

A Case of Common Carotid Artery Pseudoaneurysm Repair: An Anaesthetic Challenge

MALAVIKA NAMBIAR¹, B KALA², DIPIKA BALASUBRAMANIAN³, AKASH BABU⁴



ABSTRACT

Pseudoaneurysms of the extracranial common carotid artery are rare but potentially life-threatening vascular lesions that may present with airway compromise, embolic events, cranial nerve palsy or rupture. Surgical repair is technically challenging because of maintenance of cerebral perfusion during carotid cross clamping. The present study describes the successful management of a patient undergoing repair of a giant common carotid artery pseudoaneurysm. A 56-year-old male patient, known hypertensive and chronic smoker was planned for surgical repair of pseudoaneurysm of left common carotid artery. Extracranial carotid artery pseudoaneurysms are uncommon but potentially catastrophic because they may rupture, embolise, or compress the airway and adjacent cranial nerves. Aetiological factors like mycotic pseudoaneurysms, fibromuscular dysplasia and Behçet’s disease (triad of mouth, genital ulcers and relapsing iritis) have also been reported. Histologically aneurysms have been divided into two types: True aneurysms and pseudoaneurysms. Pseudoaneurysms are more common and develop when entire arterial wall is lacerated and surrounded by a haematoma. Large pseudoaneurysm may produce vascular impairment to the head and neck and airway distortion. The neck swelling was impinging upon and displacing the trachea. The huge neck swelling and tracheal deviation poses challenges to anaesthesiologists in airway management. The affected carotid artery was clamped during the repair. The present case highlights the precautions taken, the detection and the strategies for preventing the impending cerebral insult during such surgeries whenever the carotid artery is clamped. The present case is distinctive because a giant pseudoaneurysm causing airway displacement and vocal cord palsy was successfully repaired despite coexisting ventricular dysfunction and anaemia, using controlled airway instrumentation, short shunt-supported carotid clamping, and immediate neurological assessment.

Keywords: Cerebral blood flow, Intraoperative monitoring, Vascular surgical procedures

CASE REPORT

A 56-year-old male weighing 52 kg presented to the Department of Vascular Surgery with a progressively enlarging swelling on the left side of the neck for six months. The swelling was associated with dull aching pain with Visual Analogue Scale (VAS) score of 5. The pain was radiating to jaw, associated with hoarseness of voice. Aggravating factors included coughing and swallowing, relieved by keeping neck still. The patient had a smoking history for 20 years, he used to smoke 20 cigarettes per day (pack years -20), and consumed alcohol for 10 years everyday. He was diagnosed with hypertension since 1 year and was taking T. amlodipine 5 mg OD and T. enalapril 10 mg OD for one year on regular treatment. There was no history of diabetes mellitus, chronic kidney disease, previous neck trauma, surgery, or other major co-morbidity. He was classified as American Society of Anaesthesiologists (ASA) physical status III.

At preanaesthetic assessment, the patient was comfortable at rest, without stridor or overt respiratory distress. Pulse rate was 58 beats/min and blood pressure as 140/96 mmHg. Physical examination showed mild pallor, no icterus, clubbing, cyanosis or lymphadenopathy noted. An expanding pulsatile mass measuring approximately 9x7 cm occupied the left side of the neck, and a bruit was audible over it. Blood pressure recorded during admission ranged from 130/80 to 190/100 mmHg, with the right upper-limb blood pressure was higher than the left. Respiratory and cardiovascular examinations were otherwise unremarkable. There was no focal neurological deficit except hoarseness attributed to left vocal cord palsy. Airway examination showed modified Mallampati class II, partial edentulism, and restricted neck movement caused by the swelling. Preoperative investigations are summarised in [Table/Fig-1].

Investigation	Result
Haemoglobin	8.3 g/dL
Total leukocyte count	4500 cells per microlitre of blood
Platelet count	162000 per microlitre
Prothrombin time/ international normalised ratio	11.2 seconds/1.01
Serum urea	22 mg/dL
Serum creatinine	1.1 mg/dL
Serum sodium	139 meq/L
Serum potassium	3.95 meq/L
Chest radiograph	Mild cardiomegaly
Echocardiography	Global left ventricular hypokinesia; ejection fraction 37%; moderate systolic dysfunction; grade II diastolic dysfunction
Neck radiograph	Rightward tracheal deviation
Computed tomography angiography	10x8 cm left common carotid artery pseudoaneurysm just below the bifurcation, with thrombus and airway displacement
Video laryngoscopy	Left arytenoid oedema, left vocal cord palsy, and fullness of the left pyriform fossa

[Table/Fig-1]: Preoperative laboratory and cardiopulmonary investigations.

Anaesthetic Management

The patient was premedicated with T.ranitidine 2-4 mg/kg i.v.(150 mg) and T.metoclopramide 0.1-0.15 mg/kg i.v. (10 mg) at 6 am on the day of surgery. Patient took all his anti-hypertensive drugs except T. Enalapril. The patient was counselled and consent obtained. The case was planned to be done under general anaesthesia under ASA physical status III. In the operative table, non invasive monitors like Spo₂, Electrocardiogram (ECG), Non Invasive Blood Pressure (NIBP), and End-tidal Carbon dioxide (ETCO₂) and temperature probe (after

induction) were connected to the patient. Baseline parameters were recorded and the blood pressure was measured as 130/90 mmHg, Pulse rate of 59/min and SpO_2 -98% in room air. Intravenous access was secured with 16 G canula on the dorsum of right hand. Under local anaesthesia, a 7 Fr triple lumen central venous lines was started in right subclavian vein. Right radial artery was cannulated for invasive BP monitoring. Vasopressors and vasodilators were kept ready. The patient was given inj. glycopyrrolate 0.2 mg and inj. fentanyl 1-3 microgram/kg i.v. (100 µg) as pre-medication. He was pre-oxygenated with 100% oxygen for five minutes. Inj. lignocaine 1 mg/kg was administered two minutes intravenously to blunt the intubation response. Being 52 kg, the patient was induced with inj. thiopentone 3-5 mg/kg i.v. (250 mg), after ventilation was confirmed with bag and mask and inj. succinylcholine 1-2 mg/kg i.v. (100 mg) was given. The patient was intubated with 7.5 size flexometallic cuffed endotracheal tube (bougie guided) since Cormack-Lehane score was 3 as the external manipulation was avoided due to the possibility of aneurysmal rupture. Post-intubation- BP was 170/94 mmHg. After coming out from the effect of succinylcholine, he was given 5 mg of inj. vecuronium. Anaesthesia was maintained with $\text{N}_2\text{O}:\text{O}_2$ in a ratio of 2:1 and 0.4-0.6% isoflurane and inj. fentanyl 20 µg was repeated hourly for analgesia. Non depolarising agent-inj. Vecuronium (0.01 mg/kg) was used for muscle relaxation. Bladder was catheterised. The patient was maintained in supine position for surgical access.

The patient was placed in supine position with neck extension. A longitudinal incision was made along the anterior border of sternomastoid muscle. The Common, Internal and External carotid arteries and the aneurysm was exposed and isolated. Perianeurysmal dissection was done. During perianeurysmal dissection the patient had one episode of bradycardia (Heart rate-42), and it was treated with inj. atropine 0.6 mg. Inj. hydrocortisone 100 mg and 5 minutes after heparinisation (inj. heparin 100U/kg) was given intravenously. The internal carotid artery was clamped first followed by clamping of the external and common carotid arteries. The aneurysm was subsequently opened and the contents were evacuated. Cerebral blood flow was established using inline straight shunt between Common Carotid Artery (CCA) and Internal carotid artery. Aneurysm sac was excised and interposition bypass was done using reverse saphenous vein graft.

Before closing the distal anastomosis, shunt was removed. During carotid cross clamping- N_2O was cut down and only 100% O_2 was given. Total cross clamp time-9 minutes including the time for shunting. Cerebral flow was established after closing the distal anastomosis. Before release of the clamp, inj. mannitol 0.5 g/kg i.v. was given in order to correct the metabolic acidosis. Complete haemostasis was secured.

Haemodynamic parameters remained stable throughout procedure. Blood pressure (before, during and after cross clamping) was 152/96 mmHg, 156/90 mmHg, 142/86 mmHg, respectively, while the corresponding heart rates were 68, 66 and 59 beats per minute. ETCO_2 level was kept between 26-35 to maintain normocarbica or mild hypocarbica since CO_2 is a potent cerebral vasodilator. Temperature was maintained around 34°C. Blood loss was around 400 mL. Patient was transfused with two units of packed red blood cell since the patient had low haemoglobin preoperatively. 2000 mL of crystalloids were given. Urine output was 750 mL. Total duration of surgery was three hours. Patient was reversed with inj. Glycopyrrolate 0.01 mg/kg i.v. (0.4 mg) and inj. neostigmine 0.05 mg/kg i.v. (2.5 mg). After thorough oral suction the patient was extubated. Post-extubation, the patient's blood pressure was 150/80 mmHg. He was assessed for neurological deficit on the table. There was no neurological problem. The patient had mild hoarseness of voice, comparatively better than preoperative period. Patient was observed in Intensive Care Unit (ICU) for 24 hours. Postoperative period was uneventful

and the patient was haemodynamically stable without any support of vasopressors or vasodilators. The hoarseness of voice settled down completely on 3rd postoperative day.

DISCUSSION

Extracranial carotid artery aneurysms and pseudoaneurysms are rare and have heterogeneous causes, including atherosclerosis, trauma, infection, dissection, previous surgery, and inflammatory arteriopathy [1]. Contemporary reviews identify neck mass, pain, cranial nerve dysfunction, and neurological events as common presentations; large lesions can produce dysphagia, hoarseness, and airway deviation through local mass effect [2]. The present patient had a giant common carotid pseudoaneurysm with tracheal deviation, arytenoid oedema, and unilateral vocal cord palsy, but no preoperative cerebral ischaemic deficit. Its size, location near the bifurcation, and compressive symptoms justified active intervention.

The principal anaesthetic challenge was securing the airway without provoking rupture or losing ventilation after induction. Similar reports describe abrupt airway compromise or catastrophic bleeding from large cervical pseudoaneurysms. Das D et al., reported rupture of a common carotid pseudoaneurysm with a large neck haematoma and severe airway distortion [3], while Kadian S et al., described a 10x9x7 cm lesion with tracheal deviation that was intubated awake before unexpected rupture and emergency endovascular treatment [4]. Babu B et al., reported a ruptured postoperative carotid pseudoaneurysm with tracheal compression, and Khan MJ et al., emphasised multidisciplinary preparation for a compressive supra-aortic pseudoaneurysm [5,6]. Current difficult-airway guidance supports awake intubation when difficult ventilation, difficult intubation, intolerance of apnoea, or difficult emergency invasive airway access is anticipated [7]. In the present case, awake intubation was not preferred due to difficulty to administer airway block owing to huge neck swelling. Intubation after induction was selected to maintain haemodynamic stability and have better control over airway. Mask ventilation was confirmed before neuromuscular blockade; a bougie was used for the grade III view, and external manipulation was deliberately avoided.

The second challenge was preserving cerebral perfusion during carotid clamping while avoiding excessive myocardial workload in a patient with an ejection fraction of 37%. General principles extrapolated from carotid surgery include avoidance of hypotension, maintenance of oxygenation and normocapnia, minimisation of clamp duration, and selective or routine shunting according to surgical strategy and cerebral-monitoring findings [8]. Under general anaesthesia, electroencephalography, somatosensory evoked potentials, transcranial doppler, stump pressure, and near-infrared cerebral oximetry can help identify inadequate perfusion, although no single modality is universally superior [9]. In the present case, a temporary common-to-internal carotid shunt, a 9-minute clamp interval, and maintenance of pressure close to the patient's established range were followed by an intact immediate neurological examination. Hydrocortisone, mannitol, and mild hypothermia were used according to local practice; the most clearly established protective elements were continued cerebral flow through the shunt, short occlusion time, adequate arterial pressure, and avoidance of hypoxaemia.

Open repair permits decompression of a large neck mass and durable reconstruction, whereas endovascular exclusion can avoid extensive dissection and reduce cranial nerve injury in selected anatomy [10]. For the present patient, the lesion's large size, bifurcation-level location, thrombus burden, and airway and vocal-cord compression favoured open excision and interposition grafting. Recent series continue to report acceptable outcomes with open, endovascular, and hybrid approaches when treatment is tailored to lesion morphology [11].

Postoperative priorities include early detection of cervical haematoma, airway oedema, cranial nerve dysfunction, stroke, haemodynamic instability, and cerebral hyperperfusion. Close intensive-care observation was appropriate because both airway obstruction and neurological deterioration can occur after apparently uncomplicated repair. Immediate extubation allowed early neurological assessment, while the resolution of hoarseness by the third postoperative day suggested relief of compressive neuropathy or reversible laryngeal dysfunction.

CONCLUSION(S)

A giant common carotid artery pseudoaneurysm can simultaneously threaten the airway, cerebral circulation, and haemodynamic stability. Safe management requires an explicit difficult-airway and haemorrhage plan, minimal manipulation of the neck mass, invasive blood pressure monitoring, maintenance of cerebral perfusion during carotid occlusion, and rapid postoperative neurological assessment. In the present case, controlled bougie-guided intubation, temporary carotid shunting, a short cross-clamp time, and vein-graft reconstruction resulted in an uncomplicated neurological and airway outcome.

REFERENCES

- [1] Martinez HR, Acevedo-Castillo CD, Macias-Cruz HM, Bautista-Coronado UA, Ortega-Ruiz OR, Cornejo-Hernandez A, et al. Extracranial carotid artery aneurysms: A comprehensive analysis of its epidemiology, pathogenesis, diagnosis, and management: A scoping review. *World Neurosurg.* 2025;194:123528. Doi: 10.1016/j.wneu.2024.11.111.
- [2] AXiEr A, Turhon M, Maimaiti A, Gheyret D, Jiang S, Kadeer K, et al. Management of large or giant extracranial carotid artery aneurysms: A single-center experience. *BMC Neurol.* 2024;24:468. Doi: 10.1186/s12883-024-03970-z.
- [3] Das D, Chauhan S, Das S, Praveen P. Unforeseen rupture of pseudoaneurysm of common carotid artery: An arduous anaesthetic challenge. *Ann Card Anaesth.* 2022;25(1):119-22. Doi: 10.4103/aca.aca_257_20.
- [4] Kadian S, Haldar R, Trivedi N. Common carotid artery pseudoaneurysm: A perilous powderkeg. *J Pediatr Neurosci.* 2023;18(3):254-57. Doi: 10.4103/jpn.JPN_161_21.
- [5] Babu B, Jayant D, Behera A, Tandup C, Sahoo SK, Thakur V. Ruptured carotid artery pseudoaneurysm following excision of a carotid body tumor: A rare complication managed successfully with surgery and literature review. *J Vasc Bras.* 2024;23:e20230170. Doi: 10.1590/1677-5449.202301702.
- [6] Khan MJ, Baykuziyev T, Tageldin T, Albasha A. Anaesthetic challenges in a patient with an expanding recurrent mycotic pseudoaneurysm of the right brachiocephalic artery: A case report and literature review. *Cureus.* 2024;16(3):e55372. Doi: 10.7759/cureus.55372.
- [7] Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of Anaesthesiologists practice guidelines for management of the difficult airway. *Anaesthesiology.* 2022;136(1):31-81. Doi: 10.1097/ALN.0000000000004002.
- [8] Naylor R, Rantner B, Ancetti S, de Borst GJ, De Carlo M, Halliday A, et al. Editor's choice - European Society for Vascular Surgery 2023 clinical practice guidelines on the management of atherosclerotic carotid and vertebral artery disease. *Eur J Vasc Endovasc Surg.* 2023;65(1):7-111. Doi: 10.1016/j.ejvs.2022.04.011.
- [9] Stilo F, Montelione N, Paolini J, Strumia A, Cuccarelli M, Nenna A, et al. Current status of brain monitoring during carotid endarterectomy. *JVS Vasc Insights.* 2024;2:100060. Doi: 10.1016/j.jvsvi.2024.100060.
- [10] Hoffman ME, Squiers JJ, Hamandi M, Lanfear AT, Calligaro KD, Shutze WP. Systematic review of the influence of anatomy and aneurysm type on treatment choice and outcomes in extracranial carotid artery aneurysms. *Ann Vasc Surg.* 2022;83:349-57. Doi: 10.1016/j.avsg.2022.02.006.
- [11] Choi E, Gwon JG, Kwon SU, Lee DH, Kwon TW, Cho YP. Management strategy for extracranial carotid artery aneurysms: A single-center experience. *Medicine (Baltimore).* 2022;101(19):e29327. Doi: 10.1097/MD.00000000000029327.

PARTICULARS OF CONTRIBUTORS:

1. Junior Resident, Department of Anaesthesiology, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.
2. Professor, Department of Anaesthesiology, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.
3. Senior Resident, Department of Anaesthesiology, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.
4. Senior Resident, Department of Anaesthesiology, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dipika Balasubramanian,
No. 1, Ponni Amman Kovil, Second Cross Street, C. Pallavaram,
Chennai-600043, Tamil Nadu, India.
E-mail: dr.dipikabalasubramanian@gmail.com

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

PLAGIARISM CHECKING METHODS: [Lain H et al.]

- Plagiarism X-checker: Jun 23, 2026
- Manual Googling: Aug 29, 2026
- iThenticate Software: Aug 31, 2026 (1%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

Date of Submission: Jun 18, 2026

Date of Peer Review: Jul 08, 2026

Date of Acceptance: Sep 02, 2026

Date of Publishing: Nov 01, 2026