CASE REPORT

Another way to successfully remove dialysis catheter misplaced into subclavian artery through right internal jugular vein: case report

Xiaodong Li, Yancong Guo

Abstract

For haemodialysis in patients with uraemia, catheterization of the internal jugular or femoral vein is often required to establish access. Puncture with catheterization in the right internal jugular vein (RIJV) is relatively simple, and thus, is the appropriate choice for haemodialysis. However, catheterization at this site can lead to complications, including bleeding at the puncture site. Moreover, in several cases, the haemodialysis catheter (HDC) can be misplaced in the internal carotid artery and subclavian artery, thus making the management troublesome later on. In this article, we report the case of a middle-aged female patient with uraemia wherein a temporal HDC was misplaced into the right subclavian artery during right internal jugular vein catheterization. Instead of conventional surgery and endovascular intervention, the catheter was left in that place for four weeks and subsequently removed directly, followed by local compression for 24 hours. Three days later, a tunnelled cuffed HDC was placed in the RIJV under the guidance of ultrasound and regular haemodialysis was performed.

Keywords: Uraemia, haemodialysis, jugular vein, subclavian artery.

DOI: 10.47391/JPMA.7104

Submission completion date: 10-06-2022
Acceptance date: 16-11-2022

Introduction

Renal replacement therapy is necessary for patients with end-stage renal disease, with haemodialysis being the most common modality. Establishing vascular access is a prerequisite for haemodialysis, with the haemodialysis catheter (HDC) being the best choice in patients in an emergency situation without an Arteriovenous fistula.[1,2]. HDC is mostly placed through the internal jugular or femoral vein and can be classified as tunnelled cuffed catheter (TCC) or non-tunnelled and non-cuffed catheter. Catheterization of the right internal jugular vein (RIJV) is normally the first choice for haemodialysis and is widely used in clinical practice. However, this procedure sometimes may lead to the risk of inadvertent puncture of the carotid artery and, in rare cases, even the subclavian artery[3].

The case of a middle-aged female patient is presented who was subjected to RIJV catheterization due to uraemia. The temporal HDC was misplaced into the right subclavian artery (RSA). Conventional surgery or endovascular intervention was not performed and the catheter was left in place for four weeks. It was subsequently removed directly, followed by local compression for 24 hours. No complications were encountered. Three days later, a TCC was placed in RIJV under the guidance of ultrasound, and regular haemodialysis was performed.

Case Report

A 45-year-old female patient (Han nationality, married, farmer) was admitted to the Department of Nephrology of Baoding No.1 Central Hospital on November 28, 2018, with complaints of "weakness since one year and chest distress of one week duration.". The patient was previously in good health. Results of physical examination on admission showed pallor suggesting anaemia, a pressure of 90/65 mmHg and a heart rate of 105 beats/min. Moreover, she had oedema of the face and both lower extremities. A blood creatinine test performed

Table-1: Lab values: Hb (haemoglobin), Plt (platelet), Alb (albumin), CREA (creatinine), BNP (brain natriuretic peptide), Fbg (Fibrinogen).

Investigation	Normal Range	Predialysis	Dialysis after 4 weeks
Hb (g/L)	110-150	74.5	96.6
Plt (×109/L)	125-350	396	295
Alb (g/L)	40-55	23.3	31.8
UREA (mg/dl)	15.6-45	141.56	94.2
CREA (mg/dl)	0.46-0.8	10.7	6.6
Potassium (mmol/L)	3.50-5.30	2.85	4.16
Calcium (mmol/L)	2.11-2.52	1.86	2.25
Phosphorus(mmol/L）	0.85-1.51	1.94	1.25
BNP (pg/ml)	0-100	2320.8	586.4
D-Dimer(mg/L)	0-0.55	14.52	5.48
Fbg(g/L)	1.80-3.50	6.76	3.79

Department of Nephrology, Baoding No1 Central Hospital, Baoding, China.
Correspondence: Yancong Guo. Email: gyc18617789033@126.com

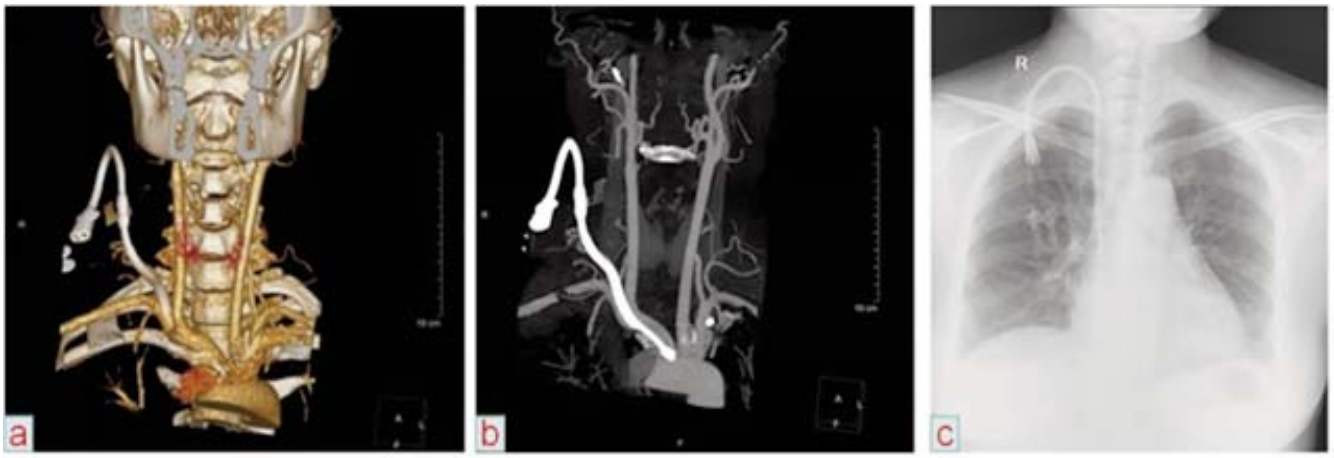

Figure-1: Computed tomography angiography (CTA) of neck showed dialysis catheter misplaced into subclavian artery and near brachiocephalic trunk artery through right internal jugular vein(a,b), chest x-ray showed tunneled cuffed catheter (TCC) in place through right internal jugular vein(c)

two days before admission showed a result of (8.2mg/dl). Urological ultrasound suggested reduced volumes of both kidneys. The primary laboratory values on admission are shown in Table-1. The patient's clinical diagnosis was uraemia with heart failure. On the day of admission, the patient underwent catheterization through RIJV and was inserted a temporal HDC (Bard, 11.5Fr, USA). The catheterization process was performed without ultrasound guidance, and the procedure went as normal. After the operation, she complained of pain at the catheterization site along with blood leakage. The following indicators were obtained from HDC blood gas analysis: PCO2, 35.80 mmHg, and PO2: 89.90 mmHg, suggesting arterial blood. Emergency computed tomography angiography (CTA) of neck showed the catheter in the proximal segment of RSA and the truncus brachiocephalicus (Figs. 1a, b). Subsequently, vascular surgery and interventional departments were involved in the patient's treatment. Due to the patient's poor condition, the HDC was left in that position. The following day a temporal HDC of 11.5Fr (Bard, USA) was inserted through the right femoral vein and maintained for regular haemodialysis. Four weeks later, the HDC in RIJV was removed manually and the right supraclavicular area was compressed under digital subtraction angiography (DSA) guidance followed by a fixture with an elastic bandage for 24 hours. The patient experienced no complications, as bleeding or haematoma. Three days later, a TCC of 14.5Fr (Bard, USA) was placed in RIJV under ultrasound guidance, and postoperative chest radiographs showed good catheter positioning (Fig. 1c). Subsequently, the HDC in the right femoral vein was removed and haemodialysis using TCC was successfully applied. Regular outpatient follow-up was performed every two months and to date she is in a stable condition.

Discussion

High local anatomic variability during catheterization in RIJV based on anatomic positioning and empirical experience alone can lead to serious complications.[3] Complications of catheterization in RIJV include bleeding, haematoma, and poor HDC placement, especially among patients with obesity and hypotension. In the absence of ultrasound guidance, the incidence of complications resulting from catheterization in the internal jugular vein are approximately 8%. Accidental perforation of the artery can lead to serious consequences, especially due to catheters of 7Fr and above, thus causing arteriovenous fistulas, and pseudoaneurysms which require emergency management[4].

Among patients receiving catheterization in RIJV into the subclavian artery, HDC should not be removed and may be treated either by open-heart surgery or by endovascular interventional placement of a covered stent[5,6]. Ultrasound-guided catheterization in RIJV significantly reduces the incidence of complications. Therefore, current guidelines on vascular access strongly recommend this method[7,8].

In our case, no conventional open surgery to repair the vessel or interventional endovascular procedures were performed. Open surgery was highly invasive and risky, and the patient's poor general conditions made it difficult for her to tolerate this procedure. Vascular repair with a vascular suture in an interventional procedure requires high operator skill and is possible to failure. In addition, covered stent insertion could have blocked the patient's vertebral artery and affected her cerebral blood supply. Consequently, the HDC was left in that place for four weeks and an arteriovenous sinus tract was formed, the

catheter was removed directly. Furthermore, the procedure did not result in complications, which might be attributed to her low basal blood pressure and hyper coagulable state.

One of the limitations of our case was the lack of CTA of neck after the insertion of TCC because of the disagreement of the patient, who thought it was too expensive and unnecessary for her.

Conclusion

To the best of our knowledge, this is the first case that reported a temporal HDC misplaced into RSA through RIJV, which was removed successfully by manual extubation without operation. In conclusion, we make another way to successfully remove dialysis catheter misplaced into subclavian artery through RIJV and gained the experiences during the treatment for this patient. A dialysis catheter misplaced into subclavian artery may be removed directly after four weeks of retention, which is more appropriate under lower blood pressure and hyper coagulated state of a patient.

Ethics statement: Consent of the patient was taken for publishing this case.

Disclaimer: This case was seen at Baoding No.1 Central Hospital, Baoding, Hebei 071000, PR China. This study was approved by Ethics Committee of Baoding No.1 Central Hospital. Reference number: 2020-079.

Conflict of Interest: None.

Source of Funding: None.

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