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An unusual catheter malposition following totally implantable venous access port insertion: The catheter tip is located into the right axillary vein

Venöz erişim portu yerleştirilmesi sonrası sıradışı bir kateter malpozisyonu: Kateter ucu sağ aksiller vende lokalize

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Abstract
Totally implantable venous access port (TIVAP) devices have been used increasingly for repetitive chemotherapy administration, long-term parenteral nutrition, blood sampling and blood transfusion for last years. Several potential complications including catheter malposition can occur during the insertion of TIVAP devices. Catheter malposition is a less commonly reported and an important complication of TIVAP insertion. In this article, we presented an uncommon case report of catheter malposition following TIVAP insertion in a 47-year-old woman. To the best of our knowledge, this is the first reported case of mispositioned TIVAP where the tip of the catheter is in the right axillary vein.
Keywords: Totally implantable venous access port, Catheter malposition, Complication, Adverse event

Öz
Tamamen implante edilebilir venöz erişim port cihazları, tekrarlayan kemoterapi uygulamaları, kan örneklemesi, intravenöz hidrasyon ve parenteral nütrisyon için kanser hastalarında veya kronik hastalarda son yıllarda giderek daha fazla kullanılmaktadır. Tamamen implante edilebilir venöz erişim port cihazlarının yerleştirilmesi sırasında kateter malpozisyonu da dahil olmak üzere birçok potansiyel komplikasyon gelişebilir. Kateter malpozisyonu, tamamen implante edilebilir venöz erişim port yerleştirilmesinin daha az tarif edilmiş ancak önemli bir komplikasyonudur. Bu makalede, 47 yaşında bir kadın hastada tamamen implante edilebilir venöz erişim portu yerleştirilmesi sonrası gelişen sıradışı bir kateter malpozisyonu olgusu sunuldu. Bildiğimiz kadarıyla, bu olgu tamamen implante edilebilir venöz erişim portu yerleştirilmesi sonrası kateter ucunun sağ aksiller ven içinde konumlandığı literatürdeki ilk rapordur.
Anahtar kelimeler: Tamamen implante edilebilir venöz erişim portu, Kateter malpozisyonu, Komplikasyon, İstenmeyen olay

Introduction

Totally implantable venous access port (TIVAP) devices provide significant comfort for not only repeated administration of chemotherapeutic agents in cancer patients but also for long-term parenteral nutrition, blood sampling and blood transfusion. These devices ensure readily available, safe, easy, long-term central venous access that are placed under the skin; thus, their utilization has been gradually increased in the recent times [1]. However, the insertion of TIVAP devices has several potential complications such as pneumothorax, hemothorax, venous thrombosis, catheter infection, occlusion and malposition. Of these adverse events, a relatively lesser described yet a considerable complication of TIVAP insertion is the malposition of catheter tip into a vessel other than the superior vena cava (SVC) [2,3]. In this paper, we presented a case of an unusual catheter malposition following TIVAP insertion, in which the catheter tip is located in the right axillary vein, for the first time in the literature.

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Case presentation

A 47 year-old woman with a diagnosis of cervix cancer was admitted to our department for TIVAP insertion. She was hospitalized and prepared for intervention. The right subclavian vein was accessed by the percutaneous Seldinger technique under local anesthesia in the operating room, without ultrasound guidance or fluoroscopy. A 7 Fr silicone catheter was inserted into the right subclavian vein along the guidewire. The port reservoir was placed into the previously created subcutaneous pouch at the deltopectoral area. A subcutaneous tunnel was created between the access area and deltopectoral pouch. The silicone venous catheter was connected to the port reservoir, and the function of the TIVAP device was checked by withdrawing venous blood and injecting a diluted heparin solution. The port reservoir was fixed on the subcutaneous tissue with a 3-0 vicryl suture, and skin was closed with a 2-0 polypropylene suture. Resistance and technical difficulty were encountered during both the progression of the guidewire in the vessel and the insertion of silicone catheter. After the intervention was completed, a postero-anterior chest radiography was obtained to check the position of tip of catheter. The chest radiography revealed that the catheter was kinked, and the tip of catheter was in the right axillary vein (Figure 1). The TIVAP was removed and re-implanted under ultrasound and fluoroscopy guidance. Afterwards, the patient was discharged uneventfully.

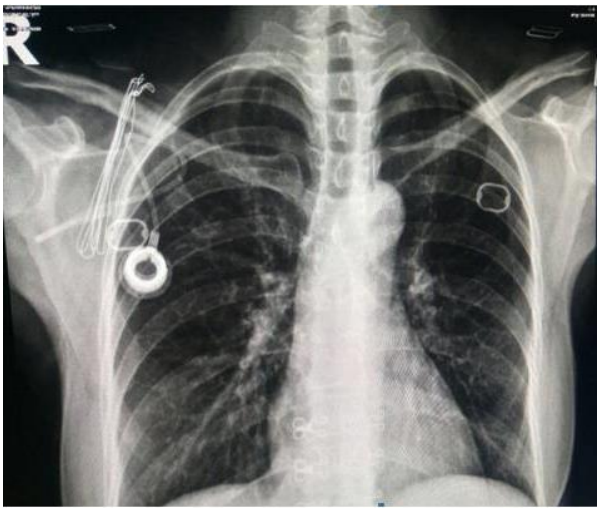

Figure 1: Catheter tip is in the right axillary vein

Discussion

In this article, we reported an unusual case of catheter mispositioning following TIVAP insertion. To the best of our knowledge, this is the first reported case of mispositioned TIVAP where the tip of the catheter is in the right axillary vein.

After the first report of TIVAP insertion by Niederhuber et al. [4] in 1982, TIVAP devices have been routinely used for safe and long-term central venous access in particular for cancer patients. The device increases the patient's quality of life, and decreases various adverse events including pain, phlebitis, frequent needle penetration, and cosmetic problems [1]. However, despite these advantages, the risks of TIVAP-related complications remain high. In a review study, overall procedure-related complication was reportedly between 16% and 28% [5].

One of these procedure-related complications is catheter mispositioning, which is defined as catheter tip placement into a vein other than the SVC or right atrium, kinking within the SVC (>40° with the lateral wall of SVC) and arterial cannulation [3]. If not taken into account, this complication can result in various serious events like catheter wedging and dysfunction, venous thrombosis, vascular erosion and even perforation [6]. Roldan et al.[3] does not consider mispositioning as a complication of central venous catheterization, while stating that missed diagnosis or delayed management of this adverse event may be related to the considerable morbidity and mortality.

According to the large case series, the rate of catheter mispositioning following TIVAP insertion varies between 0.2% and 3.1% [2,7-17] (Table 1).

Table 1: Catheter mispositioning and overall complication rates in the literature

Study	Publication year	Number of port catheters inserted	Catheter malposition rate	Overall complication rate
Kock et al. [2]	1998	1500	2.4%	12.8%
Guth [7]	2001	513	1.5%	3.1%
Yildizeli et al. [8]	2004	225	3.1%	12.4%
Araújo et al. [9]	2008	1231	1.2%	15.1%
Narducci et al. [10]	2011	815	0.9%	16.1%
Keum et al. [11]	2013	245	2.4%	9.4%
An et al. [12]	2015	397	0.8%	8.3%
Gurkan et al. [13]	2015	324	1.2%	33.9%
Ma et al. [14]	2016	2996	0.9%	6.2%
Feo et al. [15]	2017	527	1.3%	4.2%
Yanık et al. [16]	2018	3000	0.2%	9.6%
Kim et al. [17]	2019	843	0.3%	4%

Nowadays, both the surgeons and interventional radiologists all around the world frequently perform TIVAP insertion, but they use different techniques and prefer different venous access routes. In general, the interventional radiologists perform the procedure under ultrasonographic and fluoroscopic guidance and prefer the right internal jugular vein as the first choice for venous access. It has been indicated that TIVAP insertion under imaging guidance reduces the procedure-related complication rates [18-20]. On the other hand, surgeons use either cut-down or percutaneous landmark-based technique for implantation, with low complication rates [2,7-17]. Since we, the surgeons, are very familiar with blind-landmark technique as well as vascular anatomy of neck and chest regions, and also may recognize and treat the potential procedure-related complications quickly and properly, we applied the blind-landmark technique during TIVAP insertion but unfortunately observed this adverse event. In addition, we did not have adequate experience to routinely implement the radiologically guided method.

In conclusion, it should be noted that TIVAP insertion has a risk of significant catheter mispositioning even in experienced hands, and we suggest that radiological guidance should be routinely used during TIVAP insertion if possible.

References

1. Deser SB, Demirag MK. Analysis of totally implantable venous access of 70 cases with modified fast track technique. Turk J Vasc Surg. 2017;26:39-44.
2. Kock HJ, Pietsch M, Krause U, Wilke H, Eigler FW. Implantable vascular access systems: experience in 1500 patients with totally implanted central venous port systems. World J Surg. 1998;22:12-6.
3. Roldan CJ, Paniagua L. Central venous catheter intravascular malpositioning: causes, prevention, diagnosis, and correction. West J Emerg Med. 2015;16:658-64.
4. Niederhuber JE, Ensminger W, Gyves JW, Liepman M, Doan K, Cozzi E. Totally implanted venous and arterial access system to replace external catheters in cancer treatment. Surgery. 1982;92:706-12.
5. Kurul S, Saip P, Aydin T. Totally implantable venous-access ports: local problems and extravasation injury. Lancet Oncol. 2002;3:684-92.
6. Walshe C, Phelan D, Bourke J, Buggy D. Vascular erosion by central venous catheters used for total parenteral nutrition. Intensive Care Med. 2007;33:534-7.
7. Guth AA. Routine chest X-rays after insertion of implantable long-term venous catheters: necessary or not? Am Surg. 2001;67:26-9.
8. Yildizeli B, Laçin T, Batirel HF, Yüksel M. Complications and management of long-term central venous access catheters and ports. J Vasc Access. 2004;5:174-8.

9. Araújo C, Silva JP, Antunes P, Fernandes JM, Dias C, Pereira H, et al. A comparative study between two central veins for the introduction of totally implantable venous access devices in 1201 cancer patients. Eur J Surg Oncol. 2008;34:222-6.
10. Narducci F, Jean-Laurent M, Boulanger L, El Bédoui S, Mallet Y, Houpeau JL, et al. Totally implantable venous access port systems and risk factors for complications: a one-year prospective study in a cancer centre. Eur J Surg Oncol. 2011;37:913-8.
11. Keum DY, Kim JB, Chae MC. Safety of a totally implantable central venous port system with percutaneous subclavian vein access. Korean J Thorac Cardiovasc Surg. 2013;46:202-7.
12. An H, Ryu CG, Jung EJ, Kang HJ, Paik JH, Yang JH, Hwang DY. Insertion of totally implantable central venous access devices by surgeons. Ann Coloproctol. 2015;31:63-7.
13. Gurkan S, Seber S, Gur O, Yetisyigit T, Okan Donbaloglu M, Ozkaramanli Gur D. Retrospective evaluation of totally implantable venous access port devices: early and late complications. J BUON. 2015;20:338-45.
14. Ma LI, Liu Y, Wang J, Chang Y, Yu L, Geng C. Totally implantable venous access port systems and associated complications: A single-institution retrospective analysis of 2,996 breast cancer patients. Mol Clin Oncol. 2016;4:456-60.
15. Feo CF, Ginesu GC, Bellini A, Cherchi G, Scanu AM, Cossu ML, et al. Cost and morbidity analysis of chest port insertion in adults: Outpatient clinic versus operating room placement. Ann Med Surg (Lond). 2017;21:81-4.
16. Yanık F, Karamustafaoğlu YA, Karataş A, Yörük Y. Experience in totally implantable venous port catheter: analysis of 3000 patients in 12 years. Turk Gogus Kalp Dama. 2018;26:422-8.
17. Kim DH, Ryu DY, Jung HJ, Lee SS. Evaluation of complications of totally implantable central venous port system insertion. Exp Ther Med. 2019;17:2013-8.
18. Teichgräber UK, Kausche S, Nagel SN, Gebauer B. Outcome analysis in 3,160 implantations of radiologically guided placements of totally implantable central venous port systems. Eur Radiol. 2011;21:1224-32.
19. Yoldaş H, Karagöz İ, Demirkol ME, Velioğlu Y, Yıldız İ. Widespread thrombus during central venous catheterization in ultrasonography: a case. Abant Med J. 2017;6:71-3.
20. Menteş O, Cırık MÖ, Ünver M, Avcı S, Doğanay G, Alagöz A. Ultrasonographically marked catheterization of internal jugular vein in intensive care patients: Retrospective cohort study. J Surg Med. 2019;3:553-6.

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