

Management of Carotid Artery Blow Out: A Real Test to Effective Decision Making and Prompt Management

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Abstract

Carotid artery blow out is a dreaded complication in the postoperative setting of head and neck oncological surgeries. It is an emergency situation which requires immediate highly guarded decisions to explore and ligate are made in short spell of time keeping the fact of high mortality rate and neurological complications. In our institution, we encountered 4 patients with carotid blow out which tested our skill and efficiency in managing them. Each of these cases are unique in their own way of management. The decisions made and the management plan are highly in accordance with the state of the patient's condition, stage of disease, time of presentation, the skill and experience of surgeon and the resources available in our institution.

Keywords: Carotid blow out; Head and neck malignancies; Carotid artery repair

Introduction

Carotid artery blowout is one of the dreaded complications after head and neck oncological surgeries mostly when neck dissections are carried out during definitive surgeries of primary carcinomas in head and neck, usually oral cavity, oropharynx and pharyngolaryngeal malignancies. The incidence ranges from 3-4% in these patients undergoing neck dissection [1]. Cases with prior radiation, flap necrosis, mucocutaneous cervical salivary fistula and deep neck space infection all provides a greater risk of postoperative carotid blowout in these patients due to arterial wall necrosis. The mortality and neurological sequelae following carotid blowout is more than double in cases with non-elective carotid resection when compared to elective ligation [2]. In all cases, stabilizing the patient with control of airway (consider cuffed tube), fluid resuscitation and direct pressure application always comes first. Any other intervention can be considered only after the patient is stabilized from a respiratory and cardiac stand point. The possible management in circumstances where radiological interventions and support are unavailable are exploration, debridement and ligation, with a transfixion suture through a healthy vessel wall. The reported mortality rate of 9-100% (median 40%) and major neurological complication of 9-84 percent (median 60%) [1].

Here we discuss 4 cases of carotid blowout managed by 4 different ways in special situations. Each of the management differs in its own way depending upon the various factors affecting the decision making - the state of the patient's condition, stage of disease, time of presentation, the skill and experience of surgeon and the resources available in the institution. The purpose of this study was to highlight the active interventions in an emergency setting of imminent and acute carotid artery blow out where interventional radiology is not available.

Case Study

Case 1

This patient was 63 years old diagnosed as Carcinoma hypopharynx in subsite of pyriform fossa on right side with clinical staging of T3 N1 M0. The patient underwent radiotherapy 2 years back with 66 Gy in 33 fractions for 6.5 weeks. After two years, he developed locoregional recurrence and planned for salvage surgery after metastatic work up indicating disease confined to hypopharynx. He underwent total laryngectomy with partial pharyngectomy with patch pharyngoplasty using pectoralis major myocutaneous flap from right side. The immediate postoperative period was uneventful. He was detected with hypoalbuminemia preoperatively and amino acid replacements were also given both in preoperative and postoperative period. After 2 weeks postoperatively the patient developed pharyngocutaneous fistula on left side. He was given ryles tube feeding for next 2 weeks and daily pressure dressing. After 4 weeks of postoperative period, the patient still presented with fistula and hence ryles tube feeding was continued. He received conservative management with high protein diet and nursing support. After 45 days of surgery, he developed torrential bleeding from the wound on left side when the pressure dressing was removed. Immediate digital pressure was applied and he was shifted to Operation Theatre with guarded prognosis. The wound was explored and a rent on the lateral wall of left common carotid artery was identified with eroded wall. The left common carotid artery was ligated below the rent. Before ligation was carried out, Heparin 5000 units was infused. A brisk back flow of blood was present during the ligation which suggested a good indicator for the postoperative period. The pharyngocutaneous fistula was also repaired at the same time. Pectoralis Major Myocutaneous Flap was harvested from the left side and the wound was closed. Postop fluid resuscitation was done. Postoperatively anticoagulants viz. Low molecular weight Heparin and Aspirin orally were continued for 5 days with continuous monitoring in ICU. The haemoglobin values and bleeding parameters were continuously monitored. Blood transfusion was done in the immediate postop period to maintain the blood volume and haemoglobin level.

The patient did not develop any neurological complication and the fistula also healed after 3 weeks. The patient was discharged with oral feeds and regular follow up. He was in follow up for last 10 months and now lost to follow up. The standard management of ligation of common carotid artery was done because of the nonavailability of interventional radiology in our centre.

Case 2

50 years old male patient was diagnosed as Carcinoma hypopharynx in subsite pyriform sinus with clinical staging of T4a N1 M0 18 months earlier. After thorough head and neck evaluation, he underwent total laryngectomy with partial pharyngectomy with lateral neck dissection bilaterally. Primary closure of neopharynx was achieved. He received 70 Gy radiations in 35 fractions for a period of 7 weeks in the postoperative period. The patient was on regular follow up and attended the head and neck clinic regularly for next 18 months. After the mentioned period, he noticed minimal bleeding from the right side of his lower neck. He consulted a physician nearby who had given a pressure bandage and referred him to our institution. The patient reached the OPD next day and a torrential bleeding was noticed once the pressure bandage was loosened. Digital pressure was given and patient was shifted to OT with guarded prognosis where the neck was explored under local anaesthesia. The neck suture line had a gaping and the right common carotid artery was identified with a longitudinal tear below the bifurcation. The artery was clamped below the tear and the induction anaesthesia was provided after achieving the stable condition. General anaesthesia was deepened and the surgical procedure was continued. The tear along the carotid artery was repaired with 6-0 prolene. PMMC flap was harvested on right side and reinforced over that side of neck. Postoperatively adequate blood components and fluids were replaced. He was discharged in a week time. The patient was followed up for a period of 5 months but presented with a nodal recurrence on the other side (left). He is now under palliative care.

Case 3

This 65 years old, a case of carcinoma pyriform sinus in stage IV A, was advised for definitive CCRT as primary modality in the multidisciplinary clinic. But the patient defaulted during the course of CCRT and presented with residual disease on right neck level III after a period of three months. He was thoroughly evaluated with the metastatic protocol and on account of this, he underwent salvage surgery for the primary disease. In the postoperative period, after 10 days, pharyngocutaneous fistula developed on right side of neck which failed to heal on conservative management. After 3 weeks postoperatively, the neck was re-explored with the plan to repair the fistula and to secure with PMMC flap reconstruction of the neck. Peroperatively granulations were observed over the right common carotid artery and when tried clearing the granulations, torrential bleeding from common carotid artery was encountered. On careful examination, a small vertical rent was seen in the common carotid artery which was repaired with 6-0 proline and haemostasis was achieved. The wound was closed and in the postoperative period patient developed hemiplegia on second day. The patient got discharged after a period of 3 weeks with advise on domestic care and physiotherapy. He was followed up for next 9 months and later found to have expired after a brief hospitalisation for repeated seizures.

Case 4

60 years old male patient, was an old diagnosed case of carcinoma pyriform sinus of staging cT4aN1M0 and underwent total laryngectomy with partial pharyngectomy with neck dissection bilaterally followed by 70 Gy postoperative radiation completed 1 year 4 months earlier. During regular follow up visit, he had a palpable node >3 cm size on right side of the neck at level 4. FNAB confirmed as nodal recurrence and was evaluated with metastatic work up for salvage neck dissection. He presented to the emergency room with bleeding from the right side of neck. On examination, the patient was conscious and oriented and there was torrential bleeding on the right side of lower neck from the site of nodal recurrence just 2 cm superolateral to stoma. Pressure bandage was applied around the neck, cuffed tracheostomy tube was inserted and guarded prognosis was taken. Before prompt exploration, the patient had aspirated blood through stoma earlier and had cardio respiratory arrest in the emergency room. CPR was initiated but the patient was not revived.

Discussion

Carotid blow out is an extremely high risk condition associated with significant degrees of morbidity and mortality. This condition commonly results from invasion and destruction of cervical carotid vasculature from head and neck squamous cell carcinomas. Prompt diagnosis of this condition and active intervention will help in saving lives of these patients. There are 4 types of carotid blow out syndrome: (1) threatened carotid blow out which occurs in patients who have their carotid arteries exposed due to soft tissue breakdown, (2) impending carotid artery rupture, presents usually with history of sentinel bleeds from neck. This sentinel bleeding may precede ultimate blow out. This period is highly variable and can range from moments to months, (3) this type is characterised by torrential bleeding due to rupture of carotid artery. This type carries the maximum mortality since the death is nearly instantaneous if not handled properly. The first, second and third cases were third type of blowout but active intervention and management proved effective for the three case whereas the fourth case succumbed to bleeding due to recurrence disease in the bleeding site and aspiration [3].

In the first case, the pharyngocutaneous fistula that developed postoperatively was the main reason for the erosion of walls of carotid leading to blowout. This dreaded complication of fistula occurring after pharyngeal surgeries most commonly in post irradiated neck, has to be addressed earlier and a constant watch on cases developing fistula should be encouraged. This could have been prevented by cautious and meticulous closure of neopharynx and by augmenting the bare vessels with prophylactic pectoralis muscle flap. A vigilant observation of fistula and their proper management in the postoperative period is mandatory. The second case was a rare presentation with warning sentinel bleed and the expected reason for carotid wall injury might be the baring of the vessel wall during neck dissection. This retrospectively gives a warning for surgeons on careful dissection over the vessel wall and the rampant use of monopolar diathermy in dissecting the carotid sheath thus, providing an opportunity for thermal damage to the walls of the great vessels of neck.

The third case shows granulation formation over the vessel wall which are signs of chronic irritation and inflammation that takes place over a period of time postoperatively as a part of healing process. The fourth case had a nodal recurrence which could have lead to infiltration of tumour into the walls of carotid. Both these cases

specifically explain the healing tendency and the course of the disease leading to a delayed expression of a complication which is beyond the surgeons ability to prevent. The presence and absence of interventional radiology imaging facilities doesn't matter in such situations as the time to act is very less and the decision to intervene by the surgeon takes precedence.

Various causes are attributed like aneurysms, infections cause vasovasorum thrombosis leading on to necrosis of carotid walls, secondary carcinomatous deposits in cervical lymph nodes, following irradiation for secondary carcinomatous deposits in the neck - Free radicals caused during irradiation causes thrombosis of vasovasorum leading on to breakdown of carotid artery wall. Predisposing factors include prior radiation therapy, extensive surgery, wound breakdown, local infection, tumour recurrence and pharyngocutaneous fistulae. Patients develop fibrosis and thinning of the cartotid arterial wall leading on to blow out. Arterial ligation is preferred if the patient is unstable with type III carotid blow out syndrome. This is the preferred modality of treatment if facilities are not available for endovascular therapy. As a temporary measure a gloved finger can be used to occlude the bleeder instead of pressure dressing till definitive treatment is available.

Emergency surgical ligation of the ICA or CCA is typically used to treat CBS. This approach is associated with an average neurologic morbidity rate of 60% [4]. Endovascular techniques, including permanent balloon occlusion of an affected ICA, substantially improve patient outcomes [4-6]. However, as many as 15%-20% of patients with CBS who are treated with permanent balloon occlusion develop immediate or delayed cerebral ischemia [7,8].

Conclusion

Endovascular treatment for carotid blow out is the standard of care but exploration and artery ligation still have a role in treating this

feared complication where time constrains the further evaluation and when interventional radiology is unavailable.

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