

# World Journal of *Clinical Cases*

*World J Clin Cases* 2021 October 16; 9(29): 8627-8952



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**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: Jia-Hui Li; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

**EDITORIAL BOARD MEMBERS**

<https://www.wjnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

October 16, 2021

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<https://www.wjnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

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**ONLINE SUBMISSION**

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# Removal of "ruptured" pulmonary artery infusion port catheter by pigtail catheter combined with gooseneck trap: A case report

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**Author contributions:** Chen GQ and Wu Y reviewed the literature and contributed to manuscript drafting; Zhao KF reviewed the literature and contributed to manuscript drafting; Shi RS analyzed and interpreted the patient data; All authors read and approved the final manuscript.

**Informed consent statement:** Informed written consent was obtained from the patient for publication of this report and any accompanying images.

**Conflict-of-interest statement:** The authors declare that they have no conflict of interest.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution

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## Abstract

### BACKGROUND

Implanted intravenous infusion port (IVAP) is indicated for patients undergoing chemotherapy, total parenteral nutrition and long-term antibiotic treatment. Among their complications, the rupture and migration of the catheter of an IVAP *via* internal jugular vein represents a very rare but potentially severe condition.

### CASE SUMMARY

A 43-year-old woman was identified with a spontaneous fracture and migration of catheter of an IVAP *via* right internal jugular vein after adjuvant chemotherapy for left breast cancer. A computed tomography showed the fractured catheter of the IVAP in the pulmonary artery. Therefore, we conducted an emergency procedure to remove the catheter fragment by a pigtail catheter combined with a gooseneck trap.

### CONCLUSION

When the fractured catheter of an IVAP was detected, the special shape of the pigtail catheter in combination with the gooseneck trap successfully facilitated the removal of the dislodged catheter.

**Key Words:** Implanted intravenous infusion port; Fractured catheter; Gooseneck trap; Pigtail catheter; Pulmonary; Case report

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**Core Tip:** Implanted intravenous infusion port (IVAP) is indicated for patients

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**Manuscript source:** Unsolicited manuscript

**Specialty type:** Radiology, nuclear medicine and medical imaging

**Country/Territory of origin:** China

**Peer-review report's scientific quality classification**

Grade A (Excellent): A

Grade B (Very good): 0

Grade C (Good): 0

Grade D (Fair): 0

Grade E (Poor): 0

**Received:** May 17, 2021

**Peer-review started:** May 17, 2021

**First decision:** June 25, 2021

**Revised:** June 28, 2021

**Accepted:** August 23, 2021

**Article in press:** August 23, 2021

**Published online:** October 16, 2021

**P-Reviewer:** Deshwal H

**S-Editor:** Ma YJ

**L-Editor:** Filipodia

**P-Editor:** Guo X



undergoing chemotherapy, total parenteral nutrition and long-term antibiotic treatment. Among their complications, the rupture and migration of the catheter of a IVAP *via* internal jugular vein represents a very rare but potentially severe condition. We report a case of a 43-year-old woman who was identified with a spontaneous fracture and migration of catheter of an IVAP *via* right internal jugular vein after adjuvant chemotherapy for left breast cancer. Computed tomography showed the fractured catheter of the IVAP in the pulmonary artery. Therefore, we conducted an emergency procedure to remove the catheter fragment by a pigtail catheter combined with the gooseneck trap.

**Citation:** Chen GQ, Wu Y, Zhao KF, Shi RS. Removal of "ruptured" pulmonary artery infusion port catheter by pigtail catheter combined with gooseneck trap: A case report. *World J Clin Cases* 2021; 9(29): 8820-8824

**URL:** <https://www.wjgnet.com/2307-8960/full/v9/i29/8820.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v9.i29.8820>

## INTRODUCTION

Implanted intravenous infusion port (IVAP) is a subcutaneous intravenous infusion device that can be retained in the body for a long time and is widely used in many countries[1]. Because tumor patients need repeated chemotherapy and long-term infusion of high concentration nutrients, the traditional method of intravenous infusion is unsuitable, and IVAP is a common catheterization method for these patients, which can provide a good access to chemotherapy, reduce the pain of multiple punctures and improve clinical work efficiency. The puncture site is mainly subclavian vein, but due to individual differences, the catheter can be easily placed too deep or too shallow when there is no monitoring by imaging equipment. Moreover, complications, such as blockage, infection, pneumothorax, hemothorax, arterial injury, thrombus, catheter rupture, spondylolisthesis, *etc.*, may occur due to improper nursing [2-4]. Catheter rupture is one of the most serious complications after implantation, with a reported incidence rate of 1.5%-2.6% [5,6]. Although very rare, it poses a serious threat to patients' life and needs to be actively resolved. In the case of damage, the IVAP must be removed. Ectopic embolism occurs in a very small number of patients with IVAP shedding, which causes serious complications and eventually leads to medical disputes. Herein, we have described a case with broken catheter that could not be removed by conventional technique. Hence, we finally used the special shape of pigtail catheter to remove the blocked IVAP exfoliated catheter, which has not been previously reported.

## CASE PRESENTATION

### Chief complaints

The patient was a 43-year-old woman with a single, progressive, increment mass in the upper inner quadrant of the left breast. After the eighth chemotherapy, the patient's IVAP catheter was dislodged, with wheezing, coughing, chest tightness, shortness of breath and dysphasia following exercise.

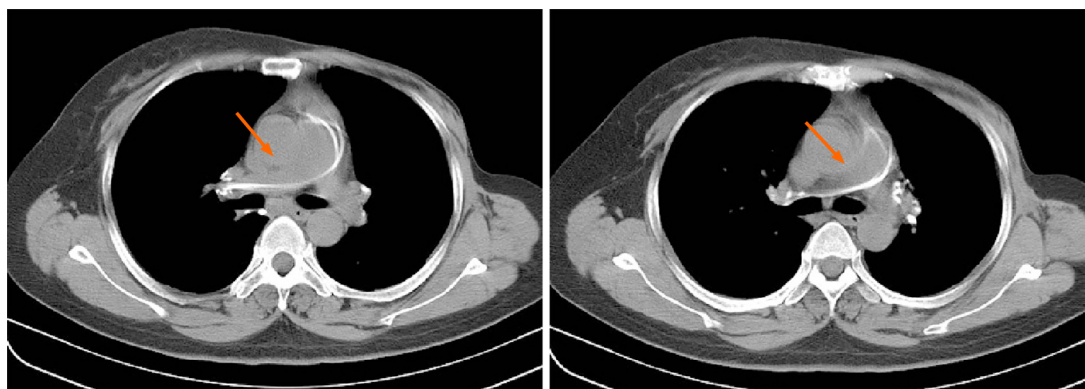
### History of present illness

Breast cancer after chemotherapy.

### History of past illness

On October 9, 2017, the patient underwent breast-conserving surgery, sentinel lymph node biopsy and a modified radical mastectomy for left breast cancer. After the operation, IVAP was implanted into the right internal jugular vein for eight courses of chemotherapy, consisting of 5-fluorouracil, epirubicin, cyclophosphamide and docetaxel, were administered.





**Figure 1 Computed tomography.** Both axial image showing a strip high density shadow in the main pulmonary artery-right pulmonary artery-hilar area (orange arrows).

### ***Personal and family history***

The patient denied any other specific personal or family history of other diseases.

### ***Physical examination***

The patient presented with the following vital signs: Body temperature, 36.1 °C; blood pressure, 111/75 mmHg; pulse rate, 78 beats/min; and respiratory rate, 19 breaths/min. She was conscious and cooperative during physical examination. She had clear breathing sounds in both lungs. Her heart rate was 78 bpm with a normal rhythm, and no other abnormalities were noted.

### ***Laboratory examinations***

The patient did not have a laboratory examination.

### ***Imaging examinations***

An emergency computed tomography (CT) performed on March 21, 2018 identified a strip high density shadow in the main pulmonary artery-right pulmonary artery-hilar area (Figure 1).

Under digital subtraction angiography fluoroscopy, the main pulmonary artery and right pulmonary artery showed tubular shadow (Figure 2A).

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## **FINAL DIAGNOSIS**

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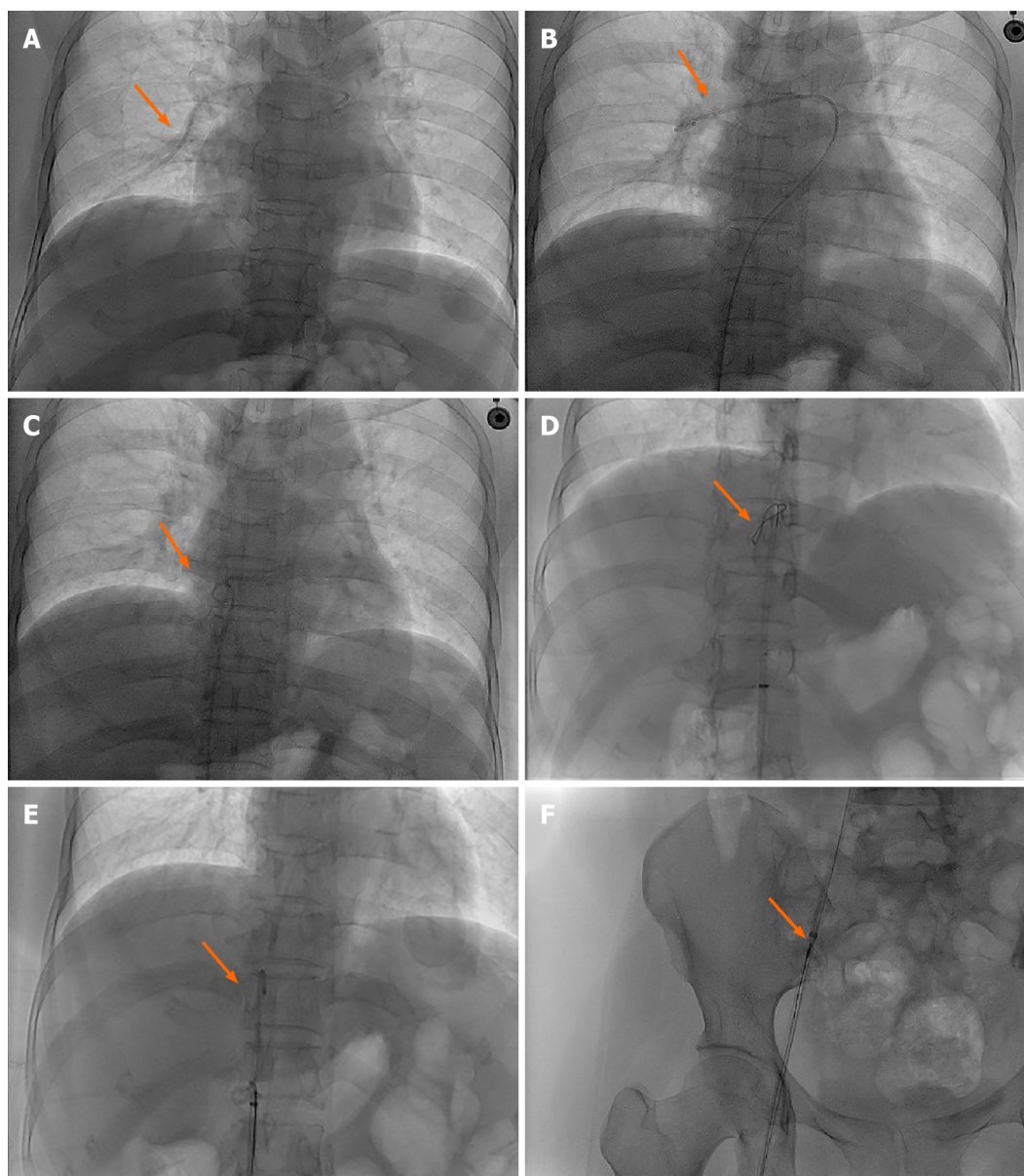
The final diagnosis of the presented case is exfoliated catheter.

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## **TREATMENT**

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We prepared to extract the IVAP by interventional method after consultation with relevant departments. During the operation, the patient was supine on the digital subtraction angiography examination bed. After local anesthesia of the right inguinal region, a 12F arterial sheath (model SFPQ12F) was introduced. A 5F gooseneck trap (model WSK-20) was introduced along the arterial sheath to attempt to remove the exfoliated catheter from the main pulmonary artery and right pulmonary artery, but several attempts were unsuccessful. To analyze the location of the dislodged catheter and the effect on cardiopulmonary activity, a 5F pigtail catheter (model 45150-503H5) was selected, and the dislodged catheter was towed to the inferior vena cava after the two catheters were crossed by rotating the catheter outside the body according to the natural bending at the front end of the catheter. The IVAP catheter was then successfully removed using a 5F gooseneck trap (Figure 2B-F).



**Figure 2 Digital subtraction angiography images.** A: The main pulmonary artery and right pulmonary artery showed tubular shadow (orange arrow); B-F: A 5F pigtail catheter was selected, and the dislodged catheter was towed to the inferior vena cava after the two catheters were crossed by rotating the catheter outside the body according to the natural bending at the front end of the catheter. The intravenous infusion port catheter was then successfully removed using a 5F gooseneck trap (orange arrows).

## OUTCOME AND FOLLOW-UP

Post-operation, the patient had no chest stuffiness, and her shortness of breath symptom improved. She was discharged 2 d later.

## DISCUSSION

IVAP chemotherapy can provide permanent venous access for patients and prevent the injury of peripheral blood vessels caused by irritant drugs[7]. It has the advantages of one-time puncture, convenient infusion, long-term indwelling *in vivo* and less pain for patients. With the increasing application of IVAP in tumor chemotherapy, the incidence of adverse events such as catheter thrombosis, obstruction and exfoliation is also increasing. Catheter rupture and shedding is one of the most serious complications. If the shedding catheter dislocates to the heart or pulmonary artery with blood flow, it will lead to arrhythmia, pericardial tamponade, pulmonary embolism, cardiac rupture, pulmonary artery rupture and other life-threatening complications[8,9].

Catheter fracture and slippage may be caused by the following: (1) Non-standard operation; (2) Inappropriate selection of the tube parts; (3) Patients have poor protection consciousness; and (4) Long-term implantation, repeated wear and oxidation of catheter. The catheter retention time should not exceed 1 year in general, and the longer the retention time, the higher the risk of complications[10]. The catheter fracture in our patient may have been due to long-term implantation, repeated wear, oxidation and folding of the catheter, as well as the poor comprehension of catheter protection, which finally led to the fracture and slippage of the catheter. The reason why it was difficult to extract the common ferrule for catheter in this case might be that the main pulmonary artery was wide, and the blood flow rate was high. In addition, cardiopulmonary activities increased the operation difficulty. The head end of the pigtail catheter is naturally bent, the surface is smooth and the stimulation to blood vessels is mild. We used the special curved shape of the head end of the pigtail catheter to cross and twist the IVAP catheter and traction the IVAP catheter to the inferior vena cava, and then used the gooseneck trap to successfully remove it through the 12F sheath.

## CONCLUSION

In conclusion, conventional extraction techniques may be unable to remove the dislodged catheter. The special shape of the pigtail catheter in combination with the gooseneck trap successfully facilitated the removal of the dislodged catheter from the pulmonary artery infusion port without any complications. Hence, this is a safe and reliable method that could be clinically applied in the future.

## ACKNOWLEDGEMENTS

We are thankful to the patient who agreed to participate in this study.

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