

Case Report

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An Early Migration of an Implantable Port Catheter: Where and how should we Place the Catheter Tip?

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Abstract

One of the reported complications of totally implantable venous access ports is the spontaneous migration of the catheter tip which can lead to serious complications. We report an early catheter tip migration into the ipsilateral internal jugular vein after initial correct placement of the port using the subclavian approach. Through this case and based on data from literature, we attempt to determine the factors predisposing to this mechanical complication and the means to avoid it.

Keywords: Catheter tip migration; Subclavian vein; Totally implantable venous access port

Introduction

Nowadays, the Totally Implantable Venous Access Port (TIVAP) is a safe and reliable long term venous access device and an indispensable tool in treatment of oncology patients. However, the classic percutaneous subclavian venipuncture method using the Seldinger technique carries a risk of certain complications. Among these complications is catheter tip migration (also called secondary malposition). This rare, but important complication can lead to catheter dysfunction or can damage the vascular wall. Consequently, the correct catheter tip position is mandatory in order to avoid complications and to maintain functionality, however there is still a controversy concerning the definition of the optimal location.

Case Report

We describe a case of a 26-year-old man, with normal Body Mass Index (BMI), who underwent curative surgery and adjuvant chemotherapy for locally invasive sigmoid adenocarcinoma. The chemotherapy drugs were administered through an implantable venous access device (BardPort[®]). Under local anesthesia, the right Subclavian Vein (SCV) was accessed percutaneously by the infraclavicular approach. The catheter tip was positioned without radioscopic imageguided assistance. A post-procedure Chest X-ray (CXR) (Figure 1) confirmed that the catheter tip lay outside the cardiac cavities, and was positioned above the carina in line with current guidelines [1].

One week later and before TIVAP use, the patient developed sudden



Figure 1: A post-procedure radiographic image showing the catheter tip position (arrow).

onset pain in the right side of the neck. On clinical examination, there was a significant restriction in the range of cervical movement due to torticollis. There was a poorly defined mass in the area of the right sternocleidomastoid muscle. Ultrasonography of the draining veins revealed a migration of the catheter tip into the lumen of the Internal Jugular Vein (IJV), and a small catheter-related central vein thrombosis. This migration was also confirmed by chest radiography (Figure 2). Due to the potential risk of pulmonary embolism, low molecular weight heparin therapy was started. The neck edema and discomfort resolved within two days. After 7 days, the port was removed and a second implantable port with an open-ended catheter was inserted in the left side with the same approach. The correct position of the catheter tip was confirmed by CXR. The patient was discharged before his next session of chemotherapy.

Discussion

One of the reported complications of TIVAPs is the spontaneous



Figure 2: The catheter tip migration in the ipsilateral IJV.

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migration of their catheter tip after initial correct placement. In contrast with malposition, the catheter tip migration was considered in the literature as a delayed complication which occurred during or after the first cure course of chemotherapy [2]. In our knowledge, this is the first case showing an early catheter tip migration of a TIVAP into the ipsilateral IJV. Also, this mechanical complication was unmasked by a central venous thrombosis.

Numerous hypotheses were suggested to determine some causes of catheter movement such as obesity, changes between supine and upright position, arm and shoulder movements, increased intrathoracic pressure (coughing, vomiting or congestive heart failure, positive pressure ventilation) and forceful flushing [3]. Indeed, three factors were found by Nazarian et al. [4] to be more likely associated with early abnormal movement of the catheter tip: female gender, obesity and subclavian venipuncture [4]. Also, in a recent study, shallow tip location (relative to the carina) and the presence of lung cancer were statistically significantly associated with catheter-tip migration [5]. Consequently, this case calls into question whether the carina is a reliable position.

Optimal positioning of the catheter tip is controversial. In order to avoid some mechanical complications (valvular and cardiac perforations, arrhythmias, etc) due to the placement of the catheter tip within the right atrium, many publications suggest that catheter tips should always lie above the pericardial reflection [1]. Therefore, Current guidelines state that the catheter tip of right-sided TIVAP should be above the carina on a post-procedure CXR. They also recommend that the catheter tip should lie in the long axis of the superior vena cava without acute abutment to the vein wall to avoid other rare, but serious complications [1]. However, Wu and colleagues found that the catheter tip was located 2.98 cm below the carina in the non-migration group and only 0.04 cm below the carina in the migration group. Also, they showed that the catheter tip location in the superior cavo-atrial junction may prevent catheter migration [5].

Several publications agree that catheter tip position is more precisely estimated using fluoroscopy because it allows visualization of the catheter *in situ* and to place its tip under direct bidimentional real-time imaging [5]. Intravasal Electrocardiogram (ECG) can also assist precise positioning.

To conclude, the practitioner must always bear in mind that the risk of catheter tip migration is increased when the catheter is short and has its extremity in the upper third of the SVC. Also, the superior cavo-atrial junction remains the adequate zone to place the catheter tip.

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