

Repositioning of an azygous positioned dialysis catheter using an extended snare technique

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Section: Interventional radiology

Area of Interest: Cardiovascular system Interventional vascular

Imaging Technique: Fluoroscopy

Special Focus: Foreign bodies Case Type: Clinical Cases

Authors: Gibran T Yusuf, Raymond Ramnarine, Mohammad Daneshi, Mohammad Husainy, Cheng Fang, Rumman Ahmed, Dean Huang

Patient: 67 years, male

Clinical History:

A chronic renal failure patient had a right tunnelled dialysis line placed in a ward setting. On chest radiograph the line showed sharp angulation and foreshortening, indicating azygous vein placement (Fig 1). Due to fear of loss of vascular access the patient was referred to interventional radiology.

Imaging Findings:

It was felt the line could be repositioned and following local anaesthetic, a 7 french sheath was placed into the right common femoral vein. An Amplatz Goose neck snare was positioned within the SVC anterior to the tunnelled line with the snare open. A 0.018mm V-18 wire was inserted through the indwelling sheath and positioned posterior to the misplaced tunnelled line. This resulted in the snare and 0.018 wire on opposing sides of the line within the SVC (Fig 2). The 0.018 wire was then threaded through the open snare and the snare then closed, resulting in an extended loop encapsulating the distal third of the tunnelled line. Both the snare and wire were retracted simultaneously resulting in the line tip being pulled out of the azygous vein into the SVC (Fig 2). Line position was confirmed using a contrast bolus through the line on digital subtraction angiography.

Discussion:

Tunnelled line placement is a common procedure and often performed without radiological guidance. Complications range from pneumothorax, haemorrhage, arterial injury, air embolism, malposition or migration. Malposition is a rare; arterial puncture or extravascular placement, and is often clinically apparent. Venous malposition, is often clinically occult but obvious radiographically. The azygous vein projects posteriorly from the SVC, descends paravertebrally, and may be distended in renal failure patients. Azygous vein cannulation is rare, estimated to occur in 1% of cases with left sided line placement whilst fluid overload and catheters with a long venous tip represent potential risk factors [1]. Radiographic findings of azygous vein cannulation are usually obvious including a medial paravertebral lie and tracheobronchial angle angulation [2].

Dialysis lines are utilised for high flow and require large vessels to achieve velocities of 400ml/min [3]. The small calibre of the azygous or the presence of a kink in the line can decrease velocity and mean inefficient dialysis and may mimic a clot [4]. If malpositioning is not recognised complications are related to opposing directionality of blood

flow and the small calibre vessel resulting in potential venous perforation or occlusion, which may manifest as haemothorax or mediastinal haematoma [1]. Rarely, placement of a tunnelled line within the azygous vein has been advocated, e.g. SVC occlusion [5] and a reason postulated is due to secondary azygous dilation and thus lowering the risk of venous occlusion or rupture.

Our case presents an unusual problem where the tip of the dialysis line lies within the azygous vein, whilst a cuff within a subcutaneous tunnel has expanded to prevent migration and does not allow the line from being pulled back. Conventional wisdom dictates line removal, the subcutaneous tunnel would have to be opened surgically, the cuff removed as well as a new line placed via a new subcutaneous tunnel. Alternatively, line exchange can be performed with a wire to secure position, opening the previously closed internal jugular access and formation of a new subcutaneous tunnel. Our novel approach retained the indwelling line, used minimal incision and could be performed quickly. Importantly, a central venous puncture was also avoided lowering the risks including of venous occlusion and losing central access in renal failure patients.

It is important to recognise complications of tunnel line placement and the role of interventional radiologist. An extended snare technique for retrieval of an azygous placed lines prevents associated risks of removal and reinsertion.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Dialysis line within an azygos vein repositioned with extended snare, NA, NA

Final Diagnosis: Dialysis line within an azygos vein repositioned with extended snare

References:

- Bankier AA, Mallek R, Wiesmayr MN, Fleischmann D, Kranz A, Kontrus M, Knapp S, Winkelbauer FW (1997) Azygos arch cannulation by central venous catheters: Radiographic detection of malposition and subsequent complications. *J Thorac Imaging* 1997; 12:64–69 (PMID: [8989762](#))
- Pua U (2010) Imaging teaching case. Radiographic features of malpositioning of a hemodialysis catheter in the azygos vein. *Am J Kidney Dis* 55:395–398 (PMID: [19781832](#))
- Schon D, Whittman D (2003) Managing the complications of long-term tunneled dialysis catheters. *Semin Dial* 16:314-22 (PMID: [12839506](#))
- Stewart GD, Jackson A, Beards SC (1993) Azygos catheter placement as a cause of failure of dialysis. *Clin Radiol* 48:329-31 (PMID: [8258225](#))
- Wong JJ, Kinney TB (2006) Azygos tip placement for hemodialysis catheters in patients with superior vena cava occlusion. *Cardiovasc Intervent Radiol* 29:143–146 (PMID: [16184325](#))

Figure 1

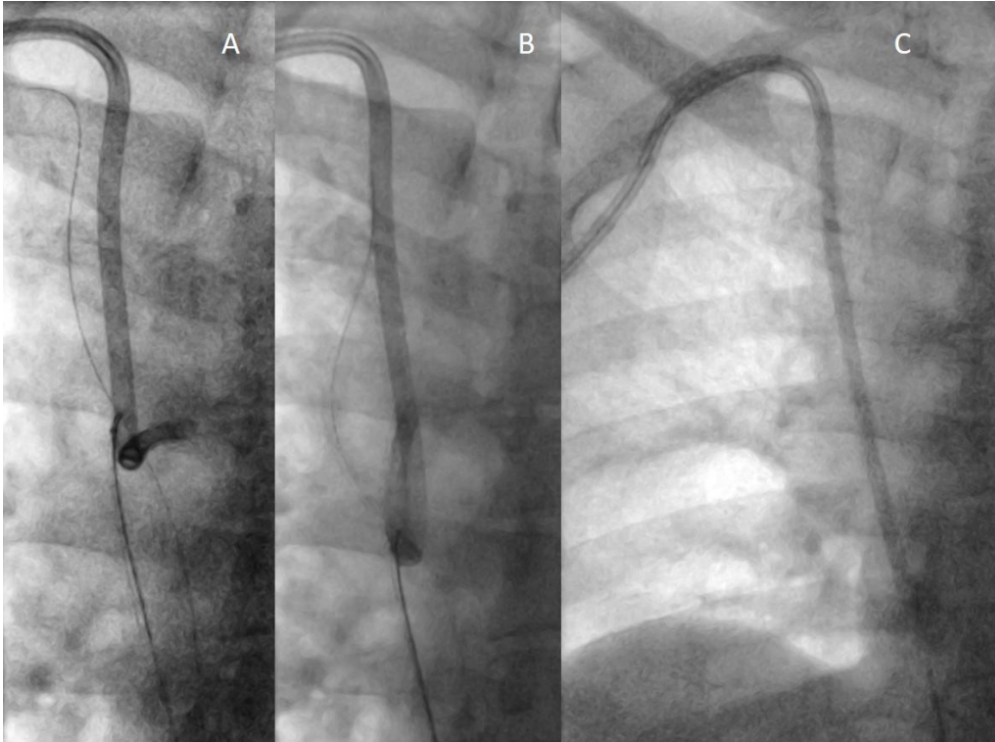
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Description: PA chest radiograph with right sided tunneled dialysis catheter. The catheter makes a sharp angulation of approximately 90 degrees medially instead of being placed within the SVC, and represents an azygous positioned line (arrow). **Origin:** King's College Hospital, London

Figure 2

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Description: a) 0.018 wire (thin arrow) was threaded through a snare (thick arrow) within the SVC causing an extended loop (thick arrow) (b,c) as the loop was retracted the dialysis is pulled into the SVC (arrow). **Origin:** King's College Hospital, London