Fracture of Intravenous Cannula in External Jugular Vein: A Case Report

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ABSTRACT

Peripheral venous cannula insertion is one of the most common invasive procedures performed. The external jugular vein is a commonly used site for peripheral intravenous cannulation for the administration of fluids, medications, low dose vasopressors, and electrolyte correction. Various complications have been reported with it, cannula fracture being one of the rarest. We report a case of fracture of a peripheral intravenous cannula in the external jugular vein. While removal of two days old peripheral intravenous can-nula from the external jugular vein, the cannula was noticed to be fractured at the entry site. The fractured fragment of the cannula was safely removed by surgical incision and phlebotomy. Early recognition, confirmation of position, and removal are a mainstay of management. Steps for prevention of such occurrences including proper care, a good technique of insertion, and training of staff should be adopted.

Keywords: Peripheral Cannulation, Embolism, Intravenous Cannula, Phlebotomy, External Jugular Vein.

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Crossref Doi: https://doi.org/10.36437/irmhs.2020.3.3.A

Introduction

Background: Peripheral intravenous cannulation is one of the most commonly performed invasive procedures by both medical and nursing staff. It is used for the administration of fluids, antibiotics, and other medicines.[1] Various complications have been documented with the procedure such as redness, swelling, hematoma, infection, and thrombophlebitis.[1] Cannula fracture and embolism are a few rare ones. The fractured cannula remains at risk of embolization involving both proximal and distal circulation. There are many reports of fracture and embolization of central venous cannula and guidewire.[2-7] Very few cases of peripheral cannula fracture have been reported.[8-12] Most of these cases were associated with delayed recognition, migration, and embolization of catheter fragment.[8-11] We report a case of fracture of peripheral venous cannula located in the external jugular vein. Early recognition and

emergent removal prevented any complications.

Case Description: A 48-year female was admitted to the intensive care unit (ICU) with probable hospital-acquired pneumonia with a background of mixed connective tissue disorder, Raynaud's phenomena, and ulceration involving peripheral digits of upper and lower limbs. Because of difficult peripheral intravenous access in extremities, an 18G intravenous cannula was obtained in the left external jugular vein. The cannula was placed in a single attempt. The patient received fluids, medications including antibiotics, low dose vasopressor, and correction for electrolyte imbalance through the catheter. The cannula was removed after two days. During removal, the cannula was noticed to be fractured at the entry site with a 45mm segment inside the external jugular vein. The fractured segment could be palpated under the skin. Immediately ultrasound-guided confirmation of the position of the fractured segment was done. (Fig.1) The patient was positioned in a head low position along with right side head turn to prevent any distal migration of the fractured segment. The cardiothoracic vascular team was immediately involved. Emergency bedside phlebotomy was done after ligation of a vein above and below the site of the fractured segment. The segment was identified and removed. The incision site was sutured, ligatures removed and the skin closed. The size and intact condition of the retrieved segment was confirmed by comparing it to the normal cannula. (Fig.2).

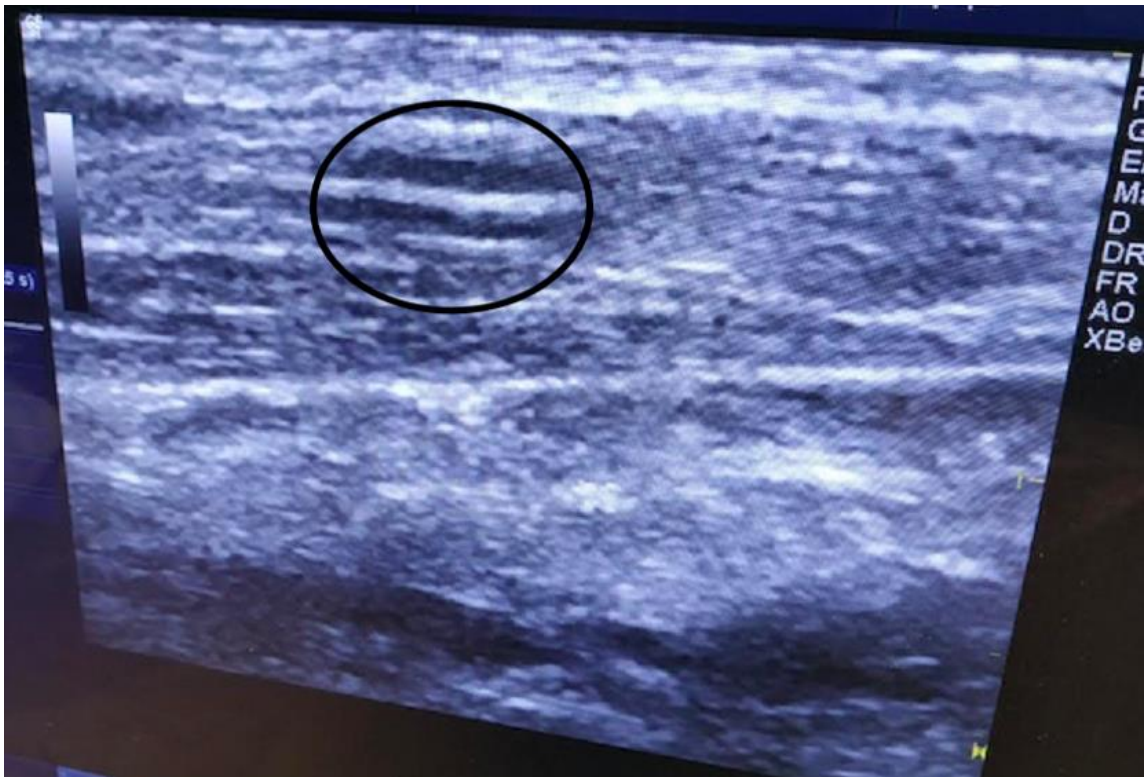

Figure.1 Ultrasound Confirmation of Fractured Cannula

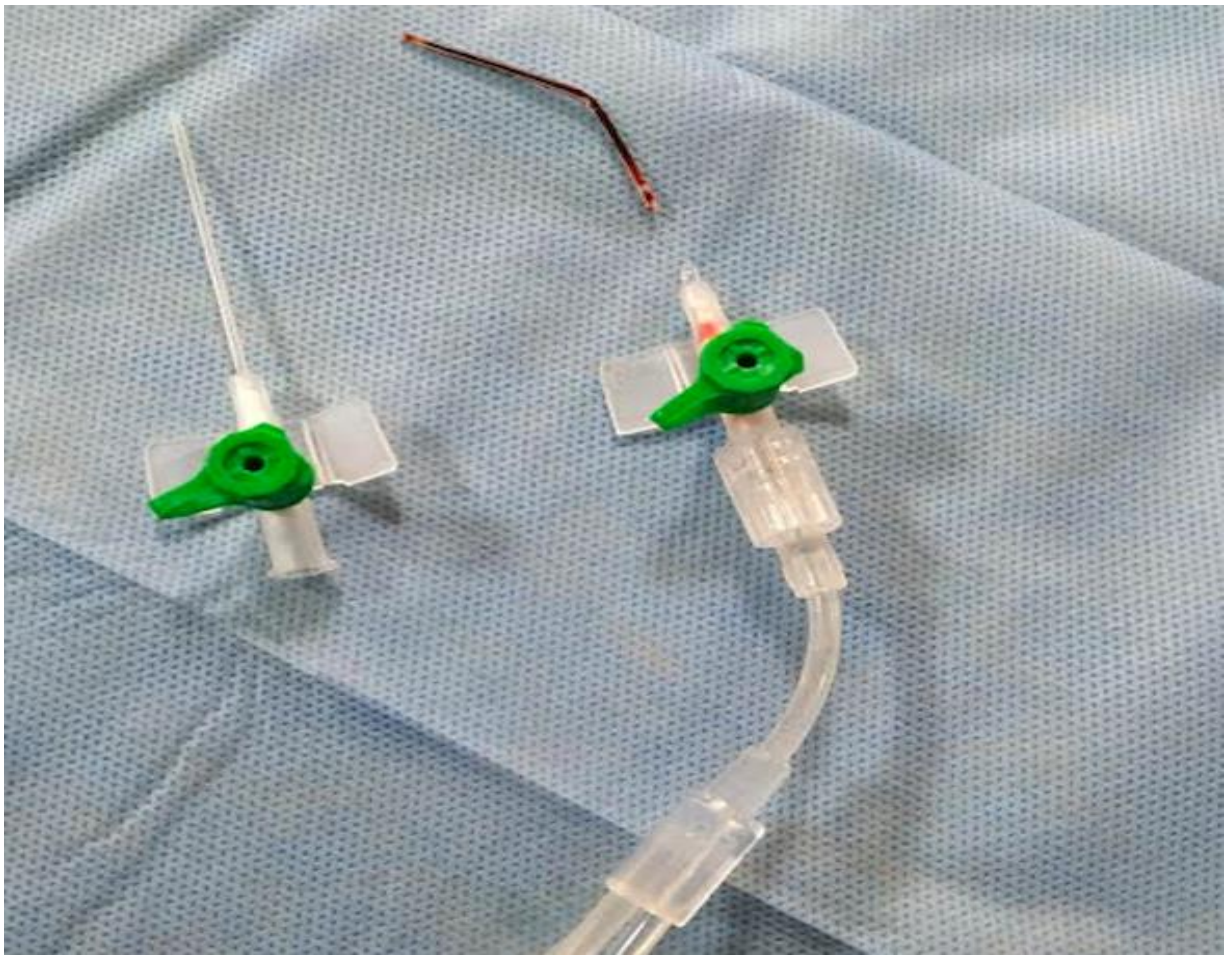

Figure.2 Retrieved Segment of Fractured Cannula

Discussion: The first case of fracture of the central venous catheter was reported in 1954. Since then there have been reports of fracture of the central venous catheter, peripherally inserted central lines or guidewires and embolization of the fractured fragment.[2-7] The embolization of the fractured fragment has been noticed both towards and against the flow of blood. This causing migration towards tissue or right heart and can be associated with dangerous complications like arrhythmia, bloodstream infection, vascular injury and perforation, and myocardial infarction.[6] Hence this requires either invasive surgical or interventional radiology guidance for removal of the fractured fragment.

There have been very few previously reported cases of fracture of peripheral cannula.[8-12]

This has mostly been reported to be associated with poor cannula site care, longer duration of use, multiple attempts at cannulation, the poor technique of insertion, repeated reinsertion of guide needle causing partial or complete transection of the cannula or positioning the cannula with partially withdrawn needle.[8-11] Most of these cases are associated with delayed diagnosis and management and migration of fractured fragment.[8-11] Only one case has been reported with a fractured cannula in the external jugular vein with the migration of

the fractured fragm ent.[9] In one case the fracture of the peripheral cannula was immediately diagnosed, the tourniquet was applied to prevent central migration, and removal of fracture fragment was done immediately post confirmation of position by ultrasonography.[12] In our patient, the cannula was positioned in the external jugular vein, was inserted in the first attempt, and was removed within two days. The probable cause of cannula fracture might be the manipulation and handling of the cannula by the patient because of discomfort related to the location of the cannula in the neck. Also, it needs to be emphasized that the manufacture needs to be informed regarding the batch of cannula developing the issue of cannula fracture.

There have been no guidelines on the management of such conditions. Various imaging modalities like x-ray, ultrasound, and CT have been used in the identification of the location of the migrated fracture segment. CT is the most commonly used modality for the diagnosis of the position of the migrated catheter.8,9 Though X-ray has been used in a case, but it is a poor marker, given the radiolucency of the cannula.8,11 In our case the cannula fracture was recognized immediately and the position of the fracture fragment was confirmed by palpation and bedside ultrasound. Steps taken to prevent embolization of the fractured fragment should be taken if possible. In our case patient was kept in head low position to prevent proximal migration to central veins and heart as this is associated with more serious complications. The chances of distal migration were less, being against the direction of flow and probable benign complications. Though surgical removal remains the mainstay of management, it can also be done under fluoroscopic guidance depending on the position of the migrated fragment.

Adherence to the hospital or institute protocol for insertion, maintenance of good insertion technique, and training of staff handling the cannula should be done. The manufacturer should be informed regarding the batch of cannula developing the issue.

Conclusion: The fractured peripheral intravenous cannula can have serious consequences. With a fractured segment being located in the external jugular vein, it acts as a potential source of dangerous embolization. This can be caused by both proximal or distal migration of the fractured segment of the cannula. Early recognition, confirmation of position, and urgent removal are the mainstay of management. Selection of proper site and size of cannula, reduction of manipulation, and proper cannula site care and monitoring can prevent such complications. This article throws light over a rarely reported complication of peripheral venous cannulation of cannula fracture. It emphasizes the importance of adherence to hospital protocol for cannulation, good technique, and need of training of staff handling the vascular access.

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How to cite this Article: Shivangi Mishra*, Padmakumar Arayamparambil Vijayan, Garud Suresh Chandan, Pooja Prathapan Sarada; Fracture of Intravenous Cannula in External Jugular Vein: A Case Report
Int. Res. Med. Health Sci., 2020; (3-3): 1-5
Source of Support: Nil,
Conflict of Interest: None declared.
Received: 12-6-2020; **Revision:** 25-6-2020; **Accepted:** 28-06-2020