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Case Report

Vascular injury of the brachycephalic trunk from vascular access: case report

Yankel A. Sanchez*

Department of General Surgery, Hospital De Especialidades Centro Medico Nacional La Raza, Ciudad De Mexico, Mexico

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***Correspondence:**
Dr. Yankel A. Sanchez,
E-mail: yankeloffice@gmail.com

ABSTRACT

Central vascular accesses are very useful tools for the treatment and diagnosis of various medical conditions such as the administration of drugs and solutions, chemotherapy, hemodialysis, hemodynamic monitoring. A review of the clinical record of a 59-year-old patient treated at a tertiary hospital was performed. We presented the case of a patient with vascular lesion of the brachiocephalic truncus arteriosus derived from the placement of a dialysis catheter. Vascular access placement is a routine procedure in many critical patient services, however it is important to know in detail the vascular anatomy and surgical technique to reduce the risk of complications.

Keywords: Vascular, Injury, Brachiocephalic, Vascular access

INTRODUCTION

Central venous catheters are very useful instruments in medical practice for hemodynamic control, drug administration, solutions, emergency dialysis, etc. However, the placement of these devices is associated with infectious, thrombotic and mechanical complications.[1] Mechanical complications associated with CVC occur in 0.7% to 2.1%, 5 of catheterization attempts and include arterial injury, pneumothorax, hemothorax, air embolism.[1] Involuntary arterial puncture is the most common and can lead to uncontrolled bleeding, formation of hematoma, pseudoaneurysm, arteriovenous fistula and embolisms.[1] Subclavian artery injuries after central venous catheter placement are a rare but life-threatening complication. On this occasion we present a case of an injury iatrogenic of the arterial bracheocephalic trunk when placing a vascular access for hemodialysis.

CASE REPORT

59-year-old female patient with a 20-year history of type 2 diabetes mellitus, 20-year history of systemic arterial hypertension, and chronic kidney disease secondary to diabetic nephropathy for 6 months.

Evolution

The patient began with the condition 1 month prior to admission, presenting persistent edema of the lower pelvic members, reason why she goes to a second-level hospital for evaluation where hospitalization is decided for the diagnostic protocol, however, she presents a torpid evolution, developing uremic syndrome, which is why that it was decided to initiate renal replacement therapy, which is why an angio-access was placed in the right subclavian region, which was placed on the first attempt, presenting as a complication abundant outflow of blood through the catheter, however, it was decided to proceed to a hemodialysis session of urgency.

Subsequently, mahurkar catheter angiotomography was performed with a journey through the right subclavian artery, brachiocephalic trunk and ascending aorta with apparent double vascular injury (Figure 1). So, she was referred to our third level hospital to be evaluated by the cardiothoracic surgery service.

Once the patient is hospitalized, they are assessed by the cardiothorac surgery service who, on finding a hemodynamically stable patient, decide to request a new angiotomography to assess the catheter journey and plan the surgical intervention which is performed 48 hours later where the presence of the catheter is evident at the entrance of the right subclavian vein which goes over the wall, crosses the brachiocephalic arterial trunk and is placed in the luminum of the ascending aorta, the tip of the catheter suffers the anterior wall of the ascending aorta without passing it (Figure 2-5).

It is appraised again by the cardio thoracic surgery service, who programs the removal of the catheter in the operating room after the hemodialysis session, however, after 24 hours the patient is mobilized and presents incidental exit of the dialysis catheter, so the present doctor starts direct compression and is transferred immediately to the operating room. Where hemodynamic monitoring and advanced airway management are started, prior to performing surgical cleaning, a transthoracic echocardiogram is performed by the cardiology service without findings suggesting active hemorrhage for which is decision expectant management with blood pressure control and close monitoring of signs of hypovolemic shock without presenting any alteration.

Patient is presented to the coronary intensive care unit service where he is admitted to maintain arterial pressures less than 140/90 mmHg and surveillance of the hemodynamic status presenting adequate evolution by performing control tomography at 24 hours (Figure 5), where only bilateral pleural effusion is reported and scant pericardial effusion, so a neurological window was initiated and mechanical ventilation was withdrawn, and she was discharged to the nephrology service at 72 hours. The patient is currently undergoing outpatient follow-up.

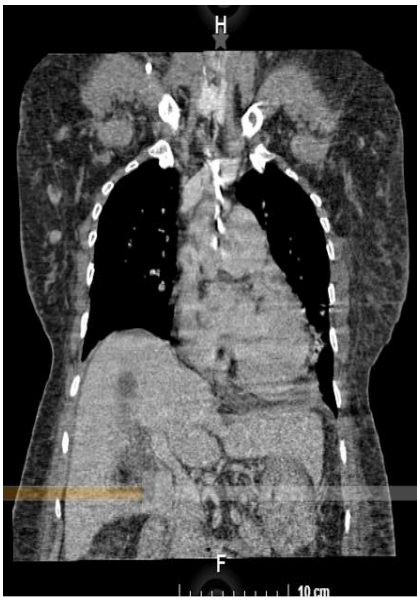

Figure 1: CT of the thorax catheter tip in the brachiocephalic trunk.

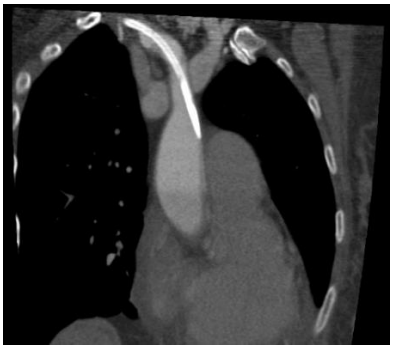

Figure 2: Thorax CT: catheter coronal cut through the right subclavian artery.

Figure 3: 3D reconstruction. Catheter in brachiocephalic trunk.

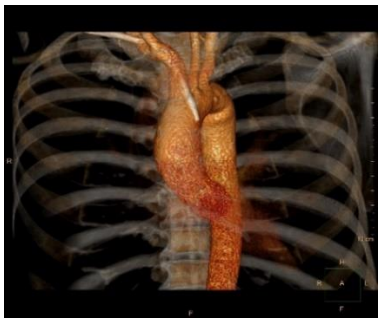

Figure 4: Thorax CT: coronal cut, catheter through the right subclavian artery to brachyocefalic trunk.

Figure 5: Coronal section of the thorax, after catheter exit.

DISCUSSION

Iatrogenic subclavian artery injury is a rare but recognized complication of central venous catheterization. The injury is more serious and complex to treat when it occurs with large catheters such as dialysis.[2] Iatrogenic trauma to the carotid or subclavian arteries can cause severe bleeding, arterial dissection, emboli, or thrombosis. In addition, several series of cases have been reported with complications, such as airway obstruction due to cervical hematoma, shock due to hemothorax, cerebrovascular accident due to arterial thrombosis or cerebral embolism, pseudoaneurysm or arteriovenous fistula.[3]

Brachioencephalic stem injuries, the spectrum of injury ranges from 'minimal' injury with intimal damage, various degrees of laceration (with or without pseudoaneurysm), and arteriovenous fistula.[4]

The approach to suspected vascular injury to the large mediastinal vessels will depend on the mechanism of injury (blunt or penetrating) and the hemodynamic status.[4] in our case, the patient remained hemodynamically stable at all times, so allowed preoperative imaging to clarify the site of the injury and the treatment plan.[3,4] However, in patients with active uncontrolled bleeding, it is necessary to proceed directly to surgical intervention.

Arterial puncture, often identified by pulsatile blood flow from the catheterization site but can be difficult to identify in a critically ill, septic, or hypoxemic patient.[1] Imaging options include focused evaluation to exclude hemothorax, pneumothorax, or cardiac tamponade using fast ultrasound, performed in the recovery room, followed by CT angiography of the chest.[4]

Regarding management, removal and compression of the arterial site is the method regularly used for iatrogenic injuries of the subclavian and carotid arteries; however, retrospective studies of large centers have found that this management is deficient and is associated with a high rate of complications.[5]

For cases of larger vessels or lesions that do not regress with compression, endovascular treatment currently has a high success rate with the advantages of endovascular techniques, including access to arteries that are difficult to expose surgically and avoidance of anesthesia. General. Endovascular repair may be considered depending on the site of injury or local experience, although surgical repair shows the best results with fewer complications.[5]

Finally, a 24-hour serial clinical follow-up is suggested to rule out a growing hematoma or associated complications such as thromboembolism, hemothorax, pericardial effusion, and hemodynamic monitoring should continue even if the images are normal. In our case, the patient presented an adequate evolution and the topographic control showed no alterations.

CONCLUSION

Iatrogenic vascular injuries have a different anatomical distribution than those resulting from non-iatrogenic vascular trauma. In addition, they generally affect an older and more vulnerable group of patients with many comorbidities, such as hemodialysis patients who require multiple vascular accesses throughout the evolution of the pathology. Therefore, it is important that the doctors who place the vascular accesses have a broad knowledge of the surgical technique and vascular anatomy in order to reduce the risk of complications, which can be fatal.

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