

Accidental intra peritoneal malpositioning of femoral central venous catheter: Learning from mistakes!

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A large number of central venous catheters (CVC) are placed each year in the emergency room, operation theatre and critical care unit. Although rarely associated with life threatening complications, femoral CVC is known to have the highest incidence of mechanical complications. It is important that clinicians are aware of wrong positioning of CVC even in the presence of good backflow of blood through all the lumens, especially in patients with haemo peritoneum. This article outlines a rare complication of misplaced femoral CVC into the peritoneal cavity in a patient with haemo peritoneum, its consequences and management. We further want to emphasize the importance of real time imaging during CVC insertion to improve safety and reduce complications rate.

Keywords: central venous catheter; femoral vein; complication; intraperitoneal; ultrasonography

Introduction

Central venous catheterization (CVC) via femoral route is known to cause mechanical, thrombotic and infection related complications.¹ Although incidence of mechanical complications is as high as 18.8%^{1,2}, life threatening are uncommon.³ We are reporting intra peritoneal misplacement of femoral CVC in a patient with haemo peritoneum. Awareness about this complication will help in early detection and appropriate management. We also want to emphasize the importance of ultrasonography guidance during CVC insertion.

Case report

A 25year old lady with 7 months of amenorrhea, presented to emergency medicine department with acute chest pain. Clinical examination revealed severe respiratory distress with gasping, unresponsive patient, absent central pulse and unrecordable blood pressure. Cardio pulmonary resuscitation (CPR) was initiated. Airway was secured with an endotracheal tube. Arterial blood gases revealed severe mixed acidosis. Fluid resuscitation was initiated. Femoral vein was cannulated by modified Seldinger's technique using anatomical landmarks. Laboratory investigations revealed haemoglobin 3.4g/dl, platelet count 7,000/mm³, prothrombin time 25.5s

and INR 2.2. Bedside ultrasonography revealed hyperechoic lesion in liver, free fluid in abdomen and absent foetal heart beat. CT pulmonary angiogram ruled out pulmonary thrombo embolism, but reported hyper echoic haemorrhagic foci in liver with active bleeding. Blood transfusion and inotropic support were started as haemodynamic parameters further deteriorated and the patient was immediately shifted to the operation theatre for exploration.

In the operation theatre, high resistance was encountered to transfusion through CVC. Thus, fluid and blood transfusion was continued through peripheral line and internal jugular vein was cannulated for inotropic infusion. Intraoperatively, haematoma involving right liver lobe was noted with 2 litres of haemoperitoneum. Incidentally, 10cm length of the femoral CVC was found in the peritoneal cavity (Figure 1). As the path of the CVC was uncertain, it was left in situ, abdomen was packed and the patient was shifted to ICU. Bedside ultrasound revealed the catheter tracking subcutaneously into the peritoneum cavity. After 48 hours when the haemodynamic and haematology parameters stabilized, she underwent laparotomy for removal of abdominal packs and



hysterotomy. The track of the femoral catheter was confirmed to be subcutaneous and was removed.

Discussion

Central venous catheterization is performed routinely in the emergency room, operation theatre and critical care unit.^{4,5} Femoral vein is the choice of central venous access especially among the beginners as the anatomical landmarks are evident.⁵ The success of landmark based technique is dependent on the expertise of the physician.⁵ However, with the advent of ultrasonography, real-time fluoroscopy and contrast fluoroscopy, the reliability of the procedure is reported to increase significantly, with lower failure rate, complication rate, and number of attempts required for successful access.⁶

In our case, puncture site being just below the inguinal ligament, inadvertent advancement of the needle would have led to the entry into the peritoneal cavity. Haemoperitoneum may have led to free back flow of blood initially. The initial ease of transfusion through the femoral CVC may be attributed to the negative pressure in the peritoneal cavity.⁷ Transfusion of blood, medications and inotropes into the peritoneal cavity explains the deteriorating haemodynamic status, failed resuscitation and worsening of the haemoperitoneum.

We need to be vigilant about the absence of backflow of blood, slowing of gravity infusion, presence of focal neurological deficits or abdominal swelling which indicates the malposition of the CVC clinically.^{8,9} It is important to watch for radiological signs such as the catheter path overlying the vertebral column and the presence of catheter tip beyond the bifurcation of the IVC and common iliac vein.¹⁰

Once the diagnosis of misplaced catheter is made, it is prudent to stop all infusions through the catheter. The catheter can be safely removed if its course is identified as not lying within a vulnerable structure. However, if found lying within or traversing a large incompressible vessel it should be removed only after considering the likely consequences. Ideally, imaging techniques should be sought, in conjunction with interventional radiology or vascular surgery.⁸

In order to improve success rate and speed of placement as well as to reduce complications, it is prudent to follow NICE guidelines which suggest ultrasound guidance for all electives and for most emergency CVCs.¹⁰

To summarize, it is important to consider intraperitoneal misplacement of CVC in a patient with worsening of haemodynamics despite inotropic support in the presence of haemoperitoneum. We need to be vigilant regarding the clinical and radiological signs indicating malposition. Real time imaging during CVC will improve safety profile of the procedure.



References

1. Jacques M, Bernard De J, Franck G, Lefrant J. Complications of Femoral and Subclavian Venous Catheterization in Critically Ill Patients. *JAMA* 2001;**286**(6):700-7
<http://dx.doi.org/10.1001/jama.286.6.700>
2. Polderman KH, Girbes, ARJ. Central venous catheter use. Part I: Mechanical complications. *Intensive Care Med* 2002;**28**:1-17
<http://dx.doi.org/10.1007/s00134-001-1154-9>
PMid:11818994
3. McGee DC, Gould MK. Preventing complications of central venous catheterization. *N Engl J Med* 2003;**348**:1123-33
<http://dx.doi.org/10.1056/NEJMra011883>
PMid:12646670
4. Marino PL, Sutin KM. Establishing venous access. In: Marino PL, editor. *The ICU book*. Vol 1.3. New York: RR Donnelley 2007;**6**:108-28
5. William JF, Seneff MG, Friedman BC, et al. Use of femoral venous catheters in critically ill adults. *Crit Care Me*. 1991;**19**:550-3
<http://dx.doi.org/10.1097/00003246-199104000-00016>
6. Abboud PA, Kendall JL. Ultrasound guidance for vascular access. *Emerg Med Clin North Am* 2004;**22**: 749-73.

<http://dx.doi.org/10.1016/j.emc.2004.04.003>

PMid:15301849

7. Gibson F, Bodenham A. Misplaced central venous catheters: applied anatomy and practical management. *Br. J. Anaesth.* 2013; **110** (3):333-346.
<http://dx.doi.org/10.1093/bja/aes497>
PMid:23384735
8. Satoko T, Toshiya A, Yoichi H. Complication of femoral vein CV port catheter malposition. *Kitasato Med J* 2013; **43**: 74-78.
9. Aarts F, Kuijsten H, Rutten A. Unusual central venous catheter complication without clinical symptoms. *Neth J Crit Care* 2011; **15** (4):218-9.
10. National Institute for Clinical Excellence. Guidance on the use of ultrasound locating devices for placing central venous catheters. London: NICE, 2002, [NICE Technology Appraisal No 49.].