



## Case Report

## Blunt carotid injury with thrombotic occlusion: Is an intervention always required for best outcome?

Amulya Rattan<sup>1,\*</sup>, Ruby Kataria<sup>2</sup>, Ajay Kumar<sup>1</sup>, Quamar Azam (Md)<sup>3</sup>*Department of Trauma Surgery & Critical Care, Trauma Center, AIIMS Rishikesh, India*

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## ABSTRACT

Blunt cerebrovascular injuries are rare, comprises of 0.08 to 0.33% of all traumatic blunt injuries. Depending on the grade of severity, they may heal with minimal consequences or may lead to debilitating and devastating stroke. Surgically accessible lesions are infrequent and hence endovascular management is preferred modality for high-grade lesions. We hereby present a case of complete thrombosis of the common carotid artery, which couldn't receive either surgical or endovascular treatment due to low resource settings. The patient developed a stroke after 18 h of trauma, which, however, recovered completely and dramatically within 96 h. To the best of our knowledge, such rapid and complete recovery from stroke secondary to blunt carotid injury managed non-operatively hasn't been reported in literature so far. Our report adds to the scarce but growing body of evidence recommending conservative management in BCVI in absence of enlarging pseudoaneurysm and dissection with near-complete stenosis.

## Introduction

Blunt cerebrovascular injuries are rare, comprises of 0.08 to 0.33% of all traumatic blunt injuries [1]. Advent of faster CTs has increased their detection rate. Depending on the grade of severity, they may heal with minimal consequences or may lead to debilitating and devastating stroke [2]. Due to rarity, current treatment guidelines are based on extrapolation of experiences from single-center studies. Surgically accessible lesions are infrequent and hence endovascular management is preferred modality for high-grade lesions [2]. Irrespective of modality chosen, antithrombotic therapy is a must to minimize rates of secondary stroke [3]. We hereby present a case of complete thrombosis of the common carotid artery, which couldn't receive either surgical or endovascular treatment due to low resource settings. The patient developed a stroke after 18 h of trauma, which, however, recovered completely and dramatically within 96 h. To the best of our knowledge, such rapid and complete recovery from stroke secondary to blunt carotid injury managed non-operatively hasn't been reported in literature so far.

## Case report

28-year lady was brought to the ED with an alleged history of accidental strangulation by cloth while working in fields. The patient presented to us after 8 h of trauma. Airway was patent and the cervical spine motion was restricted. A patterned bruise of

\* Corresponding author.

E-mail address: [amulya.rattan@gmail.com](mailto:amulya.rattan@gmail.com) (Q. Azam).

<sup>1</sup> Assistant Professor

<sup>2</sup> Trauma Fellow

<sup>3</sup> Professor



Fig. 1. Patterned abrasion suggestive of strangulation injury.

strangulation was present in the middle of the neck (Fig. 1). Larynx and cricotracheal junction were normal to palpation. Breathing and circulation were normal and there was no neurological disability. Mild surgical emphysema was present in the face and neck. CECT neck revealed tracheal transection more than 50% of the circumference and an abnormally dilated segment of the esophagus (Fig. 2). Contrast esophagogram wasn't performed as the patient had an upfront indication of exploration. CT Angio revealed complete luminal occlusion of left Common Carotid Artery due to thrombosis 3 cm below bifurcation (Fig. 3); however, the contrast was present in the internal carotid artery presumably entering retrogradely from external carotid artery. Interventional radiology expertise for CCA stenting wasn't available. The patient was taken up for emergent exploration where complete transection of the trachea was repaired along with the esophagus. CCA exploration revealed a contused artery not amenable to resection and end to end repair. CCA size precluded the use of saphenous graft due to anticipated luminal discrepancy and subsequent turbulent flow. PTFE and Dacron couldn't be arranged in the middle of the night. The operating surgeon decided to manage CCA contusion and thrombosis non-operatively as the patient presented after 8 h and majority strokes in Grade 4 injury would have manifested in this period. CCA ligation wasn't done in the apprehension of antegrade thrombus propagation post ligation.

Unfortunately, the patient developed right hemiparesis in the immediate post-operative period. MR brain with angiogram revealed thrombus propagation involving ICA and Left MCA and confirmed stroke (Fig. 4). The patient was started on anticoagulation and intensive physiotherapy. Her maximal power was 2/5 in the upper limb and 3/5 in the lower limb. With physiotherapy, she started regaining strength and by the third postoperative day, she had regained full power and could write and walk independently. Follow up Doppler showed no recanalization (Fig. 5). The rest post-op period was uneventful and the patient was discharged home neurologically intact, on antithrombotic therapy.

## Discussion

High grade blunt carotid injuries have stroke rates ranging from 26% in Grade 3 (pseudoaneurysm) to 100% in grade 5 (transection) [2]. Optimal treatment remains unclear [4,5]. Due to high rates of stroke in these patients, intervention is advocated, whether surgical or interventional radiological [2]. In all grades, low or high, antithrombotic or anticoagulant therapy is standard of care [3,6]. Grade 4 lesions (complete luminal thrombosis) are generally managed with stenting [2]. However, in this case, the patient was undergoing urgent neck exploration for concomitant tracheoesophageal injury and CCA being surgically accessible was amenable to repair. Logistic limitations ruled out surgical management of CCA injury. Saphenous vein interposition wasn't considered apt due

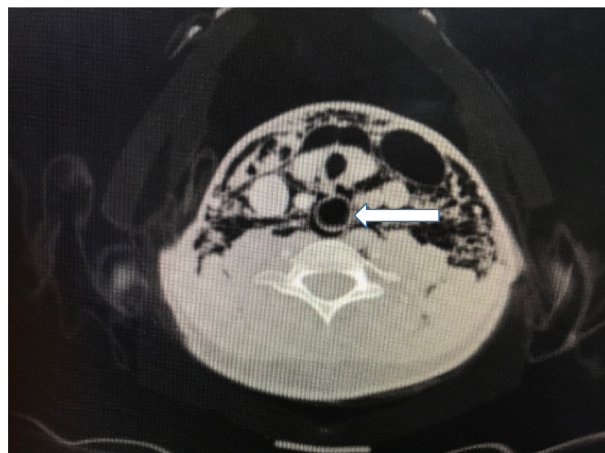


Fig. 2. Abnormally dilated esophagus.

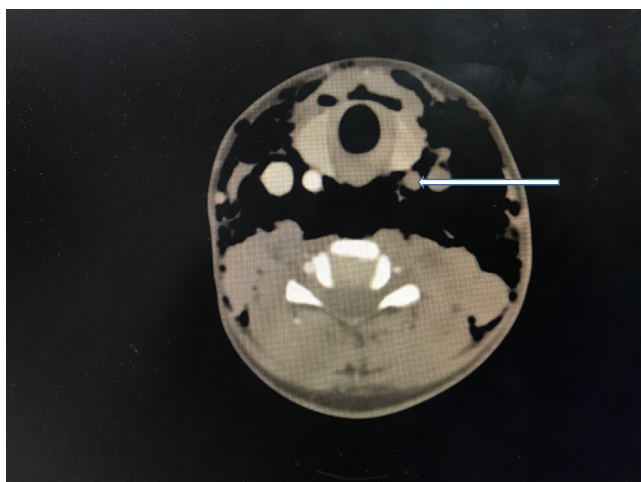


Fig. 3. Axial section CTA showing non-opacification of left CCA.

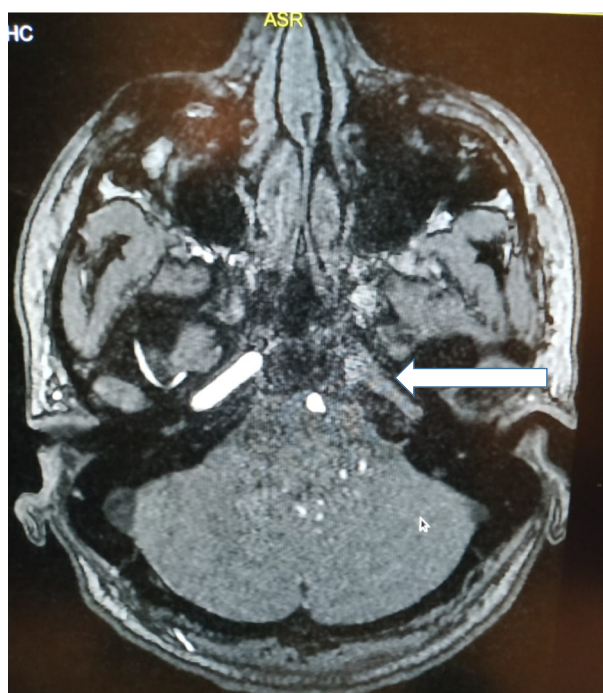


Fig. 4. MR Angio showing propagation of thrombus in left ICA.

to gross luminal discrepancy with injured CCA. ECA transposition to replace traumatized CCA was fraught with the danger of compromising the collateral supply of ICA which was perfusing the brain till presentation to ED, as seen in CT Angio.

Prognosis and neurological outcome in BCVI is highly associated with GCS at presentation [2]. In symptomatic patients, the period to development of stroke is highly variable, ranging from 6 h to 53 h [4,7,8]. Delayed presentation with rupture in asymptomatic patients has been documented as late as 2 weeks after trauma without any deficit, putting a natural history of CCA occlusion to speculation [9–11]. It is difficult to answer how many of these patients would actually benefit from intervention after being asymptomatic for so long. There are reports of neurologically intact survival after CCA and subclavian ligation in damage control surgery [12]. In our case, the patient presented neurologically intact after 10 h of trauma but developed stroke in the immediate post-operative period. Whether thrombus propagated due to the hypotensive effect of general anesthesia or migrated as a result of perioperative manipulation, remains an open question.

Some researchers have started questioning the utility of stenting in BCVI [4,13,14]. In fact, indications of stenting have been narrowed down to enlarging pseudoaneurysms and dissection with near-complete stenosis [14,15]. A review of patients undergoing CCA revascularization in the non-traumatic population also concluded that the benefits of traditional treatments in asymptomatic

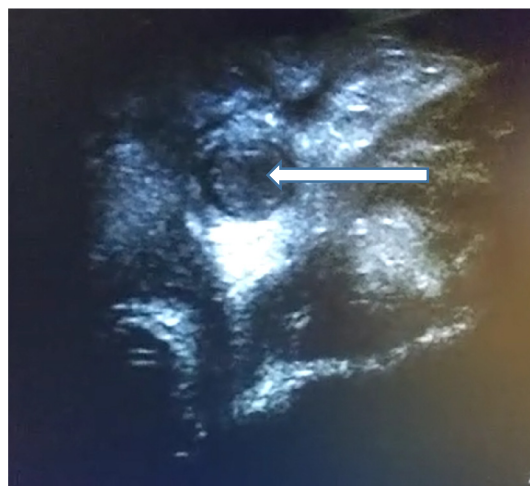


Fig. 5. Follow up Duplex showing intraluminal thrombus and absence of re-canalization.

patients are uncertain [16].

PubMed search using the MeSH terms “carotid artery injury” or “carotid artery injuries” AND “stroke” AND “stroke recovery” didn't yield any matching report.

A similar case with complete recovery of post-traumatic ICA stroke has been reported, however, time to recovery was 1 month. Similar to our case, the maximum deficit was Grade 3 and there was no recanalization on follow up imaging [17].

Dramatic recovery in MCA stroke has been defined in the medical population, however, with thrombolytic infusions in acute window [18]. In our case, routine antithrombotic therapy alone was followed. There is apprehension about secondary stroke from the recanalization of the thrombosed artery too and some people recommend follow up imaging for the same [2]. Follow up imaging in our case showed no recanalization.

The principle of ‘primum non-nocere’ with fate on the patient's side yielded excellent outcome in our case. Being a rare injury, GRADE 1 recommendations on the treatment of blunt carotid injuries are not possible currently. However, conservative management of grade 4 blunt carotid injury has come up as an option in low resource settings, as in our case, with a satisfactory outcome.

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