



Guide wire embolization of Central Venous Catheter and its rescue technique: Case report from Bangladesh

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Abstract

Central venous catheterization is a very regular procedure done in many clinical conditions for a different of indications. Central lines insertion can cause complications and there are various difficulties that are usually associated with catheter placement. Complications can be presented just after or during procedure and delayed fashion. Remarkable morbidity and mortality can be resulted from complications that are related to central venous access. These complications usually creates a significant healthcare burden in expense, increase hospital days etc. Make progress in imaging, techniques of access, and modern medical devices have decreased and altered the types of hazards encountered in clinical practice. Though most of difficulties still accounted in vascular injury, infection, misplacement and missing of guide wire. To prevent this type of complication what measures should be taken also explained in details with recommendation.

Keywords: Catheterization central venous, catheters, complications.

Introduction

Central catheterization is a common and routine procedure in intensive care and dialysis unit. Usually central venous cannulation is performed in the different position of the body such as the jugular, subclavian, femoral, and brachial veins depending on catheter types. Complications associated with the CVCs related complications most commonly are infection, failure to place the catheter, puncture of the artery, improper catheter improper position, pneumothorax, hemothorax, trauma to inferior vena cava (IVC) etc.^[1] Femoral routes most common complication is arterial puncture and secondly infection. These types of complications usually happens in about 12% of

cases.^[3] One of these extremely rare complications is intravascular loss of a guide wire is one of the rarest complication, which can be diagnosed immediately or sometimes much delay.^[2-4] In this case report, we illuminate a case of embolized guide wire during performing venous catheterization of the right femoral vein for hemodialysis purpose, which was very successfully treated with recovered from right jugular vein.

Case Report

35 -year-old young male was diagnosed as a case of ESRD due to IgA nephropathy and advised for hemodialysis as a option for renal replacement

therapy in the department of nephrology in a private medical hospital. Due to presence of short neck femoral catheter was treatment option as a temporary route. Arterio-venous fistula was planned for next step. Before maturing fistula femoral catheter was done in the right femoral route by Seldinger's technique. An expert senior physician was inserted the catheter, no complications was observed during cannulation, blood back flow was normal. After procedure during checking of catheter tray found that guide wire was missing. After that patient was stabilized, shifted to radiology unit and diagnosed catheter was embolized in the internal jugular vein. Then he was shifted to Cath Lab for further approach. [Figures 1 and 2]. Vascular surgeons and radiologists team, the patient had underwent exploration of left femoral vein. The method was very successful and the retained guide wire was removed from left femoral vein. His hospital stay was uneventful.

Discussion

There are many complication can occurred by central venous catheter, those are commonly infection, puncture of arteries, failure to place in correct position, etc. This case report is to focus on embolized guide wire in the jugular vein missing during femoral catheterization. It is very important point in to prevent this rare complication is that the wire should be held minimum 18 cm away from the point of insertion.^[2-4] If this followed, the guide wire usually will not get lost.

- This is a very rare and completely preventable difficulties of central venous catheterization. We should held the guide wire at the tip in all the time for preventing passage into the vessels. If we can follow this procedure then wire cannot be missing in from the introducing point.. Predisposing factors for missing wire includes: Lack of proper attention
- Lack of experienced operator- either in method (i.e. Seldinger technique) or actually central venous cannulation
- Lack of supervision of trainees

- Exhausted staff.

The signs of lost guide wire includes:

- Missing in the introducing point.
- Difficult to place catheter.
- Poor blood flow in the catheter lumen.
- Visible wire in the radiograph.

Guide wire related complications are:

- Cardiac arrhythmia
- Respiratory distress.
- Vessels injury.
- Looping, kinking or knotting of wire
- Breakage of the distal tip of the guide wire with subsequent embolization
- Complete loss of guide wire within the vascular system.



Fig: 1



Fig: 2

Cardiac arrhythmias are most often either premature ventricular or atrial contractions. They are usually reported during subclavian or IJ CVC insertion.^[6] The arrhythmias are usually short lived, occurs when guide wire touched the endocardium, and fixed when the tips are pulled out few centimeters.^[5] Central vein perforations are usually catastrophic. It is very difficult to find out the cause what the scenario behind this clinical event.; the needle, the guide wire, or the dilator. Different literature has reported cases of guide wire related injury resulted in perforations of the major vessels including the brachiocephalic and subclavian veins.^[6] To diagnose timely in such as cases it required maintaining a protocol when there is unexplained declining in blood pressure or saturation of oxygen.^[6] Another complication is looping or kinking of the wires. Giving gentle force to thread of the guide wire through the introducer needle inspite of significant resistance is likely to cause such a problem.^[7] If the dilator is forced in a direction that separate from the main path of the wire can also creates kinking.^[7] If one cannot habitual with this scenario there is potential for cutting through the vein with possible fatal complications.^[8] Complication can be prevented by intermittent moving the wire gently in and out as the dilator is being advanced through the subcutaneous tissue. Once the diagnosis is established, interventional radiology should be consulted, and sometimes surgical intervention is necessary. Tip breakdown of the guide wire due to inherent design flaws.^[8] Shearing and rupture of the wire usually results from pulling the wire back through the needle after it has passed the bevel.^[7] Consequently, if a wire fails to go through freely from the introducer needle into the vessel, the careful retraction of the wire through the needle is an option, but it is much easier to withdraw the wire and needle as a single unit. While the loss of a complete guide wire might cause arrhythmias, vascular damage, and thrombosis; it is usually asymptomatic and is often incidentally found on a routine X-ray done up to several months after the procedure.^[9]

Holding on to the proximal tip of the wire throughout the procedure time is fundamental in preventing this mistake. If this complication happens, use of interventional radiology techniques is the preferred method for retrieval and removal^[5]. With modern devices a lost catheter, guide wire fragment, or entire guide wire should be possible to be removed in most cases. During the intervention the patient should be heparinized.^[10] Usually, the foreign body (e.g. guide wire) is caught by a gooseneck snare passed via the femoral vein using radiographic control. The use of endovascular forceps or a Dormier basket increases the risk of endovascular trauma.^[10] If the foreign body is captured, it is usually necessary to remove it along with the vascular sheath. If the vascular sheath is twice the size of the lost catheter or the lost guide wire may be possible to withdraw the foreign body through it.^[11] If heparinization is contraindicated, extraction should be attempted by careful surgical exploration.

Conclusion

With no doubt, central venous catheterization is one of the most common performed invasive procedures in hospitalized critical patients. With growing comorbidities and complexity of illness in admitted patients, the need for central intravenous access for drugs administration, hemodialysis purposes, different lab testing, and sometimes central hemodynamic status monitoring. By this the risks of infection and spectrum of obstacles will raised as well. Most of the difficulties described above well. Clinician must be alert about that anything that can be happened, may happen, and should be aware and design a management plan are critical to the use of such lines. Guide wire-related complications are unusual during central vein catheterization and can easily be preventable. We proposed following precautions for avoiding such types of complications should be taken:

- Inspect the wire thoroughly before starting the procedure.

- Always hold the wire until removal from the vessel.
- Confirm that before the catheter is advanced, the wire is visible at the proximal end.
- Pass catheter over wire into the vein.
- Regularly inspect the wire for complete removal at the end of the procedure^[12]
- If more than one manipulations are needed, re inspect the wire and replace it if necessary.
- If resistance during insertion is met, remove and examine the wire for damage, reposition the introducer so that no resistance to its passage is felt.
- Caution should be used when patients who are predisposed to thrombosis or have had repeated catheterizations of a particular vessel.
- The catheter should be ‘railroaded’ over the guide wire into the vein, holding the wire, and not pushing catheter and wire together into the vein.

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