SHORT REPORT

Iatrogenic Arteriovenous Fistula between the Common Carotid Artery and Internal Jugular Vein: A Case Report

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Arteriovenous fistula is a rare complication of internal jugular vein catheterization. Few cases have been reported in the literature. This communications result from trauma or medical intervention, most frequently a central venous puncture for hemodynamic monitoring or for parenteral nutrition. We describe a case of a common carotid artery-jugular vein arteriovenous fistula following the insertion of a double-lumen catheter for hemodialysis access. We feel that this complication early should be detected and treated as soon as possible.

Keywords: Arteriovenous fistula; Central venous catheterization; Internal jugular vein; Complications.

Case

A 48-year-old man with chronic renal failure secondary to polycystic renal disease was admitted to our clinic with thrill on the left side of the neck. A hemodialysis catheter had been inserted in the left side of neck 1 week earlier in another hospital. A thyroid ultrasonography (USG), performed for subclinical hyperthyroidism, showed that the catheter was in the common carotid artery (CCA) (Fig. 1), and it was removed. The next day, a loud murmur and thrill were detected on the left side of the neck. The patient had been transferred to our clinic for investigation for a arteriovenous fistula (AVF).

On arrival the patient had continuous murmur and a thrill on the left lateral border of his neck. The neurological examination was normal. A magnetic resonans angiography showed a 12 mm long fistula between the internal jugular vein (IJV) and the CCA (Fig. 2). We performed through an incision along border of the sternocleidomastoid muscle. The distal and proximal control of the CCA had been ensured. A 15 mm long AVF was noted between the IJV and the CCA. The venous site of the fistula was ligated, arterial origin was oversewn with a 6–0 polypropylene suture with side-clamp without interrupting the flow in the CCA. The thrill disappeared. Postoperatively, the patient was hemodynamically stable and neurologically intact. A duplex USG on the first follow-up visit, 3 weeks after operation, showed normal anatomy and flow.

Discussion

Complications associated with IJV catheter insertion have been well described in literature.1–3 However, puncture of the CCA is a frequent complication of IJV catheterization, with a reported incidence of 2–9.9%. A less common complication of IJV cannulation is an AVF that develops between the IJV and CCA arteries as in this case.2,3 AVF may cause systemic embolization, infection, and with time, high out-put cardiac failure. Several authors offer alterations and warnings in the standard IJV catheter insertion technique: (1) Limiting head rotation to less than 40° may be utilized to avoid anatomic overlapping between the artery and vein,4 (2) the use of smaller gauge needles to locate the vein, (3) the use of ultrasound-guided cannulation of the IJV has been shown to minimize the complication rate,5 (4) if difficulty is encountered, an alternative venous

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access route should be used, (5) the vessel dilator should not be advanced over a kinked guidewire since this might change the direction of the dilator.2,3

More often, the clinical course of an AVF is insidious, over several months or even years.1–3 In this case, the AVF was detected within days after catheterization. The diagnosis is based on the presence of a murmur over the neck, although in some cases overt congestive heart failure is the presenting picture.2–5

The exact mechanism for creation of the AVF in this case is unknown. It can be speculated that the guidewire perforated both the IJV and the CCA. The catheterization needle was in the IJV but the wire might have perforated the vein and the artery by itself, or pushed the needle through the vessel’s wall.3–5

AVF should be treated either surgically or by endovascular therapy avoiding further complications such as infection, thrombosis, and arterial embolization. Endovascular therapy is safe and—being less invasive—can be the treatment of choice if the tools and the expertise of selective catheterization are readily available. Radiographic embolization for fistula closure is probably not advisable except for those not readily accessible by the usual surgical approaches because of the potential for pulmonary embolization of the material used to occlude the fistula.2

According to our knowledge, few cases of an AVF between the CCA and IJV resulting from IJV catheterization have been described. Although there are no specific measures to obviate fistula formation, AVF are potentially preventable by using a suitable insertion technique. When a fistula is suspected, proper

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**Fig. 1.** Doppler ultrasonography view depicts the hemodialysis catheter (arrows) in common carotid artery. CCA: Common carotid artery.

**Fig. 2.** Preoperative magnetic resonance angiography showing arteriovenous fistula between the common carotid artery and internal jugular vein. RBA: Right brachiocephalic artery, VJI: Jugular internal vein, AVF: Arteriovenous fistula, CCA: Common carotid artery.
investigation such as duplex scanning and angiography is required to determine the precise location and estimate the severity of the arteriovenous communication. We advocate the early surgical obliteration of iatrogenic arteriovenous fistula to avoid the development of any systemic and late complication.

References


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