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Case Presentation

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Efficacy of Sodium Heparin in Maintaining Totally Implantable Venous Access Port Catheters: a Case Report

Barba A

Vascular Medicine and Surgery Unit, IMQ Zorrotzaurre University Hospital, Ballets Olaeta, 4, 48014 – Bilbao, Basque Country, Spain, Tel: +34680406360

Abstract

Introduction: Several problems associated with totally implantable venous access ports (TIVAPs) involve complications related to both the catheter and the port. With catheter complications, the most serious is occlusion/thrombosis. Various flushing and locking methods are used to prevent this, but there is currently no consensus on the best approach. We present the case of a patient whose TIVAP remained patent for 10 years.

Case report: A 51-year-old woman diagnosed with invasive ductal carcinoma underwent a mastectomy with axillary lymph node dissection in 2014, followed by implantation of a TIVAP via the left cephalic vein cut-down technique in the deltopectoral groove. Following chemotherapy and radiotherapy treatment in 2015, the patient was discharged. Subsequently, the patient attended regular checkups every 12 weeks, during which the system was cleaned with saline solution and locked with Fibrilin® (sodium heparin). In 2025, eleven years after implantation, the patient presented with discomfort in the port area and a low-grade fever after the TIVAP system had been used at a health centre. The system was explanted, and the entire system was sent to Bacteriology for analysis, yielding negative results.

Conclusion: The TIVAP system is a useful device that does not damage the superficial venous system of cancer patients requiring chemotherapy and, with maintenance performed by trained personnel, can be used for years.

Keywords: Total implantable venous access ports; Maintenance of patency; Sodium heparin

Introduction

This case presentation stems from an article published in 2021 [1]. After presenting the case, the subsequent discussion will focus on the existing discrepancies regarding the implantation route, when to implant a Totally Implantable Venous Access Port (TIVAP), how to maintain its patency and when it should be explanted.

Case Presentation

A 51-year-old woman presented with a tumour mass in the lower quadrant of her right breast during a routine mammogram in May 2014. Following a breast ultrasound and biopsy, she was diagnosed with pT3 pN0 invasive ductal carcinoma. On July 17, 2014, she underwent a right mastectomy/lymphadenectomy with immediate reconstruction. The postoperative period progressed favourably, and adjuvant chemotherapy and

radiotherapy were recommended. Given the patient's deficient superficial venous system, implantation of a subcutaneous venous reservoir was proposed. After the consultation, a medical history was taken, and a cervical and upper extremity examination was performed. A venous study was conducted using a MyLab50 Doppler ultrasound (Esaote, Genoa, Italy) of the left deltopectoral groove. A cephalic vein measuring 3.8 mm in diameter was observed at a depth of 10 mm, and the axillary vein was found to be patent. The procedure was explained to the patient, who accepted and signed the corresponding informed consent form. On August 19, 2014, in the radiological operating room, after administration of 10 mL of mepivacaine in the left deltopectoral groove, a 4-5 cm skin incision was made, using the cephalic vein cut-down technique. A 9F catheter from a NuPort HP System (PHS Medical - Fuldabrück, Germany) was inserted. After confirming that the catheter tip was positioned at the cavoatrial junction using a Philips BV Pulsera (Amsterdam, Belgium) fluoroscopy system, it was connected to the port, which was secured to the anterior surface of the pectoralis major muscle. The entire system was locked with heparinised saline (1mL of 5% sodium heparin in 100mL of saline solution). Finally, the incision was closed intradermallyusing4-0 Monocryl (Johnson & Johnson Medical N.V. - Diegem/Machelen, Belgium), and the port was accessed with a Gripper Plus needle (ICU Medical/Smiths Medical Minneapolis, USA) for immediate use **(Figure 1)**.

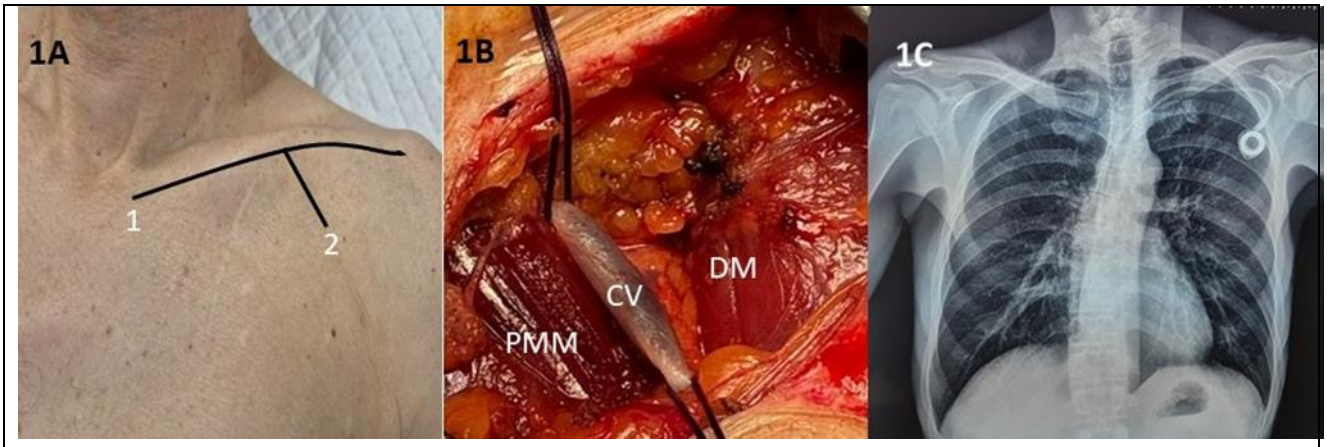

Figure 1: 1A) Inferior border of clavicle (1); incision in the deltopectoral groove (2) 1B) CV: Cephalic vein dissection - DM: deltoid muscle - PMM: pectoralis major muscle 1C): System implanted via left cephalic vein cut-down.

After 4 cycles (1 cycle every 3 weeks) of doxorubicin (Pfizer, New York, USA) + cyclophosphamide (Baxter-Deerfield, Illinois, USA) and 4 cycles (1 cycle every 3 weeks) of docetaxel (Sanofi-Aventis, Paris, France),on January 28, 2015 the patient completed chemotherapy. At the end of each cycle, the port was flushed with two 10mL syringes of saline solution using the push-pause technique, followed by locking with Fibrilin® 5 mg (Rovi, Madrid, Spain) by the nurses in the Oncology Day Hospital at our centre. Subsequently, radiotherapy treatment was administered, consisting of 25 fractions and 5 boost fractions, with the treatment concluding on April 14, 2015. Subsequently, system maintenance was carried out every 12 weeks by the nurses at the day hospital until 2024, when the patient moved to another city. During this period, the TIVAP was routinely used for blood tests and radiological contrast-enhanced imaging studies, and the system was always flushed and locked after each procedure. On July 9, 2025, at her new residence, she underwent blood tests using the TIVAP, carried out by a non-specialised nurse at a health centre because of symptoms of gastrointestinal bleeding. Twenty-four hours later, the patient reported discomfort in the port area and a slight fever. On July 14, 2025, she returned to the health centre with fever, chills and inflamed skin at the port site. Due to the

possibility of infection, the TIVAP was explanted on July 16, 2025, much to the patient's dismay. The TIVAP was sent to Bacteriology for culture, and it came back negative.

Discussion

When pacemaker or TIVAP implantation was performed exclusively by surgeons, the primary approach with the fewest complications was the left cephalic vein cut-down [2], or on the non-dominant limb since patients are generally right-handed [3]. However, with implants increasingly being performed by radiologists, intensive care specialists and oncologists, this approach has become less common, to the point that in recent studies it has disappeared, especially on the left side [4]. In my opinion, the left cephalic vein cut-down is the best approach because the angle of the catheter is less acute and it has no intraoperative complications and minimal postoperative complications. Currently, there is a general consensus that a TIVAP should be implanted in all cancer patients requiring chemotherapy for more than 4 weeks [5]; some authors, including myself, even state that they should always be implanted [6].

Regarding the maintenance of TIVAPs (catheter and port), some authors, such as Rapisarda [7], do not flush or lock them periodically and report no obstructions. However, the vast majority of us believe that this is necessary. The difference lies in the materials used: flushing and locking the system with saline solution [8] or flushing with saline solution and locking with heparinised solution [9]. Currently, authors like Ramsey [10] believe there is no difference between the two methods. There is now a consensus on the cleaning frequency, which should be every 12 weeks [8,10], an opinion I share. With regard to the timing of TIVAP explantation, there are four possible approaches: at the end of treatment [11], two years after the end of treatment [12], when complications arise, or not removing it at all [8,13] since it can be used for blood tests and contrast-enhanced imaging as well as intravenous treatments for other pathologies. One important aspect is patient opinion, as most are satisfied with its use and prefer not to have it explanted [12].

Conclusion

Reviewing the current literature, it can be stated that, while the TIVAP implantation route is optional, an implant should be mandatory for cancer patients requiring intravenous chemotherapy, with maintenance every 12 weeks according to hospital protocol. Explantation should be performed two years after the end of treatment, or it should not be explanted unless a complication occurs. It is also very important to highlight the role of nursing in the proper maintenance of TIVAPs.

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References

1. Barba A. The Implantation of Totally Implantable Venous Access Ports way Cephalic Vein Cutt-Down in Oncologic Patients. Surg Int Open Acc J. 2021;1(1):1-7.
2. Kirkfeldt, Rikke, Johansen, Jens Brock, Nohr, Ellen Aagaard, et al. Pneumothorax in cardiac pacing:a population-based cohort study of 28 860 Danish patients. I: EP Europace. 2012;14:8.
3. Werba A, Hennes R, Schuh F, et al. Prospective, monocentric observational study on the clinical use and patient satisfaction of an implantable venous access Port. Langenbecks Arch Surg. 2025;410(1):84.
4. BerkayKılıç, BurakİlhanHasan Karanlık. Totally implantable venous access devices: A fifteen-year single-center experience. Eur Res J. 2025;11:260-269.

5. Yu A, Pang R, Zhang M, et al. Research progress and narrative review of totally implantable venous access ports. Front Oncol. 2026;16:1800754.
6. Patel S, Vijayakumaran P. Totally implantable venous access devices: Necessity or luxury? Cancer Res Stat Treat. 202;4:536-7.
7. Rapisarda M, Gallo L, Terrasi A, et al. Maintenance of Functionality Without Flushing of Totally Implantable Venous Access Devices: A Presentation of Clinical Cases. EJVES Vasc Forum. 2025;64:24-27.
8. Lang T, Jaboury S, West A, et al. Is There a Relationship Between Frequency of Port-Care Maintenance and Related Complications in Patients With Cancer? JCO Oncol Pract. 2022;18(9):e1438-e1446.
9. Oner M. Med J MuglaSitkiKocman University. 2023;10(3):171-176.
10. Ramsey K, Ann Collins JA, Toedte B. Evaluating Normal Saline Locking With Totally Implanted Vascular Access Devices for Patients on 90-Day Maintenance Flushing. Clin J Oncol Nurs. 2026;30.
11. Sun Y, Wu X. Complications of implanted port catheters and peripherally inserted central catheters in chemotherapy-treated cancer patients: A meta-analysis. Adv Clin Exp Med. 2023;32(5):523-532.
12. Liu L, Liu Z, Wang J, et al. Exploring risk factors for totally implantable venous access devices (TIVADs)-related thrombotic occlusion in the off-treatment period. Sci Rep. 2023;13:10767.
13. Manici M, Darcin K, Isguzar A, Cosarcan SK, Kucukerdem B, Ercelen O. Intravenous port catheter implantation: Retrospective study in single center experience. JARSS. 2022;30(1):42-47.

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