

Unsuccessful removal of a totally implantable venous access port caused by thrombosis in the left brachiocephalic vein

A case report

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Abstract

Rationale: Thrombosis is a common complication associated with implantable venous access ports (IVAPs) and often results in loss of catheter function but is rarely associated with difficulty in IVAP removal.

Patient concerns: A 53-year-old woman presented to the hospital due to difficulty in IVAP removal. The patient had been diagnosed with breast cancer and received modified radical mastectomy. After that, she underwent IVAP implantation. Four and half years later, the IVAP catheter had become stuck while the catheter remained unobstructed. The patient had no special chief complaints.

Diagnosis: Postoperative breast cancer; difficulty in removal of IVAP (caused by thrombus in the left brachiocephalic vein).

Interventions: We injected urokinase 5 ml 1000U/L into the catheter once a day for three days but failed to remove the IVAP. Vasography showed a thrombus in the left brachiocephalic vein. Removal of the thrombus would have been very dangerous, so we decided to leave both thrombus and catheter in the body and used heparin and warfarin as anticoagulants.

Outcomes: The general situation of the patient, followed-up for 20 months, was good and there was no psychological impact or other special chief complaints.

Lessons: It is best to remove the IVAP in a timely manner once all treatments are finished.

Abbreviation: IVAPs = implantable venous access ports.

Keywords: implantable venous access port, left brachiocephalic vein, thrombosis

1. Introduction

Implantable venous access ports (IVAPs) are used for long-term venous access in management of chemotherapy, nutrition, and various other conditions. Complications associated with IVAPs include pneumothorax, arterial puncture, arrhythmias, line fracture, malposition, migration, infection, thrombosis, and fibrin sheath formation.^[1]

Among those complications, thrombosis often induces failed catheter function, and increases the risk of infection and other adverse effects.^[2] However, thrombosis associated with IVAPs

which make it difficult to remove the IVAP have rarely been documented. Herein, we describe a patient with a thrombus in the left brachiocephalic vein whose IVAP could not be taken out. The patient presented no symptoms and her IVAP was functioning normally, which made her case very unusual.

2. Case presentation

A 53-year-old woman presented to the hospital because of difficulty in removal of her IVAP. The patient was hospitalized for a mass on the right breast and diagnosed with breast cancer by pathology. She was healthy prior to diagnosis. There were no contraindications against operation and we performed a modified radical mastectomy on May 5th, 2012. Postoperative pathology indicated that her tumor was invasive ductal carcinoma of breast, while her immunohistochemistry showed that estrogen and progesterone receptors were positive in 70% and 30% of cells, respectively. 20% of cells were Ki-67 positive and all tumor cells were negative for human epidermal growth factor receptor. She received IVAP implantation on May 25th, 2012. After 6 cycles of chemotherapy, radiotherapy was applied. Afterwards, she underwent periodic follow-up in out-patient for 4 and half years in our hospital. According to her pathology, immunohistochemistry, and out-patient, we concluded that her IVAP could be removed. There was no evidence of abnormality on X-ray (Fig. 1), so an operation to remove her IVAP was performed. During the operation, we found that the IVAP catheter was stuck with the catheter unobstructed.

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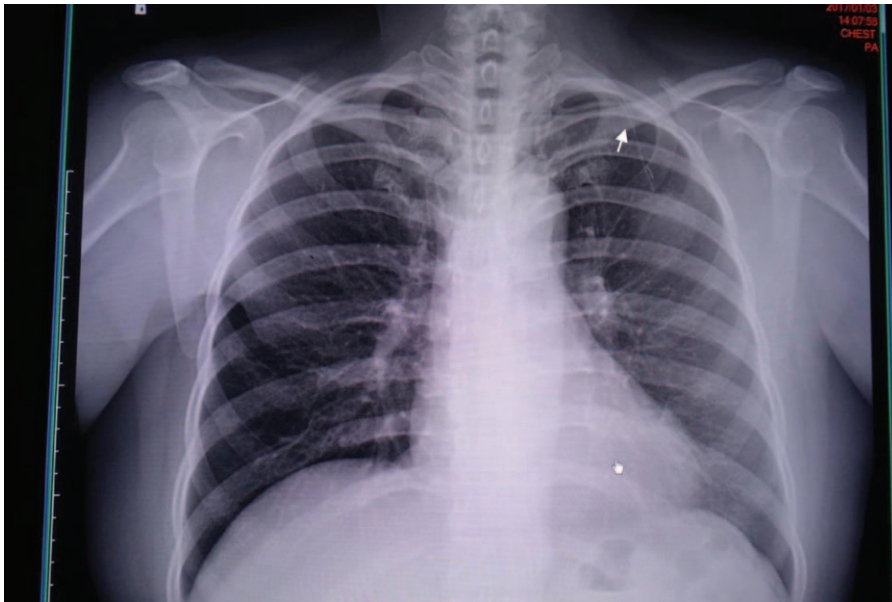


Figure 1. Patient chest X-ray at the time of attempted IVAP removal. The image shows that the IVAP catheter is complete. IVAP = implantable venous access port.

At first, we considered that this might be due to fibrin sheath formation or a thrombus in the catheter tip, so we injected urokinase 5 ml 1000U/L into the catheter once a day. Three days later, we tried again but again failed to remove the IVAP. We consulted with experts from the Invasive Technology department who recommended vasography. We found a filling defect in the left brachiocephalic vein suggesting thrombosis (Fig. 2) which fixed the catheter in the vein and made it difficult to pull out. Removal of the thrombus would have been very dangerous, because it was impossible to completely prevent pulmonary embolism caused by thrombus shedding. In the end, we decided to leave both thrombus and catheter in place and to only move the

IVAP port (Fig. 3). The patient was discharged after the international normalized ratio was between 2 and 3.

The patient was followed-up for 20 months by telephone. The catheter remained in her body and chest X-rays, taken during each out-patient review, showed that the catheter was normal and had no fracture or migration. There were no left brachiocephalic vein thrombotic complications, such as edema of head and neck, dyspnea, syncope, pectoralgia, or cough. The thrombosis showed no change and the patient took warfarin as directed, one and a half tablets once a day, and an international normalized ratio that remained between 2 and 3 for half a year. The patient's situation was generally



Figure 2. Angiography shows a filling defect in the left brachiocephalic vein indicative of thrombosis.

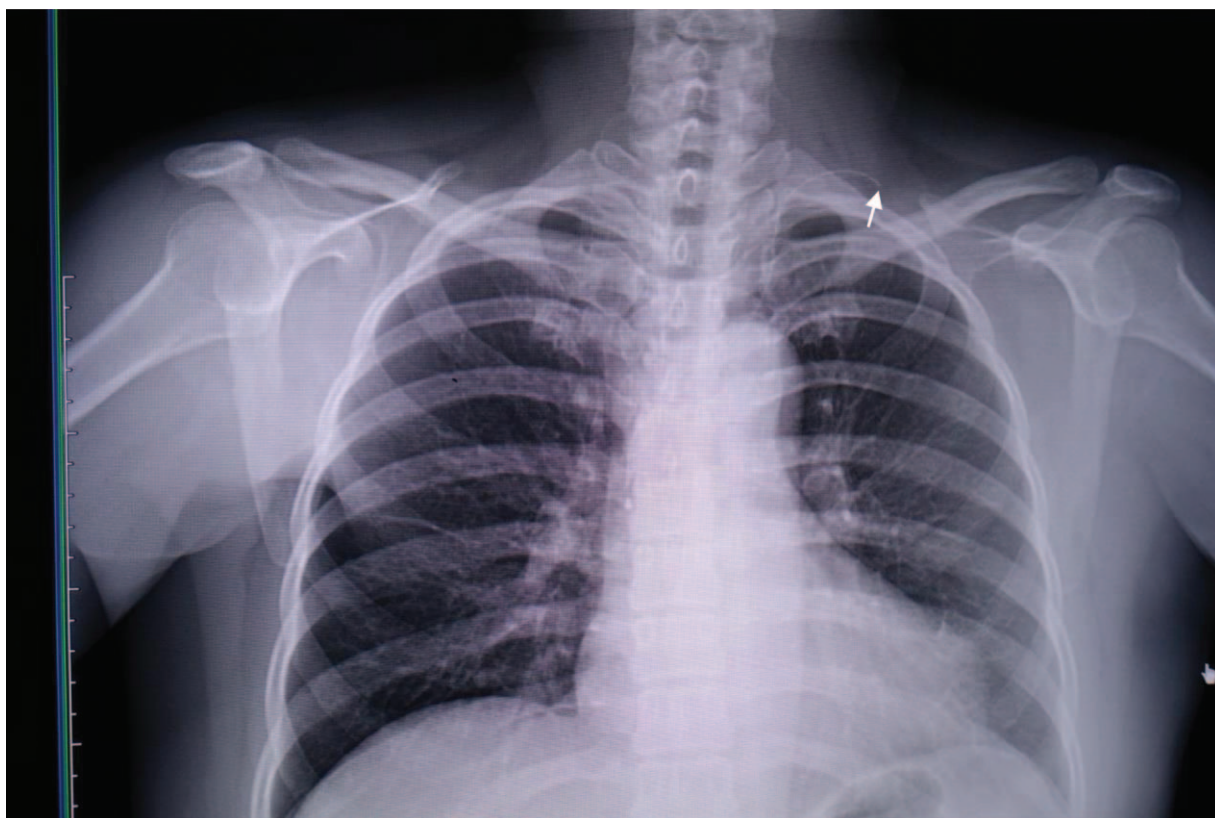


Figure 3. Chest X-ray taken after the removal of the port. The image shows that the IVAP catheter is complete without the port. IVAP = implantable venous access port.

good and there were no psychological impacts or other chief complaints.

The report was approved by our hospital's institutional review board and informed written consent was obtained from the patient for publication of this case report and accompanying images.

3. Discussion

IVAPs used as central venous catheters have common complications including pneumothorax, arterial puncture, arrhythmias, line fracture, malposition, migration, infection, thrombosis, and fibrin sheath formation.^[1,2] Infection and migration of the catheter are the most common abnormal situations affecting removal of the catheter,^[1,3,4] and always result in malfunction. We present a novel case of thrombus in the left brachiocephalic vein which led to the IVAP catheter becoming stuck in the vein with X-ray and IVAP function remaining uncompromised.

X-ray plays a very important role in monitoring catheter location and are the preferred method to show where the catheters are. However, in our case, the chest X-ray and IVAP function were normal as thrombus had already formed in the left brachiocephalic vein resulting in the catheter becoming stuck. Multiple studies have examined factors that influence the formation of catheter-related venous thrombosis including catheter duration, caliber of the catheter, or the access vein used.^[5,6] Central venous thrombosis or stenosis occurs with a higher incidence of 50% in subclavian lines compared with up to 10% for IJV lines.^[7] Left-sided subclavian central venous

catheters occludes more often than right-sided ones.^[8] Therefore, we recommend that an IVAP should be placed in the most suitable location and removed as soon as the patient no longer needs it.

Interventional radiology plays a crucial role in the diagnosis and management of complications and also in repairing the malfunctioning interventions. Research performed by Kassar et al revealed a catheter fracture by radiologic examination and showed embolizing into the right ventricle by echocardiography. The embolus was successfully removed from the right ventricle by percutaneous endovascular intervention.^[9] Effective methods to deal with a fibrin sheath include passing of a J-tipped guide wire and of a biopsy brush through the catheter or infusion of a thrombolytic agent into the catheter.^[10] In our case, the range of the thrombus was too wide and we did not have a way to ensure that the thrombus would not break off, so we did not use these techniques to clear the thrombus. Thrombolytic therapy is typically used to treat thrombosis within 12h of onset. In our case, this therapy likely failed because the thrombus was not newly formed.

The patient was followed-up for 20 months by telephone. During that period, the patient had no special complaints or mental symptoms. Therefore, leaving the catheter in place was a practical and safe decision resulting from difficulties in dislodging the IVAP from the body. In addition, warfarin was used in dealing with the thrombus that caused the catheter to become stuck.

In summary, when facing a stuck catheter, interventional radiology plays a crucial role in the diagnosis and treatment and

in our case provided a practical strategy. However, it is still ideal to remove the IVAP in a timely manner once all treatments are finished.

Author contributions

Conceptualization: Xi Zhang.

Investigation: Xi Zhang.

Resources: Xi Zhang.

Writing – original draft: Xi Zhang.

Writing – review & editing: Xi Zhang, Cuizhi Geng.

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