

A giant subclavian pseudoaneurysm following central venous catheterization

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Abstract

Inadvertent iatrogenic injury to an adjacent major artery is a rare but life-threatening complication of central venous cannulation. The present article reports the development of a large right subclavian artery pseudoaneurysm, presented as a rapidly growing mass at the site of injury, following attempted central venous catheterization.

Key words Pseudoaneurysm · Central venous catheterization · Subclavian vein

Central venous cannulation is the procedure of choice in monitoring the hemodynamic state of ill patients; it is also used for intravenous feeding and fluid replacement in such individuals. Its complications depend on the physician's skill, the patient's physical anatomy, and the postoperative care provided.

Injury to an adjacent vein or artery is one of the most important complications during catheterization, and may lead to hemorrhage, thrombosis, fistula, and pseudoaneurysm formation. The present study reports the formation of a giant subclavian pseudoaneurysm following central venous catheterization.

Following a head trauma, a 60-year-old man was transferred to an intensive care unit (ICU) after craniotomy and drainage of a cerebral hematoma. Central venous catheterization via the right subclavian vein was performed, with the aim being to monitor the patient's hemodynamic state. A puncture needle was inserted several times into the artery instead of the vein before the J-wire and the catheter were correctly introduced into the subclavian vein. The injury site was compressed for 5 min each time as the needle was pulled out. Finally,

correct placement of the catheter was confirmed by chest X-ray.

On the seventh day after the operation, a small pulsatile mass appeared near the catheterization site. The catheter was then pulled out, but the mass continued to expand in the next 48 h (Fig. 1). The patient did not show a tendency to have coagulation abnormalities. Ultrasonography was performed and a subclavian pseudoaneurysm was diagnosed; angiography confirmed the development of this pseudoaneurysm.

At this time, the patient was referred to our center for further action. At our center, he underwent an urgent operation, due to the rapidly growing mass and a significant decline in his hemoglobin level. Under general anesthesia, a large hematoma (about 1000 ml in the form of a clot) was drained through the proximal part of the subclavian artery. The site of injury was then diagnosed and repaired. The patient left the hospital after 2 weeks in an acceptable condition.

Central venous catheterization is an appropriate method for fluid replacement therapy, feeding, and monitoring the hemodynamic state of critically ill patients in the ICU; this procedure, however, is associated with various complications in 15% of cases [1].

Inadvertent arterial puncture is one of the most common reported complications, especially following femoral vein cannulation. The frequency of mechanical complications depends directly on the site of catheter insertion and the patient's medical condition [1]. Subclavian artery puncture is reported in 3.7% of the cases; small hematomas caused by arterial injury may expand and lead to the formation of hemothorax in some cases [2]. Arterial venous fistula and pseudoaneurysm are considered to be delayed complications of the condition [3].

Pseudoaneurysm is a delayed complication of arterial injury that occurs 1 to 4 weeks after artery puncture. The formation of pseudoaneurysms in the carotid, vertebral, pulmonary, and subclavian arteries has been



Fig. 1. Forty-eight hours after the catheter had been removed, the mass was still growing rapidly

reported frequently, although no accurate rate has been stated. Pseudoaneurysm has been reported in 2% of cases following femoral artery cannulation [4].

The use of a large-diameter catheter, multiple cannulations, the administration of anticoagulant drugs, old age, atherosclerosis, hypertension, and technical errors are precipitating factors for the condition.

Pseudoaneurysms may present as emboli, persistent hemorrhage, large hematomas, or masses with pressure effects on adjacent organs [2,5]. The development of a large subclavian artery pseudoaneurysm following right internal jugular vein cannulation was reported by Baldwin et al. [6], presenting as a mass causing pressure necrosis of the membranous trachea and esophagus. Mortality due to severe hemorrhage in a patient with

the complication was reported by Mercer-Jones [7], suggesting that close observation of patients with pseudoaneurysm is obligatory. Moreover, the therapeutic procedures should be performed as soon as possible.

In the patient in the present case report, the pseudoaneurysm presented as a pulsatile mass that formed a week after the arterial injury. It grew rapidly in size and became hemorrhagic in 4 days. Multiple cannulations, along with the patient's age and the presence of atherosclerosis were the precipitating risk factors. In this patient, it is likely that the multiple arterial punctures increased the probability of pseudoaneurysm formation. Thus, patients with the above mentioned risk factors, need close observation after central venous catheterization, especially if they experience arterial puncture during the procedure.

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