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Spontaneous Migration of Central Venous Catheter to Anterior Mediastinum

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Case Report

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AbstractCentral venous devices are routinely used in delivering chemotherapy and total parenteral nutrition. Spontaneous migration of central venous catheters is a very rare complication, but the etiology of this problem is not clear. We report here a case of migration of a port catheter to the anterior mediastinum in a patient with stage IVC nasopharyngeal cancer during chemotherapy. The patient presented with pulmonary manifestations in form of shortness of breath and chest tightness caused by left massive pleural effusion. The pleural effusion was resolved by thoracocentesis and the migrated catheter was retrieved surgically.

Keywords:*Central venous catheter,Migration*

1.Introduction

Implantable central venous access devices are widely used for administration of chemotherapeutic drugs[1]. However, many complications are well known and the complication rate ranges from 0.4% to 29% [2,3,4,5]. Spontaneous central venous catheter migration is a rare complication with an unknown cause that occurs in about 0.9 to 2% of patients [2,3,6]. Migration of the catheter tip into the right internal jugular vein, the right axillary vein, or the pericardium has ever been reported [1,6,7]. We report a case of spontaneous migration of the central venous catheter into the anterior mediastinum, managed surgically. To the best of our knowledge, therehave been no previous reports in the literature of thiscomplication.

2. Case report

A 64-year-old woman was diagnosed to have nasopharyngeal cancer, cT2N3bM0,stage IVC(liver metastases). She received a central venous device implantation (Polysite, Perouse Laboratoires, Ivry-Le-Temple, France) via the left subclavian vein using the standard technique. The postoperative chest plain film showed the central venous catheter tip in superior vena cava (Figure 1 left). Induction chemotherapy of cisplatin (80 mg/m^2) plus 5-fluorouracil (1000 mg/m^2/day), administered as a continuous infusion was done monthly for 4 cycles. The port was functioning with free-flow on injection and aspiration during testing at the previous chemotherapy courses. However, the port had free flow on injection, but no blood return from the port during testing at the fifth cycle chemotherapy. Hydration with normal saline solution and premedications through the port were done. Furthermore, cisplatin 80mg and 5-fluorouracil (1000mg) were administrated after hydration. The total intravenous fluid was about 1800ml. Shortness of breath and chest tightness developed after the

medications. Chest plain film showed malposition of the central venous catheter and left massive pleural effusion, but the location of the port was not changed (Figure 1 right). Further chest CT scan proved the central venous catheter migrating into the anterior mediastium, not lying in the innominate vein or superior vena cava (Figure 2). Thoracocentesis for left pleural effusion was done and about 1400ml pleural effusion was drained out totally. The pleural effusion was clear and colorless with pH 7 and specific gravity 1.009. Chemical analysis of the pleural fluid demonstrated a triglyceride level less than 10 mg/dl and atotal protein level less than 1 g/dl. The cell count of the pleural fluid showed WBC 8/dl, RBC 20/dl. The cytology of pleural effusion showed negative for malignant cell. Normal saline leakage into the left pleural cavity was highly suspected. Then, the central venous access device was retrieved surgically and another new one was implanted. The symptoms subsided after thoracocentesis and no more pleural effusion recurred after the surgery (Figure 3). The newly implanted port was functioning in the following months. However, the patient died of malignancy4 months later after revision of the central catheter, without port-related complications.

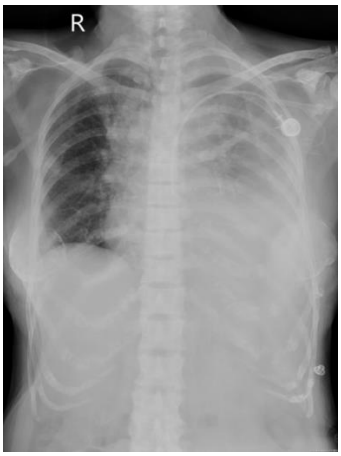

Figure 1. Chest plain films showed the central catheter initially implanted through the innominate vein with catheter tip at superior vena cava (left) and then migrating to mediastinum with left massive pleural effusion (right).

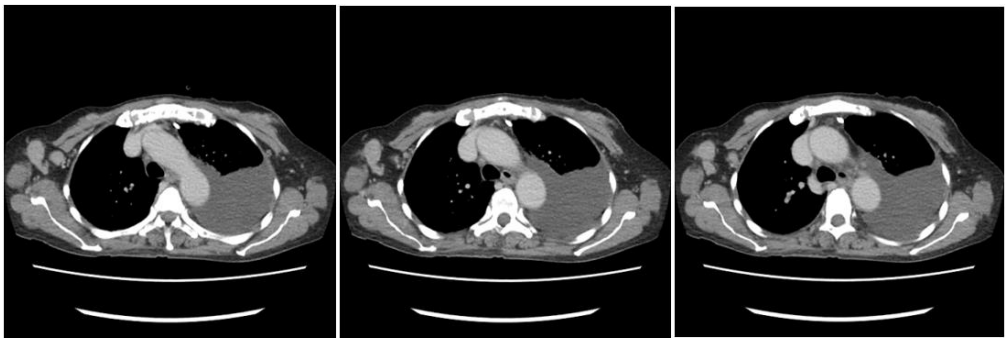

Figure 2. Chest contrast-CT scan demonstrated the central catheter migrating into the anterior mediastinum with left massive pleural effusion.

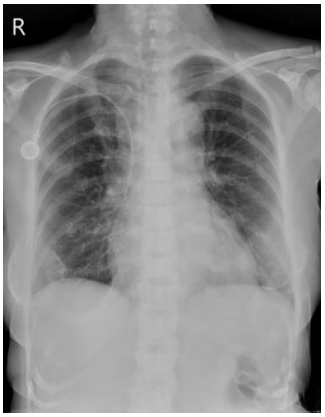

Figure3. The migrated central venous access was retrieved surgically and re-implantation of a new one was done. No more pleural effusion recurred after the surgery.

3. Discussion

Implantable central venous devices have been used increasingly since 1980sfor chemotherapy, total parenteral nutrition and fluid replacement[8]. Many complications of port catheter implantation have been reported. Early complications include pneumothorax,hematoma, malposition, improper anchoring of the reservoir, skin infection, sepsis, vascular perforation with hemothorax or hemorrhagic pericardial effusion, embolism, and arrhythmia, which are often related to the placement technique.[2,6,8]. Late complications include drug extravasation, skin necrosis, infection, catheter fracture, venous thrombosis, or spontaneous migration of the catheter[1,2,6,8,9]. The total rate of complications is about 11.8-14%[2,8,9]. Among all the complications, spontaneous migration of the central catheter is rare and has an estimated incidence of 0.1-2% [2,6,10]. The most common migration site is the internal jugular vein. Other migration sites include the opposite brachiocephalic vein, the azygous vein, the pericardiophrenic vein, the right internal thoracic vein, the inferior thyroid vein, and the left brachial vein, etc. [2,11]. We present here a case of spontaneous migration of the central venous catheter into the anterior mediastinum. Initial misplacement of the central venous catheter due to the implantation surgery is not possible, because the postoperative chest plain film showed the catheter tip in superior vena cava correctly as shown in Fig. 1, and the central venous access remained functioning in the first four chemotherapy courses. As far as well know, there is no such complication reported in the literature review.

The mechanism for spontaneous migration of the central venous catheter is not clear[6]**.**In our case presented here, the catheter entered the anterior mediastinum may caused by intravascular spontaneous migration and then the innominate vein penetration. The proposed mechanisms for central venous catheter migration include high infusion flow rate, vigorous physical movements such as abduction or adduction of the arms, neck flexion,and increased intrathoracic pressure due to vomiting or coughing[1,2,3,6]. Further, the infusion drugs, especially acidity or alkalinity solution, may cause vascular erosion [11]. The pH range of cisplatin injection is 3.8-5.9 and the pH range of 5-fluorouracil injection is 3.0-3.8. Vascular erosion contributes to vascular perforation[11,12].The higher incidence of vascular perforation in female patients was also reported and that might be relatedto a smaller vein size[11]. The presented case here, we supposed that intravascular spontaneous migration of the central venous catheter happened first and then vascular perforation developed later, resulting in the catheter migration into the anterior mediastinum.

Migration of central venous catheters may lead to severe symptoms or signs, includingneck pain, shoulder pain, chest pain, paraesthesia in the arm, arrhythmias, palpitation, venous thrombosis, resistance to infusion, and even life-threatening neurologic problems [1,2,10]. In the present case the central venous catheter migrated into the anterior mediastinum, and the intravenous fluid leaked to the left pleural cavity. Thus, the patient presented with shortness of breath and chest tightness. Fortunately, no complications developed in the case because the left pleural effusion containing chemotherapy pharmaceuticalswas resolved in time by thoracocentesis.If migration is detected, immediate removal of the catheter is important to avoid complications [2]. Revision of the central venous access device was performed at once in the presented case.

Our case demonstrates an unusual and peculiar complication of a central venous access device. The manifestations of shortness of breath and chest tightness resulting from sudden onset of pleural effusion after intravenous fluid supplement via a central venous access device may caused by spontaneous migration of the central venous catheter into the anterior mediastinum. Spontaneous migration of the central venous catheter is a rare complication that must be early recognized and managed promptly[1,2,6].A chest plain film is recommended for early detection of the central catheter migration [1,6] and a chest CT scan is suggested for confirmation of the unique complication discussed here.

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