Hydrothorax due to extravasation of intravenous contrast through left subclavian catheter
-A case report-

Jung-Gi Choi¹, June-Seog Choi¹, Cheon-Hee Park¹, Cheol-Seung Lee¹, Lee-Kyoung Kim¹, and Young-Ryool Chung²

Departments of ¹Anesthesiology and Pain Medicine, ²Orthopedic Surgery, Gwangju Christian Hospital, Gwangju, Korea

Central venous catheterization is associated with a large number of complications, such as pneumothorax, hydrothorax, hemothorax, phlebothrombosis, pericardial tamponade, air embolism, aberrant placement and line sepsis. There are many case reports of the extravasation of various central venous catheter fluids, including the intravenous fluids, total parenteral nutrition and chemotherapeutic agents into the pleural cavity and mediastinum. These have led to hydrothorax, hydromediastinum and pericardial effusions. We report a case of the extravasation of intravenous contrast into the pleural cavity after dynamic CT through a left subclavian catheter. (Korean J Anesthesiol 2010; 58: 550-554)

Key Words: Central venous catheterization, Extravasation, Hydrothorax, Intravenous contrast.

A central venous catheter is useful for monitoring the cardiovascular status in the management of patients under anesthesia or with severe diseases as well as for providing intravenous routes in case it is difficult to secure peripheral venous catheters and supply routes for fluids [1]. However, an injection of contrast medium through a central venous catheter using a mechanical pump causes more pressure that can result in leakage. Due to such pressure, the central venous catheter might move out of the blood vessels and the contrast medium may spout into the adjoining structures, such as a pleural space or mediastinum. This can cause hypoxia, sepsis, and even cardiovascular collapse and dyspnea. Therefore, it is important to detect the symptoms as early as possible.

We report a case of the extravasation of intravenous contrast into the pleural cavity after dynamic CT through the left subclavian catheter.

Case Report

A 51-year-old female patient, 52 kg in weight and 155 cm in height, visited to receive total hip arthroplasty due to osteoarthritis caused by acetabular dysplasia in her left hip joint. There were no special findings in her personal medical history, including a recent physical examination, chest X-ray, electrocardiogram and blood test before surgery.

Before the operation, 20 mg of famotidine and 0.2 mg of glycopyrrolate were administered intramuscularly. Due to a spinal block, 10 mg of 0.5% bupivacaine was injected into the
subarachnoid space and a lack of sensation in the 9th thoracic vertebrae was confirmed. For sedation during surgery, 1.0 mg of midazolam was injected and 5 L/min of oxygen was administered through a face mask. The patient was placed under anesthesia for approximately two hours. The amount of blood loss, fluid administered during surgery and urine output was 400 ml, 2,100 ml and 950 ml, respectively. Arterial blood gas analysis immediately before completion of the surgery revealed the following: pH 7.386, PaCO2 42.5 mmHg, PaO2 164.7 mmHg, HCO3 24.6 mM/L, SaO2 99.8%, and Hb 10.1 g/dl.

When the patient arrived in the recovery room, her blood pressure, heart rate and pulse oximetry was 110/60 mmHg, 65 beats/min, and 99%, respectively. The patient was covered with a warm blanket because she complained of being cold and shivered. After approximately three hours, a blood test, a chemical test and coagulation were performed because she complained of dizziness and showed slight cyanosis in her lips. At this time, her blood pressure, heart rate and pulse oximetry was 90/50 mmHg, 70–95 beats/min and 98%, respectively. The test results showed 7.9 g/dl of hemoglobin and 24.3% of hematocrit, due to suspected hypovolemia.

A decision was made to provide a central venous catheter to secure the routes for fluids and monitor the cardiovascular status. In addition an attempt was made to insert 7 Fr (Two-lumen central venous subclavian catheter set with blue flex tip, Arrow, USA) to the left, because a large assortment of wires for monitors, fluids and racks were dangling and attached to the patient. The bed was inclined slightly to hold the patient in the Trendelenburg position. Her left arm was in complete internal rotation and her neck was turned to the right. Lidocaine was administered at 2–3 cm downward from the midpoint of the left central clavicle for local anesthesia and the skin was punctured using an 18 G, 6.35 cm needle. The needle was inserted along the back of the clavicle to proceed toward the sternal notch parallel to the clavicle. A J-inducing wire was inserted after venipuncture and the needle was removed. Space for the catheter was expanded using an expander and after inserting the central venous catheter, it was confirmed that blood had been absorbed at the two catheters without resistance. They were fixed at an approximately 15 cm length from the skin. At this time, the patient’s blood pressure, heart rate and pulse oximetry was 110/60 mmHg, 78–100 beats/min and 99%, respectively. 500 ml of packed red blood cells was injected through a central venous catheter.

The emergency blood test found that approximately 50 ml of blood had drained into the Hemovac, which was much lower than that drained extravascularly. Therefore, a decision was made to use computed tomography (CT) on the next morning to locate the bleeding, considering that 50 ml of blood had drained into the Hemovac, which was too little. Iopromide, a contrast medium, was injected at a rate of 2 ml/s to a total dose of 120 ml through a central venous catheter of the left subclavian vein for CT of the abdomen and pelvis.

Immediately after CT, the patient complained of heaviness in her chest and 5 L/min of oxygen was administered through a face mask. At that time, her blood pressure and heart rate was 110/66 mmHg and 70 beats/min, respectively. The results of her arterial blood gas analysis were as follows: pH 7.406, PaCO2 36.8 mmHg, PaO2 109.6 mmHg, HCO3− 11.5 mM/L and SaO2 99.3%. There were no outstanding symptoms evident after the electrocardiogram, an echo cardiology and a cardiac enzyme test, and no signs of an allergic reaction that could occur after using the contrast medium. However, after a chest X-ray, the tip of the central venous catheter was placed at the brachiocephalic vein (Fig. 1) and a hydrothorax on the left was observed by abdominal CT.

At the department of radiology, the site of a hydrothorax was detected using a sono guide and a Chiba needle was inserted between the 8th and 9th rib to drain approximately 100 ml of pleural effusion. An 8.5 F pig tail catheter was inserted using a hair wire. A slightly transparent fluid was absorbed through the piercing needle, which was checked by X-ray and established to be contrast medium. A contrast medium was injected slowly through the catheter to eliminate the possibility that it originated from the central venous catheter, which is a possible reason for it permeating through the chest cavity. It was confirmed that the contrast medium flowed inside the vein through the catheter and blood was sucked in slowly into the catheter without resistance. Although the central venous catheter was needed, a hair wire carefully was inserted to recheck the site of the catheter within the vein while double

![Fig. 1. Chest AP radiograph shows the pleural effusion of the left lung. The arrow shows that central venous catheter tip is positioned in the left brachiocephalic vein.](image-url)