



UNUSUAL CAUSE OF LIFE-THREATENING RESPIRATORY DISTRESS FOLLOWING HYBRID TEVAR FOR DUCTAL AORTIC ARCH ANEURYSM- A RARE CASE REPORT

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ABSTRACT -

Hybrid TEVAR (Thoracic Endovascular Aortic Repair) is a recent technical advancement combining an interventional procedure along with an open surgical technique for avoiding risks of open surgical procedure and at the same time having the advantage of minimal intervention and enhanced recovery with optimisation of neck vessel revascularisation.

We report a case of an elderly gentleman who presented with dyspnoea and hemoptysis. He was evaluated and diagnosed with an aortic arch aneurysm. He underwent hybrid TEVAR with open surgical carotico-carotid bypass followed by endovascular stent grafting of the aortic aneurysm. Patient had a preexisting left vocal cord palsy, probably due to Ortner's / Cardio vocal syndrome. Post procedure, he developed life-threatening respiratory distress requiring reintubation. Symptoms improved within 48 hours, and extubated and discharged in stable condition.

We present this case to highlight the possible factors responsible for transient vocal cord palsy in carotid surgical interventions and also the rare occurrence of bilateral vocal cord palsy resulting in life-threatening respiratory distress in the case of hybrid aortic interventions with undiagnosed unilateral vocal cord palsy, which necessitates preoperative video laryngoscopy evaluation for any patient planned for hybrid aortic interventions.

KEY WORDS - Ductal aortic aneurysm, hybrid TEVAR, vocal cord palsy, recurrent laryngeal nerve injury

CASE REPORT -

An 83-year-old gentleman presented with dyspnoea on exertion and occasional streaky hemoptysis for 2 months, and on evaluation was diagnosed as having a ductal aneurysm of the aorta. preoperative evaluation revealed normal haematological and biochemical parameters.

Preoperative indirect laryngoscopy revealed an immobile left vocal cord and a normal right-sided vocal cord. Contrast-enhanced computed tomography aortogram was done, showing a normal ascending aorta in its course and calibre. There was an irregular contrast-filled out-pouching from the lateral and inferior aspect of the distal arch of the aorta, just distal to the origin of the left subclavian artery - suggestive of a saccular pseudo-aneurysm. The neck of the aneurysm measured 3.0 x 2.9 x 5.3cm (AP x TR x CC) as shown in image 1 and image 2, with partial peripheral thrombus within the aneurysm. The inferior aspect of the partially thrombosed aneurysm was causing indentation over the left main pulmonary artery, causing mild narrowing. In the superolateral aspect, the aneurysm was causing focal lateral displacement of the apicoposterior segmental branch of the left upper lobe

pulmonary artery. Medially, mass effect is noted over the trachea, causing mild displacement towards the right side, causing no significant narrowing.

Echocardiography revealed normal cardiac function. Bilateral carotid Doppler showed a normal flow pattern with minimal atherosclerotic plaques.

In view of old age and poor performance scale, he was planned for hybrid endovascular repair of aortic aneurysm with open carotico-carotid bypass. The subclavian artery was not bypassed as it was already occluded with good distal reformation. The patient underwent open carotico-carotid bypass using an 8 mm PTFE graft under general anaesthesia and was extubated on the table following the procedure. TEVAR was planned the next day. Patient developed respiratory distress and stridor 6 hours post carotico-carotid bypass procedure, and was reintubated. TEVAR was completed by deploying a 34x30x200mm aortic stent graft (Ankura, Life Tech) as shown in image 3. Post-stenting angiogram showed non-filling of the ductus aneurysm. Patient was extubated on day 5 and was weaned off from oxygen support in 2 days and was discharged on the 8th postoperative day without any respiratory difficulty.

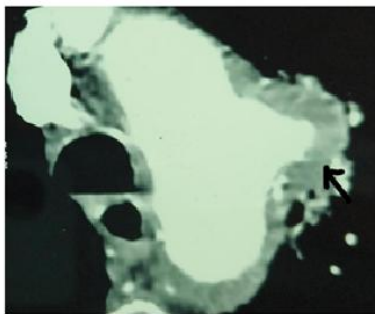


Image 1

CT aortogram showing irregular contrast filled outpouching from the lateral and inferior aspect of the distal arch of aorta - suggestive of aneurysm

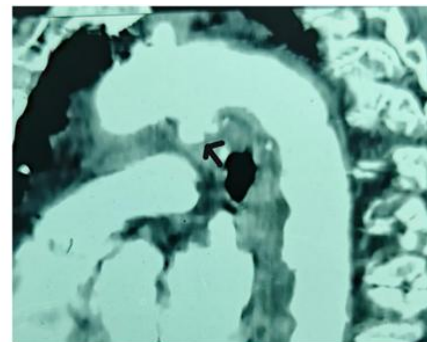


Image 2

CT aortogram showing irregular contrast filled outpouching from the lateral and inferior aspect of the distal arch of aorta distal to left subclavian artery suggestive of ductal aneurysm

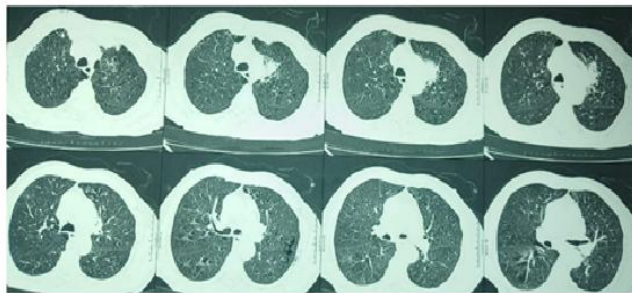


Image 3

CT CHEST showing normal lung parenchyma with minimal parenchyma changes near aortic arch level

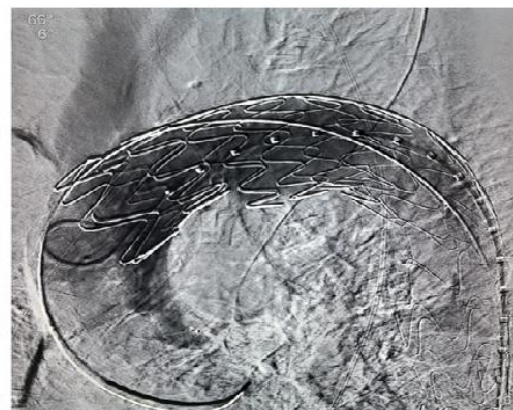


Image 4

LAO cranial view post stenting showing complete occlusion of aneurysm segment with no residual flow.

DISCUSSION

Complex aortic arch pathologies are controversial in their management strategies, where most of the surgeons still choose open surgical procedure as optimal management, but with technical advancement, interventional procedures are preferred in the present day. However, open surgical procedures are still the preferred choice for ascending aortic pathologies.^[1] In high-risk, elderly individuals with significant comorbid conditions, complex aortic pathologies can often be effectively addressed through an integrated strategy that incorporates both emerging endovascular approaches with open surgical technique as a less invasive therapeutic option.^[2,3]

Hybrid approaches help minimise the risks involved in open procedure, optimising revascularisation of neck vessels, and providing a proper landing zone for stent insertion. TEVAR is usually performed for aortic aneurysm, aortic dissection, penetrating aortic ulcers or aortic pseudo-aneurysms.^[1,2,3]

Ortner's syndrome (OS), or cardiovocal syndrome, first described by Norbert Ortner in 1897 in patients with severe mitral stenosis, is an uncommon clinical condition in which hoarseness results from vocal cord paralysis secondary to underlying cardiovascular pathology.^[5] Anatomical studies by Fetterolf and Norris, suggested that paralysis results when the nerve is compressed between the aortic arch and the left pulmonary artery or the ligamentum arteriosum.^[6]

Left RLN is more frequently affected than the right, due to the anatomical vulnerability of the left recurrent laryngeal nerve (RLN), which loops around the aortic arch and traverses the aortopulmonary window.^[5]

RLN injury during carotid interventions is due to nerve traction resulting in local inflammation and oedema within the carotid sheath, microvascular injury leading to hematoma formation and subsequent compression, and vagal or branch neuropraxia.^{[6][7][8]} Airway-related factors, such as vocal cord trauma from intubation or cuff-induced pressure, may further exacerbate injury. Carotid plaque embolisation causing nerve ischemia and the use of disproportionately large stents that overstretch the vessel following carotid stenting are rare.^{[9][10]}

Aortic aneurysms are reported to be associated with unilateral vocal cord palsy in approximately 21% patients. Advances in aortic reconstruction have reduced RLN palsy significantly during distal aortic reconstruction. The elephant trunk procedure is associated with comparatively lower rates of vocal cord palsy.^{[4][5]}

Recurrent laryngeal nerve injury was also observed following uncomplicated carotid angioplasty and stenting (3–30%) and, less frequently, after open carotid endarterectomy (0.5–4%).^{[6][7][8]} Temporary palsy typically resolves within 10 months, although 1–2% of cases persist more than a year, progressing to permanent palsy.^{[6][7]}

Our patient was diagnosed with left vocal cord palsy, probably due to cardio-vocal syndrome. He developed acute respiratory distress 6 hours post carotico-carotid bypass procedure. This would be explained by a compromised right recurrent laryngeal nerve, as the patient already had left recurrent laryngeal nerve palsy. He was immediately reintubated, and his symptoms improved within 24 hours and extubated without any respiratory complications.

Several meta-analyses have shown possible risk factors for cranial nerve injuries following carotid procedures, including older age (≥ 80 years) and female sex, preexisting coagulation disorder, prolonged duration of procedure, reoperations, general anaesthesia requiring endotracheal intubation, emergency procedures, preexisting cardiac failure, the degree of contralateral carotid stenosis (long > 2 cm), technical causes like use of patch, use of graft, eversion endarterectomy, less experienced surgeon performing procedure, and any changes noted during intra-operative neurophysiologic monitoring.^{[7][8][10]}

Preventive strategies include good knowledge about clinical anatomy, techniques like sharp dissection, careful use of retractors, cautery and clamps. Use of perioperative injection dexamethasone may reduce transient nerve injuries.^{[8][9][10]}

CONCLUSION -

This case highlights the importance of routine preoperative vocal cord examination by laryngoscopy, even if asymptomatic, in all cases planned for hybrid carotid interventions, and to anticipate the possibility of respiratory distress in patients undergoing hybrid carotid interventions, particularly with preexisting vocal cord palsy, which should be prevented by appropriate strategies.

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