MANAGEMENT OF OTOSCLEROSIS

ROUND TABLE

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Kaoru OGAWA
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HO CHI MINH
November 24th-26th, 2019
GOAL OF THE ROUND TABLE

To discuss the various factors which may influence the decision in counselling patient between:

- Hearing aid
- Stapes surgery
- Auditory implant
CONDUCTIVE HEARING LOSS
DEGREE OF STAPES FIXATION
SENSORINEURAL HEARING LOSS
DEGREE OF HYALINIZATION

Amount of hyalinization by the degree of hearing loss

Fayad, Linthicum
INTEREST OF IMAGING

► To confirm a doubtful diagnosis
► To anticipate surgical difficulties
► To eliminate a possible conductive inner ear
► To analyse a cause of failure
The high specificity may be due to the inclusion criteria and advancement in scanner technology.
COUNSELING PATIENTS IN CASE OF NEGATIVE CT-SCAN

- Middle ear exploration BUT

- **Risk of mobile footplate x 5**
  - Early form with an incomplete fixation of the stapes

- **Possible inner ear conductive hearing loss due to:**
  - An enlarged vestibular aqueduct
  - Minor inner ear malformation
  - Superior semicircular canal dehiscence
  - Modiolus anomalies
POSSIBLE INNER EAR CONDUCTIVE HEARING LOSS

△ Superior semicircular canal dehiscence
△ Enlarged vestibular aqueduct
△ Abnormal modiolus
MODIOLUS MALFORMATION

-3mm
CLINICAL CASES

Which are the surgical contraindications?
SURGICAL CONTRAINDICATIONS

- Severe tubal dysfunction
- Pure sensorineural hearing loss
- Patient refuse any risk
- Fluctuating hearing loss
- History of sudden hearing loss
- Only hearing ear *
51 years woman
- Right mixed HL and left cophosis post stapedotomy
- CT-Scan positive with anterior focus
30% with discriminate at 60 dB with powerfull hearing aid
SURGICAL DECISION

- CI on the Left side
- Right stapedotomy when the CI result will be superior to the right ear with hearing aid
RESULTS

Stapedotomy + HA

- Word discrimination 80%
- In quiet

- Quality of sound, music perception is better in the right ear

Cochlear Implant

- Word discrimination 85%

- CI threshold
ONLY HEARING EAR IN THE ERA OF CI

Case 1  ●  M – 49 years old

Case 2  ●  W – 55 years old

Case 3  ●  W – 65 years old
CASE 2

- 59 years old woman
  - The optimal gain provide undesirable audiometric effects
  - It is not possible to provide enough gain to compensate
SURGERY + HEARING AID

Gain par la prothèse
Gain par la chirurgie

HEAD SHADOW
S
N

SOMMATION
S
N

SQUELCH
N
S

DICHOTIC
Improve 8-10 dB

DIOTIC
Binaural redundancy - Improve 2-3 dB

INVERSE DICHOTIC
Binaural demasking - 2 dB
Improvement of binaural effect in all cases even without a complete symmetrical hearing

Strong correlation between gain and quality of live (SSQ)
CASE 3

Imaging criteria

- CT Scan evidence of otosclerosis focus
POPULATION

N : 66

- Stapedotomy + CI: 25 pts (38%)
- Stapedotomy alone: 32 pts (48%)
- CI alone: 9 pts (14%)

Preop data

<table>
<thead>
<tr>
<th></th>
<th>Air Conduction</th>
<th>Word Discrimination Score</th>
<th>Bone Conduction</th>
</tr>
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<tbody>
<tr>
<td><strong>Group A:</strong> Stapedotomy</td>
<td>104.5 dB</td>
<td>12%</td>
<td>64 dB</td>
</tr>
<tr>
<td><strong>Group B + C:</strong> CI alone / CI + Stapedotomy</td>
<td>109 dB</td>
<td>12%</td>
<td>69.5 dB</td>
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</tbody>
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NS

*p < 0.001*
Previous stapedotomy has No impact on Cochlear implant outcome
Success of stapedotomy cannot be predicted pre-operatively

Previous stapedotomy has no impact on cochlear implant results
CASE 4

JA..., 25 yo, stapedotomy + hearing aid failure

No gain
POST OPERATIVE CT-SCAN

- Prothesis in place
- Obliteration of RW
Round Window Otosclerosis: Radiologic Classification and Clinical Correlations

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*Division of Otolaryngology HNS and †Radiology Department, Faculty of Medical Sciences, Lebanese University, Beirut, Lebanon
CASE 5

The two options are possible
DO THE AUDIOLOGICAL RESULTS ARE COMPARABLE?

Inclusion criteria
- Patient candidate for surgery with a conductive hearing loss > 30 dB and normal contralateral ear. First two months HA and then surgery.

Study design
- Prospective longitudinal study comparing audiological outcomes with hearing aid then stapedotomy at 2 months on 30 patients.

Evaluation
Preliminary results
- Main criteria: Improvement from 0 to 100 (GHSI) S
- Secondary criteria: Hearing threshold S
  Sound localisation S
PRELIMINARY RESULTS

N = 22

 ● GHSI
 ● PTA
 ● Discrimination

Significant improvement of quality of live after surgery
SOUND LOCALISATION

N = 22

Significant improvement of quality of sound localization
CASE 6

- Delayed post operative conductive hearing loss
- Hearing fluctuation improved after Valsalva
- Otoscopy: prosthesis loop against the tympanic membrane
RADIOLOGICAL FINDINGS
SURGICAL FINDINGS

● Lateral displacement of the piston in the axis of the stapes. No or partial erosion of the incus

● Closing of the stapedotomy hole
## RESULTS – TYPE OF PISTON

<table>
<thead>
<tr>
<th></th>
<th>Conventional piston</th>
<th>Curved piston</th>
<th>TORP</th>
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</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>31</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Rinne ≤ 10 dB</td>
<td>48%</td>
<td>55%</td>
<td>0</td>
</tr>
<tr>
<td>Rinne ≤ 20 dB</td>
<td>93%</td>
<td>85%</td>
<td>50%</td>
</tr>
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NS

Significant $p < 0.05$
PHYSIOPATHOLOGY

- Too short piston and excessive air pressure changes in the middle ear
  (Farrior.B;AnnOtolRhinolLaryngol 1981: 90;636-9)

- Excessive inner ear pressure changes
  (Farrior.B;AnnOtolRhinolLaryngol 1981: 90;636-9)

- None radiological abnormalities of the inner ear

- Eversion of the lining membrane of the vestibule
  (Shea.JJ;Laryngoscope 1974: 84(7);1122-34)
CASE 7
Thank you for your attention