



CAROTID BLOW OUT AS A COMPLICATION OF DEEP NECK SPACE ABSCESS

ENT

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ABSTRACT

Carotid rupture is a devastating complication of untreated or partially treated deep neck space abscess. Here is a report of 2 cases of deep neck space abscess in which carotid blow out occurred. Both patients were managed successfully, without any long term sequelae. Deep neck space abscesses are a very important part of day to day ENT practice and should be treated as soon as possible to prevent complications. In case complications occur, the knowledge regarding same and necessary precautions can help in successful management of patients.

KEYWORDS

Para-pharyngeal, Retropharyngeal, Carotid, carotid blow out, Deep neck Space Abscess

INTRODUCTION

Carotid bleed is usually associated with head and neck cancers owing to factors like erosion of vessels, surgery, radiation, etc. Another very important segment of patients presenting with carotid artery blow out is Deep Neck space Infections. It is more common in patients with poor socioeconomic strata and poor health care. Carotid blow out is a life threatening condition and here, we are discussing 2 cases that presented with Carotid artery bleed, which occurred as a complication of deep neck space abscess.

CASE 1:

A 14 year old male presented in ENT emergency with chief complaints of left sided neck swelling (Fig 1), which was noticed 7 days back. It was associated with dysphagia and fever. He had a history of sore throat, prior to the commencement of swelling. On examination, patient was febrile, dehydrated and had a left sided tonsillar and posterior pharyngeal wall bulge along with lymphadenopathy on left side of the neck, along with a diffuse, tense and tender bulge, on lateral aspect of neck. An ultrasound neck revealed a collection in left para-pharyngeal space. X ray soft tissue neck also showed increased prevertebral soft tissue.

The patient was taken up in emergency OT and incision and drainage was done trans-cervically under general anaesthesia. Extensive tissue necrosis along with extensive lymphadenopathy was observed along the course of Sternocleidomastoid muscle. Abscess was drained (Fig 2), around 20-25 ml pus was present, skin was partially sutured and a drain put in the abscess cavity for daily antibiotic washes. Patient showed initial improvement but the total leukocyte count had an increasing trend and swelling did not regress as expected.

On post-op day three, patient developed sudden massive haemorrhage from the neck wound. It was initially managed by digital pressure and intravenous fluids, while patient was swiftly shifted to theatre. Neck was explored under general anaesthesia (Fig 3), by a vertical incision along the anterior border of sternocleidomastoid muscle, joined to the previous horizontal incision. The bleeding point was localized at the medial end of carotid bulb. Internal Jugular vein was found thrombosed. The rent in the carotid artery was repaired using 5/0 prolene with intervening muscle patch from sternocleidomastoid muscle. All necrotic material from the cavity was debrided. Neck wound was kept open and dressing was done regularly. No neurological deficit was observed during post-operative period. The neck wound was sutured after satisfactory healing and granulation tissue formation. The patient is doing well, being in follow up for last 8 months



Figure 1: Neck swelling.



Figure 2: Parapharyngeal abscess drainage



Figure 3: Control taken at common carotid while exploring for bleeding site(case 1)

CASE 2:

A 2 year old female child presented to ENT emergency with complaints of dysphagia and fever for past 7 days. She was febrile and had mild respiratory distress at the time of presentation. Neck movements were restricted but there was no obvious neck swelling.

Left Posterior pharyngeal wall bulge was visualized on intraoral examination. X-ray soft tissue neck showed increased prevertebral shadow. Airway was partially compromised. USG neck revealed multiple necrotic nodes bilaterally with abscess collection in retro-pharyngeal space.

Patient was transferred to emergency OT where tracheotomy, followed by intraoral drainage of the retropharyngeal abscess was performed. Ryle's tube was also inserted and fixed. The patient seemed to be well initially, but developed fresh intraoral bleed in post-operative period on day one. It was a sudden fresh bleed and stopped spontaneously. Since this looked like a sentinel bleed, the patient was shifted to emergency theatre and oral cavity was explored under general anaesthesia.

On examination, there was no active bleed, but clots were found in the previous incision. On careful removal of the blood clots there was a sudden gush of excessive, bright red bleeding from the oropharynx. It was probably a large arterial bleeding. The oral cavity was packed with gauze and neck was explored. Carotid artery was delineated in the lower part of the neck but in the parap-haryngeal region there were blood clots and extensive necrosis of the tissues including the carotid wall. The exact point of point of bleeding could not be identified. When the common carotid artery was blocked with a clamp, the bleeding stopped immediately. It was then decided to ligate the common carotid artery (Fig 4) as a life saving measure. Left half of palate and tongue were immediately exsanguinated. The oral wound was packed with surgical and neck wound was closed. Patient was transferred to pediatric ICU. In the postoperative period the patient was found to be moving all limbs and pupillary reflexes were also normal. Subsequently, decannulation trial followed by closure of tracheostomy was done. The patient is under follow up for 2 months now and is doing well.



Figure 4: common carotid ligation(case2)

DISCUSSION

A variety of causes have been associated with deep neck abscesses and include pharyngitis, tonsillitis, sinusitis, otitis media, dental infections, sialadenitis, and trauma to the upper aero-digestive tract, such as that from endotracheal intubation, upper endoscopy, or foreign bodies. Though, in today's day and age with advancement in technology and effective pharmaceuticals, these infections are in less numbers than before and the complications have also become rare. These days, complications like carotid artery bleed are usually seen associated with malignancy.

But, in saying that, we also realise that a vast majority of Indian population is rural and deprived of immediate medical attention. This leads to oto-laryngeal infections, fuelled by malnutrition and immunodeficiency, eventually presenting as complications.

The carotid sheath receives connective tissue contributions from all three layers of deep cervical fascia, and yet it remains anatomically independent as a barrier against the spread of infection into the carotid space from the adjacent deep neck compartments, of which the parapharyngeal space is the most intimate. Involvement of the carotid sheath contents can lead to complications such as septicemia, Lemierre's syndrome, an infective internal jugular vein thrombosis (IJVT), carotid artery pseudo-aneurysm or rupture, ipsilateral Horner's syndrome, and cranial nerve IX through XII palsies.

Carotid artery rupture happens less frequently than IJV thrombosis and carries a grave prognosis. The four cardinal signs of carotid artery rupture are

- (1) **Sentinel bleed**-recurrent small hemorrhages (which occur in arterial injuries more than in venous injuries)
- (2) **Protracted clinical course** (7 to 14 days)
- (3) **Hematoma/discolouraion** of the surrounding skin and tissues
- (4) **Shock**

If blood clots are found on exploration or drainage of an abscess, a carotid artery rupture should be expected (1). The largest series reported that 62% of hemorrhages were from the internal carotid artery, 13% from the common carotid artery, and 25% from the external carotid artery.(2)

In case of deep neck space infection of prolonged duration, there can be erosion of carotid sheath because of infective necrosis leading to formation of a pseudo-aneurysm. A pseudo-aneurysm(PA), or false aneurysm, is defined by the loss of integrity of the 3 layers of the arterial wall, resulting in a contained rupture of the blood vessel and differs from a true aneurysm, in which the vascular wall is intact but dilated. Osler initially named this condition *mycotic pseudoaneurysm* in 1885 (3), but the name is somewhat of a misnomer since the PA is more frequently caused by bacterial rather than fungal infection. PA of the internal carotid artery usually presents as a growing pulsatile mass at the lateral aspect of the neck. They may be associated with pain, fever, dysphonia, or dysphagia; therefore, PAs can be misdiagnosed clinically as neck abscesses. The outcome would be devastating if a PA were to be incised and drained or even needle aspirated. It is thus imperative that proper diagnostic imaging be performed before treatment is initiated. If treatment is delayed, the PA may rupture or send septic emboli to the brain, resulting in death.(4,5,6)

In 1843, Dr. Liston first suggested that chronic cervical abscess can lead to pseudo-aneurysm of the carotid arteries.(7)

In 1933, Dr. Salinger and Dr. Pearlman, reviewed 227 cases in the largest series of PA. In total of 227 cases for all groups, there were 154 in which no ligation was performed, and only 36 patients (23 per cent) recovered. Ligation was performed on 72 patients, and 47 recovered (65 per cent). There were 18 ligations of the external carotid artery, with 11 recoveries (61 per cent), and 54 ligations of the common carotid artery, with 36 recoveries (67.5 per cent). These figures prove definitely that the advantage was in favour of the patients on whom a ligation was performed. The high mortality in the cases in which ligation was not performed was shown in 90 autopsies to have been due to erosion of a major vessel (the internal carotid artery in most cases), which had been involved in the suppurative process with resultant weakening of its walls and aneurysmal dilatation.

As has been pointed out by Dr. Skoog and by Dr. Serker, the dangerous cases are those in which one or more of the following factors are present:

1. Spontaneous hemorrhage or hemorrhages so severe as obviously not to be arising from a minor vessel.
2. A protracted course in which the swelling fails to disappear following a previous incision.
3. Hematoma of the surroundings as evidenced by submucous discoloration or tense, brawny swelling.
4. Increasing pain, swelling locally and in the neck and trismus, despite incision of the abscess and long after the course of a normal peri-tonsillar abscess has been run.
5. The presence of pulsation in the peritonsillar area.

They concluded that it was better to offer the patient, a chance at survival by attempting ligation of carotid, rather than avoiding to do so for the fear of complications. (2)

The incidence of arterial PA complicating deep neck space infection declined significantly after the introduction of antibiotic medications, with only 23 such cases being reported between 1933 and 1987 (8,9). Dr. Andrew Reisner and Dr. Gary Marshall reported a 6 year old female, in 1999, with a carotid PA due to a deep neck space infection. She was treated by endovascular occlusion of ICA and made an uneventful recovery.(10) Dr. Ishwar Singh and Dr. Ravi Meher reported the case of a 4 year old child, in 2003, who presented with a massive para-pharyngeal abscess with a sentinel bleed. Patient underwent a common carotid artery ligation and did not have any neurological sequel after the procedure.(11) Dr. Siamak Pourhassana and Dr. Dirk Grottemeyer reported 4 cases with carotid aneurysms in 2007, 2 of which were there as a sequel of deep neck infections and

were treated by resection and grafting.(12) Dr. Michel Ruff and Dr. Dina M reported the case of a 2 year old boy with retropharyngeal abscess, with a PA, who presented with neurological symptoms. He was treated by platinum coiling of the internal carotid followed by drainage of abscess. (13)

Early recognition and surgical intervention to gain proximal control of the common carotid artery is essential because more distal ligation may be impossible(14), as seen in our second case. Interventional radiologic procedures such as endovascular stenting or vessel occlusion are also an option in less urgent cases. In case of infective aetiology, arterial ligation may be considered since the arterial wall in these cases is mostly necrosed, friable, and beyond repair. Reconstruction procedures and repair with stents and coils may not be always feasible in case of post-abscess aneurysm. Open surgery also provides a path for drainage of the abscess. Patients who present with history of sentinel bleed thus should be treated on an emergency basis as they are at risk of carotid blow-out.(15) In both our cases, there was sentinel bleeding from the abscess cavity and the oral cavity. The diagnosis of possible carotid involvement was considered in both the cases and hence were managed on an emergent basis. Accordingly, the parents were also counseled pre-operatively in view of the high morbidity and mortality of carotid involvement by the abscess. In both the cases we had to ligate the carotid to save the life of the patient and the common carotid artery ligation did not cause any neurological sequelae. This is due the contralateral ICA, ECA, and the vertebral arteries which provide the collateral circulation.

Thus, vigilance and preparedness to act quickly is very important when dealing with such patients. Whenever suspecting a pseudo-aneurysm, incision and drainage has to always be performed in OT setting, and we should be prepared for carotid ligation if the need may arise, not forgetting the airway. Also, we have to do frequent check-ups during follow up to catch any neurological deficit at the earliest and manage the same.

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