

Cannula segment pulmonary embolism – a rare complication of a fractured cannula

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Introduction

Peripheral intravenous cannulae are commonly used for intravenous access. The commonly used cannulae in non-emergency units are 18 G (55.65%) and 20 G (35.65%) [1]. Even though it is a relatively simple and safe procedure, complications can result during insertion and while it is being used. Commonly encountered complications are cannula site infections, thrombophlebitis, sepsis, and extravasations. In addition, other significant complications like damage to surrounding structures during insertion, accidental intra-arterial cannulation and injection, cannula fracture, migration and embolisation can also occur [2]. This case report describes a cannula fracture resulting in cannula fragment embolism to the pulmonary circulation.

Case

A 65 year-old male was admitted to the National Hospital of Sri Lanka Colombo (NHSL) with osteomyelitis of the tibia. An 18 G (green) cannula was inserted to the External Jugular Vein (EJV). EJV was selected because there was difficulty in accessing upper limb veins for intravenous antibiotic administration. The cannula was left in situ for five days. The intravenous part of the cannula (catheter) fractured when attempting to remove it. He did not have chest pain or shortness of breath. On examination the cannula fragment was not palpable near the insertion site. The respiratory system examination was normal. The heart rate and the rhythm were normal. He was haemodynamically stable. An ultrasound scan of the neck was done to locate the fractured segment. But the fractured segment was not found in the neck veins and there was no thrombosis in the EJV. A non-contrast computed tomographic scan (CT) of the chest was planned. CT scan revealed the fractured segment lodged at the descending pulmonary artery branch on the left side [Figure 1].

He was kept under observation. He maintained oxygen saturation (SaO₂) of 100% on air. Since he was maintaining the SaO₂ and was haemodynamically stable, the patient was managed conservatively. At one month and at three months of follow-up the patient did not have any complications.

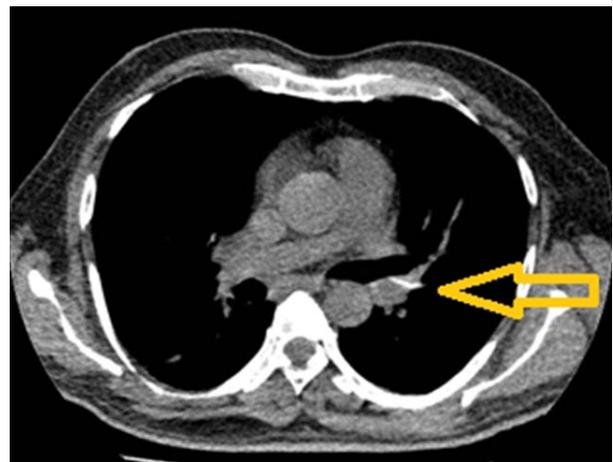


Figure 1. Image showing fractured segment (yellow arrow) lodged at the descending pulmonary artery branch.

Discussion

Most of the studies done on intravenous cannula fractures were on central venous catheter (CVL) related fractures. The first reported case of an embolisation of the catheter fragment was in 1954 as a complication of CVL fracture [3]. In a review of 202 cases, majority of the central vein emboli were from subclavian vein catheter followed by femoral and internal jugular vein catheters. The pulmonary arteries, right ventricle and right atrium were the frequent sites of embolisation [4]. There is one case

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report of embolism from EJV to confluence of subclavian vein and internal jugular vein (IJV) [5]. In the current case report, the intravenous cannula fractured and embolised to pulmonary circulation from EJV.

Clinical presentation may vary from asymptomatic to severe systemic symptoms and signs [6]. There have been reported cases of deaths due to perforation (of atrium, ventricle, and valves), arrhythmia, endocarditis, pulmonary embolism, and sepsis (Richardson, 1974). The most dangerous site was the right ventricle. Pulmonary artery embolisation was also a significant cause of morbidity and mortality [4].

High resolution ultrasonography at the local insertion site is an initial investigation of choice. If the cannula fragment is not visualised at the local site, then a non-contrast CT scan of the neck and the chest should be done. In the current case the embolised cannula fragment was found at the descending branch of the left pulmonary artery.

The mainstay of management is prevention. This is done by following the safe insertion and maintenance practices i.e. avoiding repeated attempts of insertion with the same cannula, avoiding insertion at mobile sites (over the joints, neck), securing the cannula with adhesive plasters, minimizing cannula movements and removing the cannula as soon as possible [2].

Indication for removal of an embolised fragment is still debated [7]. Some authors recommend extraction of all embolised segment considering the risk of developing pulmonary artery thrombosis or septic complications. But evidence for this practice is lacking. But if acute complications or symptoms occur, the fractured segment needs to be removed. Percutaneous retrieval is the most preferred method and only in few cases open surgery is done. Surgical options include video assisted thoracoscopic surgery (VATS) or open surgical removal [3]. Interventional techniques include digital subtraction angiography (DSA) and snare removal of the fractured segment. However interventional options are not freely available in our setting. Complications of endovascular procedures i.e. transient arrhythmias are rare [8].

The current patient was managed conservatively because the patient was asymptomatic, haemodynamically stable and the respiratory functions were not compromised. But the patient was kept on monitoring for early detection of complications and retrieval of the embolised fragment if needed.

Therefore fracture of a cannula and embolisation is a rare complication of a common procedure. It can cause serious complications. Imaging is essential to find out the

site of the fragment. It should be removed immediately if it is in an accessible site. Peripheral intravenous cannulae inserted to the external jugular vein and at mobile sites are prone to fracture and such sites should be avoided as much as possible. The correct insertion techniques should be followed during cannulation.

Author contributions

Joel Arudchelvam – Was involved in drafting the article, formatting, corresponding and literature search.

Pirakash Pathmanesan – Was involved in gathering patient details, investigations and literature search.

Ruwan Ranaweera – Was involved in gathering patient details, investigations and literature search.

Conflicts of interests

There are no conflict of interests, there was no external funding sources.

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