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Journal of Clinical Research and Reports
Iyad Abuward Abu-sharkh

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Case Report

Aberrant Termination of the Thoracic Duct, Structure to Be Considered In Interventional Nephrology for Vascular Access

Iyad Abuward Abu-sharkh*, Nisrine Arhda, Suleyka Puello Martinez, Marta Pais Seijas, Rafael Alonso Valente, Candido Diaz Rodriguez
Interventional Nephrology Unit, Nephrology Department, University Clinical Hospital of Santiago de Compostela, Spain.

***Corresponding author:** Iyad Abuward Abu-sharkh, Interventional Nephrology Unit, Nephrology Department, University Clinical Hospital of Santiago de Compostela, Spain

Received date: February 12, 2020; **Accepted date:** February 18, 2020; **Published date:** February 26, 2020

Citation: Abu-sharkh. IA, Arhda N, Suleyka P. Martinez., Marta P. Seijas., Rafael A. Valente., Candido D. Rodriguez, (2020) Aberrant Termination of The Thoracic Duct, Structure To Be Considered In Interventional Nephrology For Vascular Access. J Clinical Research and Reports, 3(2); DOI:**10.31579/2690-1919/050**

Abstract

Background: The placement of the central vascular accesses for hemodialysis is a very frequent activity in the daily work of nephrologists, and the success of renal replacement therapy in both chronic and acute patients depends on it. That is why it is important to know the complications due to these interventional procedures. In this article we discuss the case of a possible anatomical variant of a structure that is mentioned very little in the clinical practice of interventional nephrology; the thoracic duct.

Conclusion: The knowledge of anatomy and possible anatomical variants, the use of minimally invasive instruments and good training are considered essential to avoid major complications during vascular interventions.

Keywords: Hemodialysis; Tunneled catheter; Thoracic Duct

Introduction

Vascular access for hemodialysis is considered a main pillar in renal replacement therapy, since a good functioning of the vascular access guarantees better treatment quality.

The use of central venous catheters for hemodialysis patients has progressively increased in recent years; however indications for their use should be limited due to the greater associated complications, both thrombotic and infectious. This is due to the variation in the characteristics of the patients, who are older and with a higher percentage of diabetics.

However, it remains an essential vascular access for the nephrologist due to the possibility of immediate use after placement, in addition to the increase in the number of patients without the possibility of creating arteriovenous fistula [1].

Central venous catheters are classified as non-tunneled (for use less than 3 weeks) and tunneled (when their use for more than 4 weeks).

The right tunneled or permanent catheter is the first choice between percutaneous vascular access, and the right jugular vein is the first option in case of no contraindications, because it is straight and there is less chance of thoracic duct injuries. Several studies concluded that cannulation of the left internal jugular was associated with a higher incidence of failures and complications. There is clear evidence that supports the use of ultrasound during the cannulation of central vessels to reduce the complications arising from puncture, in addition to the search for branches or anatomical variants. Vascular mapping prior to procedures and the study of neighboring structures of large vessels with ultrasound is important, since it allows the detection of morphological and anatomical abnormalities, especially in the cannulation of the left jugular vein [2].

Clinical case

A 63-year-old male patient, height 176 cm, weight 89 kg, begins hemodialysis through a temporary femoral catheter 10 days before, comes for placement of a right tunneled catheter while waiting for arteriovenous fistula creation. His past medical history is: chronic kidney disease due to diabetic nephropathy, type 2 diabetes mellitus for 15 years, controlled arterial hypertension with two drugs, hyperlipidemia, goiter without thyroid dysfunction, and surgical history of ankle fracture in a traffic accident.

His chest X-ray is normal, and abdominal ultrasound shows no abnormality. His blood test shows a normal coagulation study, Urea 120 mg dl, Creatinine 6 mg/dl, Hemoglobin 12.3 g / dl, K 4.7 mmol, Na 141 mmol, CL 101 mmol, Ca 9.2 mg / dl.

The patient is prepared in the interventional nephrology unit for ultrasound guided placement of 28 cm tunneled catheter, 15.5 F, in the right jugular vein. A Micropuncture Access Set 4.5 F was used for ultrasound control puncture of the vein through posterior approach.

The puncture was unique and direct with successful channulation of the right jugular vein and the introduction of the micro guide wire was without incident.

After the introduction of the guide wire and the first dilator, the exit of white creamy liquid mixed with the blood has been observed, Lymph leak was suspected, an urgent blood sample obtained from the puncture is sent to the laboratory that shows triglyceride level of 996mg/dl while in peripheral blood it was 162 mg /dl.

After confirming the correct position of the guide wire by fluoroscopy, the insertion process has been completed without further incident.

No complications were observed on the chest X-ray during the next few days. No other complications were detected in the area of the wound or in the neck.

Discussion

Early complications arising from the placement of percutaneous vascular accesses occur immediately upon placement or in the first hours. They are usually uncommon and are related to venous puncture, for example: arterial puncture, pneumothorax, pneumomediastinum, pericardial tamponade, retroperitoneal hematoma, air embolism, cardiac arrhythmias, laryngeal recurrent nerve paralysis, reactions to local anesthesia, vasovagal reactions, etc [3, 4].

The most frequent late complications are venous stenosis that occurs more frequently in the subclavian vein than in the jugular. Thrombosis, which could be total or partial, and also is classified as extrinsic and intrinsic; extrinsic are secondary to the formation of a wall thrombus, attached to the tip of the catheter, in the superior vena cava or right atrium, while in the intrinsic the thrombus is located intraluminally, at the tip of the catheter or forming pericatheter fibrin sheath [5].

Another structure that we must take into account is the thoracic duct; the thoracic duct has a normal caliber of approximately 2 to 4 mm and carries between 2 ml and 10 ml of lymph per hour. It is usually born in the abdomen and continues in a middle course through the posterior mediastinum, located in front of the thoracic vertebra bodies between the thoracic aorta on the left and the azygos vein on the right. It goes up the upper mediastinum, gradually deviates to the left, penetrates the neck and describes an upward convex curve leading to the left jugular-subclavian junction, either in the internal jugular vein, in the subclavian or in the brachiocephalic [6].

Thoracic duct lesions are more frequent in cannulation of the left jugular vein, since that most cases, the duct ends on the left side, but there are also variations in its terminations. In some studies on cadavers, multiple variants have been demonstrated in the path and termination of the thoracic duct, most of the cases the thoracic duct ends on the left side in the internal jugular vein, the subclavian vein or the angle between the two, but termination has also been observed in the external jugular vein, the vertebral vein, the brachiocephalic vein, the suprascapular vein and the transverse cervical vein [7,8]. In addition, and although with a very low incidence, a variant of the thoracic duct has been observed with termination in the right internal jugular vein [9]. According to Van Pernis, in a study of 1,081 cadavers he found the right variation in 61 (5.6%) [10] And Kausel reports an incidence of 2% [11].

In our case, as there were no complications and the subsequent controls; Chest x-ray; at 1 day, 2 days and one week, have not shown lymph leak, the patient has not been studied with lymphogram to demonstrate the presence of a right thoracic duct and otherwise the lymph leak could have its origin in the right lymphatic duct. In any case, we believe that if damage to the thoracic duct has occurred would be minimal thanks to the use of the micropuncture introducer needle.

Conclusion:

The complications of cannulation of vascular accesses are relatively frequent and vary from mild to very serious. In the field of interventional nephrology, vascular access is a fundamental pillar in daily practice, since the success of renal replacement therapy depends on it, which is why prior exploration and ultrasound mapping allows reducing the incidents that can be found during Interventional procedures. However, interventional nephrologists should know the anatomy of the region and the possible anatomical variants that they can find and also be able to diagnose and treat complications. In addition, we cannot ignore the importance of using minimally invasive needles such as the 21G needle instead of 18 G needles.

Conflict of Interest Statement

We have no financial, consultant, institutional, and other relationships that might lead to bias or a conflict of interest.

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DOI:10.31579/2690-1919/050