



Inadvertent Left Common Iliac Vein Catheterisation during Left Varicocele Embolisation—A Potential Pitfall

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Abstract

Testicular vein embolisation has become the first line therapy in treatment of varicocele with good technical success and low complication rate. We report two cases of anatomical anomalies in which the left iliac vein was catheterised after selective catheterization of the left renal vein. This is a potential pitfall, which has not been previously reported. Reasons for catheterisation of the left iliac vein through the left renal vein are discussed and angiographic features to recognise and prevent potential left iliac embolisation are reviewed.

Introduction

Testicular vein embolisation has become the first line therapy in treatment of varicocele with good technical success and low complication rate [1]. We report two cases in which the left iliac vein was inadvertently catheterized after selective catheterization of the left renal vein with a view to testicular vein embolization. This potential pitfall has not been previously reported and has an important clinical and medico-legal implication.

Reasons for catheterisation of the left iliac vein through the left renal vein are discussed and angiographic features to recognise and prevent potential left iliac embolisation are reviewed.

Case Presentation

Case 1

A 51 year old patient with left varicocele was referred for embolization. At the start of the procedure, the right common femoral vein (CFV) accessed. A 4 Fr. sheath (Cordis, Miami Lakes, USA) was introduced then a 4 Fr. cobra catheter (Cordis, Miami Lakes, USA) and angled hydrophilic wire (Radiofocus, Terumo, Tokyo) were manipulated through the Inferior Vena Cava (IVC) into the left renal vein. Venography demonstrated contrast reflux into a vein arising from the caudal surface of the left renal vein. Assuming it was the testicular vein, this vein was catheterised selectively and the catheter and wire were advanced into the pelvis. At this stage, the catheter was noted to pass laterally in the pelvis and moving away from the scrotum (Figure 1a). This was recognised and a venogram revealed that catheter was actually in the left external iliac vein (Figure 1b). At this point, the catheter and wire were withdrawn and the procedure was abandoned.

Case 2

A 19 Year old male referred for left sided varicocele embolisation, which was confirmed on ultrasound. After ultrasound guided right Internal jugular vein punctured and a 5 Fr. vascular sheath (Cordis, Miami Lakes, USA) was inserted. An angled hydrophilic wire (Radiofocus, Terumo, Tokyo) and 5 Fr. MPA catheter (Cordis, Miami Lakes, USA) were manipulated through the right atrium into the IVC and then into the left renal vein. Venography demonstrated reflux of contrast into a vein arising from the caudal surface of the left renal vein (Figure 2a). The catheter and wire were manipulated into the presumed left testicular vein and advanced into the pelvis. Further venography suggested that the catheter was placed into the left testicular vein (Figure 2b). A 9 mm fibred platinum Coil (Target Vascular, Boston Scientific, Cork, Ireland) was deployed initially followed by a 10 x 400 mm spiral coil (Balt Extrusion, Montmorency, France). The last deployed coil showed unconstrained widening of coil, which was not expected in a vessel of the size of the left testicular vein. This raised the suspicion of non-targeted embolisation and a further venogram confirmed the inadvertent deployment of coils in the left common iliac vein, left internal iliac vein and its tributaries (Figure 3a). The 10 mm Spirale Coil was successfully removed with a gooseneck snare (10 mm Multisnare, BVM). However, a small coil in a tributary of the left internal iliac vein was not retrievable and was left in-situ (Figure 3b) with no immediate post procedure implications.

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Figure 1a: Catheter noted to pass laterally in the pelvis with the tip pointing away from the scrotum (white arrow).
Figure 1b: A venogram confirms suspicion of catheter placement in the left external iliac vein.

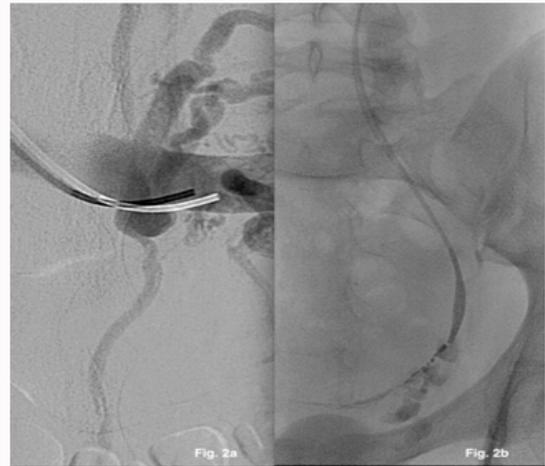


Figure 3a: Digital subtraction venogram after unconstrained widening of the coil shows deployment of coils in the left common iliac vein and its tributaries.
Figure 3b: Digital subtraction venogram showed a small coil in a tributary of the left internal iliac vein was not retrievable and left *in situ*.

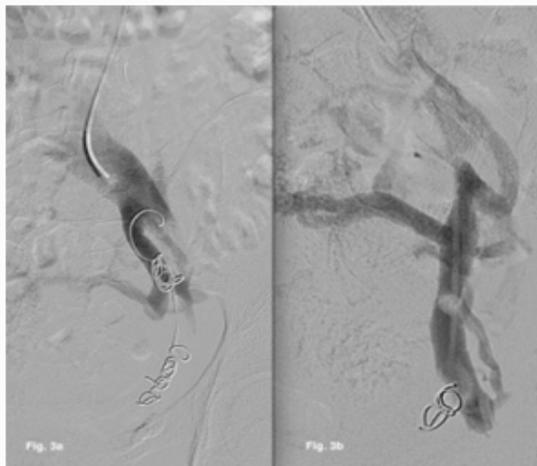


Figure 2a: Demonstrates reflux of contrast into a vein draining into the caudal surface of the left renal vein.
Figure 2b: Venogram after advancing the catheter into the vein draining into the caudal surface of the left renal vein shows filling of some veins in the pelvis, which was presumed to be the testicular vein.

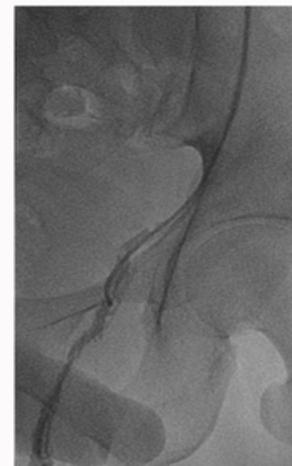


Figure 4: The definitive sign of cannulation of the testicular vein on venogram is contrast passing medially towards the scrotum inferior to the inguinal ligament.

Discussion

Percutaneous testicular vein embolisation has a good technical success with some authors, such as Nabi et al. [2], reporting a technical success of 95.7%. The long-term success and complication rates of percutaneous embolisation of adolescent varicocele remain comparable to those with surgical ligation [3].

Complications of percutaneous therapy are infrequent and are generally minor. Complication rates in recent literature have been reported from 0% [2] to 11% [4]. Such complications include contrast material reaction, testicular thrombophlebitis from sclerosing agents, venous spasm, and non-targeted embolization to the lungs, retroperitoneal haematoma due to vessel injury and those associated with the venous access puncture.

Apart from the above reported potential complications, cannulation of the left common iliac vein after selective catheterisation of the left renal vein has not been previously described as a possible

complication of varicocele embolisation. Failure to recognise this during procedure may lead to non-target vessel embolisation which may have significant clinical and medico-legal implications.

There are certain signs during fluoroscopy and angiography, which would help recognize that the catheter is not in the desired position (the left testicular vein) despite selective catheterisation of the left renal vein. If the catheter or the wire are pointing and moving away from the scrotum, as in case 1 (Figure 1a), it would suggest that the catheter is in the external iliac vein. In this case, venography would confirm the position of the catheter in the left external iliac vein. However, if the catheter passes into the tributaries of the left internal iliac vein, the catheter would point medially as it would if it was correctly positioned in a testicular vein (Case 2 (Figure 2b)). Venography at this stage should be reviewed carefully to differentiate between tributaries of the internal iliac vein and the testicular vein. The definitive sign of cannulation of the left testicular vein on venography is contrast passing medially towards the scrotum inferior to the inguinal ligament (Figure 4). If this is not seen, then

the possibility that the catheter tip is in one of the tributaries of the internal iliac vein should be considered.

Cannulation of the left common iliac vein after selective catheterisation of the left renal vein can be explained anatomically by the variations in the collaterals of the left testicular vein. Bahren and co-workers introduced a classification for the left-sided varicocele that is used as a basis for the most frequent anatomical variants [5].

Relevant to the described complication in this report is the Bahren Type II variant, which is described as the presence of collaterals from the left testicular vein to the inferior vena cava, left iliac vein or lumbar veins on phlebography. This variation has a relatively common frequency of 12.7%. This would explain how it is possible to pass the catheter into the left common iliac vein after catheterisation of the left testicular vein.

The other possible anatomical pathway for the catheterization of the left common iliac vein through the left renal vein is through the left ascending lumbar vein. The ascending lumbar veins arise from the embryological lumbar venous line and connect the common iliac, ilio-lumbar and lumbar veins. They ascend deep to the psoas muscle anterior to the medial portions of the lumbar transverse processes to join with the subcostal veins forming the azygos on the right and the hemiazygos on the left. Communication with the left renal vein rather than the subcostal vein occurs commonly. The incidence of left ascending lumbar vein draining to the left renal vein ranges from 34% [6] to 68% [7]. Baniel et al. [8] noted that lumbar veins draining in to the left renal vein are posterior to the entrance of the left testicular vein. This relatively common anatomical variant would allow the passage of catheter from the left renal vein through the left ascending lumbar vein into the left common iliac vein.

Double IVC with the left IVC draining into the left renal vein is another potential anatomic pathway for this complication. However, venography after selective catheterisation of the left renal vein would demonstrate a large high flow vein draining into the left renal vein, which would clearly differentiate the left IVC from the ipsilateral testicular vein.

The two cases described highlight the importance of recognizing the potential for left iliac vein catheterisation after selective

catheterisation of the renal vein as a procedure related complication. Failure to recognise this could lead to the erroneous embolisation of the left iliac vein and its tributaries. Catheter tip pointing and moving away from the scrotum should be carefully monitored, and if observed, should suggest that the catheter is in the left external iliac vein. However, catheter tip pointing is not a reliable anatomical marker particularly if the catheter tip has already passed into one of the internal iliac vein tributaries. A venogram after the catheter has been introduced in to the pelvis through the testicular vein can differentiate between internal iliac vein tributaries and testicular vein tributaries. This should demonstrate contrast flow distal to the inguinal ligament towards the scrotum, which is the definite proof of selective catheterisation of the testicular vein.

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