



Supraclavicular approach of Subclavian Vein Catheterization: A Case of Knotting of Guidewire

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Introduction

Central venous cannulation is a common procedure done in operation theatres for patients posted for major surgery and intensive care units for the purpose of drug administration, for monitoring central venous pressure[1] and for rapid volume replacement during shock. Subclavian vein cannulation(SVC) is preferred in neurosurgery patients due to less restriction of neck mobility. It also has the advantage of low rates of both infectious and thrombotic complications[2] . These complications include arterial puncture, haematoma, pneumothorax, haemothorax, arrhythmias, air embolism, catheter malposition, and guidewire knotting. While the supraclavicular approach to subclavian vein has been described since 1965, it is generally employed much less often than the “traditional” Infraclavicular approach. The supraclavicular approach has some advantages over the Infraclavicular approach like: a well-defined insertion landmark(the clavisternomastoid angle); less procedural time; a larger target area; high success rate at first attempt and lesser complications[3,4]. We have encountered a case of knotting of guidewire during subclavian vein cannulation using supraclavicular approach.

A 9 year old male patient of weight 30 kg was posted for excision of hypothalamus hamartoma. Patient had history of headache on and off since 2 months. He had ventriculoperitoneal shunt present on right side. Consent of the patient was taken and he was taken on operation table. 20 G cannula was taken on right arm. Electrocardiogram, non-invasive blood pressure and saturation probe was attached. After preoxygenation, patient was given fentanyl 2 micrograms per kg , then induced with injection propofol 2 mg kg⁻¹ and injection vecuronium 0.1 mg kg⁻¹. Tube 5.5 cuffed inserted. Air entry checked and tube was fixed and patient was put on ventilator. Right radial artery was cannulated for blood pressure monitoring following anaesthesia induction. Left subclavian vein cannulation was chosen using supraclavicular approach. After proper positioning of the patient and with the help of seldinger technique, introducer needle was inserted at supraclavicular position and after free aspiration of blood, we started to thread the guidewire through it. During threading of guidewire , we encountered mild resistance but we proceeded with the act. Dilator was inserted over the guide wire again with some resistance. Then the triple lumen catheter was placed over the guide wire. But the catheter cannot be negotiated after

insertion of 5 cm. guide wire got stuck and cannot be moved to and fro. We removed the whole assembly of catheter and guide wire simultaneously and to our surprise we found knotting of guide wire at the distal end [Figure 1]. local pressure was applied for 10 minutes. Clinical examination confirmed bilateral normal breath sounds, a normal rate of respiration and oxygen saturation of 98%. Thereafter the subclavian vein cannulation was done by Infraclavicular approach with fresh set of guide wire and surgical procedure was completed uneventful. Since the duration of surgery was extensive, patient was transferred to the medical care unit (ICU) to be followed up.

Complications during the insertion of CVC can take place due to kinking or looping of the wire itself. Applying force to thread a guide wire through the introducer needle despite significant resistance is probably going to cause such a problem[5]. Kinking of the guide wire can also result in misdirection of the dilator and may be insertion of the guide wire outside the vessel.[6]

In our case, minimal resistance was encountered during guidewire insertion. Consequently, we emphasize that a guidewire should not be advanced if any resistance is encountered as originally acknowledged by seldinger. Guidewires are not very rigid structures and if any force is applied they are likely to kink, moreover, further application of force after kinking might result in knot formation [7]. If we pull out the knotted guidewire back, the guidewire could get entrapped. To avoid these complications, if there is any resistance, guidewire should not be advanced and if resistance encountered during insertion of guidewire, it is necessary to ascertain the chest x-ray to determine the position of the guidewire instead of pulling it back. Nowadays

Ultrasound guidance is used as a method of reducing the risk of complications during central venous cannulation(1). Although development of a knot in guidewire is rare complication, preventing the occurrence of this complication is as important as solving the problem itself. Bedside chest X-ray facility should be available to ascertain for guide wire position if malpositioning is suspected. Therefore, both clinicians and anaesthesiologists who perform central venous catheterization should keep their knowledge updated about prevention of complications and treatment options so as to stop the morbidity and mortality.

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Legend Figure

Figure 1: It shows knotting of guidewire at distal end

