

Unusual Placement Of A Central Venous Catheter

A Gupta, M Garg, M Jain, S Goel

Citation

A Gupta, M Garg, M Jain, S Goel. *Unusual Placement Of A Central Venous Catheter*. The Internet Journal of Anesthesiology. 2007 Volume 15 Number 2.

Abstract

Central venous catheter (CVC) insertion may be associated with many life threatening complications. Here, we are reporting a case of unusual placement of CVC in pleural cavity in a patient of hemothorax.

Financial Support- Subharti Medical College, Meerut, U.P., INDIA.

INTRODUCTION

Placement of central venous catheters, although often considered to be a relatively safe and “junior” level procedure, may be associated with life-threatening complications. Complications^{1,2,3,4} can be of an acute nature, which fell into the categories of pneumothorax, hydrothorax, cardiac tamponade, and hemothorax or manifesting later viz shearing or migration of catheter, infection at the catheter site, embolism etc. We present here a case of an eighteen year old male patient who had a central venous catheter (CVC) inserted in the right internal jugular vein during thoracotomy for hemothorax. Although the conventional techniques for checking catheter position were consistent with correct placement, the catheter was found to traverse the pleural cavity during thoracotomy.

CASE REPORT

An eighteen year old male patient presented with penetrating injury of the right side of chest following a road traffic accident and was brought to emergency room within thirty minutes of injury. Immediate chest tube insertion (Fr size 32) was performed on the right side in the emergency room by the attending surgeon. Two intravenous (i.v.) access secured (16 G), fluids and colloids started. Request for arrangement of blood was made. The patient bled almost two liters within 15 minutes and his condition started

deteriorating. His vitals were pulse 144/min, blood pressure 84/53 mm Hg, respiratory rate 28/min. Blood and inotropic support (nor adrenaline) was started and the decision to

perform an emergency thoracotomy for control of bleeding was taken. Blood were arranged and patient was shifted to operation theatre (OT) after obtaining informed and written high risk consent (ASA Grade IV E). In the OT, Monitors (ECG, NIBP, SPO₂, EtCO₂, and Temperature) were attached and CVC insertion planned through right internal jugular vein route before induction. Under all aseptic precautions, CVC (Certofix Duo V720 B Braun) was inserted using catheter over guide wire (Seldinger's) technique and position confirmed by aspirating blood freely from both lumens. I.V. fluids (Ringer's lactate) started from the distal lumen and colloids (hydroxy ethyl starch) through proximal one. The patient was premedicated with inj. Midazolam 1 mg, inj. Fentanyl 1mcg/kg, and inj. Glycopyrrolate 0.2mg. Induction was done using inj. Ketamine 1.5mg/kg and inj. Succinylcholine 2 mg/kg. All the drugs were given through peripheral route. The patient was then intubated using left sided double lumen tube (DLT) [Bronchocath

™,

Mallinckrodt ® fr 37] and after confirmation of correct placement of DLT, patient was positioned in left lateral position and surgery started. Inj. Vecuronium Bromide (0.08 mg/kg) was given through CVC. However, the effect of Vecuronium did not come as expected and it was hence repeated through peripheral line and desired effect obtained. This raised the suspicion for misplacement of CVC. As soon as surgeon opened the pleural cavity, around one liter of fluid mixed with blood was suctioned; bleeding vessels were identified and ligated. It was then that the surgeon noticed the CVC lying freely in pleural cavity. Intravenous fluids were immediately stopped and started through peripheral lines and CVC was removed. Surgery continued and rest of the procedure was completed uneventfully. The patient was

shifted to SICU for post operative ventilatory support after changing over from DLT to size 8.5 portex endotracheal tube. The post operative period went uneventfully; patient was extubated on second post operative day and discharged from the hospital on seventh post operative day.

DISCUSSION

Central venous catheters are essential components of modern critical care. They allow delivery of medications, i.v. fluids, parenteral nutrition, hemodialysis and monitoring of haemodynamic variables.

Unfortunately, the use of central venous catheters is associated with adverse events that are both hazardous to patients and expensive to treat.^{5, 6, 7} More than 15 percent of patients who receive these catheters have complications.^{8,9,10} Mechanical complications are reported to occur in 5 to 19 percent of patients,^{8,9,11} infectious complications in 5 to 26 percent,^{8,10,12} and thrombotic complications in 2 to 26 percent.⁸

In our case, CVC was placed in right internal jugular vein. At the time of procedure, patient was hypotensive and insertion was done as an emergency procedure as the patient was bleeding. Confirmation was done by freely aspirating blood from both lumens of CVC. Confirmation by chest x-ray could not be done because of lack of time. As the pleural cavity was filled with blood, so we were able to freely aspirate blood from both lumens of CVC. Diagnosis of misplacement was made only after thorax was opened and surgeon visualized the tip of CVC in the pleural cavity.

This clearly indicates that tests routinely done to confirm the position of CVC in patients with hemothorax may fail as they happened in our case.

Another approach to put CVC is by the use of real time ultrasound. During internal jugular venous catheterization, ultrasound guidance reduces the number of mechanical complications, the number of catheter-placement failures, and the time required for insertion.^{13,14,15,16} Ultrasound guidance for venous cannulation is expensive, time-consuming, and requires an experienced operator. As a result, this method is not used routinely but is reserved for situations where attempted central venous cannulation using anatomical landmarks has failed. Failed venous cannulation is most likely to occur when physicians with limited experience are attempting emergency venous cannulation, such as during cardiopulmonary resuscitation.^{17, 18} Unfortunately, this situation is not well suited for the use of

ultrasound because of the time required and the need for experienced personnel.

This complication has not been reported so far in the literature to our knowledge but can lead to disastrous consequences.

Thus, in patients with hemothorax who require CVC placement, there can be three approaches to place CVC:

1. Avoid internal jugular/ subclavian route and put CVC by other route (femoral, basilic, cephalic, external jugular),
2. Avoid inserting CVC on the same side as injury, and
3. If available, prefer ultrasound guided placement of CVC.

CORRESPONDENCE TO

Dr. Amit Gupta, Mailing Address: A-5, Padam Kunj, Kishan Flour Mill, Railway Road, Meerut, U.P., INDIA. Phone No.: +91-9412101475 Fax No.: +91-0121-2767018 E-Mail- amitgupta_f2@yahoo.com

References

1. Jacobs BR. Central venous catheter occlusion and thrombosis. *Crit Care Clin* 2003;19:489-514.
2. Marin MG, Lee JC, Skurnick JH. Prevention of nosocomial bloodstream infections: effectiveness of antimicrobial-impregnated and heparin-bonded central venous catheters. *Crit Care Med* 2000;28:3332-3338.
3. Merrer J, DeJonghe B, Golliot F, et al. Complications of femoral and subclavian venous catheterization in critically ill patients. *JAMA* 2001;286:700-707.
4. Ruesch S, Walder B, Tramer M. Complications of central venous catheters: internal jugular versus subclavian access: a systematic review. *Crit Care Med* 2002;30:454-460.
5. Pittet D, Tarara D, Wenzel RP. Nosocomial bloodstream infection in critically ill patients: excess length of stay, extra costs, and attributable mortality. *JAMA* 1994;271:1598-1601.
6. Arnow PM, Quimosing EM, Beach M. Consequences of intravascular catheter sepsis. *Clin Infect Dis* 1993;16:778-784.
7. Richards MJ, Edwards JR, Culver DH, Gaynes RP. Nosocomial infections in medical intensive care units in the United States. *Crit Care Med* 1999;27:887-892.
8. Merrer J, De Jonghe B, Golliot F, et al. Complications of femoral and subclavian venous catheterization in critically ill patients: a randomized controlled trial. *JAMA* 2001;286:700-707.
9. Sznajder JJ, Zveibil FR, Bitterman H, Weiner P, Bursztein S. Central vein catheterization: failure and complication rates by three percutaneous approaches. *Arch Intern Med* 1986;146:259-261.
10. Veenstra DL, Saint S, Saha S, Lumley T, Sullivan SD. Efficacy of antiseptic-impregnated central venous catheters

in preventing catheter-related bloodstream infection: a meta-analysis. *JAMA* 1999;281:261-267.

11. Mansfield PF, Hohn DC, Fornage BD, Gregurich MA, Ota DM. Complications and failures of subclavian-vein catheterization. *N Engl J Med* 1994;331:1735-1738.

12. Raad I, Darouiche R, Dupuis J, et al. Central venous catheters coated with minocycline and rifampin for the prevention of catheter-related colonization and bloodstream infections: a randomized, double-blind trial. *Ann Intern Med* 1997;127:267-274.

13. Hind D, Calvert N, McWilliams R, et al. Ultrasonic locating devices for central venous cannulation: a meta-analysis. *Br Med J* 2003;327:361-367.

14. Keyes LA, Frazee BW, Snoey ER, et al. Ultrasound-guided brachial and basilic vein cannulation in emergency department patients with difficult venous access. *Ann Emerg*

Med 1999;34:711-714.

15. Gualtieri E, Deppe S, Sipperly ME, et al: Subclavian venous catheterization: Greater success rate for less experienced operators using ultrasound guidance. *Crit Care Med* 23:692, 199531.

16. Randolph AG, Cook DJ, Gonzales CA, et al: Ultrasound guidance for placement of central venous catheters: A meta-analysis of the literature. *Crit Care Med* 24:2053, 1996.

17. Bo-Lin GW, Andersen DJ, Andersen KC, et al. Percutaneous central venous catheterization performed by medical house officers: a prospective study. *Cathet Cardiovasc Diagn* 1982;8:23-29.

18. Emerman CI, Bellon EM, Lukens TW, et al. A prospective study of femoral versus subclavian vein catheterization during cardiac arrest. *Ann Emerg Med* 1990;19:26-30.

Author Information

Amit Gupta, DNB

Assistant Prof, Anaesthesiology & Critical care Dept, NSCB Subharti Medical College

Munish Garg, MD

Assistant Prof, Anaesthesiology & Critical care Dept, NSCB Subharti Medical College

Manish Jain, MD

Assistant Prof, Anaesthesiology & Critical care Dept, NSCB Subharti Medical College

Sharad Goel

Assistant Prof, Anaesthesiology & Critical care Dept, NSCB Subharti Medical College