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Access of a fully rotated implantable port lead to extravasation: a case report

Short title

Extravasation following access of a fully rotated implantable port

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Abstract

We report an unusual cause of extravasation. A Huber needle was unknowingly inserted through a silicone filled "suture hole" of a totally rotated port, with the same feeling as the puncture through the silicone septum. This lead to chemotherapy injection in the subcutaneous tissue. Different risk factors for extravasation with ports and preventive measures are discussed.

Keywords: Catheters, Indwelling; Equipment failure; Extravasation; Port rotation

Introduction

Totally implantable venous access devices (TIVADs) are frequently used in the onco-hematology population for the administration of drug therapy. TIVADs consist of a catheter, which is inserted in a vein, and a port chamber, which is placed in a subcutaneous pocket. The chamber may be inserted free-floating in the subcutaneous pocket (1) or attached to the pectoral fascia using absorbable (2) or non-absorbable sutures (3). When inserted into a large pocket, the port can easily flip over, such that the port chamber becomes inaccessible (1). Although suture attachment is recommended as a preventive measure, 180° port rotations occur in up to 0.8% of inserted TIVADs, independent of device fixation (1-3). To the best of our knowledge, our case is the first reported case of extravasation due to mistaken access of a completely rotated port.

Case report

A non-sutured Pro-Fuse® CT port (MedCOMP®, Harleysville, PA) (Fig. 1) was inserted into a non-obese female patient with breast cancer in a regional hospital in Tienen, Belgium. The first cycle of chemotherapy (Docetaxel-cyclophosphamide) was administered without any problems. However, port access was difficult for the second cycle, which was attempted 28 days later. The chest radiograph protocol failed to report any device positioning problems. No less than six attempts were needed before the needle could be fixed in the port chamber. Injection of normal saline (NS) was easy, but blood aspiration was limited. Thirty minutes after the start of Docetaxel infusion, a painless red swelling around the port site was observed. The injection was stopped and the needle removed. The next day, the patient was referred to the University Hospitals Leuven for an evaluation of the device function by the Advanced Practice Nursing (APN) team. At that time, the skin medial and caudal to the port presented with erythema. The specialist nurses inserted a new needle. More than 50 ml of NS was easily injected manually but only pink-tinged saline was withdrawn. Although the needle was stable in the port, the abutting sensation against the chamber bottom was absent. Another attempt to access the port with a longer needle was unsuccessful. Initial chest x-ray image was unavailable and a second one revealed full chamber rotation (Fig. 1). The port was removed. Several deep scratches were present on its backside, likely from needle sticks slipping between the soft silicone sheath and the chamber housing. Obviously, the needle punctured a suture hole through the back of the reservoir (Fig. 2), as shown in the reconstruction (Fig. 2).

Discussion

Port reservoirs sutured to the pectoral fascia do not eliminate the risk of port rotation. However, reservoirs with open suture holes are able to limit this hazard, because they allow physiological port fixation to the subcutaneous tissue by spontaneous ingrowth of scar tissue through these holes. Indeed, a randomized study including 900 ports of three different types showed a lower incidence of port rotation among devices with open suture holes: 0% for Port-a-cath® (Smiths

Medical, Deltec, St. Paul, MN, USA) and 1.43% for Celsite® (B.Braun, Boulogne Cedex, France) versus 3.16% for BardPort® with silicone-filled holes (Bard Accesses, Salt Lake City, UT, USA) (unpublished data). On the lateral view image, a fully rotated port is diagnosed when the port base is directed anteriorly (white arrow) and the port septum is directed posteriorly (black arrow) (Fig. 3). Rotation of plastic reservoirs are detectable only when radiopaque lettering, such as “CT” stenciled on the reservoir backside, appears mirror reversed on a chest x-ray frontal view (Fig. 1).

For patients, an inverted port means unsuccessful access attempts, eventually a new surgical intervention, and potentially major morbidity due to chemotherapy extravasation. Reported incidence of extravasation with port catheters vary between 0 and 1.6% (1). Several causes have been reported: catheter sleeve formation (4); port (5) and catheter damage (6); superior vena cava wall perforation and needle misplacement and accidental needle dislodgement (7). Reported risk factors for needle misplacement are (1) reservoirs with silicone-filled suture holes, (2) overweight patients, (3) inexperienced clinicians, and (4) absence of brisk blood return or unchecked blood aspiration (8). Therefore, to avoid needle misplacement, clinicians need to acquire specific skills and knowledge. This starts with the choice of an appropriate needle length followed by prompt and correct needle placement verification, which occurs when the clinician accessing the port is aware of what to expect during needle insertion. Initially, resistance is felt when the needle penetrates the septum. This is followed by a sensation that the needle is abutting against the reservoir bottom. A short delay between these two events is important. Finally, adequate port function is confirmed when injection and aspiration occur easily. In our patient, a combination of several risk factors led to extravasation: (1) an APN team was unavailable and correct needle placement was not adequately confirmed, (2) the lack of brisk blood return, and (3) the lack of documentation of full port rotation in the radiological protocol.

Conclusion

Needle insertion through a silicone-filled port suture hole is a real hazard, particularly in obese patients. Clinical signs might be the needle tip not hitting the chamber bottom or absence of brisk blood return. Incorrect port position should be checked and reported radiologically, prompting a corrective intervention before drug delivery.

Conflict of interest

Disclosures: none

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Fig. 1 Frontal Pro-Fuse® CT view and fully rotated port on chest x-ray.

Fig. 2 Back of port reservoir showing visible puncture lesion (arrow) and reconstruction of needle insertion.

Fig. 3 Fully rotated titanium port on lateral view of chest x-ray, the port base is directed anteriorly (white arrow) and the port septum is directed posteriorly (black arrow).