Malposition of Hemodialysis Catheter Into Arch of Aorta

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Letter

ABSTRACT

Malpositioning of internal jugular hemodialysis catheter in great artery is rare but a serious complication. Misplacement of a hemodialysis catheter from internal jugular vein in to arch of aorta is presented.

A 28-year-old male patient diagnosed with chronic kidney disease, underwent cannulation using landmark guidance in preparation for dialysis. Chest X-ray revealed malpositioning of the catheter tip piercing the arch of aorta.

During exploration under general anesthesia surgical approach was through neck, to dissect down to the catheter entry into the thorax. The catheter was removed uneventfully.

Although rare, vascular complications following hemodialysis catheter insertion can lead to considerable morbidity and mortality. If any suspicion of arterial injury arises then it is recommended to leave the catheter in situ and seek prompt vascular surgery consultation

The level of experience of the clinician can also reduce the risk of inadvertent arterial placement of central venous catheter. Use of real time ultrasonography may be helpful.

Key Words: Catheter, central venous, hemodialysis, misplacement.

Received: 22 November 2023**, Accepted:** 22 January 2024

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ISSN: 2090-925X, 2024, Vol.16, No. 1

INTRODUCTION

Malpositioning of internal jugular hemodialysis catheter in great artery is rare but a serious complication. Discussed here is malpositioning into the arch of aorta that was removed following mini-sternotomy.

A 28-year-old male patient diagnosed with chronic kidney disease, underwent right internal jugular vein (IJV) cannulation using landmark guidance in preparation for dialysis. Pulsatile backflow of bright red colored blood led to the suspicion of arterial placement of the catheter. Ectopic arterial placement was confirmed by attaching the catheter to arterial transducer that showed the arterial pressure waveform on monitor. Further radiological confirmation was done by obtaining chest X-ray, which revealed malpositioning of the catheter tip (Figure 1A). Thereafter catheter was left in situ and flushed with heparin. Communication with patient revealed that multiple attempts at cannulation were made. CT aortogram revealed catheter tip piercing the arch of aorta in the mid intraluminal region with no evidence of complications (Figure 1B).

During exploration under general anesthesia initial surgical approach was through neck, to dissect down to the catheter entry into the thorax but the catheter entry point could not be accessed. Ministernotomy revealed that catheter first traversed the right internal jugular vein, then the tip of the catheter entered into arch of aorta. Perioperative period was uneventful.

Hemodialysis catheter is used as a vascular access for hemodialysis and placement of catheter without use of ultrasonography play a part in malposition. However, in this patient the initial puncture was into the internal jugular vein only. A study has shown that arterial punctures are directly proportional to the number of attempts made at catheterization, occurring at a rate of 50% after three attempts at cannulation[1].

It appears that initial entry was into the right IJV, subsequently the catheter entered the aorta after making a counter puncture in the IJV. Excessive length of either the puncturing needle or the tissue dilator might have been inserted inadvertently leading to this situation.

Management options of arterial injury depend on the patient's clinical condition and the extent of the vascular injury and include catheter removal and external compression, endovascular repair, or open surgical repair[2]. Although rare, vascular complications following

DOI: 10.21608/ASJA.2024.250592.1015

hemodialysis catheter insertion can lead to considerable morbidity and mortality. If any suspicion of arterial injury arises then it is recommended to leave the catheter in situ and seek prompt vascular surgery consultation[3]. Cardiopulmonary bypass machine should be kept ready as back-up while repairing the major vascular injuries that may be complicated with catastrophic bleeding.

Use of real time ultrasonography allows direct visualization of needle insertion in relation to the anatomical structures and guide wire location resulting in decreased complications and improved cannulation success. The level of experience of the clinician can also reduce the risk of inadvertent arterial placement of central venous catheter.

Following the standard guidelines of hemodialysis catheter insertion like avoidance of inserting excessive length of puncture needle and tissue dilator should always be practiced. Such avoidable complication may not only increase the morbidity and mortality but also puts the patient under enormous financial burden.

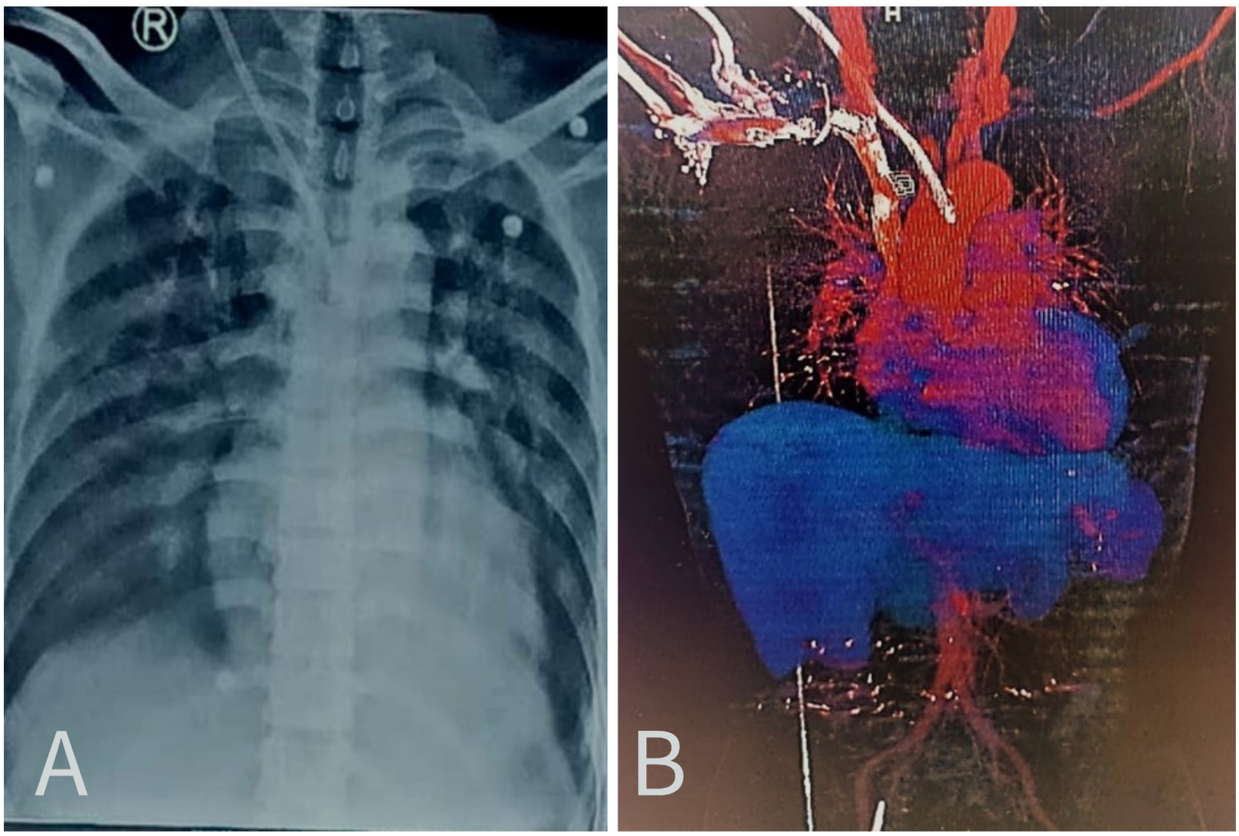

Fig. 1: A. Chest X-ray showing tip of hemodialysis catheter at 4th intercostal space behind sternum. B. CT Aortogram showing tip of catheter piercing arch of aorta in mid-intra-luminal region.

ABBREVIATIONS

1. IJV: Internal jugular vein
2. CT: Computed tomography

CONFLICT OF INTEREST

There are no conflicts of interest.

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