Preemptive Guidewire-Assisted Technique to Assist in Safe Removal of Chronic Indwelling Central Venous Catheters

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Clinical Presentation

- 7 yo boy with a past medical history of acute lymphoblastic leukemia, now in remission, who had an indwelling left subclavian port placed 3 years ago.
- After completion of chemotherapy, he was scheduled for port removal in the OR.

Background

- Long-term indwelling catheters are frequently used, enabling a route for intravenous therapies to treat a number hematologic and oncologic diseases.
- Longer duration leads to a state of chronic inflammation and fibrosis around the catheter and an independent risk factor for fracture during removal[1,2]
- If fractured this risks stenotic and embolic potential (i.e., migration of fragment to the right heart, pulmonary artery, etc.), requiring further interventions to ensnare and remove it.
- Thus far, no described protocol is readily available to protect patients from this complication.

References

1. Ai, Ning, et al. "Analysis of risk factors for implantable venous access port catheter fracture with internal jugular vein." *Annals of Palliative Medicine* 9.1 (2020): 30-36.
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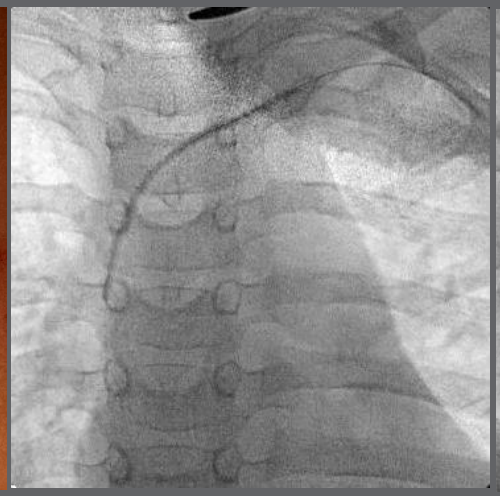
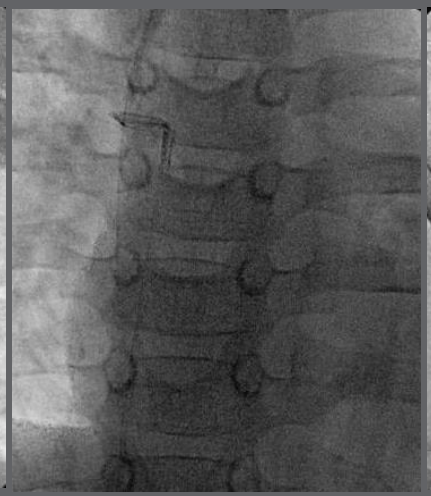
3. Yildizeli B, Laçin T, Batirel HF, Yüksel M. Complications and management of long-term central venous access catheters and ports. J Vasc Access. 2004;5(4):174-178. doi:10.1177/112972980400500407
4. Huang SC, Tsai MS, Lai HS. A new technique to remove a "stuck" totally implantable venous access catheter. *J Pediatr Surg*. 2009;44(7):1465-1467. doi:10.1016/j.jpedsurg.2009.03.033

- During attempted removal from the port site, significant resistance was met, prompting a cutdown over the insertion site.
- Despite capsular dissection, the catheter still was not easily removed.
- A 0.018" J-tip guidewire was fed through the catheter before additional attempts.



- Increased tension on next attempts led to fracture of the catheter with significant intravascular catheter segment left behind.



- IR consulted with right groin access
- An endovascular 10mm snare device was introduced.
- The guidewire within the catheter fragment was passed through the deployed snare, allowing facile advancement of the snare around the catheter.

- The snare was sinched and a push-pull technique from both the groin and subclavian guidewires freed the fragment which was safely removed from the groin access site.

Discussion

- After externalization of the extravenous catheter, we assess for resistance in removal
- If significant force is required or witnessed loss of catheter integrity, a J-tip guidewire is fed through the length of the catheter under fluoroscopy.
- We posit this serves three beneficial functions:
    1. **As the catheter stretches and collapses upon retraction it distributes the force circumferentially along the length of the catheter as well as reduces angular kinking, both of which mitigate stress points of fracture.**
    2. **If the catheter does fracture, the distal portion should remain intubated by the guidewire, theoretically reducing embolic potential.**
    3. **Allows more facile percutaneous transvenous retrieval if indicated.**
- Though this is not the first documented use of a guidewire to assist with central venous catheter removal [4], our center's experience appeals for wider adoption and more routine use to improve retrieval and facilitate a safer environment for troublesome catheters.
- The feasibility of its application requires no significant increase in procedural cost or time and may in fact save considerable anesthesia, radiation use, and OR time by enabling easier transvenous removal.