Reminder of important clinical lesson

Pinch-off syndrome: transection of implantable central venous access device

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Correspondence to Dr Takuya Sugimoto, taku1313@yahoo.co.jp**Summary**

As the population of people with cancer increases so does the number of patients who take chemotherapy. Majority of them are administered parentally continuously. Implantable central venous catheter device is a good choice for those patients; however, severe complication would occur concerning the devices. Pinch-off syndrome is one of the most severe complications. The authors report a severe case of pinch-off syndrome. The patient with the implantable central venous device could not take chemotherapy because the device occluded. Further examination revealed the transection of the catheter. The transected fragment of the catheter in the heart was successfully removed by using a loop snare placed through the right femoral vein.

BACKGROUND

Implantable central venous catheter (CVC) device is a good choice for those who have to take continuous parental chemotherapy or those who cannot take diet for a long time. Thrombosis and infection are well-known complications however, pinch-off syndrome (POS) is less common but severe complication of the devices. We report a case of POS to remind this complication to doctors and surgeons who deal with these devices.

CASE PRESENTATION

A CVC device for chemotherapy was implanted in a 56-year-old woman with recurrence of rectal cancer. The catheter was inserted through the right subclavian vein by the centesis technique. The first three cycles of chemotherapy were administered without any trouble. However, occlusion of the catheter was suspected 2 months later after surgery. She had no symptoms.

INVESTIGATIONS

Posteroanterior chest x-ray revealed a shortened catheter (figure 1). The reason was unclear because there were no other abnormal findings. The lateral chest x-ray revealed the severed end of the catheter in the heart (figure 2). CT showed that one end of the catheter fragment was in the coronary sinus, and the other end in the auricle of the right atrium (figure 3).

DIFFERENTIAL DIAGNOSIS

Catheter occlusion, catheter migration and venous thrombosis.

TREATMENT

The remaining catheter that was connected to the port was removed operatively, and the catheter was found to be transected at 7 cm from the end. The transected end of the catheter was clean-cut and smooth. Postoperatively, the catheter fragment in the heart was successfully

removed by using a loop snare placed through the right femoral vein.

OUTCOME AND FOLLOW-UP

A CVC device was implanted through the right external jugular vein by cut-down technique. The patient has taken chemotherapy using the device.

DISCUSSION

CVC devices are often implanted for the purpose of delivering chemotherapy or nutrition. Although infection and thrombosis are two of the main complications of CVC, Embolisation of fragments of CVCs is a rare but a potentially serious complication of catheter placement. According to the literature, the global death rate of this complication accounts 1.8%.^{1 2}

The main cause of catheter transections is when chronic compressive forces that is created between the clavicle and the first rib or the surrounding connective

Figure 1 Posteroanterior chest x-ray revealed a shortened catheter. The arrow showed the end of the catheter.

Figure 2 The lateral chest x-ray showed that the catheter fragment was located in the cardiac shadow (above the dashed line). The catheter shadow could have been easily missed because it was behind the cardiac shadow.

tissue with shoulder movement.^{2 3} Hinke *et al*³ described this phenomenon as 'POS'. POS occurs when a catheter is inserted into the subclavian vein percutaneously and the centesis point of the vein is more medial, the catheter is compressed between these bones and the connective tissue outside of the subclavian vein.³ This causes obstruction or transection of the catheter. Hinke *et al*³ also devised the radiographic scale of catheter distortion, which ranges from Grades 1 to 3. Transection of a catheter is the most severe and is classified as Grade 3.

Figure 3 CT revealed the fragment of the transacted catheter in the heart.

To avoid POS, theoretically a catheter must be inserted into the subclavian vein as laterally as possible.⁴ One good method is a cephalic vein or external jugular vein cut-down.⁵ Another is ultrasound-guided subclavian vein centesis.⁶ These procedures can avoid POS as well as iatrogenic pneumothorax or miscentesis of the subclavian artery.^{7 8}

Removal of a migrating fragment can be achieved by a transvenous approach with a high success rate.^{1 9 10} Thus, this approach should be tried first because it is less invasive and safer than thoracotomy or other surgeries.

Learning points

- Doctors who implant the devices are responsible and should take care of them periodically. When something is wrong with them, the suspicion and further examinations are always required.
- Pinch-off syndrome is severe complication. Doctors or surgeons always have to consider whether the implantable devices are really necessary for patients.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Mirza B**, Vanek VW, Kupensky DT. Pinch-off syndrome: case report and collective review of the literature. *Am Surg* 2004;**70**:635–44.
2. **Surov A**, Wienke A, Carter JM, *et al*. Intravascular embolization of venous catheter—causes, clinical signs, and management: a systematic review. *JPEN J Parenter Enteral Nutr* 2009;**33**:677–85.
3. **Hinke DH**, Zandt-Stastny DA, Goodman LR, *et al*. Pinch-off syndrome: a complication of implantable subclavian venous access devices. *Radiology* 1990;**177**:353–6.
4. **Magnay JE**, Flynn DM, Parsons JA, *et al*. Anatomical mechanisms explaining damage to pacemaker leads, defibrillator leads, and failure of central venous catheters adjacent to the sternoclavicular joint. *Pacing Clin Electrophysiol* 1993;**16**:445–57.
5. **Di Carlo I**, Barbagallo F, Toro A, *et al*. External jugular vein cutdown approach, as a useful alternative, supports the choice of the cephalic vein for totally implantable access device placement. *Ann Surg Oncol* 2005;**12**:570–3.
6. **Sakamoto N**, Arai Y, Takeuchi M, *et al*. Ultrasound-guided radiological placement of central venous port via the subclavian vein: a retrospective analysis of 500 cases at a single institute. *Cardiovasc Intervent Radiol* 2010;**33**:989–94.
7. **Poorter RL**, Lauw FN, Bemelman WA, *et al*. Complications of an implantable venous access device (Port-a-Cath) during intermittent continuous infusion of chemotherapy. *Eur J Cancer* 1996;**32**:2262–6.
8. **Nightingale CE**, Norman A, Conningham D, *et al*. A prospective analysis of 949 long-term central venous access catheters for ambulatory chemotherapy in patients with gastrointestinal malignancy. *Eur J Cancer* 1997;**33**:398–403.
9. **Bessoud B**, de Baere T, Kuoch V, *et al*. Experience at a single institution with endovascular treatment of mechanical complications caused by implanted central venous access devices in pediatric and adult patients. *AJR Am J Roentgenol* 2003;**180**:527–32.
10. **Fisher RG**, Ferreyro R. Evaluation of current techniques for nonsurgical removal of intravascular iatrogenic foreign bodies. *AJR Am J Roentgenol* 1978;**130**:541–8.

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