

Aberrant venous anatomy and catheter directed thrombolysis: A case series

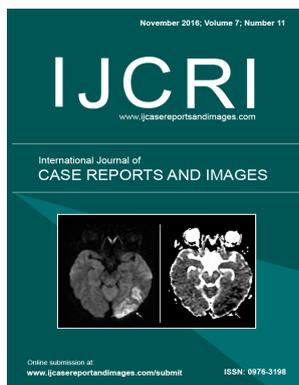
Nihal Abosaif, Simon Hobbs, Jules Dyer, Michael Collins

ABSTRACT

Catheter directed thrombolysis (CDT) has been approved by national institute of clinical excellence (NICE) in June, 2012 according to certain criteria for proximal and extensive deep venous thrombosis (DVT). This procedure entitles medical thrombolysis in addition to endovascular thrombectomy which would help in prevention of long-term consequences of post thrombotic syndrome. The introduction of this procedure must be preceded by CT angiogram to rule out intra-abdominal pathology or aberrant anatomical disorders. We are here presenting two potential cases whom we attempted CDT but were found to have rare anatomical variants of their venous system.



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Keywords: Aberrant venous anatomy, Catheter directed thrombolysis, Deep venous thrombosis (DVT), Iliofemoral deep venous thrombosis, Post thrombotic syndrome, Proximal DVT

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INTRODUCTION

The incidence of post thrombotic syndrome (PTS) in extensive iliofemoral deep venous thrombosis (DVT) has been shown to be decreasing since the introduction of catheter directed thrombolysis (CDT). Post thrombotic syndrome can occur in up to 80% of proximal DVT patients with accumulation incidence of 50% post DVT [1]. The pathogenesis of PTS is related to increased venous pressure, venous reflux and valvular dysfunction. It can lead to heaviness, swelling, redness, venous claudication, varicose veins, recurrent DVT and venous ulcerations.

On the other hand, the risk of peri-procedural complications hindered the routine use of CDT although incidence of these risks has been reported by many multinational studies to be very low [2–4]. For example; the risk of major bleeding occurred in less than 6% and was mainly secondary to bleeding from the site of puncture. Periprocedural pulmonary embolism has developed in less than 1% of patients and the arguable necessity for insertion of inferior vena cava filter has been reported. Two deaths were attributed to pulmonary embolism and intracranial hemorrhage happened from a

total of 473 in a large multicentre study [3]. According to the recent National Institute of Clinical Excellence (NICE) guidance that was published in June 2012, CDT has been considered for patients with symptomatic iliofemoral DVT who have symptoms less than 14 days with good function, life expectancy more than one year and low risk of bleeding [5]. The balance between increased bleeding was considered against a lower incidence of PTS and lower hospital stay [6–11].

CASE SERIES

We are here presenting two interesting case studies with proximal DVT whom we referred for CDT.

Case 1

The patient was a 34-year-old male presented with painful left leg swelling. He had right iliofemoral DVT five years earlier which was attributed to a long haul flight. There was no evidence of thrombophilia or autoimmune diseases. He was treated with warfarin® for a period of six-month without complications. On this occasion, he was found to have an acute extensive left iliofemoral DVT that had no obvious causative factor. In addition to his swollen leg, there were engorged dilated veins subcutaneously in the lower part of his abdomen that felt serpiginous. A CT scan of abdomen and pelvis with venous phase contrast was performed to investigate the probability of intra-abdominal pathology. He was found to have an occluded infra-renal inferior vena cava (IVC). The renal veins were tortuous and drained into the supra-renal IVC. He had extensive collateral venous circulation in left ascending lumbar and anterior abdominal wall veins. He had a dilated left renal pelvis and two complex cysts in his right kidney (Figure 1). He underwent CDT through a puncture of gastrocnemius vein with a 6F sheath. The wire passed easily into the popliteal and femoral veins and venography confirmed the presence of an extensive clot (Figure 2). Mechanical thrombectomy was performed in the left iliac, femoral and popliteal veins using an Angiojet® Ultra Thrombectomy System, Bayer Health care).

A catheter was placed in left iliac vein for infusion of pharmacological thrombolysis with Alteplase® for 24 hours. His thrombus was partially lysed following this but he declined further continuation of thrombolysis because of pain at the site of catheter. He was investigated for his renal cysts which were found to be hemorrhagic or proteinaceous and these remain under surveillance (Figure 1).

Case 2

The patient was a 52-year-old female with a background of hypothyroidism but otherwise fit and healthy. She was found to have right sided extensive iliofemoral DVT on ultrasound Doppler scan of her

leg. She had a two-week history of right leg swelling, back pain and low grade fever. She had no risk factor of thrombophilia and was not on oral contraceptive pills. Her autoimmune profile and vasculitic screen were negative. She was referred for CDT but at the time of the angiogram it was not possible to advance a guide wire into the infra-renal vena cava (IVC) which was thought to be chronically occluded (Figure 3).

The patient underwent further imaging in the form of a magnetic resonance venogram (MRV) which revealed an occluded IVC up to the level of the renal veins. No apparent collateralization was present (Figure 3). There was an element of inflammation in the periaortic area which also appeared to involve both ureters but with no features of upper urinary tract obstruction. It was suspicious of retroperitoneal fibrosis but there was no other evidence of that either clinically, biochemically



Figure 1: Axial and coronal sections of computed tomography angiogram with venous phase showing absent IVC and collateral venous circulation. There were two abnormal cysts in the right renal upper pole and dilated renal pelvis of the left kidney which was thought to be congenital peripelvic cysts.

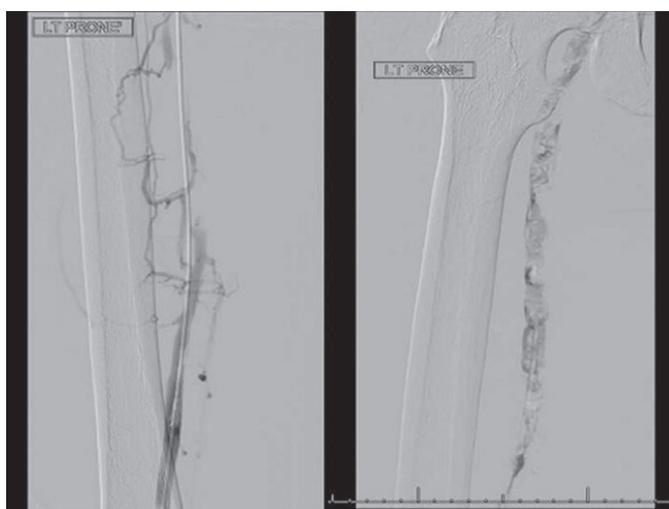


Figure 2: Catheter directed thrombolysis catheter passing through left iliofemoral vein with extensive thrombosis.

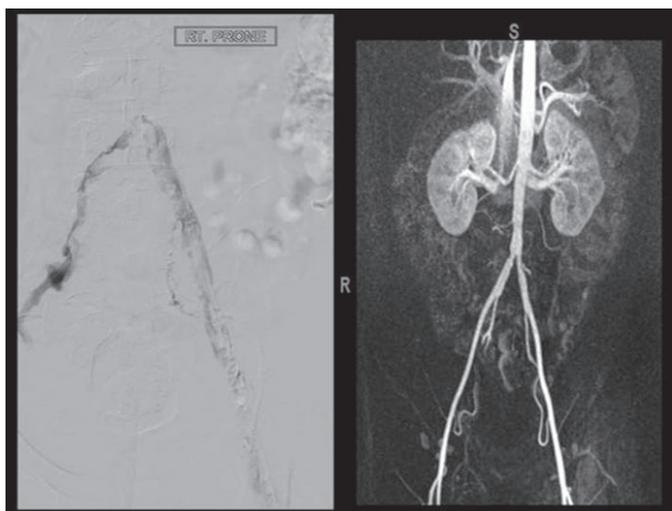


Figure 3: Angiogram of iliofemoral veins showing extensive clot and inability to pass catheter through infra-renal vena cava. A magnetic resonance venogram showed complete occlusion of both iliofemoral veins.

or radiologically. She was treated medically with low molecular weight heparin followed by warfarin® and with thigh length class II graduated compression hosiery.

The patient in Case 1 was given 1.5 mg/kg of clexane for two weeks then was maintained on warfarin for life because that was his second massive proximal DVT.

The patient in Case 2 was given 1.5 mg/kg of clexane once per day for two weeks then she was maintained on warfarin for life and she was followed-up by the vascular team for the first year then has been discharged. The patient was followed on monthly basis for the first three months then every three months by the vascular team. She was referred to the gynecologist to follow-up her presumed retroperitoneal fibrosis.

DISCUSSION

Both of these patients presenting with iliofemoral DVTs were identified to have unusual venous anatomy. The first patient had an occluded infra-renal vena cava which we assumed to be developmental as most cases of IVC absence or occlusion happen in the prenatal period secondary to maldevelopment of the kidneys and renal veins [12]. This will lead to recurrent DVT at a younger age. The incidence is 1 in 10,000 in people aged 20–40. Various anomalies of the IVC have been described including complete absence, partial absence or presence of bilateral IVC [13]. This will lead to decreased venous return from both legs and development of venous hypertension and stasis that may precipitate DVT even in the presence of collaterals [14]. A recent case report by Iqbal et al. has described a similar patient with extensive DVT who was found to have agenesis of his left kidney and absent IVC with prominent azygos and hemiazygos vein and collaterals on the anterior abdominal wall [14].

In patient of Case 2, the IVC was present but was chronically occluded. Also patient had thrombosis of her both iliofemoral veins although it was not diagnosed clinically. On further enquiry, her symptoms were ongoing for the last six months in the form of recurrent leg swelling, vague abdominal and back pain and dusky discoloration of her legs. The presence of an occluded IVC on her CT angiography was not associated with any collateral circulation which was unusual. We could not elicit any underlying pathology for her DVT and her IVC was present but occluded with an organized thrombus.

Since the publication of NICE guidelines we have increased our utilization of CDT for iliofemoral DVTs [5]. Performing CT abdomen and pelvis for all patients with proximal DVT was one of the recommendations of NICE to rule out intra-abdominal malignancy or abnormal anatomy [5].

The presence of these interesting findings on computed tomography angiography in the both cases was extremely helpful in making a decision about applying CDT to them. It also helped to determine the type of anticoagulation and duration of treatment. In both of our presented cases, the presence of aberrant venous anatomy resulted in either a decision not to undertake CDT of a greater likelihood of failure.

So whilst we recommend the introduction of CDT to treat extensive iliofemoral DVT, as per NICE guidance [5], we feel that the presence of central venous anomalies make this form of treatment less likely to succeed. Efforts should therefore be made to identify such anatomical variants prior to commencement of CDT to minimize risks in patients who are less likely to benefit from this treatment.

CONCLUSION

Cases of proximal deep venous thrombosis have to be investigated thoroughly by doing computed tomography angiography or magnetic resonance angiography to rule out cancers, abnormal venous anatomy or any other pathology. The management of these patients should be under the vascular team as early as possible. These patients could be eligible for direct catheter thrombolysis or thrombectomy which would save them developing post thrombotic syndrome.

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Author Contributions

Nihal Abosaif – Substantial contributions to conception and design, Acquisition of data, Analysis and

interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Simon Hobbs – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Jules Dyer – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Michael Collins – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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