

Dislocation of Intravenous Port Systems – Three Case Reports

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Key Words

Venous port system · Intravenous chemotherapy · Catheter fracture

Summary

Background: Many patients with intravenous chemotherapy have an intravenous port system because of high tissue toxicity of most chemotherapeutic agents in the case of paravasation. With more port systems implanted, the rate of complications is increasing. Apart from catheter thrombosis, we primarily know of fracture of the port catheter. **Case Report:** We describe 3 patients of our chemotherapeutic clinic who experienced complications of the intravenous port system implanted in the vena brachialis. All of them showed fracture and loss of the port catheter, followed in some cases by symptoms such as cardiac problems. **Conclusion:** We have to discuss the use of intravenous port systems. Besides their comfortable use, intravenous port systems have to be handled with care and it has to be considered in every case if there really is the need for an implantation.

Schlüsselwörter

Intravenöses Portsystem · Intravenöse Chemotherapie · Katheterkomplikationen

Zusammenfassung

Hintergrund: Viele Patienten mit intravenöser Chemotherapie besitzen ein intravenös liegendes Portsystem aufgrund der hohen Gewebetoxizität der meisten Chemotherapeutika im Fall eines Paravasates. Je mehr Portsysteme implantiert werden, desto höher ist die Rate der Komplikationen; neben der Portvenenthrombose treten hauptsächlich Katheterkomplikationen auf. **Fallbericht:** Wir berichten von 3 Patientinnen aus unserer Chemoambulanz, die Komplikationen des Portsystems im Bereich der Vena brachialis zeigten, nämlich Katheterdislokationen, was sogar in einem Fall zu kardialen Symptomen geführt hat. **Zusammenfassung:** Man muss die Verwendung der intravenösen Portsysteme diskutieren. Insbesondere aufgrund des angenehmen Gebrauchs eines Ports muss dieser sorgfältig benutzt werden und in jedem Fall muss die Indikation zur Implantation neu gestellt werden.

Introduction

Increasing incidence of several malignancies is correlated with an increasing number of chemotherapies being applied. Apart from some orally administered chemotherapeutic agents, most patients need an intravenously applied chemotherapy. As an immediate consequence, more intravenous port systems are used because of the following reasons.

Some chemotherapeutic agents like anthracyclines, which are very frequently used in adjuvant as well as palliative

therapy of breast cancer, may cause substantial tissue toxicities when there is a paravasate [1]. In addition, most elderly patients present with poor venous conditions which will eventually get worse if several chemotherapies are applied via peripheral venous catheters. Thus, in routine oncological care, the use of intravenous port systems has become very common.

Intravenous port systems can be implanted in different locations: either in the infraclavicular region via the subclavian vein or in the forearm via the vena brachialis [2]. The injec-



Fig. 1. A Fracture of the catheter cranial of the injection port reservoir.
B The port catheter dislocated through the right heart into the truncus pulmonalis.



tion port reservoir is located subcutaneously and is connected with the actual port catheter which reaches intravenously into the vena cava superior just above the atrium of the right heart [3]. Therefore, if the port reservoir is implanted in the forearm, the length of the catheter is consequently longer, which is a reason for potentially more catheter complications. Apart from port-associated thromboses [4], complications associated with material malfunctions may occur [5–12].

In this case report, we demonstrate detachment of the catheter from the injection port system which may potentially cause a lot of symptoms and even complications if not recognized immediately [13, 14]. Potential complications caused by dislocation of the port catheter include angina pectoris symptoms, disturbed heart rhythm, and asthenia, in addition to problems caused by the unusable port system.

Case Report

The first patient had a breast carcinoma on the left side, which was first diagnosed as a pT1b, pN0, G3, R0, hormone receptor-positive and HER2-negative carcinoma in 2003. After breast-conserving surgery, she was treated with 6 cycles of anthracycline-based chemotherapy without any complications. Afterwards, the patient received adjuvant aromatase inhibitor therapy. Since the patient suffered from osteoporosis, she also received an intravenous bisphosphonate; this was done with the same

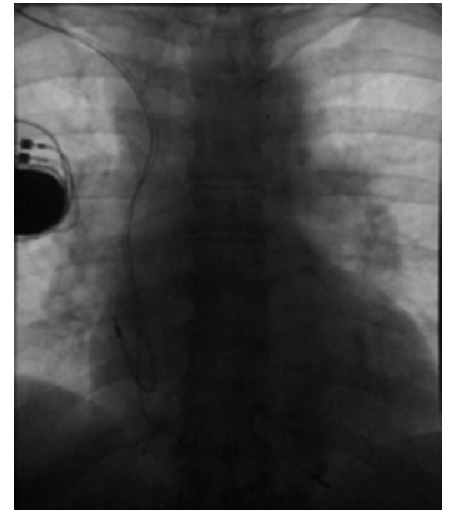


Fig. 2. The port catheter dislocated into the vena cava superior and with a loop through the right heart into the truncus pulmonalis.

port which was used for chemotherapy. During a routine bisphosphonate application, the infusion suddenly stopped. Upon X-ray control, dislocation of the intravenous port system was seen. The catheter was detached from the port reservoir and dislocated into the right atrium and ventricle until the truncus pulmonalis. The apparent reason was an accidental rupture of the catheter about 5 cm beyond the port injection system (fig. 1). There was an immediate risk of perforation so the whole port system was removed instantly. For the whole time, the patient did not have any symptoms attributable to the port catheter dislocation.

The second patient was an 84-year-old woman who had an exulcerated breast carcinoma with metastases in lung, bones, and lymph nodes. Because of this diagnosis, the patient got a port system in the vena brachialis. The state of health of this patient was so poor that she received a low-dose weekly chemotherapy regimen (paclitaxel 80 mg/m² q7) which she tolerated well. During therapy, the loco-regional relapse became smaller and clinical symptoms improved. At cycle 15, the patient complained of weakness and dizziness together with dyspnea, which she had never reported before. Because of these symptoms, a port needle was inserted into the port injection system to draw blood for some laboratory tests; after insertion, it was noted for the first time that it was not possible either to flush the system with saline solution or to aspirate blood. Thus, it was necessary to perform an X-ray of the port system: It showed the dislocation of the catheter which was lying with both ends in the vena cava superior and with a loop through the right heart into the truncus pulmonalis (fig. 2). Because of the clinically unstable situation of the patient, the whole port system was removed in an emergency session. After this operation, the symptoms, such as heart failure and weakness, lasted for about 2 weeks.

The third patient had a FIGO IIIC ovarian carcinoma. After tumor-reductive surgery with a residual tumor of less than 1 cm, she needed a platinum-based chemotherapy (carboplatin AUC 5 / paclitaxel 175 mg/m² q21). Before starting the chemotherapy, the intravenous port system was implanted into the vena subclavia. At cycle number 5, the patient got up from her hospital bed while the infusion (total time requirement 6 h) was still running; after this incident, the infusion stopped spontaneously and it was not possible to start it again. We first thought of a mere needle dislocation, so we removed the needle and reinserted a new one; however, it was still not possible to flush the port or aspirate blood. The subsequent X-ray of the whole port system showed a dislocation of the connector between the port injection system and the catheter (fig. 3). Consequently, the port system could not be used and was explanted the next day. Then, the last cycle of chemotherapy was applied via a peripheral venous catheter without any complications.



Fig. 3. Dislocation of the connector between port injection system and catheter.

Discussion

These 3 cases show complications of intravenous port systems located in the forearm and in the vena subclavia caused by problems with the material. All port systems have been manufactured by different producers. They could not find any fault in the material. In the literature, these material complications are described with a frequency of 0.1–1% [8, 11, 12] of all implanted intravenous port systems; there is no significant difference in the literature regarding where the port system is located. Systems implanted in the forearm show a trend towards more complications. Our cases concerned 3 patients treated within 1 year, which corresponds to the data described in the literature with about a 1% occurrence rate. However, these complications may cause adverse events such as heart rhythm alterations with consecutive tachycardia or bradycardia, reduction of the ventricular ejection fraction, and thoracic pain with angina pectoris-like symptoms. Additionally, if these symptoms appear it may be necessary to interrupt the chemotherapy which may result in reduced efficacy of the oncological therapy, in particular in the adjuvant setting.

Therefore, we have to look for alternatives or any possibilities to avoid complications of intravenous port systems. On the one hand, there is the possibility of using less intravenous port systems and more peripheral venous catheters; here, the risk of paravasation should be considered. One has to distinguish between chemotherapeutical substances with high and those with low tissue toxicity potential. The decision for or against a venous port system should be made accordingly.

Furthermore, one has to discuss the optimal time for explantation of the port systems, in particular in the adjuvant setting: for example, the first patient only received a bisphosphonate therapy after completion of adjuvant anthracycline-containing chemotherapy; in the case of a bisphosphonate therapy or an antibody treatment, port systems should only be maintained if the peripheral venous situation is poor. A statistically high risk of a relapse or mere temporary convenience should not be the only reason for keeping the port system in place.

In addition, the venous port system has to be handled with care. Before every application, the system needs to be flushed with saline; in order to keep the port system clean, a heparin lock needs to be performed after each treatment and at least once every 8–12 weeks [4]. Needles should be inserted perpendicular to the implanted port after locating the port container in order to avoid incomplete needle insertion and air influx.

In conclusion, intravenous port systems need to be handled with care, and indications for using these systems should consider potential complications. With every patient, implantation of such a system needs to be decided individually after the discussion of advantages and disadvantages of the port system. Problems occurring during routine use of intravenous port systems should be evaluated immediately as our cases demonstrate. Even without the patient initially experiencing clinical symptoms, severe complications may have occurred which only become apparent by sudden problems of flushing the port or aspirating blood. Nevertheless, knowing the appropriate and correct use and not forgetting potential complications, an intravenous port system is a comfortable and safe device.

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Conflict of Interest

The authors declare that they have no conflicts of interest.

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