Propofol extravasation via a peripherally inserted central catheter mimicking a chylous fistula during neck dissection

Clinical Case

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Abstract

The use of peripherally inserted central catheters (PICCs) in oncological patients offers advantages but carries risks. We present the case of a male patient with laryngeal squamous cell carcinoma scheduled for a total laryngectomy and neck dissection. Following anesthetic induction, a PICC was inserted. During the dissection of left neck level IV, leakage of a milky fluid adjacent to the internal jugular vein (IJV) was observed, suggesting a thoracic duct injury (chylous fistula). After unsuccessful ligation attempts to control the leakage, an anomalous whitish discoloration was noted on the IJV wall. PICC malposition was suspected; following an ineffective partial withdrawal, further manipulation necessitated the ligation and transection of the IJV. The catheter tip was confirmed to be lodged within the transected vessel. The fragments were removed, and the venous stumps were ligated, resolving the complication.

Keywords: chylous fistula; peripherally inserted central catheter; thoracic duct; oncology.

Introduction

The use of peripherally inserted central catheters (PICCs) has become widespread in oncological patients due to their insertion advantages and a lower risk of immediate severe complications[1]. However, they present a considerable complication rate (14.4% - 48.1%), with tip malposition being a frequent mechanical failure, particularly into the internal jugular vein (IJV)[2].

Description of the Case

A male patient with cT4aN0M0 laryngeal squamous cell carcinoma was scheduled for a total laryngectomy and bilateral cervical lymph node dissection. Following anesthetic induction, a PICC was inserted for intravenous medication administration. Anesthetic main-

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tenance was achieved with a continuous propofol infusion. During the dissection of left neck level IV, the surgical team observed the leakage of a milky fluid into the surgical field, adjacent to the IJV. Given the anatomical location, the primary diagnostic suspicion was an iatrogenic thoracic duct injury. Attempts were made to control the leakage through selective ligation and a purse-string suture at the jugulosubclavian junction, which proved unsuccessful. Furthermore, the IJV wall exhibited an anomalous whitish discoloration (Figure 1). Communication with the anesthesiologist was essential to revise the diagnostic suspicion and consider the possibility of an anomalous PICC tip position within the IJV, resulting in the extravasation of the propofol lipid emulsion. Partial withdrawal of the catheter neither decreased the leakage nor normalized the vein's color. Ultimately, vascular manipulation necessitated the ligation of the IJV to achieve effective

Figure 1
Intraoperative image of the anomalous whitish coloration of the IJV wall, identified by the blue arrow and yellow vessel loops. White arrow: ligation at the injured area of the IJV. Yellow asterisk: previous tracheotomy stoma. Blue star: omohyoid muscle.

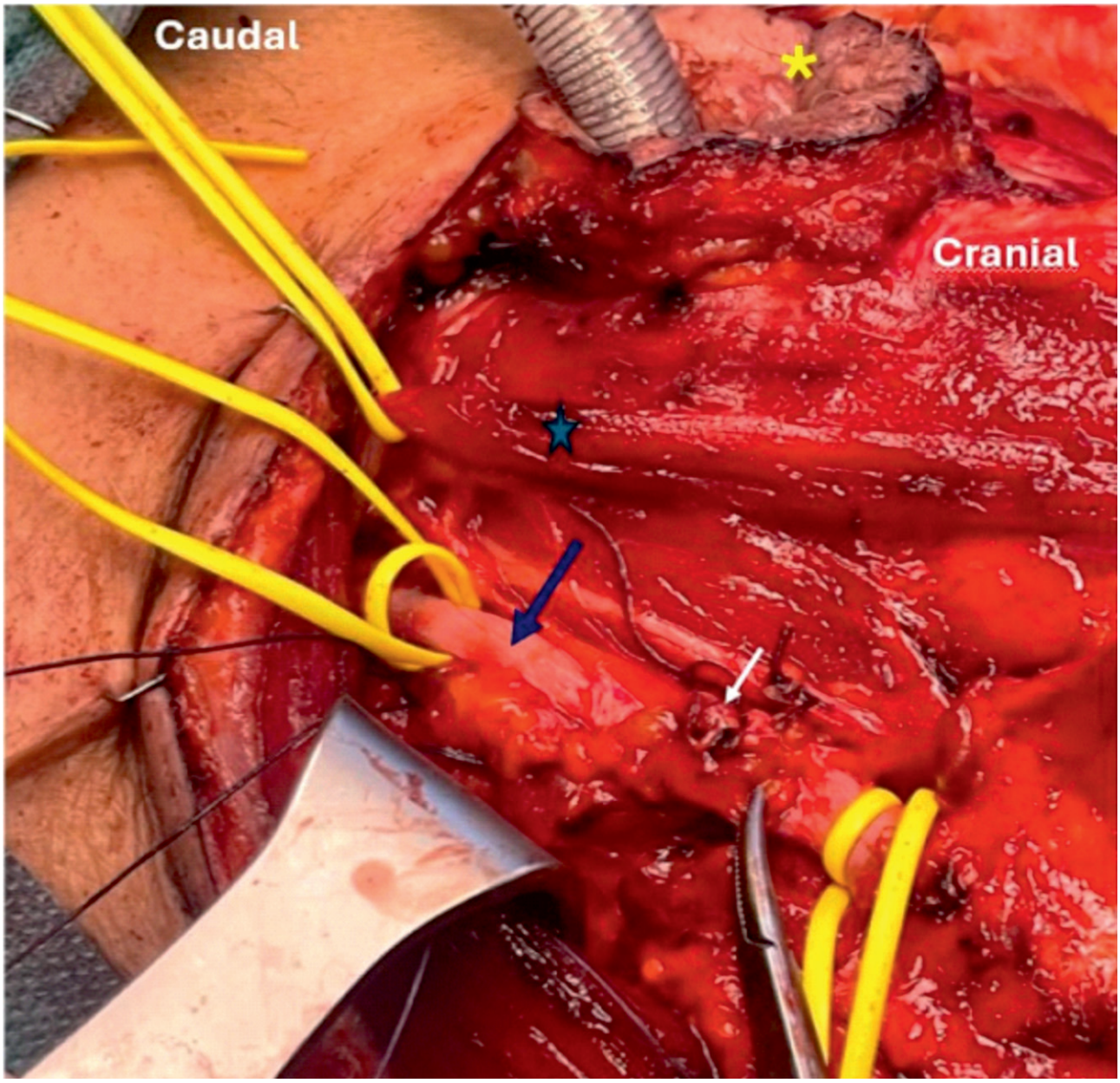
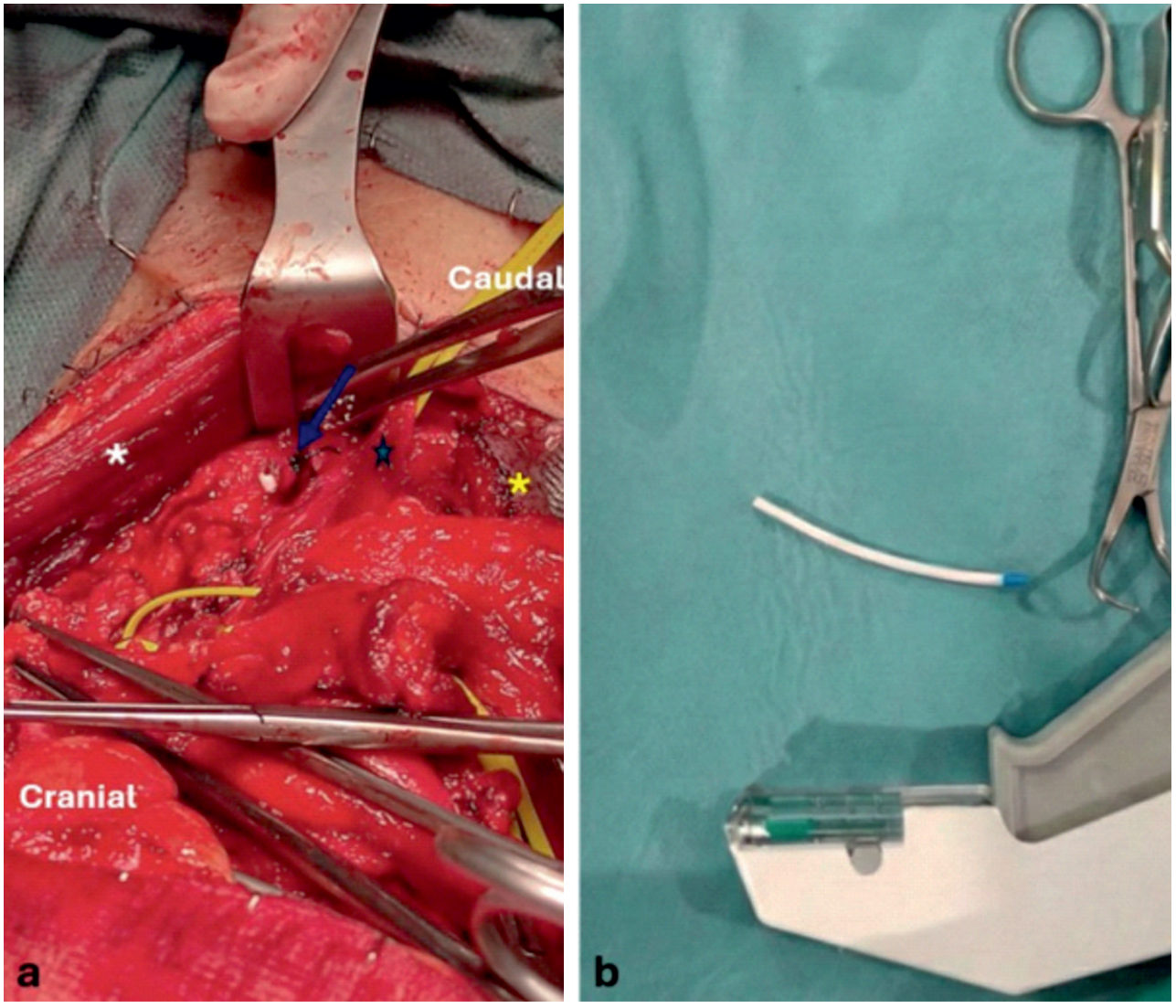


Figure 2
a) View from the right side of the surgical field. Caudal to the right and cranial to the left. Note the sectioned white PICC fragment inside the caudal end of the IJV (blue arrow), which was removed by the anesthesiologist. White asterisk: left sternocleidomastoid muscle; yellow asterisk: tracheal stoma; b) Fragment extracted from the cephalic end of the transected vein, outside the surgical field



hemostasis. Following the transection of the vein, it was confirmed that the PICC tip was lodged inside (Figure 2). Both ends of the catheter were identified: one in the cranial stump and the other in the caudal stump of the vein. Both fragments were completely removed, and the venous stumps were re-ligated, successfully resolving the incident. The final diagnosis was propofol leakage from a PICC into the IJV, mimicking a chylous fistula.

Discussion

The use of PICCs has become prevalent in clinical practice, particularly in oncological patients requiring medium- or long-term vascular access. Their advantages, such as ease of insertion and a lower risk of severe mechanical complications during placement (e.g., pneumothorax, hemothorax) compared to traditional central venous catheters, have also boosted their popularity in the intraoperative setting [1-4].

Nevertheless, the overall complication rate associated with PICCs is significant, ranging from 14.4% to 48.1%[2]. The most common complications include venous thrombosis, bloodstream infections, and mechanical failures [1,3]. Among mechanical failures, catheter

tip malposition is a well-known complication, with an incidence of up to 34.2%. The IJV is the most frequent anomalous location, accounting for 30% of all PICC tip malpositions in the ipsilateral IJV [5]. Factors increasing this risk include: placement from the left arm, lack of ultrasound guidance, bedside technique without subsequent verification, operator experience, and patient anatomical variations[6]. Actions such as slowly threading the catheter and patient positioning (lateral rotation and flexion of the neck) may reduce the likelihood of malpositioning [3]. Also, another recommendations to prevent PICC-associated complications are the use of ultrasonography for insertion; imaging (X-ray) or electrocardiogram guided confirmation of catheter tip position in SVC [3].

In our case, catheter insertion from the left arm and the bedside technique without subsequent verification—as is often performed in the operating room post-anesthetic induction—were predisposing factors for catheter malpositioning. Furthermore, the maintenance of general anesthesia with an intravenous propofol infusion, rather than inhalational sevoflurane, contributed to the intraoperative findings.

The most unique aspect of this case is the simulation of an intraoperative chylous fistula. During neck dissection, particularly at left level IV, the sudden appearance of a milky fluid is an almost pathognomonic sign of thoracic duct injury. This is one of the most feared complications in head and neck surgery, and its immediate management is crucial to prevent severe postoperative metabolic and immunological morbidity[7]. In our patient, the placement of the catheter tip in the IJV and the propofol infusion created a scenario that perfectly mimicked a chyle leak, leading the surgical team to perform—correctly but unsuccessfully - standard hemostatic and suturing maneuvers for its control.

This clinical case highlights several critical points. First, the importance of maintaining a high index of suspicion for intravascular device-related complications, even when the clinical presentation appears typical of another pathology. Second, it underscores the need for continuous and fluid communication between the surgical and anesthesiology teams. In conclusion, although PICCs are valuable devices in oncological patient management, it is imperative that all clinical staff remain aware of their complications and their potential interaction with ORL. Catheter migration into the IJV or its malpositioning is a frequent risk, and intravenous propofol infusion can act as a confusing mimicker of a chylous fistula, presenting an intraoperative diagnostic and therapeutic challenge.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Confidentiality

The authors declare that they have followed privacy protocols regarding the processing of patients' personal data.

Privacy Policy, Informed Consent, and Ethics Committee Authorization

The authors declare that they have obtained written informed consent from the patient for the publication of the photographs.

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