



Traumatic Common Carotid - Internal Jugular Arteriovenous Fistula Presenting as Life-threatening Epistaxis: Clinical Features Surgical Treatment

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Abstract

The development of post traumatic common carotid - internal jugular vein fistula is an extremely rare (4% to 7%) occurrence that may remain undetected during the acute phase of injury. Its clinical manifestation varies depending on its size, duration, and proximity to the heart. We report here 5 the case study of one such patient who remained undiagnosed for 20 years and was recently 6 treated by trans-sternal ligation of left common carotid artery with an uneventful postoperative 7 follow-up. This case report illustrates the importance of timely diagnosis by having a high index 8 of suspicion so as to prevent complications. The operative strategy should be safe and decided on 9 a case-by-case basis.

Keywords: Common carotid artery; Internal jugular vein; Carotid jugular fistula

Abbreviations

CCA: Common Carotid Artery; CJF: Carotid Jugular Fistula; AVF: Arterio-Venous Fistula; IJV: Internal Jugular Vein; TIA: Transient Ischemic Attack

Introduction

Traumatic common Carotid-internal Jugular vein Fistula (CJF) is a rare entity with a published incidence of only 4% to 7% of all traumatic Arterio-Venous Fistulas (AVFs). It is caused by penetrating injury or by internal jugular venous cannulation, and it may remain untreated for months or years after the initial injury [1]. If left untreated, the patient is likely to develop high output cardiac failure, embolization, and/or atrial fibrillation. We report a case that remained undiagnosed for 20 years and was successfully treated by trans-sternal ligation of left common carotid artery - a procedure rarely reported in the literature. Direct surgical repair of the fistula was not a safe option nor was the endovascular approach feasible in this case.

Case Presentation

A 60-year-old man was referred to our hospital after four episodes of nasal bleeding and one episode of transient loss of consciousness. He had also experienced a progressive increase in breathlessness on moderate exertion and decreased effort tolerance in the preceding three years. The patient suffered an arrow injury on the left side of his neck 20 years previously and had undergone a surgical wound exploration along with multiple blood transfusions at another institution. Clinical examination was remarkable for a pulsatile soft tissue swelling along with prominent veins on the left side of his neck, an old scar, a palpable thrill, and a harsh murmur over the swelling. The Branham's sign was positive. The examination of other systems was unremarkable.

A color duplex ultrasonography revealed communication between the left common carotid artery and the internal jugular vein. Also, an MRI carotid angiography revealed a fistulous communication (3.71 mm in diameter) between the left common carotid artery and the adjacent internal jugular vein with total occlusion of the left common carotid artery beyond the fistula. Further, there was a small aneurysm at the site of the fistula. The internal jugular vein was hugely dilated and the left vertebral artery was very prominent (Figures 1 and 2).

The endovascular approach was not a therapeutic option because of technical reasons (see discussion). As the left common carotid artery was occluded beyond the fistula and the fistula was

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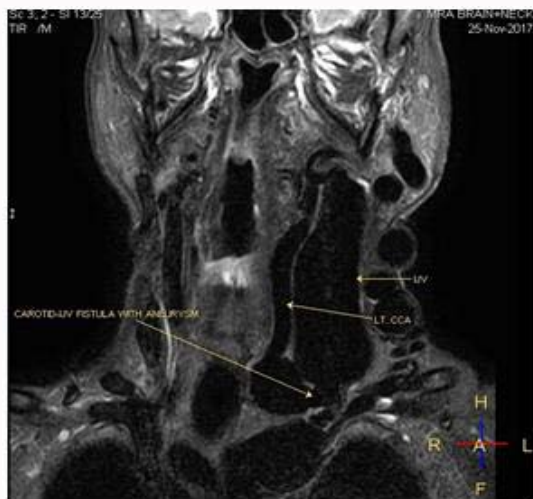


Figure 1: MRI Neck-Stir Long T1 image showing void of flow related signal in both left CCA and IJV.



Figure 2: MRI - Angiogram-showing CJF, hugely dilated IJV, occluded left CCA beyond fistula, and very prominent left vertebral artery.

situated in difficult Zone I, a safer approach was chosen and the left common carotid artery was ligated at its origin through sternotomy. The thrill disappeared and postoperative recovery was uneventful. At one year follow up, he was asymptomatic and there was remarkable reduction in the swelling and prominence of the neck veins.

Discussion

Traumatic common carotid-jugular fistula is extremely rare and its rarity can be gauged from its appearance only as case reports in medical literature [2]. A total of 24 cases were reported by 22 authors from 2000 to 2012. Of these, only 9 were due to a gunshot or stab injury while the remaining was due to an Internal Jugular Vein (IJV) catheter insertion [2]. A few of the cases were diagnosed quite late, as in the present case. Kakkar et al. [3] reported a case of CJF lasting 28 years that was surgically treated after repeated hospitalization for control of congestive failure. However, the longest presentation of CJF was 58 years after the gunshot injury that was then treated by surgical repair [2]. Besides the duration, the severity of symptoms is largely determined by the fistula characteristics mainly its size and proximity to the heart. A large diameter (>8 mm) fistula leads to early high cardiac output failure but a small diameter (<5 mm) fistula may manifest many years after injury, as in the present case. The episode of nasal bleeding in this case was due to rupture of an engorged nasal vein and transient loss of consciousness may have been due to Transient Ischemic Attack (TIA) per se from right carotids or posterior circulation.

The endovascular option was not possible because of an unfavorable anatomical condition, mainly the absence of a landing zone and the presence of an aneurysm. Also, direct surgical repair was not considered very safe due to its location in the difficult Zone I, the presence of surrounding scar tissue, and hugely dilated veins due to resultant venous hypertension. The lateral neck is divided into three zones. Zone I extends from the clavicle to the cricoids cartilage, Zone II from the cricoids to the angle of the mandible, and Zone III from the angle of the mandible to the base of the skull. It is difficult to achieve adequate exposure for repair of fistula in Zones I and III whereas it is relatively easier to achieve in Zone II. Considering

all these factors, a ligation of the left common carotid artery at its origin was considered to be very safe as there was no requirement for maintaining vascular continuity. The result was gratifying. Ligation of the left common carotid artery has rarely been used and reported [1]. Sometimes repair of this type of fistula may be complex so as to require cardiopulmonary bypass [4]. Since 2004, there has been a paradigm shift in the treatment of CJF when Droll performed the closure using a covered stent wherein the vessel distal to fistula was patent [5]. Whether the approach to treat a CJF should be endovascular or surgical is as yet debatable and is still determined on a case-by-case basis [2]. However, the primary indications for surgery are a large-sized fistula, an associated aneurysm, its presence in Zone II, and/or the involvement of other vessels.

In conclusion, post traumatic common Carotid-Jugular Fistula (CJF) is an extremely rare clinical condition that may be missed during the acute phase of injury. All penetrating neck injuries should be carefully evaluated by CT angiography to confirm the presence or absence of CJF. The therapeutic strategy of a long-standing fistula should be individualized depending on the anatomy and situation of the lesion as well as the safety of the available treatment choices.

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