Gradual right ear hearing loss for 10 years
History

• 36y/o male
• 10 years ago
  - right hearing loss and pulsatile tinnitus
  - right retrotympatic mass

• 94-2 OPD
  - LF: retrotympanic tumor
  - HRCT: right glomus jugulare

• 94-12 Admission
  - NE: no cranial n. abnormality
• Final diagnosis:
  Right glomus jugulare, Fisch type C2

• Surgery:
  Type A infratemporal fossa approach with supraomohyoid neck dissection
Type A infratemporal fossa approach (1)

1. Retroauricular-cervico-temporal skin incision
2. Blind sac closure of EAC
3. Facial n. exposed in parotid gland
4. Great vessels and cranial n. exposed in the neck
5. Subtotal petrosectomy
6. Permanent ant. transposition of facial n.
7. Ligation of sigmoid sinus
8. Mandible displaced anteriorly
9. ICA exposed in temporal bone
Type A infratemporal fossa approach (2)

10. Jugular foramen and intralabyrinthine space exposed for tumor remove
11. Tumor removed
12. Middle ear cleft obliteration with fat and temporalis m. flap
13. Eustachian tube obliterated

→ CN IX sacrificed
Glomus jugulare, Fisch type C2
Post-op course

• Vital sign stable

• Facial palsy: Gr.III → Gr.IV → Gr.II~III

• Dysphagia: NG feeding
difficulty to initiate and incomplete swallowing

• Wound: clean and smooth
Discussion

- Glomus tumor
- Post-op complication or sequelae
Glomus tumor

- Glomus jugulare, glomus vagale, glomus tympanicum, carotid body tumor
- Paragaglioma
- Slow growing, highly vascular neoplasm
- 1~4% catecholamine secreting
- Female predominance
- 10% multicentric
- Tx: observation, medical Tx, radiotherapy (Gamma knife), surgery
Post-op complication or sequelae

- CSF leakage
- Aspiration
- Infection
- Facial palsy
- Lower cranial n. (CN IX, X, XI, XII) injury
**TABLE 11. Complications (%)**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Fisch(^1)</th>
<th>Green(^3)</th>
<th>Jackson(^6)</th>
<th>Present series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebrospinal fluid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leak</td>
<td>11</td>
<td>4</td>
<td>4.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Aspiration</td>
<td>10</td>
<td>4</td>
<td>12.5</td>
<td>6</td>
</tr>
<tr>
<td>Pneumonitis</td>
<td>0</td>
<td>6</td>
<td>3.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>2</td>
<td>2</td>
<td>2.6</td>
<td>0</td>
</tr>
<tr>
<td>Meningitis</td>
<td>1</td>
<td>4</td>
<td>2.6</td>
<td>0</td>
</tr>
<tr>
<td>Wound infection</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Seroma/hematoma</td>
<td>0</td>
<td>4</td>
<td>1.9</td>
<td>0</td>
</tr>
<tr>
<td>Stroke/cerebrovascular accident</td>
<td>1</td>
<td>0</td>
<td>2.6</td>
<td>0</td>
</tr>
<tr>
<td>Ileus</td>
<td>0</td>
<td>0</td>
<td>3.9</td>
<td>0</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>0</td>
<td>0</td>
<td>1.3</td>
<td>0</td>
</tr>
<tr>
<td>Mortality</td>
<td>1</td>
<td>0</td>
<td>2.7</td>
<td>0</td>
</tr>
<tr>
<td><strong>Intraoperative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blood loss (average)</td>
<td>2 L</td>
<td>2.9 IU used</td>
<td>1.1 IU used</td>
<td></td>
</tr>
</tbody>
</table>

IU, international units.
Facial palsy

• TAE
  - rare, PVA into perineural vessels
  
  J Laryngol Otol. 1999 Mar;113(3):268-70

• Tumor invasion
  - mass effect
  - perineural vessels invasion

• Ant. re-routing of facial n. (main factor)
  - traction
  - blood supply of parotid area

Eye protection (eg, artificial tear)

Anterior re-routing of facial n.

Short re-routing

Long re-routing

Posterior re-routing of facial n. (in CP angle tumor)
Facial nerve re-routing

Long re-routing have larger area for operation
Short re-routing is for less carotid artery involved (Fisch type B)

Table 3
Facial nerve function after facial nerve rerouting (percentage with grades I–II facial nerve function)*

<table>
<thead>
<tr>
<th>Type of rerouting</th>
<th>n</th>
<th>Short-term</th>
<th>Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short anterior</td>
<td>84</td>
<td>47% (27/58)</td>
<td>93% (78/74)</td>
</tr>
<tr>
<td>Long anterior</td>
<td>259</td>
<td>41% (77/190)</td>
<td>72% (175/242)</td>
</tr>
<tr>
<td>Posterior</td>
<td>74</td>
<td>2% (1/48)</td>
<td>26% (19/74)</td>
</tr>
</tbody>
</table>
**Lower cranial nerve injury**

**TABLE 5. Cranial nerve deficits according to ICE**

<table>
<thead>
<tr>
<th>Cranial nerve</th>
<th>No ICE (n = 20)</th>
<th>ICE (n = 33)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preoperative</td>
<td>Postoperative</td>
</tr>
<tr>
<td>IV</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>VI</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IX</td>
<td>3 (15%)</td>
<td>8 (40%)</td>
</tr>
<tr>
<td>X</td>
<td>3 (15%)</td>
<td>8 (40%)</td>
</tr>
<tr>
<td>XI</td>
<td>3 (15%)</td>
<td>6 (30%)</td>
</tr>
<tr>
<td>XII</td>
<td>3 (15%)</td>
<td>3 (15%)</td>
</tr>
</tbody>
</table>

ICE, intracranial extension; Postoperative, at least 1 year after the initial procedure.
Lower cranial nerve injury

Review of major paraganglioma series in 15 years

<table>
<thead>
<tr>
<th>Report</th>
<th>ICE incidence</th>
<th>CN preservation</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisch¹ (n = 119)</td>
<td>72</td>
<td>22.3, 54, 61</td>
<td>73</td>
</tr>
<tr>
<td>Green²¹ (n = 28)*</td>
<td>54</td>
<td>66.6, 81.8, 68.2</td>
<td>93</td>
</tr>
<tr>
<td>Jackson¹⁶ (n = 152)†</td>
<td>36</td>
<td>61, 75, 74</td>
<td>74</td>
</tr>
<tr>
<td>Manolidis³⁰ (n = 139)†</td>
<td>33</td>
<td>—, —, —</td>
<td>—</td>
</tr>
<tr>
<td>Present series (n = 54)</td>
<td>62</td>
<td>66.7, 69.7, 74.3</td>
<td>87.5</td>
</tr>
</tbody>
</table>

*Preserved function / Clinical (pre-op) non-involved

CN IX is the most easy damaged nerve in glomus jugulare surgery

Dysphagia

- Right CN IX sacrifice
- CNX, XII and facial palsy (orbicularis oris m.)

Goal:

1. Prevent aspiration
2. Nutrition (swallowing or -stomy)
Dysphagia

• Compensatory treatment
  - food bolus/consistency
  - postural change
• Swallow maneuver
  - supraglottic swallow
  - Mandelsohn maneuver
  - effortful swallow
• NG feeding
• Gastrostomy or jejunostomy

Thanks for your attention