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Case Report

Forty hours with a traumatic carotid transection: A diagnostic caveat and review of the contemporary management of penetrating neck trauma

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ABSTRACT

Although penetrating neck trauma (PNT) is uncommon, it is associated with the significant morbidity and mortality. The management of PNT has changed significantly over the past 50 years. A radiological assessment now is a vital part of the management with a traditional surgical exploration. A 22 years old male was assaulted by a screwdriver and sustained multiple penetrating neck injuries. A contrast CT scan revealed a focal pseudoaneurysm in the left common carotid artery bulb. There was no active bleeding or any other vascular injuries and the patient remained haemodynamically stable. In view of these findings, he was initially managed conservatively without an open surgical exploration. However, the patient was noted to have an acute drop in his hemoglobin count overnight post injury and the catheter directed angiography showed active bleeding from the pseudoaneurysm. Surgical exploration 40 hours following the initial injury revealed a penetrating injury through both arterial walls of the left carotid bulb which was repaired with a great saphenous vein patch. A percutaneous drain was inserted in the carotid triangle and a course of intravenous antibiotics for five days was commenced. The patient recovered well with no complications and remained asymptomatic at five months followup.

Introduction

Penetrating neck trauma (PNT) is uncommon, which represents approximately 1% of all traumas in the United States.[1] However a mortality rate of PNT is accounted between 3% and 6%. The most common mechanism of PNT is stab wounds.[2] Given the anatomical intricacy of this region and the vicinity of major arterial vessels to the aerodigestive tract, a multidisciplinary approach is often needed to manage these injuries.

Case report

A 22 years old male was assaulted by a slotted screwdriver and suffered multiple facial and neck penetrating injuries. On arrival to our tertiary trauma center, the patient was noted to have suffered multiple penetrating injuries to his neck, involving zone Ion the right side and zone III on the left side as well as a right sided infraorbital facial laceration (Fig. 1). The patient had an intact airway with no respiratory compromise and remained haemodynamically stable without ongoing bleeding. No neurological deficit was noted. There were no documented soft or hard signs of vascular injury.

Contrast CT scan showed extensive surgical emphysema and a poorly defined hematoma involving the left carotid and parapharyngeal space which raised concern for a concomitant pharyngoesophageal injury. A small focal pseudoaneurysm of the carotid bulb was also noted (Fig. 2). Based on these findings, a plan made by a tertiary care which combines the otolaryngology surgical team and the vascular surgical team was implemented. In view of the patient's stable clinical condition, hemodynamic stability and absence of any soft and hard signs of vascular injury, he was managed non-operatively with a view for catheter directed angiographic imaging the next day. However the patient was noted to have an acute drop in hemoglobin count overnight post injury. Via the right femoral artery access, the emergent catheter-directed digital subtraction angiography (DSA) of the carotid elucidated the active contrast blushing arising from the pseudoaneurysm at the carotid bulb, which would raise concerns about the imminent rupture (Fig. 3).

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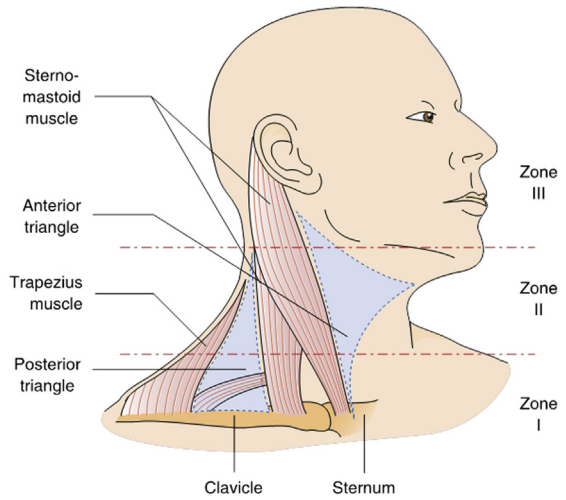

Fig. 1. Anatomical description of the location of penetrating neck injuries. Source: Van Waeset al.[11].

Fig. 2. Computer tomography angiography of the neck demonstrates a left common carotid artery pseudoaneurysm.

A decision was made to proceed with an exploration and repair of the carotid injury together with an exploration of the neck for pharyngoesophageal injury. Surgical exploration demonstrated a transection of the carotid bulb, which was repaired with a great saphenous vein patch (Fig. 4). The common carotid, internal carotid and external carotid were slung via an incision anterior to the sternocleidomastoid muscle. The anterolateral penetration of the distal common carotid was opened medially to connect with the posteromedial injury. The saphenous vein was anastomosed in a continuous fashion with 6-0 polypropylene starting at the posterior wall and continued around the medial wall to the anterior aspect of the common carotid artery. Surgical drains were left in the carotid triangle adjacent to the retropharyngeal space. In addition to this, saline lavage of the aerodigestivetract was performed by the otolaryngology team which demonstrated the absence of any

Fig. 3. A 3-D reconstruction of catheter based carotid angiography reveals focal pseudoaneurysm of the carotid bulb (white arrow).

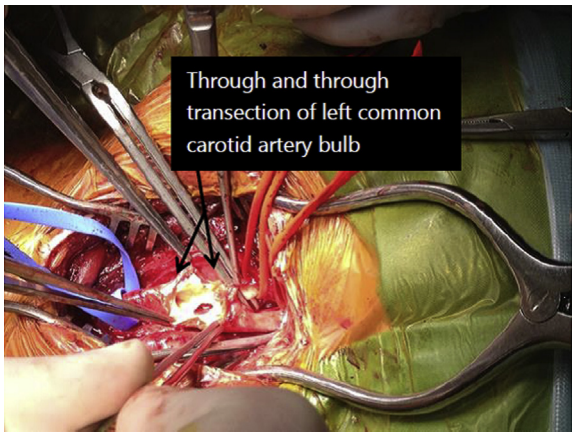

Fig. 4. Intraoperative photo depicts carotid transection in the left common carotid artery bulb (black arrows).

pharyngoesophageal injury. A barium swallow was also performed postoperatively which confirmed the absence of any aerodigestive tract injury and excluded the need for any further endoscopic assessment. The patient remained on piperacillin and tazobactam for five days and he was discharged seven days later on oral amoxicillin with clavulanate acid. Six weeks postoperatively, CT angiography (CTA) showed a patent carotid artery and the annual carotid ultrasound surveillance was planned. Five months after injury, the patient remained asymptomatic.

Discussion

The management of PNT has evolved over time. Over the following three decades, there has been a gradual shift to selective exploration or selective non-operative management secondary to high rates of negative explorations and iatrogenic injuries.[3]Current recommendation of the necessary of the mandatory exploration is controversial, which is based on anatomical location of injury.

PNT is typically classified according to the anatomical zone of the injury (Fig. 1). Zone I injuries occur between the clavicle and

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