CASE REPORT

Case of unilateral leg swelling: a DVT mimic

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SUMMARY

A 68-year-old woman with known metastatic renal cell carcinoma presented with an acutely swollen right leg. In between the two sessions of palliative radiotherapy to the right hip, she also had right hip modified Harrington procedure for tumour resection with hip replacement. Initial clinical evaluation raised the suspicion of right leg deep vein thrombosis (DVT). However, DVT was excluded and further investigations revealed stenosis of the right external and common iliac veins, likely secondary to radiotherapy.

BACKGROUND

Radiotherapy-induced venous stenosis has been reported infrequently in the literature.^{1–8} It is an important mimic of deep vein thrombosis (DVT) which should be considered in the work-up of an acutely swollen limb in patients treated with radiotherapy. This case reports highlights the use of iliac venography in the investigation of this condition, which is not usually diagnosed by lower limb Doppler ultrasonography.

CASE PRESENTATION

A 68-year-old woman was admitted to the hospital with a 2-week history of right leg swelling. She had known metastatic renal cell carcinoma for which she received palliative radiotherapy to the right hip (8 Gy in one fraction) 2 years prior to her presentation (figure 1). She then had a modified Harrington procedure for acetabular bony metastases at her right hip a year later and radiotherapy to the right hemipelvis and hip (20 Gy in five fractions) 7 months prior to her current presentation (figure 2).

Before her acute admission with right leg swelling, she had been experiencing a sharp and crampy right leg pain for several months. Systemic

Figure 2 Radiotherapy planning and field of the right hemipelvis and hip 7 months prior to presentation.

enquiry revealed no chest pain or breathlessness. There was no history of trauma. Wells score was 4 for DVT. Examination revealed gross pitting oedema of the entire right lower limb extending from the hip to the foot with no tenderness on palpation. Cardiorespiratory and abdominal assessments were unremarkable.

INVESTIGATIONS

D-dimer was positive at 1377. Plain radiographs revealed no fractures. Lower limb Doppler ultrasonography found no evidence of DVT. CT scan of the chest, abdomen and pelvis was unrevealing. MRI of the pelvis and lumbosacral spine found no evidence of nerve entrapment. As investigations thus far were non-diagnostic, iliac venography was performed and this showed tight stenosis across the common iliac vein and the right external iliac vein.

DIFFERENTIAL DIAGNOSIS

In the context of metastatic malignancy, an acutely swollen leg immediately raises the suspicion of DVT. Differential diagnosis in this case includes venous stasis, lymphoedema and bony injury.

TREATMENT

The patient was initially commenced on treatment dose enoxaparin for suspected DVT. This was subsequently discontinued. A 16 mm × 120 mm self-expanding venous stent was inserted by the interventional radiologist across the site of stenosis at the right common iliac vein and external iliac vein (figures 3–5).

OUTCOME AND FOLLOW-UP

Following the procedure, our patient's leg swelling and pain improved significantly. Leg swelling had resolved by the time of discharge. She was able to mobilise independently with a stick. She also had

Figure 1 Radiotherapy planning and field of the right hip 2 years prior to presentation.

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Figure 3 Catheter venogram (anteroposterior view) demonstrating stenosis across the common iliac vein and the external iliac vein.

orthotics input due to leg length discrepancy as a result of her hip surgery.

DISCUSSION

Commonly in patients with history of abdominal malignancy, unilateral limb swelling will raise the suspicion of DVT. Other causes such as intraperitoneal fibrosis, malignancy and extrinsic compression causes are rare. Radiotherapy-induced venous stenosis without thrombus is a rare complication, but has been reported in the literature, mainly related to

Figure 4 Digital subtraction angiography showing predilatation of stenosis with balloon angioplasty.

Figure 5 Catheter venogram showing widely patent right common iliac vein and external iliac vein post-stenting.

superior vena cava obstruction.¹⁻³ We have identified only five reported cases of radiotherapy-related venous stenosis of the iliac vein: two cases related to chemoradiotherapy for rectal carcinoma,^{4,5} a case of previous pelvic irradiation for Paget's disease causing iliofemoral DVT associated with venous stenosis,⁶ a case of venous stenosis secondary to radiotherapy for malignant melanoma,⁷ and a case of iliac artery stenosis after iliac vein stenting for surgery and radiation-associated stenosis.⁸ All cases required stenting.

Where discrepancy arises between the ultrasound outcome and clinical suspicion, further investigations are warranted. Clinically, her presentation was strongly suggestive of venous thrombosis. In our case, because of the complex medical history, her symptoms of right leg swelling and increased leg pain were aggressively investigated, including D-dimer and lower limb Doppler ultrasonography followed by CT chest, abdomen and pelvis to exclude extrinsic venous compression. This did not identify any obvious cause and the artefacts secondary to hip surgery complicated the interpretation of the venous structures. Therefore she underwent iliac venography, which revealed tight stenosis of the right external iliac and common iliac veins, thought to be related to radiotherapy. Her elevated D-dimer was likely due to malignancy and was therefore of limited diagnostic value.

In contrast to venous stenosis, radiation-induced arterial stenosis is a well-known complication. It has been postulated that this may be due to the less cellular nature of the venous wall. In radiation-associated arterial injury, it is believed that a combination of hypoxic damage to vasa vasorum and stimulant effect by radiation on tunica intima layer encourages proliferative changes and thickening of the vessel.⁵ Radiation-induced fibrosis of the surrounding soft tissues leads to vascular compression, and this may also deprive the vasa vasorum of nourishment.⁵ The development of venous stenosis was slow, which was reported 16 months post-radiotherapy for Paget's disease of the scrotum by Zhou *et al*,⁶ whereas it

was decades following radiotherapy for Hodgkin's disease by Mehta and Koo.¹

Our patient reported rapid symptomatic relief after stenting with minimal swelling day 3 post-procedure, illustrating the efficacy of stenting in the management of venous obstruction. Endovascular stenting for iliofemoral stenosis has evolved to become the initial procedure of choice.⁹ Endovascular stenting for non-thrombotic iliofemoral venous outflow obstruction can achieve a high technical success rate.¹⁰ Venous stenting has a primary patency rate of 96% at 1 year in cases of non-thrombotic venous compression.¹⁰ Complications of venous stenting are infrequent. Reported complications include bleeding, infection, stent fracture, migration, erosion and loss of patency.^{9 10} Venous stenting provides symptomatic relief of leg pain and swelling, making it the management of choice in the case of venous stenosis.^{9 11 12}

Learning points

- Radiation-associated venous stenosis is a late complication in patients with previous radiotherapy, and clinicians should consider this as a differential diagnosis in patients with limb swelling.
- In cases with clinically evident venous obstructive symptoms, venography is another useful investigation of choice when Doppler ultrasound scan fails to identify a cause.
- Venous stenting is an effective treatment for venous stenosis.

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have contributed equally as last authors. They have both supervised the work and evaluated manuscript. In addition, AS supplied images of the radiology intervention, whereas RM assisted with correspondence to the editors.

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