





Intravenous cannula fracture in external jugular vein access: A case report

Alper Selim Kocaoglu¹ , Gürkan Demirdizen¹ , Tarık Taştekin¹ , Emrah Şişli² 

¹Department of Cardiovascular Surgery, Eskişehir Osmangazi University Faculty of Medicine, Eskişehir, Turkey

²Department of Pediatric Cardiovascular Surgery, Eskişehir Osmangazi University Faculty of Medicine, Eskişehir, Turkey

Received: November 04, 2021 **Accepted:** November 07, 2021 **Published online:** March 18, 2022

ABSTRACT

External jugular vein (EJV) is commonly used for intravenous access, particularly in pediatric patients. A 2.5-year-old boy in whom an intravenous cannula fracture occurred was admitted. Since an intravenous access was difficult to establish due to previous attempts, intravenous access was established in the left EJV. The fracture of the cannula was noticed immediately after removal. After confirmation of the broken segment in subcutaneous tissue, it was surgically removed. In conclusion, training of the staff, good technique of insertion, proper care, attentive removal, early recognition and emergent removal of the fractured segment of the cannula are of utmost importance.

Keywords: Cannula, complication, equipment failure, jugular veins.

External jugular vein (EJV) is a commonly used site for intravenous access, particularly in pediatric patients.^[1] To the best of our knowledge, although there is no consensus in the literature in regards to not using, or at least avoiding the use of EJV, the literature comprises occurrence of intravenous cannula fracture cases at the site of EJV.^[2,3] Since the fracture of the tip of the cannula is a very rare complication, it can lead to intravenous migration, embolization, and thrombosis.^[1-3] The issue of cannula fracture is a serious problem that must be undertaken and mandates proper diagnosis and treatment.^[3] In this article, we present a pediatric case in whom an intravenous cannula fracture occurred at the site of EJV at the time of removal and was surgically removed.

CASE REPORT

A 2.5-year-old boy was diagnosed with extra-hepatic portal hypertension and was receiving treatment for esophageal varicose vein bleeding in the Pediatric Intensive Care Unit (PICU) for seven days. As active bleeding was brought under control, the central venous line was removed. Since it was difficult to establish an intravenous access in the upper and lower extremities due to too many attempts, the intravenous access was provided by an intravenous line inserted in the left EJV. As the patient was decided to be discharged from the hospital on Day 5 of the EJV access, the intravenous cannula at the EJV

was removed by a nurse, who was aware that the half of the intra-corporeal part of the cannula was broken and remained in the subcutaneous tissue. The patient was consulted with the Pediatric Cardiovascular Surgery. On physical examination, the patient was hemodynamically stable. Palpation of the entrance site of the left EJV revealed a stiffness indicating that the fractured part of the cannula was still remaining within the subcutaneous tissue. Additionally, the EJV was wholly palpable throughout its course as a cord in the neck which suggested that the EJV was thrombosed. The first bedside evaluation with ultrasonography revealed the fractured part of the cannula within the EJV. Additionally, the EJV was thrombosed (Figure 1). The findings of the bedside ultrasonographic findings were confirmed by the consultant radiologist indicating that the broken part laid within the subcutaneous tissue extending into the thrombosed EJV lumen.

Following preoperative work-ups, the patient was transferred to the operation. Under intravenous sedation and local anesthesia, a small skin

Corresponding author: Alper Selim Kocaoglu, MD. Eskişehir Üniversitesi Tıp Fakültesi Kalp ve Damar Cerrahisi Anabilim Dalı, 26040 Meşelik, Eskişehir, Türkiye. Tel: +90 533 - 678 05 26 e-mail: dr.aselimkocaoglu@gmail.com

Citation:

Kocaoglu AS, Demirdizen G, Taştekin T, Şişli E. Intravenous cannula fracture in external jugular vein access: A case report. *Cardiovasc Surg Int* 2022;9(1):56-58.

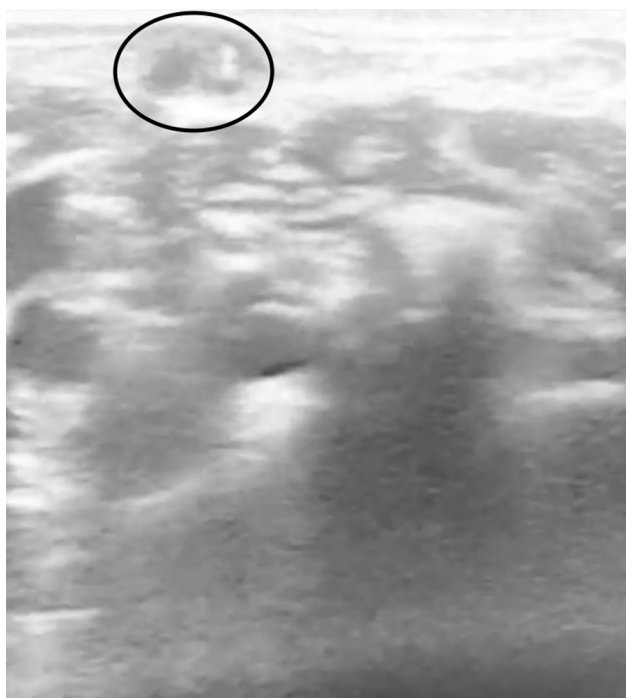


Figure 1. The ultrasonographic view of the external jugular vein and the fractured cannulas within the lumen of the vein.

incision was made at the entrance site. When the subcutaneous tissue was explored, the tip of the broken cannula coming out from the thrombosed EJV was found and removed (Figure 2). The EJV did not bleed after removal of the broken cannula, as it was totally thrombosed. The postoperative period was uneventful. An anticoagulant treatment was initiated with low-molecular-weight heparin with an anticipated duration of three months.

A written informed consent was obtained from the parents and/or legal guardians of the patient.

DISCUSSION

The intravenous cannulas are made of a variety of materials such as Teflon, polyurethane, polyvinyl chloride, or polyethylene. The complication rates seem to be lower in the cannulas made of Teflon and polyurethane than that of the others made of polyvinyl chloride and polyethylene.^[4] The cannula in the current case was made of polyethylene, which is consistent with the literature. Additionally, along with the long-standing use of intravenous cannulas, low quality of the material used during fabrication and casualness at the time of removal of the cannula would be the reasons of the cannula fracture.^[2]



Figure 2. Intraoperative view of the removed fractured segment of the cannula.

Since the common outcomes of intravenous access are infection and thrombosis, migration, embolization of the fractured cannula is far less likely, which can lead to pulmonary embolism, arrhythmia, pulmonary vascular trauma, and myocardial infarction.^[5] None of these complications occurred in the current case, as it was highly likely that the EJV was already thrombosed at the time of the removal of cannula, preventing migration and embolization of the cannula to distance organs.

External jugular vein is used as an intravenous access line, particularly more common in pediatric patients than adults, mainly due to the difficulty in establishing extremity intravenous access and in the situations where emergent volume replacement and resuscitation are necessary.^[2,3] In our opinion, the EJV is located at a mobile site of our body, the neck. Additionally, it is difficult to stabilize the intravenous line in place at the neck, and it necessitates a constant observation by a companion or the nurse. Moreover, the cannulas placed at the mobile sites are subject to be exposed to a constant wrench and upturn, which, in our opinion, is the main mechanism that weakens and eventually results in fracture of the cannula. The cases of cannula fractures are more common among the patients in whom the cannula is placed at a mobile site vein, such as the neck, wrist and cubital region.^[2,3,6]

Overall, due to the aforementioned reasons, the caregivers should be more careful in regards to the intravenous access line fracture. Application of a

gentler force of withdraw would be beneficial at the time of removal. Furthermore, it is reasonable to observe the tip of the cannula immediately after withdrawal, as many of the complications are related to the unawareness of a fractured cannula.^[2,3,5] In our opinion, along with the application of cannulas at a mobile site, the intravenous part of the cannula be made of a stiffer material, insufficient stabilization, insertion of a large cannula in a small vein (vein-cannula mismatch) are the other contributing factors that expedite fracture of the cannula.

In conclusion, the whole medical staff, particularly the nurses, should be aware of this rare, but potentially risky complication with the use of intravenous cannulas. However, training of the staff, good technique of insertion, proper care, an attentive removal, early recognition and emergent removal of the fractured segment of the cannula are of utmost importance to prevent high-risk, fractured cannula-related complications.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Courcoux MF, Jouvet P, Bonnet D, Iserin F, Bonhoeffer P. Intravascular rupture of a central venous catheter in a premature infant: Retrieval by a nonsurgical technique. *Arch Pediatr* 2000;7:267-70.
2. Mohanty CR, Panda R. Fracture and embolization of intravenous cannula placed in external jugular vein: A rare complication. *Saudi J Anaesth* 2018;12:504-5.
3. Mishra S, Arayamparambil Vijayan P, Suresh Chandan G, Prathapan Sarada P. Fracture of intravenous cannula in external jugular vein: A case report. *International Research in Medical and Health Sciences* 2020;3:1-5.
4. Peripheral intravenous catheter (PIVC). Available at: https://www.health.qld.gov.au/__data/assets/pdf_file/0025/444490/icare-pivc-guideline.pdf. [Accessed: November 01, 2021]
5. Franey T, DeMarco LC, Geiss AC, Ward RJ. Catheter fracture and embolization in a totally implanted venous access catheter. *JPEN J Parenter Enteral Nutr* 1988;12:528-30.
6. Kumar RR, Ranjan P. Case report: Iatrogenic fracture of intravenous cannula during removal with proximal migration. *Int J Surg Case Rep* 2020;76:562-5.