Case Report

A PULSATILE MASS ON RIGHT SIDE OF NECK AFTER A PENETRATING INJURY

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INTRODUCTION: Traumatic Carotid artery to Jugular vein fistula is very rare and is a known complication of gunshot injures and stab wounds, but can be iatrogenic mostly due to Internal Jugular Vein (IJV) cannulation for different indications like Hemodialysis, Transvenous pacing etc. This is usually not detected during the acute injury phase. However, if it remains untreated; it may lead to intractable heart failure, atrial fibrillation or embolization.

The previously reported cases are mostly of gunshot injuries leading to traumatic carotid – jugular arteriovenous fistula (AVF). We present a case of common carotid jugular fistula which was acquired by a steel particle.

KEY WORDS:Arteriovenous fistula, carotid artery injuries, internal jugular vein.

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CASE PRESENTATION:

A 50 years old steel mill worker was admitted to emergency department of Services Hospital Lahore on March 3, 2017 who sustained an injury few hours prior to presentation while at work. A high velocity iron particle hit him on right side of neck. He experienced a sharp pain at site of injury followed by transient loss of consciousness for few minutes. This was associated with profuse bleeding from anterior aspect of neck. The patient was given emergency treatment at nearby medical center. No surgical intervention done at that time. He was referred to Services Hospital Lahore for further management.

Clinical examination showed that his general condition was stable. He was well oriented and conscious. His pulse rate was 100 beats / minute regular and bounding. The blood pressure was 130/80mm Hg. His heart sounds were no additional sounds.

Neck examination showed a 5 – 6 mm puncture wound on right anterolateral aspect of neck, in Zone II (from cricothyroid membrane to angle of mandible). There was a slight swelling which was pulsatile and warm with a continuous thrill. On auscultation, a continuous bruit was audible. The Nicolandani-Branham's sign (Bradycardia produced by manual compression of AVF to stop the flow of blood through fistula) was positive.

Neck radiograph showed a radio opaque foreign body of about 6 mm at right side of neck at the level of 7th cervical (C7) vertebra.

Clinical diagnosis of carotid jugular-fistula was made. Patient was admitted in surgical ward. He was kept propped up at 450, and monitored for any increase in neck girth, shortness of breath or fall in O2 saturation. He remained stable.

Color Doppler ultrasound revealed a fistulous communication between proximal Right common carotid artery (RCCA) and right internal jugular vein, the rent in RCCA was 5.2 mm. A pseudoaneurysm of 22 x 18 mm was also present opposite to AVF in posterolateral aspect of neck. Turbulent, high diastolic, low resistant flow, typical for AVF was noted in carotid – jugular fistula. Other findings included; increased velocity and low pulsitality carotid flow, increased velocity and high pulsitality IJV flow, increase in the caliber of common carotid artery around the AVF and focal IJV dilatation distal to AVF.

CT angiography was done which further confirmed this diagnosis. On CT angiography, there was a rapidly filling vascular channel traversing between proximal right common carotid artery (RCCA) and right internal jugular vein (IJV) which measured 3.9 x 9.2mm, suggesting arteriovenous fistula. This channel was about 35mm away from origin of RCCA from brachiocephalic trunk. At this point RCCA showed diameter of 8.5 mm and CT density of 402 – 415HU. The rent in anterolateral aspect of RCCA was 4.0 mm.

Right IJV was dilated measuring 13.0mm and showed early venous opacification (390 – 400HU).

An out-pouching measuring 20x13 mm project-

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Figure 1: Image revealing right AVF.

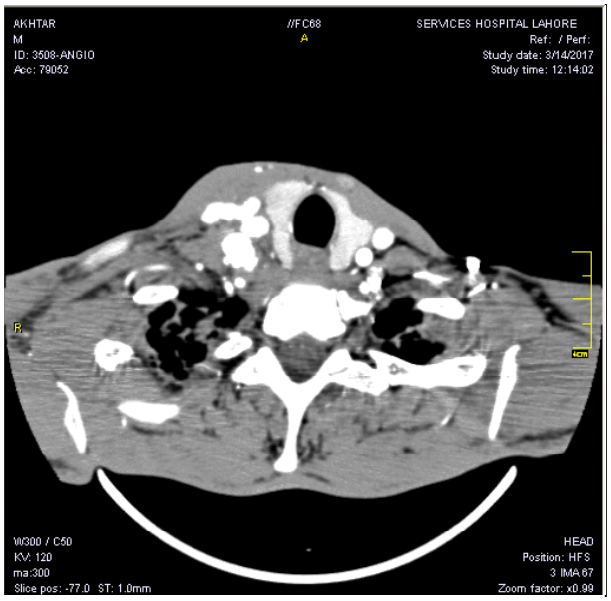
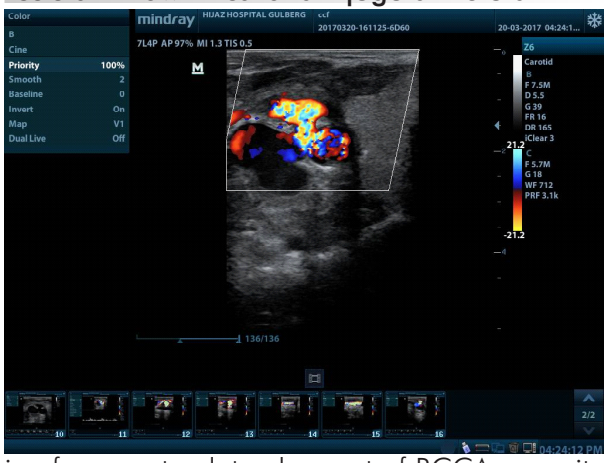


Figure 2: Turbulant, high diastolic low resistant flow in carotid - jugular fistula.



ing from posterolateral aspect of RCCA opposite the site of AVF – represented a pseudoaneurysm. The neck of aneurysm measured 5.4 mm. No mural thrombus or contrast extravasation was noted.

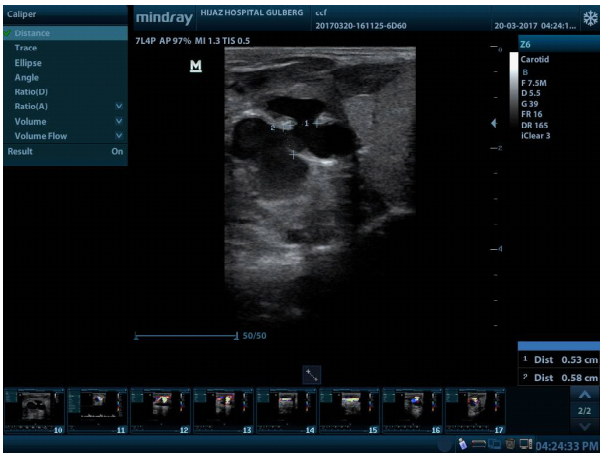
A metallic foreign body measuring 8.0 x 5.6 mm having CT density of 13385 HU was seen impacted in posterior part of pseudoaneurysm, just anterior to right sternoclavicular joint, at the level of C7 vertebra.

Right carotid bulb, RICA and RECA appeared unremarkable.

Left Common Carotid Artery, Internal Carotid Artery, External carotid artery and left IJV showed normal appearance.

The patient underwent exploration of right side

Figure 3: A 5.2 mm rent in RCCA and a 22 x 18 mm pseudoaneurysm opposite to AVF.



of neck under GA on June 21, 2017 for the repair of AVF. Fistula was identified, dissected and disconnected. Repair of artery and vein was done.

Post operative recovery was uneventful and patient was discharged after three days. Subsequent Doppler imaging confirmed the closure of fistula.

DISCUSSION:

Carotid-jugular fistula (CFJ) can be congenital or acquired. Acquired CJFs are mostly the result of iatrogenic trauma while performing IJV catheterization for the purpose of Hemodialysis and less commonly CJFs result from gunshot or stab wound. Acquired CJFs are uncommon in head and neck region accounting only 4 – 7% of all traumatic AVFs encountered throughout the body[4].They are so rare that they can only be encountered as case reports in the medical literature. Our case is different in that the cause of trauma was an iron particle acting as high velocity missile piercing neck vasculature and forming CJF.

In acute settings an AVF may present at the same time as the arterial injury. The initial diagnosis is made by the patient presenting with a penentrating neck injury, the presence of continuous thrill or bruit, positive Branham's sign and signs of high cardiac output or failure depending on time of presentation.

CJFs are particularly prone to complications (1) and cases with severe hemodynamic symptoms (High cardiac output and heart failure) may present with large diameter (>8mm) fistula that allow large volume of blood to be directly shunted into venous circulation [4,7]. Signs and symptoms of smaller diameter AVF (<5mm) with low output can take many years to appear after injury and generally consist

of mild Left ventricular failure and cardiomegaly without congestive cardiac failure [4,7].

Kakkar and coworkers [6, 1, 4] reported the case of a patient with a carotid–jugular fistula of 28 years' duration with intractable congestive cardiac failure, and no benefit from medical treatment. The patient's signs and symptoms of congestive cardiac failure disappeared remarkably after repair of the fistula and his heart size decreased dramatically.

Talwar and coworker [5], in 2000 described a fistula between the proximal left ICA and the IJV treated by institution of a cardiopulmonary bypass and IJV and carotid repair. The signs and symptoms of the patient resolved subsequently.

Post traumatic fistulas should be surgically repaired as early as possible to avoid complications including hemorrhage and pseudoaneurysm.[2, 3]

Color Doppler ultrasound is highly sensitive for visualizing AVF and may be the reference standard, but it may overestimate the diameter of the tract.[4] Other modalities include CT Angiography and MRA.

CT Angiography provides the best spatial resolution of catheter angiography and offers the best three dimentional localization of AVF within the tissues if surgical repair is planned.[4] MRA offers flow information via dynamic sequences and phase velocity mapping, though hemodynamic information is inferior to ultrasound. MRA spectral resolution is good though inferior to CTA[4]. Catheter angiography remains the gold standard for diagnosing CJF, and it also offers the opportunity of endovascular repair at the same time.[4]

Surgery for carotid jugular fistula involves adequate exposure, vascular control and direct vascular procedure to eliminate the fistula and perform vascular repair[1, 4]. The lateral neck is divided into three zones. Zones I extends from clavicle to cricoids cartilage. Zone II from cricoids to angle of mandible. Zone III from angle of mandible to skull base. The injury of this patient was in zone II. The ideal vascular procedure is to divide fistula and maintain vascular integrity on both vessels. (1) Rarely vascular ligation is required for jugular vein.

As far as the treatment for AVF is considered, open surgery versus endovascular repair (stent-graft insertion) is still a matter of debate [4, 8]. Direct surgical repair of carotid-jugular AVFs is preferred in large sized fistulas consequent to a gunshot or stab wound, or with associated pseudoaneurysms. Endovascular treatment is preferred in smaller fistulas, mostly caused by IJV catheterization, with no associated vascular lesions, or in patients at high risk for open surgery. The fistula site is important for the treatment: endovascular repair is valuable for vertebral artery fistulas, high carotid-jugular fistulas [4, 9] and, carotid artery injuries in either Zone I or Zone III where access to vessels is difficult [4]. In our case, AVF was in Zone II of right side of neck, and there was also an accompyning false aneurysm. The patient benefited well by open surgical repair with division of fistula and repair of carotid artery and internal jugular vein, which resulted in resolution of his signs and symptoms.

CONCLUSION:

We suggest that vascular imaging including duplex imaging, together with CT angiography / arteriography should be immediately performed in patients with penetrating neck injury in the territory of major vessels despite normal clinical neurovascular examination for early detection of AVFs and other occult vascular injuries. This will help in prompt diagnosis and early repair of injuries which may otherwise remain unnoticed in an acute stage and later present with complications.

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