PICC Tube Dissection with Residual Pulmonary Artery: A Case Report

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Abstract

Peripherally inserted central catheter (PICC) is widely used in clinical practice to protect patients’ peripheral veins. However, various complications can occur during PICC placement, among which catheter rupture is rare and residual catheter retention can cause serious complications such as cardiac arrhythmias and pulmonary embolism in patients. Therefore, timely positioning and removal of the residual catheter are extremely important to ensure the safety of patients’ lives. A case of a 19-year-old male with a residual PICC catheter is reported as follows.

Keywords: PICC; Catheter disconnection; adverse events; Patient safety

Introduction

The resuscitation treatment and preventive care for patients with peripherally inserted central catheter (PICC) disconnection in vivo require good management of PICC catheter safety, monitoring the whole process of catheter use, regular radiographs for PICC positioning, early detection of PICC disconnection in vivo, and strengthening health education to ensure its safe use.

Case Report

A 19-year-old male was undergoing chemotherapy in our hospital for Hodgkin’s lymphoma. The patient had a peripherally inserted central catheter (PICC) placed on the left side in February 2020 for long-term chemotherapy with a catheter for a three-way valve silicone catheter and weekly treatments for almost nine months. Due to inner lumen occlusions, the PICC was required to be replaced. But there was difficulty in extubating, only 50.0 cm (the original PICC tube length was 65.0 cm) was extracted after changing the position of the patient. After extubation, the patient did not show symptoms such as chest pain, shortness of breath, or dyspnea and his vital signs were stable. The patient then underwent a left upper arm and chest X-ray (Figure 1). The left upper arm X-ray did not show any abnormality, while the chest X-ray showed: a residual ductal shadow was seen from the left subclavian region to the hilum of the lung (at the level of the inferior border of the T7 vertebra). For further localization, a left upper extremity venous computed tomographic venography (CTV) examination was performed: The residual PICC was in the main trunk of the right lower pulmonary artery with its tip in the branch artery of the anterior basal segment with a length of approximately 15.0 cm (Figure 2). The patient was then transferred to the vascular surgery department for “right lower pulmonary artery foreign body removal via left upper limb vein access” and the residual portion of the PICC was successfully removed, with a length of approximately 15.0 cm. The patient was in stable postoperative condition and was transferred to a ward for rest and discharged 3 days later.
Discussion

PICCs play a pivotal role in providing care to these patients because they serve as central venous access for long-term intravenous infusion, tumor chemotherapy, and parenteral nutrition [1,2]. Although PICC has numerous benefits, complications of PICC still cannot be ignored, such as catheter-related bloodstream infection (CRBSI), post-catheterization phlebitis, catheter migration, and catheter fracture, among which catheter fracture is less common [3,4]. The retention of broken catheters in the body can cause serious complications such as cardiac arrhythmia and pulmonary embolism in patients; Therefore, the broken catheter should be located and removed promptly [5]. In this case, the patient did not show symptoms of chest pain, shortness of breath, or dyspnea when the PICC was retained in the patient’s body, so the possibility of acute pulmonary artery embolism due to the residual catheter could be ruled out yet. Subsequently, the patient immediately underwent an X-ray examination of the left upper arm and chest to clarify the approximate location, number and length of the residual catheter. However, the X-ray is an overlapping image of the human tissue and could only clarify the approximate location of the residual catheter (The tip is located in the right pulmonary hilar at the level of the inferior border of the T7 vertebra) but could not be accurately localized to the exact vessel. To obtain the exact location of the catheter in preparation for the removal of the residual PICC tube, the patient then underwent a left upper extremity vein CTV examination and obtained its exact location, which was located within the main trunk of the right lower pulmonary artery, with the tip located in a branch artery in the anterior basal segment. This suggests that the residual PICC drifted with the blood flow from the superior vena cava through the right atrium, into the right ventricle, and finally reached the right inferior pulmonary artery and then lingered, also ruling out the possibility of PICC reaching other parts of the vasculature via other anomalous pathways (e.g., atrial septal defect, etc.). Thus, CT examination provides the vascular surgeon with important location information and also lays the foundation for a successful operation.

Conclusion

When PICC breakages, a plain X-ray is still a diagnostic tool to quickly obtain information about the residual catheter, while CT examination is an important imaging method to clarify information about the exact location of the residual catheter, and clinicians need to cooperate with radiologists to remove the fractured catheter quickly and accurately.

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