



Should a Double-Lumen Catheter be withdrawn?

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ARTICLEINFO	A B S T R A C T
Article Type: Case Report	Haemodialysis needs a credible and recurrent access to the systemic circulation which can be accomplished by way of central vein catheterization. We report the case of bleeding after withdrawal of the double lumen catheter. A 36-year-old woman who was a known case of end-stage renal disease referred to a dialysis center because of her arteriovenous fistula malfunction. A double-lumen catheter was inserted via the right internal jugular vein but failed to become functional so in the emergency department we decided to withdrawal catheter under cardiac monitoring and pulse oximetry but unfortunately A few minutes after the withdrawal of the double lumen Catheter the patient became agitated and confused. The resuscitation team after infusing IV fluid and blood decided to emergent thoracotomy. We control bleeding by direct pressure and repaired a rupture of the posterior aspect of the right internal jugular and right subclavian vein junction. Six hours later she became alert and one week after discharged, she was in well general condition.
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Introduction

Using central venous catheterization is a necessary and usually method in the really ill patient.¹ This procedure is proportionately safe but not completely with no serious complications. The incidence of serious complications due to venous access ranges from 0.4% to 9.9%.² Complications contain local hematoma, pneumothorax, hemothorax, hydrothorax, central venous thrombosis, air embolism, and cardiac tamponade because of puncturing of the superior vena cava or right side of the heart. Unintentional arterial perforation, which happens in about 5% of all central venous catheter placements³, can cause arterial dissection, arteriovenous fistula formation, hematoma, pseudoaneurysms, and even stroke.⁴

Complications are affected by factors. These are: a defective puncture technique, i.e., low or high puncture places and etc⁵ and also there are patient-specific risk factors which are advanced age, female gender, obesity, coagulopathy and etc.^{6,7} the most common cause of death or injury is perforation which can be prevented by correct choice of the percutaneous venous entry place, which determines the structures through which the catheter must transport, and the angle of vessel wall impingement as the catheter courses through the vessels.⁸ Although other complications connected to

venous access are enhanced significantly by catheter positioning. $^{9\text{-}13}$

The 3.6% complication rate for inaccurate placed catheters, all of which were put by the subclavian vein, shows a very big improvement in this complication from antecedently reported data.⁹⁻¹³

Care Report

A 36-year-old woman, who was a known case of endstage renal disease and had been on regular hemodialysis in recent years, referred to a dialysis center because of her arteriovenous fistula malfunction. A double-lumen catheter was inserted via the right internal jugular vein but failed to become functional. The patient's SPO2 of aspirated blood was 96% and her chest radiography revealed catheter malposition (Figure 1). She was consequently referred to our center for emergent vascular surgery consultation.

The patient was alert and stable in our emergency department, and her vital signs were: BP: 145/90 mmHg; PR=88; RR=22; and temperature=36.7°c.

The entrance site of the catheter was above the right clavicle near the suprasternal notch without any secretion or erythema. The respiratory sounds of both lungs were clear and symmetric, and the peripheral

*Corresponding Author: Samad Shams Vahdati (MD), Tel.: +98 411 6581558, E-mail: sshamsv@yahoo.com Copyright © 2011 by Tabriz University of Medical Sciences pulses of the right and left upper limbs were normal and symmetric. In addition, there was no abnormal finding on the neurologic examination.



Figure 1. Arrow shows the malposed double lumen catheter.

A large-bore peripheral intravenous line was obtained, and packed RBC and FFP were also reserved. A vascular surgery resident was called for consultation. A contrast study through the catheter revealed pleural cavity opacification (Figure 2).



Figure 2. Contrast injection through double lumen catheter (gray arrow) opacified pleural cavity (yellow arrow).

The vascular surgery resident decided to withdraw the catheter under cardiac monitoring and pulse oximetry in the emergency department. A few minutes after the withdrawal of the double lumen catheter, however, the patient became agitated and confused. Heart and respiratory rates increased, while BP decreased to 80/50 mmHg and an episode of focal seizure (myoclonic jerks of right hand and gaze to left) occurred. Free intravenous (IV) fluid (normal saline) was commenced; but 5 minutes later, she became unresponsive, pulse less, and suffered cardiac arrest.

Revealing a systole in cardiac monitoring, resuscitation efforts were immediately initiated. Chest compression and bag and mask ventilation were performed. Upon intubation, the respiratory sounds of the right hemithorax decreased on chest auscultation. A high suspicion of right massive hemothorax prompted an immediate right tube thoracostomy, during which approximately 2.5 liters was drained.

The resuscitation team requested blood for transfusion, but the peripheral IV line suddenly lost its function. All efforts to obtain another peripheral IV line failed, so a double-lumen catheter was inserted through the right femoral vein during the resuscitation efforts. As a result, IV fluid and blood was infused unlimitedly.

The leader of the resuscitation team opted for emergent thoracotomy with two incisions: one classic anterolateral incision for open cardiac massage and one incision on the second right intercostals space to control the bleeding. Immediately after thoracotomy, the patient's heart beat and spontaneous circulation were resumed. There was a large hematoma on the base of the neck just below the right sternoclavicular junction; direct pressure was applied to control the bleeding. The anterolateral incision was approximated, and left tube thoracostomy was carried out. Thirty-five minutes after cardiac arrest, the patient was transferred to the operating room with BP=98/57 mmHg.

A mid sternal incision allowed an exploration of the entrance site, which revealed a rupture on the posterior aspect of the right internal jugular and right subclavian vein junction. There was no arterial damage, so the rupture was repaired and the patient was transferred to ICU. Six hours later, the patient became alert and was extubated. She had an uneventful post-operative course and was discharged home one week later in good general condition.

Discussion

Misplacement of the central venous catheter inserted via the subclavian, internal jugular, or other veins, is a relatively common complication.¹²

Catheter-induced complications should be deemed an iatrogenic trauma and approached according to Advanced Trauma Life Support (ATLS).¹⁴

The reports of complications after removing the central venous catheter are rare, and also hemothorax after removing the central venous catheter is very rare. A case of massive hemothorax developing a few minutes after the removal of a central venous catheter was reported in a patient who had an arteriovenous fistula for hemodialysis.¹⁵

Lee *et al.* reported the case who is a 5-year-old child who died due to terrible hemothorax because they try to insert an implantable subclavian venous access device and remove an infected port.¹⁶

Momiy and Vasquez presented two cases of pseudoaneurysms of the vertebral and subclavian artery because of attemptation to catheterize the internal jugular vein. They could treat them successfully with open surgical repair and bypass.¹⁷

Kim *et al.* reported a rare case of pseudoaneurysm of the inferior epigastric artery and inguinal hematoma which

are extended to the scrotum after removing femoral venous catheter in a 24-year-old male patient who suffers two sequential neurosurgical procedures.¹⁸

Wahbi reported two cases who have acute lifethreatening bleeding after attempting at femoral vein catheterization. They could control both bleeding places successfully by endovascular covered stent placement, with nocomplication.¹⁹

Looking for Complications due to central venous cannulation is necessary and an ordinary chest x-ray must be executed. It is interesting that complications after removing the central venous catheters are rarely, if ever reported. This may be partially because such complications are not so energetically looked for.¹⁶

In the case of our patient, our primary survey suggested that the patient was stable; nonetheless, we should have conducted a secondary assessment comprising thorough paraclinical examinations such as neck and chest spiral CT scan with contrast in order to determine the exact anatomical site of the catheter and assess the important adjacent great vessels and nerves. Indeed, a blind catheter withdrawal could even prove fatal. There is also no doubt that the preparedness of a resuscitation team in terms of expertise and decision-making in anticipation of severe injuries could be life saving.

Ethical issues: The study was approved by the Ethical Committee of Tabriz University of Medical Sciences, Tabriz, Iran. We kept personal information of patient as confidential. Also, patient signed informed consent form before launching of the study.

Conflict of interests: No conflict of interest to be declared.

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