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Occlusion of the fistula in a dialysis patient—is it always a common reason?

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A 67-year-old man with chronic glomerulonephritis and end-stage renal disease (ESRD), on maintenance haemodialysis for 1 year, had a history for failure of a right radiocephalic fistula, a right radiocephalic graft, a right subclavian permanent catheter and a left radiocephalic fistula due to refratory thrombosis. He presented to our hospital with intermittent gross haematuria for 9 months and swelling over the right arm and left hand for 1 month. On further questioning, he also reported a history of deep venous thrombosis over bilateral lower legs, 3 months earlier. He had no local cutaneous erythema and heat, fever or flank pain.

His blood pressure was 130/70 mmHg. Physical examination identified pale appearance and swelling over right arm and left hand. On admission, pre-dialytic blood creatinine was 7.2 mg/dL, urea nitrogen 75.4 mg/dL, albumin 3.5 g/dL, haemoglobin 9.0 g/dL, platelet 100 k/μL, cholesterol 68 mg/dL, triglycerate 98 mg/dL, sodium 138 mmol/L, potassium 4.3 mmol/L, calcium 10.0 mg/dL and phosphate 5.1 mg/dL. Pro-thrombin time was 11.6 s (normal 10.7–13 s, control 12.15 s), INR 1.1 and activated partial thromboplastin time 25 s (normal 20–36 s, control 31.1 s). Fibrinogen was 800 mg/dL (200–400), fibrinogen degradation products >20 μg/mL (<10) and D-dimer >1 μg/mL (<0.5). Lupus anticoagulants, anti-thrombin III, protein C, S and other plasma coagulation factors were negative or within normal limits. Urinalysis showed macroscopic haematuria 40–60 per high power field. Prostate sonography (Figure 1) displayed a prostate tumour. Prostate specific antigen (PSA) was 38.94 ng/mL. Transurethral radical prostatectomy was done, and the pathology reported prostate adenocarcinoma without local invasion. Venography for right arm (Figure 2a) and left hand (Figure 3) was performed, for further workup.

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What abnormalities are seen on the venography of right superior vena cava (SVC) and left upper limb?

What is the clinical diagnosis?

THE DIAGNOSIS: prostate adenocarcinoma with chronic diffuse intravascular coagulation and recurrent thrombosis of vascular access (trousseau's syndrome).

Right SVC venography showed near-total occlusion of SVC lumen (Figure 2a, white arrow). There were patent basilic, median, medial cubital and axillary veins at left forearm and arm. However, cephalic vein was poorly visualized (Figure 3a). There were also patent ulnar, radial, distal basilic and median veins at left forearm. Poor flow over distal cephalic vein due to thrombosis was disclosed (Figure 3b). After surgical thrombectomy with pathological proof of fibrin thrombi, patency of SVC was demonstrated (Figure 2b, white arrow).

PSA declined to 0.06 ng/mL 6 months after prostatectomy. With low molecular weight heparin and then a shift to coumadin to keep INR 1.5–2X, the newly created brachiobasilic graft functioned well. Swelling of upper limbs also disappeared in several weeks.

Trousseau's syndrome was first reported over 100 years ago, whereby cancer patients have an increased incidence of venous thromboembolism (VTE) in patients with a wide variety of tumours such as bladder, breast, lung, stomach and colon tumours, although pancreatic cancer accounts for 50% of all cases [1]. Paraneoplastic syndrome of prostate cancer (trousseau's syndrome), such as in our case, was also reported in a few earlier cases [2–3]. VTE is increased fourfold in patients with cancer, and underlying malignancy accounts for 10% to 20% of causes of VTE. Indeed, the presence of an unexplained and recurrent vascular or shunt thrombosis can be clinical reason enough to screen for occult malignancy in patients on maintenance haemodialysis [1].

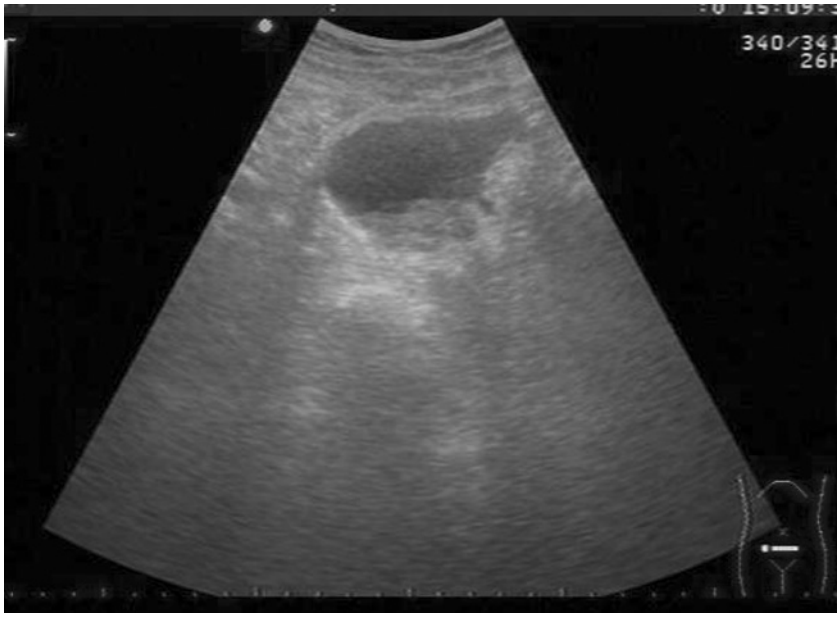

Fig. 1. Prostate sonography showed lobulated prostate mass with intra-vesical protruding.

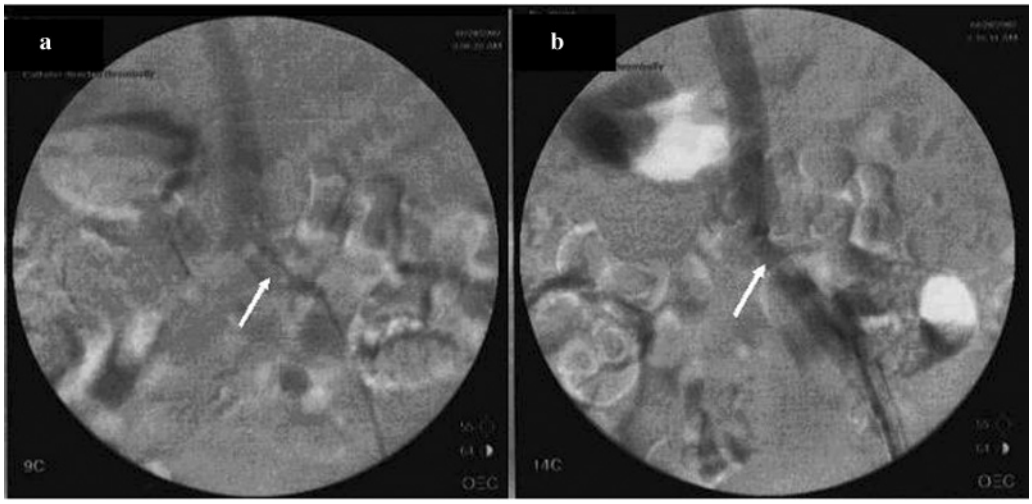

Fig. 2. (a) Left: right SVC venography showed near-total occlusion of SVC lumen (white arrow). (b) Right: after surgical thrombectomy with pathological proof of fibrin thrombi, patency of SVC was demonstrated (white arrow).

Along with a comprehensive medical history and physical examination, numerous conventional diagnostic testing and imaging including blood tests, tumour markers, chest radiography, venography, endoscopy, computed tomography and magnetic resonance imaging of the chest, abdomen and pelvis can be used to successfully diagnose VTE with a primary malignancy in approximately 85% to 95% of patients. These clinical findings have been supported by laboratory studies, which have identified altered levels of blood clotting factors in the serum of cancer patients, including elevated fibrinogen, FDP, 3P test, D-dimer as well as declined or normal PT, PTT and PLT count [4]. These changes susceptible to coagulation are also risk factor for vascular access failure in haemodialysis patients. Currently, vascular access problems are the most common complication encountered in patients undergoing long-term haemodialysis, as well as thrombosis, which is a leading cause of vascular access failure, usually resulting from occlusion or stenosis caused by progressive thrombosis in the venous outflow system. In addition to endothelial injury following a shunt operation, excessive intra-luminal pressure, turbulent flow and frequent needle insertion during haemodialysis, hypercoagulability like paraneoplastic syndrome, trousseau's syndrome and DIC are also common aetiologies of shunt failure [5].

Proposed mechanisms include changes in anti-thrombotic and pro-thrombotic proteins, tumour-cell-induced thrombosis responsive to hypoxia and dysregulated angiogenesis, hypoxia-induced pro-coagulant gene expression, cytokine activation, endothelial dysfunction, and

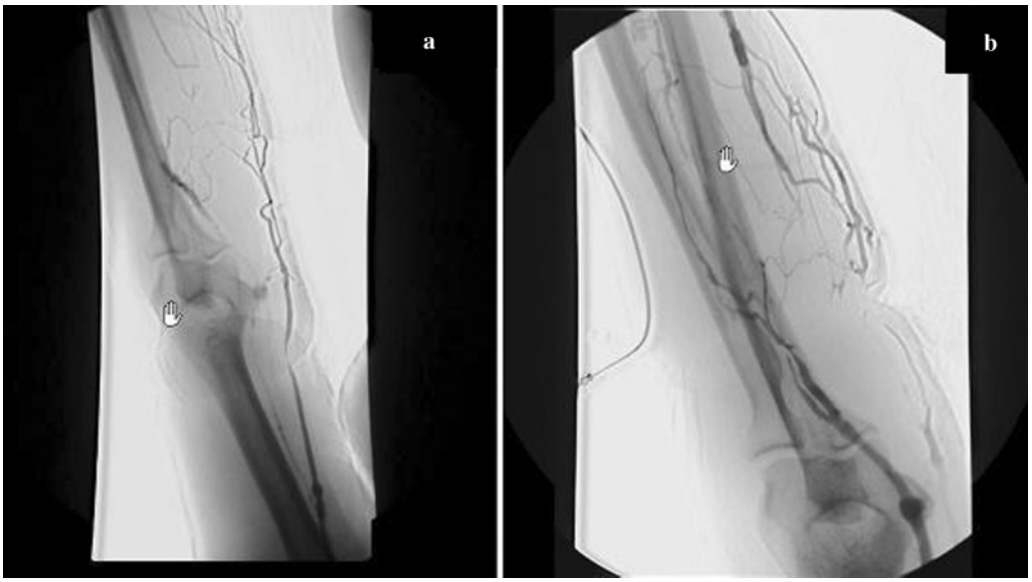

Fig. 3. (a) Left: there were patent basilic, median, medial cubital and axillary veins at left forearm and arm. Cephalic vein was poorly visualized. (b) Right: there were patent ulnar, radial, distal basilic and median veins at left forearm. Poor flow over distal cephalic vein due to thrombosis was disclosed.

conditions that can lead to chronic disseminated intravascular coagulation [6].

The cornerstone of management is the treatment of the underlying cancer, anticoagulants and adequate prophylaxis in patients with high risk for VTE [4].

Conflict of interest statement. None declared.

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