemodialysis and plasmapheresis were performed on alternative days. Fresh frozen plasma as the replacement fluid was administered. Afterwards continuous arteriovenous haemofiltration (CAVH) was initiated and the patient needed systemic heparinization. In addition, the patient received 60 mg/day of methylprednisolone maintained for 2 months. On the day 18 a right subdural haematoma was diagnosed by CT and MR scans. Haematological indices improved progressively and plasmapheresis was discontinued on day 25. The patient’s neurological status gradually improved. However, there was no improvement in renal function and she became CAVH/haemodialysis dependent.

A few days later the patient had a relapse and plasmapheresis was re instituted for a month. On the 65th hospital day, the patient was receiving 40 mg/day of subcutaneous low-molecular-weight heparin and she presented an abrupt decrease of the haematocrit. A CT scan demonstrated a right haemothorax, a massive retroperitoneal haematoma, and a large intracyst haemorrhage in the right kidney. Heparin was discontinued and transfusions were administered. On the 90th day the presence of a pulsatile mass and a systolic...
murmur in the right supraclavicular fossa were observed. Colour Doppler US showed the presence of a pseudoaneurysm 7.5 cm in diameter, communicating with the proximal portion of the subclavian artery (Figure 1). A chest X-ray showed an elevated right hemidiaphragm. A CT scan showed a right supraclavicular mass (Figure 2). Angiography confirmed the presence of a large pseudoaneurysm originating from the thyrocervical trunk (Figure 3).

At surgery under general anaesthesia the presence of the pseudoaneurysm was observed; it proved to be supplied from the thyrocervical trunk. It displaced and compressed the phrenic nerve. The pseudoaneurysm was resectioned and the arterial branch was ligated. Postoperative course was uneventful with the exception of a transitory Horner’s syndrome.

Discussion

Although percutaneous internal jugular-vein cannulation has become a standard technique for obtaining reliable haemodialysis access, it is associated with many potential complications, including arterial puncture and intraarterial catheterization [3–6]. Anatomical variations of the internal jugular vein occur in about 5% of patients, making it difficult to locate the vein using the blind technique [7]. Puncture-related complications occur in up to 11% of the series in the literature [8] and some of these complications have been fatal. Among the most frequent iatrogenic vascular lesions after accidental puncture are pseudoaneurysms. Pseudoaneurysms may undergo rupture (with consequent bleeding), may increase in volume and compress the adjacent nerves and veins, or may disappear by spontaneous thrombosis.

This patient was an exceptional case of a large pseudoaneurysm of the right thyrocervical trunk related to an attempt of internal jugular-vein cannulation performed 3 months previously, that was successfully treated by surgical ligation. Although arterial puncture during attempted central venous catheterization is uncommon, unrecognized intra-arterial placement of the catheter is relatively rare. In this case the cause of arterial lesion was, no doubt, the wrong cannulation of the artery. Moreover the patient had other additional risk factors for complications from

Fig. 1. Doppler US image of the pseudoaneurysm and the communicating neck showing inner turbulent flow. Blood supply to the pseudoaneurysm is clearly demonstrated.

Fig. 2. CT scan showing a large right supraclavicular mass.

Fig. 3. Angiography showing a large pseudoaneurysm originating in the right thyrocervical trunk.
vascular lesion related to accidental puncture and insertion of a catheter, such as hypertension, thrombocytopenia, and systemic heparinization. In addition, she had ADPKD and these patients may have the predisposition to develop arterial dissections because the mutant form of polycystin [9,10]. Finally, there was a sequelae related with compression of the phrenic nerve that caused diaphragmatic palsy.

Judging from the size and location of the lesion and from the history of this patient, the pseudoaneurysm could be present immediately although it was initially without symptomatology. The reason for the late development of symptoms is not clear. The pseudoaneurysm could have been initially small, growing slowly and progressively until it finally became symptomatic. The arterial lesion could have been temporally closed, but reopened many days later by increasing hypertension, coagulopathy, or other undefined reason. The pseudoaneurysm could also have resulted from arterial dissection and/or from spontaneous rupture of an aneurism.

In summary, after haemodialysis access attempt of internal jugular-vein cannulation the presence of a pulsatile mass and a systolic murmur usually allows correct diagnosis of pseudoaneurysms. The clinical suspicion may be confirmed by colour Doppler US. Angiography allows a more complete definition of the pseudoaneurysm location and size.

Although some cases of endovascular repair with a stented graft have been reported [11], we believe that surgical treatment of large pseudoaneurysms is the procedure of choice since it allows good results with a low risk of complications.

References

5. Ohisi AJ, Zietlow SP, Sarr MG. Erroneous arterial placement could have been initially small, growing slowly and progressively until it finally became symptomatic. The pseudoaneurysm could also have resulted from arterial dissection and/or from spontaneous rupture of an aneurism.

In summary, after haemodialysis access attempt of internal jugular-vein cannulation the presence of a pulsatile mass and a systolic murmur usually allows correct diagnosis of pseudoaneurysms. The clinical suspicion may be confirmed by colour Doppler US. Angiography allows a more complete definition of the pseudoaneurysm location and size.

Although some cases of endovascular repair with a stented graft have been reported [11], we believe that surgical treatment of large pseudoaneurysms is the procedure of choice since it allows good results with a low risk of complications.

References

5. Ohisi AJ, Zietlow SP, Sarr MG. Erroneous arterial placement could have been initially small, growing slowly and progressively until it finally became symptomatic. The pseudoaneurysm could also have resulted from arterial dissection and/or from spontaneous rupture of an aneurism.

In summary, after haemodialysis access attempt of internal jugular-vein cannulation the presence of a pulsatile mass and a systolic murmur usually allows correct diagnosis of pseudoaneurysms. The clinical suspicion may be confirmed by colour Doppler US. Angiography allows a more complete definition of the pseudoaneurysm location and size.

Although some cases of endovascular repair with a stented graft have been reported [11], we believe that surgical treatment of large pseudoaneurysms is the procedure of choice since it allows good results with a low risk of complications.

References