

Vocal Fold Palsy Induced by Seldinger Technique for Totally Implantable Venous Access Device

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셀딩거 방법을 이용한 TIVAD 삽입 시 발생한 성대마비 1예

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= 국문 초록 =

셀딩거 방법을 이용한 TIVAD 삽입 시 신경손상으로 인하여 성대마비가 발생할 가능성은 아주 낮은 것으로 알려져 있다. 본원에서 셀딩거 방법을 이용한 TIVAD 삽입 후 우측 성대마비가 발생한 18세 남아환자에서 초음파 검사를 시행하여 미주신경의 손상을 확인한 증례가 있어 보고하고자 한다.

중심 단어 : 셀딩거 방법 · TIVAD · 성대마비.

Introduction

TIVAD(Celsite[®], BRAUN) insertion provides a reliable means for the long-term administration of cancer chemotherapies, and the risks of complications after TIVAD insertion have been well documented.¹⁾ The majority of complications develop at time of catheter insertion due to injury of an important nearby anatomical structure, such as great vessels, trachea, esophagus, lungs, or thoracic duct. On the other hand, neurological complications are rare. Here, we present a case of right vocal cord paralysis following TIVAD insertion.

Case Report

A 18-year-old male underwent TIVAD insertion for neoadjuvant chemotherapy of osteosarcoma of the right femoral

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shaft. Under local anesthesia using skin infiltration of 2% lidocaine at anterior chest and neck around internal jugular vein, a TIVAD was inserted into the right internal jugular vein using the Seldinger technique, over a guide-wire using split-sheath technology and portal was implanted in right subclavian subcutaneous pocket. During local injection of lidocaine, the patient complained no hoarseness. The catheter tip was located in the superior vena cava as confirmed by post-operative chest radiography(Fig. 1). The patient complained of throat pain and hoarseness immediately after TIVAD insertion. A flexible laryngoscopic examination on one day after procedure demonstrated paralysis of the right vocal fold, which was fixed in a paramedian position. Physical examinations of the head and neck and the findings of a neurologic examination were normal. Ultrasonography revealed a swollen vagus nerve which seemed penetrated by catheter between the internal carotid artery and internal jugular vein(Fig. 2). Neck CT showed that the catheter had been passed through a small vein(probably the right vertebral vein) between the right internal jugular vein and the right carotid artery instead of right internal jugular vein(Fig. 3).

We then recommended TIVAD removal and exploration

for decompression but patient refused due to fear of pain and morbidity. At 2 months after TIVAD insertion, the patient had no complaint of hoarseness, and a laryngoscopic examination revealed mobility of the bilateral vocal fold fully recovered. At one year after TIVAD insertion when chemotherapy had been completed, the TIVAD was removed without complication.

Discussion

TIVADs are used in patients that require long-term chemotherapy for the treatment of cancer, because they are more

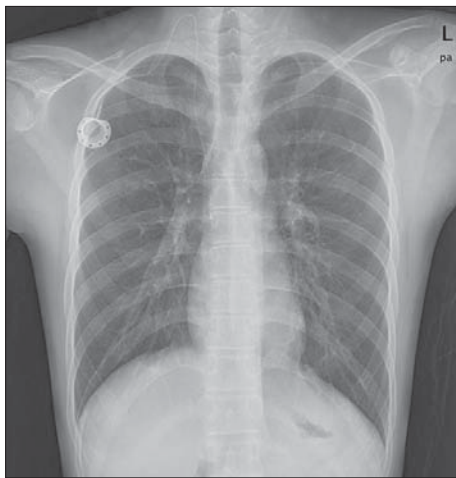


Fig. 1. Tip of TIVAD is well in position in superior vena cava at postoperative chest radiography.

comfortable than external devices, easier to use, long-lasting, and more cost-effective than other forms of long-term maintenance.¹⁾ The subclavian or internal jugular vein are usually used as access routes for TIVAD insertion by the Seldinger technique, and at our hospital, the right internal jugular vein is preferred because it has a more vertical disposition with respect to the superior vena cava. Complications associated with TIVADs by the Seldinger technique have been well documented, and include pneumothorax, hemothorax, air embolism, chylothorax, infection, hemopericardium, and arterial perforation.²⁾ However, neurologic damage caused by TIVAD insertion through the right internal jugular vein is rare. Nevertheless, because the vagus nerve and the right recurrent laryngeal nerve lie close to the lower end of the internal jugular vein, TIVAD insertion through the right internal jugular vein can result in damage to the vagus nerve or recurrent laryngeal nerve due to needle trauma, direct penetration, pressure from hematoma, fibrosis around the nerve, or leakage of chemotherapy agent.^{3,4)} In addition the migration of a the catheter tip of a TIVAD can result in vocal cord paralysis.⁵⁾ Multiple attempts at cannulation also increase the risk of complications.

The vocal fold paralysis causes phonation difficulties and possible post-operative chest complications due to aspiration and an inadequate cough. Sim DW et al reported a case of right vocal cord paralysis³⁾ and Martin-Hirsch DP reported two cases,⁴⁾ but unfortunately, the causes and sites involved were not reported. As for our patient, ultrasonography and neck CT

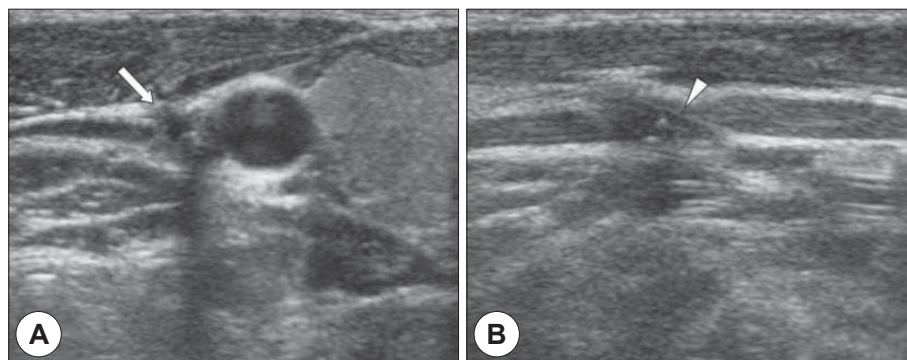


Fig. 2. Ultrasonography shows swollen vagus nerve(arrow, A) and catheter which looks penetrating through vagus nerve(arrow head, B).

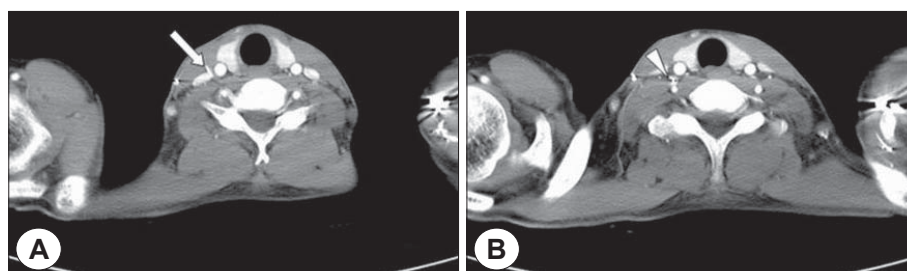


Fig. 3. Neck CT shows that catheter of TIVAD passes between right internal jugular vein and right common carotid artery(arrow, A) and enter into small vessel, probably a vertebral vein(arrow head, B).

showed that injury to the vagus nerve was caused by the catheter between internal carotid artery and internal jugular vein (Figs. 2 and 3). In this case, catheter seemed to enter a vertebral vein instead of internal jugular vein. Thus we assumed that anatomically incorrect Seldinger technique could damage vagus nerve.

The situation was explained fully to the patient, and the authors recommended immediate removal and reinsertion of the TIVAD and neck exploration for decompression of the vagus nerve as a first option. Nevertheless, the patient decided to 'wait and see' due to fear of morbidity and pain associated with surgery, and 2 months after TIVAD insertion the vocal fold paralysis had completely resolved. Although we do not know why the vocal fold palsy recovered spontaneously, we guess that the neural injury was only mild, such as neuropraxia or axonotmesis. This is also supported by the fact that during TIVAD removal, vocal cord movement was intact, and had the nerve been severely injured or penetrated by the catheter, the vocal cord could have been damaged during removal.

If vocal fold paralysis occurs after TIVAD insertion by the Seldinger technique, ultrasonographic and/or CT evaluations are required to locate and determine the cause of damage. In

the described case, the patient experienced complete spontaneous recovery without TIVAD removal. Nevertheless, we favor TIVAD removal and neck exploration for nerve decompression promptly after the identification of vagus or recurrent laryngeal nerve damage.

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