

中文題目：個案報告-使用經皮血管縫合器於中央靜脈導管誤置入右鎖骨動脈之重症患者進行成功止血與血管修補

英文題目：A case report: Using an arterial suture-mediated closure device for closure of accidental Subclavian arterial punctured Central venous catheterization in a critical illness patient

作者：陳力瀚<sup>1,2</sup>，張維安<sup>3,4</sup>，朱俊源<sup>1,2</sup>，李文賢<sup>1,2</sup>，許栢超<sup>1,2</sup>，邱正安<sup>1,2</sup>，蘇河名<sup>1,2</sup>，林宗憲<sup>1,2</sup>，李智雄<sup>1,2</sup>，顏學偉<sup>1,2</sup>，溫文才<sup>1,2</sup>，賴文德<sup>1,2</sup>，許勝雄<sup>1,2</sup>

服務單位：<sup>1</sup>高雄醫學大學附設中和紀念醫院內科部，<sup>2</sup>高雄醫學大學附設中和紀念醫院心臟內科，<sup>3</sup>高雄醫學大學附設中和紀念醫院重症醫學部，<sup>4</sup>高雄醫學大學附設中和紀念醫院胸腔內科

**Introduction:** Central venous catheterization(CVC) through the internal jugular vein is needed in critical illness patients. Accidental arterial puncture is one of the main complications associated with CVC insertion. However, manual compression to achieve hemostasis is often ineffective in subclavian punctures because of the anatomical arterial position and surrounding great vessels. Closure of this vital artery can be challenging. Traditionally, accidental arterial puncture has been treated with open surgery, but which also bring risk in these clinically critical patients. Here, we present a case who received the closure of an inadvertently placed catheter from a subclavian artery by using an arterial suture-mediated closure device("Abbott" Perclose ProGlide Suture-Mediated Closure System).

**Case presentation:** a 73-year-old woman with hypertension, diabetes, and chronic kidney disease (stage4), was sent to our emergency department due to profound shock accompanying with severe metabolic acidosis, suspect acute pancreatitis and metformin-associated lactic acidosis related, with the initial presentation of comatose status found by her family. Due to unstable hemodynamic, CVC insertion at the right subclavian vein was performed at the Emergency Department and vasopressors were prescribed. However, the CVC was found placed in the right subclavian artery. The Cardiovascular surgeon had been consulted for surgical repair, but the patient's family was hesitated due to high anesthesia and operation risk under such critical conditions. Instead, the interventional cardiologist was consulted for 2<sup>nd</sup> opinion and percutaneous artery closure using the self-paid Perclose ProGlide Suture-Mediated Closure System was advised and the patient's family agreed. In the beginning of this procedure, we arranged an angiogram from CVC, which showed a CVC tip placed in the right subclavian artery just next to the brachiocephalic artery. Under aseptic techniques, we cut the remaining CVC and inserted a Terumo 0.035" wire into the ascending aorta, then removed the CVC. A 6-French ProGlide was inserted over the Terumo wire under Fluoro-guidance. Several attempts was tried and it is very difficult to advance this closure device due to anatomic limitations resulting from the surrounding vital organs. Finally, Successful closure of the right Subclavian artery was achieved after a horizontal manual compression over the suture nodes in the subclavian-brachiocephalic junction.

**Discussion:** CVC insertion is an essential procedure in the management of a critically ill patient. Accidental arterial puncture is a known complication with potentially fatal outcomes including active hemorrhage or cerebrovascular thromboembolic events. Where puncture occurs, treatment options include open surgical repair, placement of a stent-graft across the puncture site, or repair of the arterial puncture with a percutaneous closure device. Direct compression was mostly ineffective due to relative deep and central puncture site at retro-clavicular site. Open surgical repair may pose greater risk in a critically ill patient with poor premorbid state. Use of a percutaneous closure device is another convenient and readily available

option. We therefore adopt a percutaneous approach for catheter removal with vascular repair performed using an arterial suture-mediated closure device("Abbott" Perclose ProGlide Suture-Mediated Closure System).

Advantages of a suture-mediated closure device is that it involves only suture lines with minimal intraluminal material, therefore, it could reduce such risk of dislodgement or distal vascular thromboembolic event. Use of a percutaneous closure device has been approved in the closure of femoral arterial puncture, and has been proven to be a safe and reliable method with additional benefits of earlier hemostasis and patient mobilization. Use of a percutaneous closure device for subclavian arterial puncture repair is yet to be approved and still considered off-label use. However, some successful cases of subclavian artery puncture repair of various diameters solely with percutaneous closure devices or in conjunction with a balloon catheter have been reported.

The option of stent-graft repair may be considered, but this technique increases procedure complexity. In addition, the need for antiplatelet therapy following stent-graft placement was a clinical dilemma. Without antiplatelet therapy, the stent-graft could be easily thrombosed, nevertheless, antiplatelet therapy could increase the bleeding risk, particularly in critical ill patients, which may be fatal.

Based on the above concern, we applied an arterial suture-mediated closure device for accidental arterial puncture, and the result was confidential.

**Conclusion:** Accidental subclavian artery puncture during central venous catheterization is an uncommon situation, but can be effectively managed by using percutaneous vascular closure device, and should be considered before morbid surgery and stenting. It is a reliable alternative choice that should be considered as a first-line approach before endovascular or open surgery, especially in patients with unstable conditions in which it is possible to be performed without transfer to an operation room.