Rare cause of failure of central venous catheter insertion in a patient with end stage renal disease-septum in internal jugular vein

Sir,

Chronic kidney disease (CKD) is a major public health problem and a leading cause of morbidity and mortality in India. Patients with the end stage renal disease (ESRD) on maintenance hemodialysis (MHD) commonly have a history of central venous catheter (CVC) insertion for hemodialysis (HD).

A 50-year-old male patient with ESRD on MHD since 2008 presented to the institute for the evaluation of living donor related renal transplantation. He was diagnosed with CKD in 2005 which progressed to ESRD in December 2008. Past history included the hypertension since 2008 and was controlled on anti hypertensive medication.

MHD was provided through a left brachio-cephalic fistula (BCF) created surgically in February 2009 that became functional only in September 2009 due to poor flow. During this 10 months, period MHD was achieved using HD double lumen catheter inserted in a right internal jugular vein (RTIJV) for 2 months and a cuffed HD catheter (penta cath) inserted in the right. Subclavian vein for the subsequent 7 months till the BCF became functional.

Intraoperatively after induction general anesthesia and endotracheal intubation, invasive blood pressure monitoring was achieved by cannulating the right radial artery. Central venous access was attempted under all aseptic precautions using the landmark technique on the right side. RTIJV was punctured, and venous blood aspirated, but the guide wire could not be navigated beyond 8 cm. Three separate attempts by two trained anesthesiologists using the landmark technique were unsuccessful. RTIJV in short axis view [Figure 1] using a 10 MHz ultra sound probe did not reveal any intraluminal thrombus. Repeat puncture attempt under ultrasonography (USG) guidance was successful but still the guide wire could not be navigated beyond a distance of 8 cm.

The site of insertion was changed to the left internal jugular vein (IJV) which was cannulated in a single prick under USG guidance and guide wire navigated. A 7.5 French four-lumen silver coated CVC was inserted and fixed at the 11 cm mark after confirming the back flow in all four ports and confirmation of the CVP trace on the monitor. Surgery was uneventful, and the patient was shifted to the Intensive Care Unit. There was no oozing or hematoma formation at the CVC insertion site. Postoperatively, the patient did not report any difficulty or complication in previous CVC access before presenting to our institute.

Failure of the passage of guide wire on the right side despite no intra vascular thrombus prompted us to call the interventional radiologist to ascertain the cause of failure. On evaluation of the RTIJV in the longitudinal view much distal to the site of puncture a membrane-like structure originating from the posterior wall and approaching the anterior wall with almost complete occlusion of the lumen was seen. There was a blind end of the vessel in mid distal IJV with a small defect allowing slight blood flow across the membrane [Figure 2].

CVC are used for administration of IV fluids, medication, total parenteral nutrition, repeated blood sampling and for HD.[1] CVC catheter usage is associated with complications related to- Catheter insertion, in situ period and removal. Highest incidence rate amongst complications is of catheter-related bloodstream infection which ranges from 4.3% to 26% of placed catheters.[2] The incidence of catheter-related thrombosis ranges from 0.6% to 33%.[3] A study by Kujur *et al.* reported an incidence of 33% in patients having CVC inserted through the IJV with an incidence higher in patients with malignancy and those with HD catheters.[4] As patients with HD catheters use have a high incidence of intra luminal thrombus our first suspicion for failure of guide wire insertion was the presence of a thrombus. But on USG the absence of any thrombus lead us to the assessment of vein patency throughout its course. On USG and Doppler evaluation, our patient had a septum in the distal IJV correlating to the area just above the middle one-third of the clavicle. As there was previous CVC insertion at the same site with no difficulty or complication, we concluded that the septum was secondary to either previous CVC insertion or long-term presence.

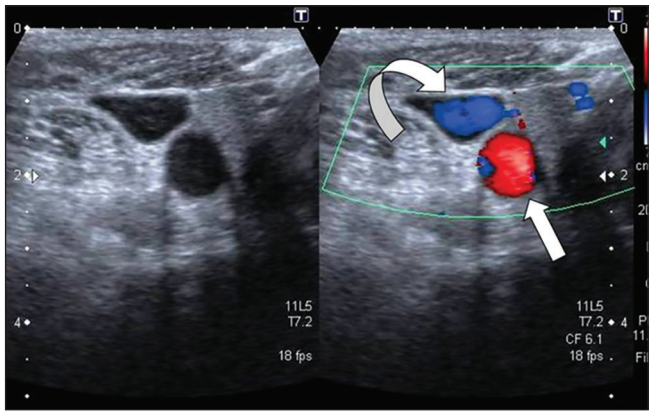

Figure 1: Intra-operative ultrasound using high frequency probe in short axis view revealed anechoic thrombus free lumen of right internal jugular vein

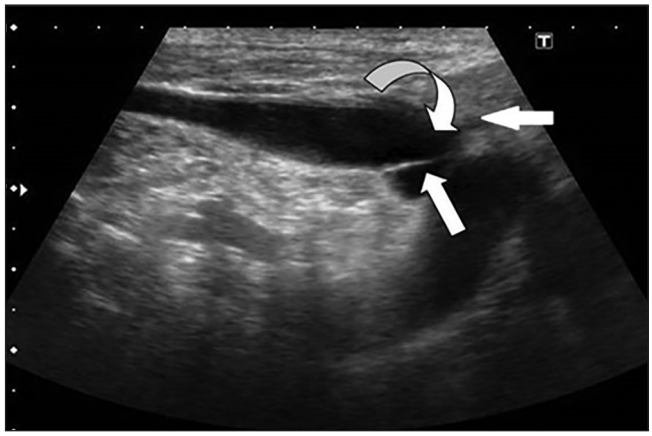

Figure 2: Longitudinal view of right side reveals blind end in mid distal internal jugular vein (short straight arrow) separated with thin membrane like structure (septum) (straight arrow) with small defect (curved arrow)

Another important cause of failure of the guide wire or catheter insertion in patients on HD with long-term CVC placement can be stenosis. It has a reported incidence of around 50% with risk factors being placement of multiple catheters, longer duration *in situ*, subclavian venous location, poor catheter tip positions, and placement on the left side.[5] Normal USG appearance at the puncture site does not rule out significant stenosis and requires angiography or Doppler for confirmation.

We recommend USG and Doppler evaluation of all major veins to rule out thrombus and luminal obstruction in patients with previous history of CVC insertion to avoid failures and complications.

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References

1. Akoh JA. Vascular access infections: Epidemiology, diagnosis, and management. Curr Infect Dis Rep 2011;13:324-32.
2. Hammarskjöld F, Wallén G, Malmvall BE. Central venous catheter infections at a county hospital in Sweden: A prospective analysis of colonization, incidence of infection and risk factors. Acta Anaesthesiol Scand 2006;50:451-60.
3. Lee AY, Levine MN, Butler G, Webb C, Costantini L, Gu C, *et al.* Incidence, risk factors, and outcomes of catheter-related thrombosis in

adult patients with cancer. J Clin Oncol 2006;24:1404-8.
4. Kujur R, Rao SM, Badwaik G, Paraswani R. Thrombosis associated with right internal jugular central venous catheters: A prospective observational study. Indian J Crit Care Med 2012;16:17-21.
5. Lumsden AB, MacDonald MJ, Isiklar H, Martin LG, Kikeri D, Harker LA, *et al.* Central venous stenosis in the hemodialysis patient: Incidence and efficacy of endovascular treatment. Cardiovasc Surg 1997;5:504-9.

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