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Refractory Hypotension Despite High Dose Inotropic Support: An Unusual Cause

Yüksek Doz İnotropik Desteğe Rağmen Refrakter Hipotansiyon: Olağandışı Bir Neden

Received/Geliş Tarihi : 22.02.2019
Accepted/Kabul Tarihi : 28.06.2019

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Turkish Journal of Intensive Care published by Galenos
Publishing House.

Keywords: Central venous catheter, hypotension, ultrasound

Anahtar Kelimeler: Santral venöz kateter, hipotansiyon, ultrason

Sunit Kumar Gupta, Mussavvir Agha
All India Institute of Medical Sciences, Department of
Anesthesiology and Intensive Care, Jodhpur, India

Ankur Sharma
All India Institute of Medical Sciences, Department of
Trauma and Emergency (Anesthesiology), Jodhpur,
India

Varuna Vyas
All India Institute of Medical Sciences, Department of
Pediatrics, Jodhpur, India

Ankur Sharma MD (✉),
All India Institute of Medical Sciences, Department of
Trauma and Emergency (Anesthesiology), Jodhpur,
India

E-mail : ankuraesthesia@gmail.com
Phone : +919654045653
ORCID ID : orcid.org/0000-0001-9339-6988

Dear Editor,

Central venous cannulation is common invasive procedure that is executed in operating rooms, intensive care unit's (ICU) and wards. It is usually put in hemodynamically unstable patients or patients undergoing major surgical procedures. It is a secure venous access for infusion of inotropes, vasoactive drugs, electrolytes, fluid, central venous pressure monitoring, temporary hemodialysis, pulmonary artery cannulation or when no peripheral access can be secured. This procedure is associated with many complications including malposition (1). Thus it is important to ensure it's proper placement. This is a report that shows a rare malpositioning of venous catheter in internal jugular vein (IJV) which resulted into a cause of refractory hypotension despite high dose inotropic support attached to it.

This patient was a case of carcinoma ovary, pseudomyxoma

with uterine prolapsed and was planned for cytoreductive surgery. Anaesthesia was induced by experienced anesthesiology team with peripheral venous access as per hospital protocol. After intubation, central venous cannulation was done in IJV by ultrasound (USG) guidance, blood flow was checked in all three ports and 7.5 Fr catheter was fixed at 12 cm by suturing. The duration of surgery was seven hours and patient had 3 episodes of hypotension, which was managed with fluid bolus through peripheral venous access. After the surgery, patient was shifted to ICU for further monitoring. In immediate post operative period, patient required inotropic support, but despite giving inotropes, patient's blood pressure was not able to be maintained. Patient's chest X-ray was done and central line was found to be turning on to itself and going in upwards direction (Figure 1A). Immediately IJV was recannulated with 7.5 Fr

catheter under USG guidance and blood was checked to be coming from all ports. Post procedure X-ray was also done immediately to localize it's position, which was found normal (Figure 1B).

Misplaced central venous cannulation is a common complication faced by anesthesiologist all over the world. Central venous catheter (CVC) have been found to be misplaced in normal or rarely anomalous structures (1-4). The various sites of CVC malposition and their clinical features are: carotid artery (hypotension and hemorrhagic shock); azygos vein (pleural effusion, pulmonary edema, dyspnea, chest pain, back pain, and cardiac tamponade); persistent leftsided superior vena cava (cardiac tamponade); internal mammary vein (shoulder or arm pain); vertebral vein (thrombosis, endothelial damage, and fluid leakage); extradural space (severe back pain); pericardium (hemopericardium, fatal ventricular fibrillation), pleural space (dyspnea, pneumothorax, chest pain, and back pain); mediastinum (Chest pain); thoracic duct (infusion mediastinum and chylothorax) (5). There can be "ear-gurgling" or "water running" sensation and headache if CVC is malpositioned near the intracranial structures (6).

In our case, the angle of the IJV and subclavian vein, facilitated the catheter looping back of itself by pushing the j-shaped tip of the guidewire upward. This bending of catheter led to it's occlusion, although it was put under



Figure 1. A, B) Central venous catheter looping back of itself and after repositioning

USG guidance. This malposition of CVC catheter resulted into a scenario of refractory hypotension despite high dose inotropic support. Kamalipour et al. (7) in their observational study on 116 patients comparing USG and chest radiography for detecting the correct location of CVC, found sensitivity of 98% and specificity of 69% for USG with positive and negative predictive values were 95% and 85%, respectively. They concluded that despite close concordance between USG and chest radiography, USG is not a suitable alternative for standard chest radiography in detecting CVC location. Further they added that USG can be a useful for detecting CVC location on a real-time basis in the operating room because of it's high sensitivity and acceptable specificity. In a recent meta-analysis (8) of 15 studies, bedside USG was found faster than radiography at identifying pneumothorax after CVC insertion and it reduced mean CVC confirmation time by 58.3 minutes. Chui et al. (9) in a recent study on 6.875 patient who underwent USG guided CVC catheter insertion concluded that routine post procedural X-ray is unnecessary.

USG has aided in CVC insertion in many ways. However, fully reliable on USG for localising vein and guiding the needle is not enough and can not prevent malposition of catheter and it can lead to a catastrophic situation. Our message to readers is to scan along the vein to localise the CVC catheter even after it seems apparently normal. We should also not forget the importance of post CVC insertion chest X-ray to visualize it's tip.

Ethics

Informed Consent: Obtained from patient.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: S.K.G., Design: M.A., Literature Search: V.V., Writing: A.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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