Case Report

Anomalies in Chemoport Insertion: Unraveling the Complexity of Guidewire Knotting in a Patient with Hodgkin's Lymphoma - A Case Analysis

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ABSTRACT

Introduction: Hodgkin's Lymphoma, a neoplasm often managed through chemotherapy, necessitates the installation of a chemoport for effective treatment delivery. Real-time ultrasound (USG) guidance stands as the preeminent and precise technique for chemoport insertion, demanding adept hands to mitigate potential complications.

Case Presentation: A 26-year-old female with Hodgkin's Lymphoma underwent planned chemoport insertion via the Right Internal Jugular Vein (Rt. IJV) under USG guidance. Despite aseptic measures, an unforeseen complication arose during out-of-plane needle insertion, resulting in the entanglement of the guidewire between the Rt. IJV and right subclavian artery. Subsequent failed attempts at guidewire removal prompted Contrast Enhanced Computed Tomography (CECT), revealing entanglement. Surgical exploration under general anesthesia unveiled knotting between the RIJV and Rt. carotid artery. Safe removal necessitated cutting the guidewire, preventing potential major vascular injury. Fluoroscopy post-procedure exhibited no residues. Patient consent for potential publication has been obtained.

Conclusion: The case underscores Real time ultrasound guidance's importance, cautious force application to avoid any malposition of guidewire, and readiness for surgical intervention under general anesthesia to prevent vascular complications emphasizing the need for interdisciplinary collaboration. Patient consent has been secured for potential publication.

Key Words: Chemoport, Contrast Enhanced Computed Tomography (CECT), Right Internal Jugular Vein (Rt.IJV), Ultrasound (USG).

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INTRODUCTION

Patients diagnosed with cancer needs long term chemotherapy for which central venous access using chemoport insertion has been increasingly used to facilitate long-term chemotherapy [1]. Due to the close proximity of major arteries and nerves, a misplaced guidewire or the chemo port catheter itself can be associated with major immediate complications like arterial puncture, guidewire knotting, and injury to nearby structures that can be fatal and even require surgical intervention [1,2]. The ultrasound (USG) has been considered the gold standard to guide central venous access to increase the efficacy and decrease the complications of such procedures. It is thus considered as one of the recommendations by the Agency for Healthcare Research and Quality [2,3]. We are going to discuss a case of guidewire knotting and uncoiling that occurred during insertion necessitating removal of guidewire by surgery. A written informed consent has been obtained from the patient for the publication of this case report.

CASE PRESENTATION

A 26-year-old female, diagnosed 2 years back with Hodgkin's Lymphoma, was admitted to hematology department for multiple chemotherapies. Patient was planned for chemoport insertion using Right Internal Jugular Vein (Rt. IJV) under USG guidance. With all aseptic precautions, the needle was inserted in Rt. IJV under USG guidance in out of plane and guidewire was inserted. During catheter insertion, the guidewire could not be pulled back (Figure 1) so the catheter was removed and guidewire removal was attempted which was failed. So the attempt to remove it was abandoned and Contrast Enhanced Computed Tomography (CECT) was planned immediately that revealed the guidewire entangled between the Rt. IJV and right subclavian artery (Figure 2).

Perioperative course:

Patient was planned for surgical intervention under general anesthesia with multidisciplinary team including endocrinologist, cardiovascular surgeon, ENT surgeon and

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anesthetist for safely removal of the entangled guidewire. Patient was kept nil per oral and 4 PRBC were kept as rescue.

In the operating room, all Standard ASA monitors were applied. An 18G Peripheral IV cannula and right radial arterial line was secured for invasive blood pressure monitoring. The patient was preoxygenated with 100% oxygen. Premedication was done with Injection midazolam 1mg IV along with injection Fentanyl 100mcg IV followed by induction with injection propofol 100mg IV and muscle relaxation with inj vecuronium 5mg IV. The trachea was intubated with 7.5mm endotracheal tube which was confirmed by capnography. Patient was put on controlled mechanical ventilation. Anesthesia for the patient was maintained along with oxygen and air mixture using isoflurane keeping MAC values between 0.8-1.

On surgical exploration of neck, the guidewire knotting was found between the RIJV and the Rt. carotid artery. The guidewire was cut into two parts taking care of major vessels lying nearby to remove the entangled portion by surgical team. The serrated margins were clearly seen throughout the guidewire with nearby vessels. If the guidewire removal was attempted without surgical dissection, it might have resulted in tragic major vascular injury. The perioperative period was uneventful. Fluoroscopy performed post-procedure showed no residue. Consent has been obtained from the patient for possible publication.

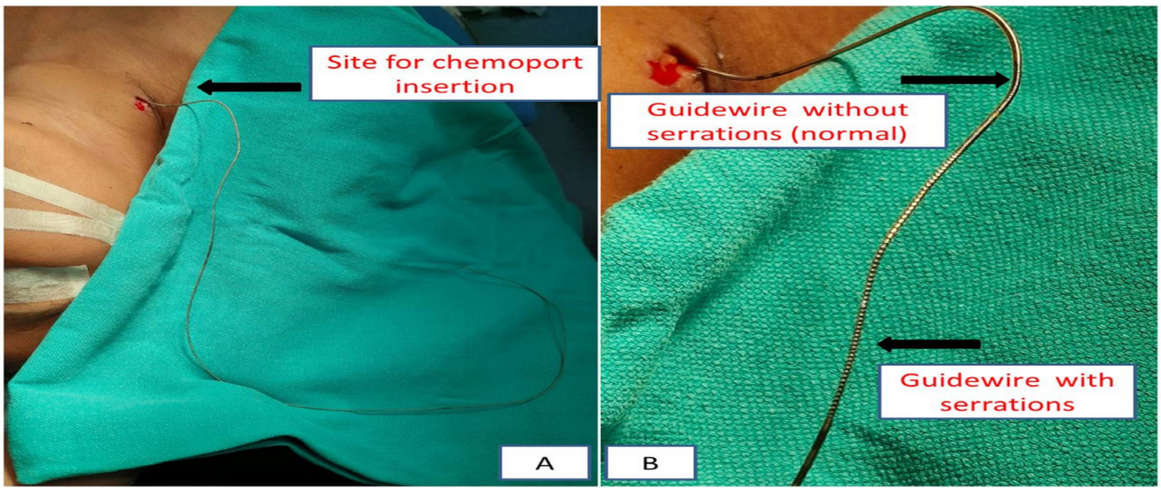

Figure 1: Figure showing Guidewire insertion site (A) and appearance of circular serrations, occurs because of undue force leading to unwinding of internal wire (B).

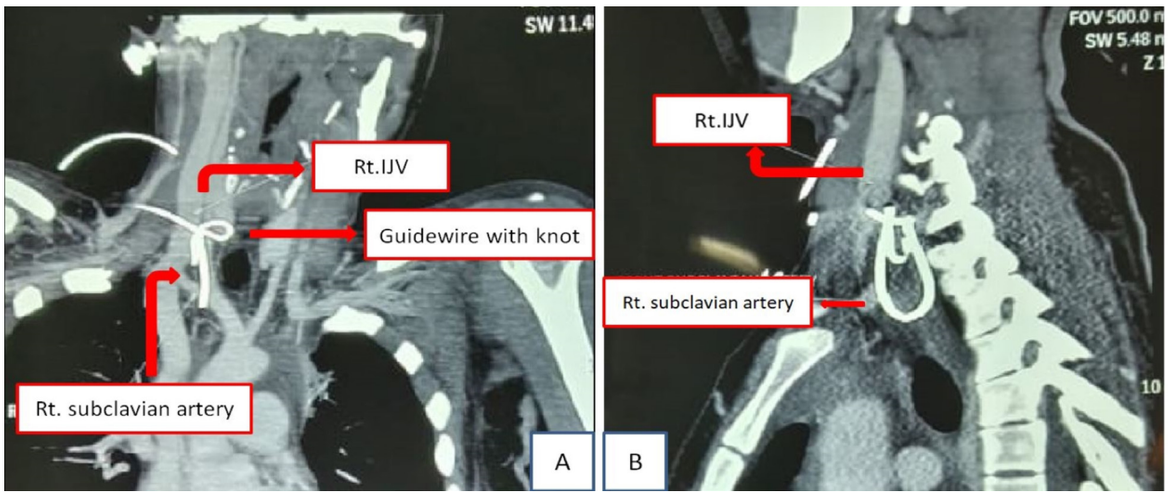

Figure 2: Computed Tomography showing the Right internal jugular vein (IJV), right subclavian artery and the guidewire knot.

DISCUSSION

Guidewire related immediate complications during chemoport insertion include arrhythmias, vessel perforation, guidewire knotting or kinking, breakage of the distal tip etc [3,4]. In most of the cases intravascular knotting of the guidewire occurred during pulmonary artery catheter approx 60% but very rarely chemoport guidewire knotting occurs as happened in our case [5]. As such complications are extremely rare so the incidence of such complications is not yet known. Various modalities have been described in literature for management of kinking or catheter knotting which include endovascular approach, surgical exploration. Endovascular approach is usually helpful if the guidewire knot forms within the vessel [6]. In our case, the introducer needle was placed correctly, as it was confirmed by dark colored blood and needle tip at the center of the vessel in USG scan. During guidewire insertion the needle might have punctured the posterior wall leading to malpositioning of guidewire between the great vessels. Forcing the guidewire further and pulling it backwards would have led to knot formation leading to uncoiling of guidewire, which have further aggravated the problems.

It is desirable to use long axis real time USG for needle puncture and guidewire insertion 4. Undue force should be avoided during insertion of guidewire/catheter or removal of guidewire as it may lead to uncoiling and knotting of guidewire. If there is any difficulty in removal of guidewire it should be further investigated, as was done in this case. A surgical option may be considered for removal of guidewire depending on CECT findings to avoid any catastrophic event.

CONCLUSION

The case highlights the importance of real-time ultrasound guidance during needle puncture and guidewire insertion to prevent complications. Excessive force should be avoided during the procedure, and prompt investigation and a surgical option may be considered for difficult guidewire removal to prevent catastrophic vascular injuries.

LIST OF ABBREVIATIONS

USG: Ultrasound; **Rt. IJV:** Agency for Healthcare Research and Quality, Right Internal Jugular Vein; **CECT:** Chemoport, Contrast Enhanced Computed Tomography.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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