Abstract:
INTRODUCTION Extracranial carotid artery aneurysms (ECAAs) are quite rare lesions that count for 1% of all peripheral aneurysms and 1.5% of all carotid procedures. We had three cases in past 1 year.

MATERIALS AND METHODS All three were males. Case 1 had LT CCA aneurysm with RT ICA occlusion with LT vocal cord palsy and Horner's syndrome. Blood culture grew E.Coli. Case 2 had Lt CCA aneurysm with no neurological deficit. Case 3 had RT CCA aneurysm with HO FNAC performed outside with sudden increase in size of swelling and compression symptoms Procedure Case 1 and 2 underwent aneurysm repair with interposition GSV grafting with shunt. Case 3 underwent CCA, ICA ECA ligation due to pus in the sac. None of them had a major neurological deficit. Conclusion ECAA are difficult to manage. With meticulous planning and good cerebral protection, these patients can be managed without major neurological deficit.


Introduction:
Extra cranial carotid artery aneurysms (ECAA's) are quite rare lesions that count for 1% of all peripheral aneurysms and 1.5% of all carotid procedures. Atherosclerosis is the most common reported etiologic factor for the formation of a true and usually fusiform-shaped ECAA. In contemporary series, nearly 50% of the reported cases were false aneurysms of the Extra cranial carotid artery that occurred after carotid Endarterectomy (CEA) and patching. We will be reviewing the 3 cases which had presented to our department of in the past one year.

Patients and Methods:
Patient population:
Three patients were encountered over a period of one year (January 2011 to December 2011). All three were men with a mean age of 47 years. Diagnosis was established in all by duplex scan, 64 slice CT angiogram and confirmed by operative findings. Atherosclerotic risk factors among these patients included smoking (100%), hypertension (33%), hyperlipidemia (67%) and none had diabetes mellitus. Clinically evident manifestations of extra carotid atherosclerotic disease were frequent including coronary artery disease (33%), peripheral vascular occlusive disease (67%) and none had abdominal aortic aneurysm or any other co-existent peripheral arterial aneurysm.

**Manifestations:**
Presenting central neurological symptoms referred to the side of aneurysm was noted in one (33%) patient, who had left hemiplegia 6 months earlier. All three patients (100%) had hoarseness of voice with vocal cord palsy. Giddiness was present in one (33%) patient. Thrombosis was noted in the wall in two out of the three patients (67%). None of the patients had aneurysm rupture.

**Aneurysm characteristics:**
Preoperative CT angiogram was performed in all patients. All had unilateral disease. One of the patients had fusiform aneurysm (33%) and the remaining two (67%) had saccular aneurysms. Two of the patients had left sided aneurysm (67%) and one had it on the right side (33%). One of the patients had occlusion of contralateral internal carotid artery.

**Treatment:**
All three patients were subjected to operative treatment. Surgical procedure include aneurysmectomy with autogenous saphenous vein interposition grafting in two (67%) patients and carotid ligation in one (33%) patient. Intraluminal shunts were used in two patients (67%). Carotid occlusion time averaged 6.5 minutes in the two patients who had shunts. No operative deaths occurred in this series. None of the patients had central neurological deficit in the peri-operative period. Cranial nerve related complications occurred in one patient (33%). He had transient hypoglossal nerve palsy which recovered in three weeks duration. All three patients had residual vocal cord palsy. The third patient who had nasal regurgitation in the pre operative period persisted and was discharged with Ryle’s tube feeding. This patient had a large aneurysm and was secondarily infected.

**Follow – up:**
Follow up was available in two patients for a period of 6 months. None of the patients had delayed neurological deficit. Duplex scan done in the follow up period showed a patent graft with no evidence of anastomotic stenosis.

**Discussion:**
All three patients were males. In the available literature, comparing other peripheral aneurysms, the male predisposition is lower (2.5:1) for ECAA. None had co-existent peripheral arterial aneurysms while femoral or popliteal aneurysms are associated with 90 or 60 % multiple aneurysms respectively. Two patients had evidence of co-existent peripheral arterial occlusive disease. Hypertension was noted in only one of the patients. The common clinical presentation was swelling in the neck (100%) and hoarseness of voice (100%). In the literature, the most common first manifestation is a TIA or a neurological event. In our series, only one (33%) had preceding neurological event.
<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age/sex</th>
<th>Symptoms</th>
<th>Location and size</th>
<th>Comorbidities/Co-existent disease</th>
<th>Investigation</th>
<th>Procedure</th>
<th>Complications</th>
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<tr>
<td>1</td>
<td>40/M</td>
<td>Swelling left - 6 months Giddiness (+) Hoarseness of voice (+) Lt Ptosis+ Gag Reflex - Normal</td>
<td>4X4cm in Lt Carotid Triangle</td>
<td>Seizure disorder - 10 years Smoker - 15 years Lt upper limb Brachial involvement Lt tibial occlusion ABPI-0.5 Lt LL</td>
<td>Echo-Normal LV function. IDL - Lt vocal cord palsy Duplex - Rt ICA total occlusion. LT CCA Aneurysm with thrombus in wall. MRI Brain - Lacunar infarct in RT caudate nucleus Blood culture - E.Coli Angiogram</td>
<td>LT CCA to ICA RSV interposition graft with shunt. Carotid Clamp time (off shunt - 5 min)</td>
<td>Transient Hypoglossal N palsy</td>
</tr>
<tr>
<td>2</td>
<td>56/M</td>
<td>Swelling left side of neck - 6 months. Pain (+) Hoarseness of voice (+) TIA/CVA (-)</td>
<td>7X4 cm in Lt Carotid Triangle Thnl (+) Bruit (+)</td>
<td>Hypertension (+) CAD (+) Smoker (+) Lt subclavian bruit (+) Lt iliac disease (+)</td>
<td>Echo - Global hypokinesia LV (EF-37%) Moderate LV dysfunction IDL-Lt vocal cord palsy Blood culture - No growth Duplex - LT CCA Aneurysm proximal to bifurcation Angiogram</td>
<td>CCA interposition RSV graft with Shunt Carotid clamp time - 8 min</td>
<td>Residual Vocal Cord palsy</td>
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The outcome of non-operative therapy has an unacceptable stroke rate (50-70%). Hence aggressive surgical therapy is appropriate for ECAA. Surgical treatment in general is directed towards aneurysm resection with restoration of arterial continuity while avoiding neurological complications from either low flow or thromboembolism. Regarding the choice of conduit, there are differences in opinion. Zwolak et al suggested that autogenous saphenous vein is the conduit of choice. Whereas Donas et al suggested that PTFE should be the first choice for reconstruction owing to less time duration and challenge compared with vein interposition graft. Whereas a long vein graft in the extremities accommodates to this additional length by assuming a gentle curve in the thigh, a short vein graft as in the case of carotid procedures instead tends to kink within the tight confines of the neck. It tends to elongate as well as dilate once flow has been restored. Therefore, a carotid interposition vein graft must be trimmed precisely to its estimated post-perfusion length before the final anastomosis is completed.

Whether to place an intraluminal shunt during the procedure is controversial. Shunts are not necessary routinely but needed in those with contralateral occlusive disease, poor collateral flow and low stump pressure. In study by Donas et al, the simultaneous reduction of regional brain tissue saturation (rSO2) <55% and great changes in SSEP amplitude, or history of ipsilateral stroke or contralateral occlusive lesions were absolute indications to use an intraluminal shunt.

In the three patients we had none had central neurological deficit in TIA, CVA. In the literature, the incidence of perioperative neurological deficit is around 19%. All three patients had pre-operative vocal cord palsy. The literature provides for the moment scant information concerning endovascular...
techniques in the treatment of ECAA’s. In the study by Zhou et al, endovascular intervention is a feasible and durable alternative with the advantages of less convalescence and procedure related complications.

**Conclusion:**
Untreated ECAA produces high incidence of severe neurological deficit. Hence an aggressive surgical approach is justified. Nevertheless the operative treatment of these lesions is technically demanding and strongly related to high risk of cranial nerve injuries and neurological events. Reliable alternatives are needed to simplify the challenging surgical approach such as selective shunting, avoid excising the sac and avoid handling the aneurysm prior to occlusion should be followed to have a much better clinical outcome.

**References:**


**Case 1** Left CCA- ICA aneurysm
**Case 2** LT CCA aneurysm
Left CCA aneurysm with Right ICA occlusion

Left CCA aneurysm with RT ICA occlusion
Left CCA aneurysm extending to LT ICA

Left CCA, ECA & ICA control
Intraluminal shunt in place Partly completed proximal and distal anastomosis
Shunt removal and completion of distal anastomosis Case 1 Post op Photo