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CASE REPORT

Successful Closure of Subclavian Artery with Vasculature Closure Device

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ABSTRACT

A 57-year-old female patient was referred to our clinic for cardiac defibrillator (ICD) insertion. During procedure, arterial hemorrhage was seen when the dilator was pulled to place the ICD lead and it was realized that the access site was the left subclavian artery. Subclavian artery cannulation which was done inadvertently was succeeded in management with 6-French Perclose Proglide® vascular closure device.

Introduction

Vascular closure devices have recently been developed and provide enormous ease after percutaneous interventions, especially in peripheral major arteries [1]. It offers promise for the prevention and management of pseudoaneurysms, hematomas, arteriovenous fistulas and similar undesirable complications that may arise after transcatheter procedures for cardiovascular surgical operators, cardiologists, interventional radiologists, and a multitude of interventional areas [1,2].

Arterial placement with catheter or sheath during central venous cannulation is an undesirable complication that may be seen in rare cases. Surgical treatment of such complications is safe and effective option [3]. With open repair, however, it is difficult to remove the damaged region of the artery. Surgery also carries additional risks in patients with co morbidities.

Here we aimed to present a rare case where the vascular closure device was successfully used after placement of the undesirable subclavian artery catheter.

Case

A 57-year-old female patient was referred to our clinic for cardiac defibrillator (ICD) insertion before cardiac transplantation by our heart failure coordination center. Sinus rhythm was present on her electrocardiogram. Echocardiography showed enlargement of all heart chambers, decrease in left ventricular systolic function, left ventricular Ejection Fraction (EF) was 20%, first-degree mitral valve regurgitation, second-degree tricuspid valve regurgitation and systolic pulmonary artery pressure was 35 mmHg. A single ICD implantation was planned after the laboratory and clinical evaluations. The patient was taken to catheter laboratory. Before the procedure, left subclavian vein was clearly observed with subclavian vein angiography. After the incision which required for the procedures, the pockets for ICD generator were opened and the venous puncture was performed with seldinger

technique. After the puncture, the guide wire was attached to the tip of the needle, but after observing easy progress with slight manipulation, it was placed to the vein over the guide wire with 9 french sheath, however, arterial hemorrhage was seen when the dilator was pulled to place the ICD lead, and it was realized that the access site was the left subclavian artery (Figure 1). The dilator was then repositioned, and the bleeding was controlled. Subclavian artery cannulation which was done inadvertently was succeeded in management with 6-French Perclose Proglide® (Abbott Vascular, Redwood, CA, USA) vascular closure device (Figure 2). Then, the procedure was postponed to another session. After 1 week ICD was placed in the left subclavian area again.

Figure 1: Unwanted placement of guide wire

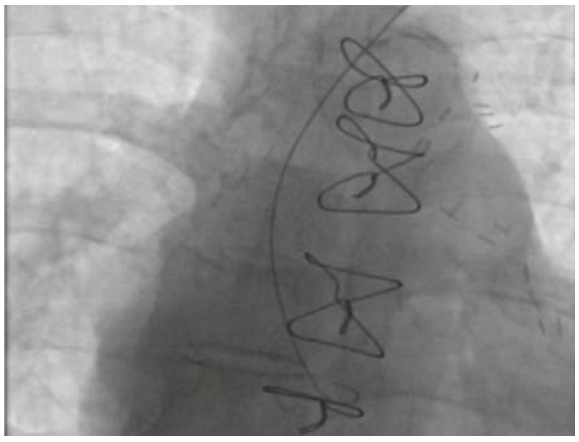

Figure 2: Vascular closure device.

Discussion

Subclavian venous puncture is an interventional approach and commonly used especially in cardiology and cardiovascular surgery in clinical practice. Subclavian venous access is used for interventional temporary or permanent transcatheter processes in many areas such as permanent pacemaker, inverter cardiac defibrillator or cardiac resynchronization therapy implantation, and in patients with renal insufficiency that requires dialysis. Given the frequent interventional procedures, undesirable vascular complications are sometimes inevitable [4]. Surgical treatment is a successful and reliable method for vascular complications that can develop firstly. In a 14-year retrospective study, Pravin M Shah at al indicated that serious clinical consequences such as mortality and stroke after arterial displacement might occur in 11 patients, especially during venous cannulation, and they applied surgical therapy in such cases [3]. However, when such complications are encountered during vascular catheterization, the necessary time and equipment and surgeon constraints for any vascular surgery may be a significant problem. Except for routine use, the use of vascular closure devices after accidental subclavian artery cannulation, similar to our case, is rarely present in the literature. Taek Kyu Park et al. accidentally caused subclavian artery cannulation while placing hemodialysis catheter through an internal jugular vein, and used Pro Glide similarly to our case [5]. In our case, we inadvertently placed 9 french sheath into the left subclavian artery while trying to perform subclavian vein puncture for ICD implantation, and then we successfully closed it with the 6-French Perclose Proglide® (Abbott Vascular, Redwood, CA, USA) vasculature closure device instead of surgical procedure. Subclavian venous cannulation seems simple but there are some important steps we should take into consideration to avoid such and other complications. After subclavian vein catheterization, we should not proceed unless we make sure that guide wire is definitely below the heart contours and it faces inferior vena cava and in the true lumen. Inaddition, considering

the subclavian venous and arterial anatomic proximity, if the guide wire cannot be advanced after venous puncture, it should be avoided as far as possible from back and forth manipulations. It was a successful management of the complication that the dilatators was repositioned and the sheath was not removed completely after the catheterization was understood into artery because it was not a desirable area in which the control of hemostasis is difficult only by compression of the subclavian artery. It is also known that surgical treatment in such patient poses high risk [6]. Given that there may be such complications even though all procedures are performed carefully, management of such condition should be ensured under appropriate management and conditions as in our case with minimal damage.

Conclusion

Vascular closure devices are medical devices that are newly applied in routine percutaneous interventions and prevent many vascular complications, as well as promising devices that prevent patients from being exposed to major operations during or after interventional vascular complications and are expected to increase in use. The use of vascular closure devices in complications, such as undesirable subclavian artery catheterization, where compression is difficult to perform, may be an effective alternative to surgical treatment.

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