Combined TBH / GSH meeting

11 September 2007

Eric F Post

Case

- 32 yo male
- Presenting:
  - Vertigo x since a.m.
  - Tinnitus 5/7
  - Hearing loss worsened 4/7
  - Otorhea (L) x 2/ 52

Case

- History
  - Ear surgery 1990 @ Umtata
  - No further ENT follow up
- Specific: no trauma,
- PMHx (-), nil TB
- Meds (-), nil ototoxic drugs
- Allergy (-)

Case

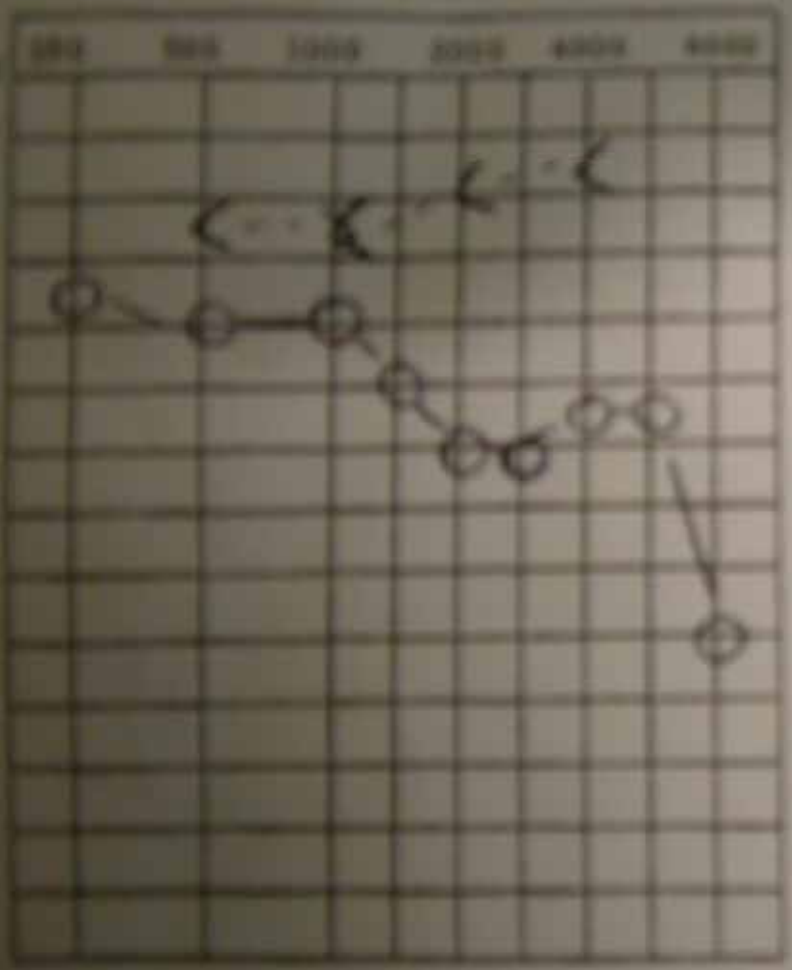
- Examination
  - “Ill” looking pt
  - Hemodynamic stable, Afebrile
  - Nystagmus (-)
  - Ear, huge aural polyp
    scar, ? Mastoid surgery
    Rhine (-) C1 – C3
    Weber to ®
    Fistula test (-)

Special investigations

- Audiogram
  - Problem with overmasking
  - SNHL (L)
- HR CT of PTB
  - Mastoid cavity with soft tissue and bony overhang
  - No ossicles
  - Eroded lat SCC

SUIWERTOONOUDIOGRAM

Regteroor

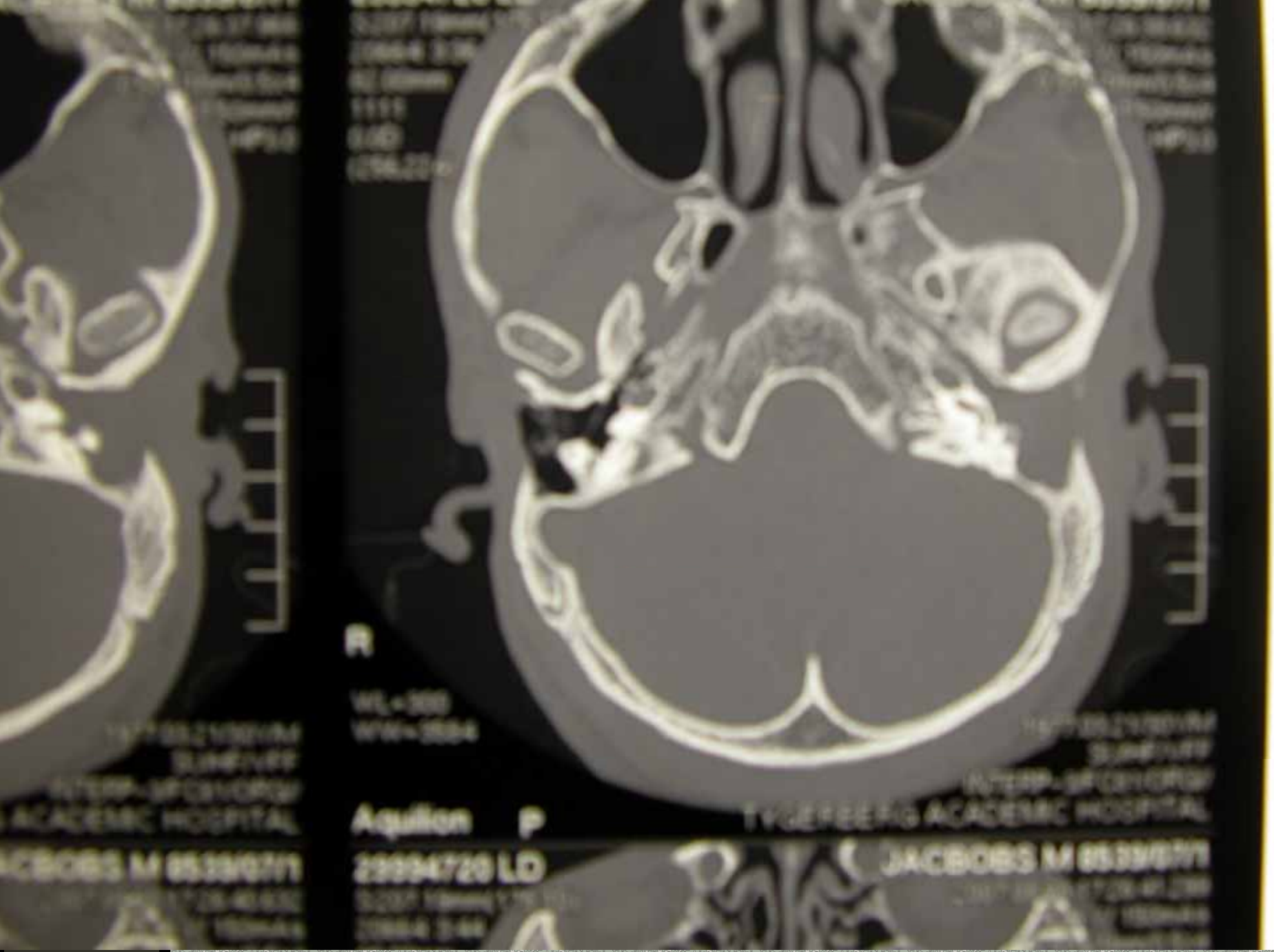


Linkeroor

Maskering links in dB					

Maskering regs in dB					
LG					
BG		NP	NP		

SPRAAKOUDIOGRAM


R
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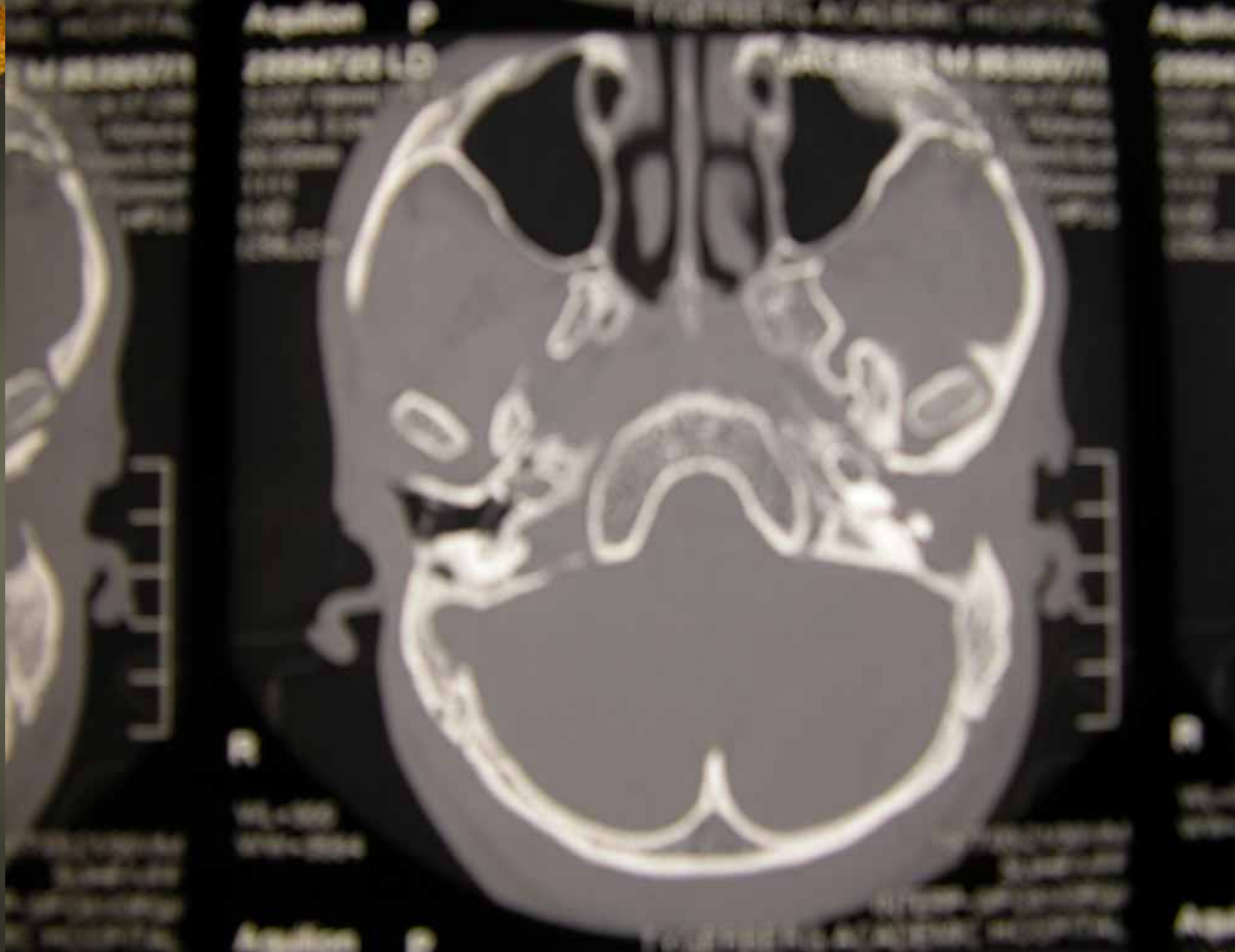


Treatment

- Commence IVF, Augmentin, Cinnarisine; await surgery time
- Surgery
  - Remove polyp: intact drum/ (N) ME
    keratin debris (+) into cavity
  - Open old cavity: prominent overhang
    high facial ridge
    keratin debris (++)
  - Granulations over lateral SCC with cholesteatoma matrix

Question

- What do you do when faced with a labyrinthine fistula secondary to cholesteatoma?

Case

- Drill overhang, create better cavity – drill overhang and drop facial ridge
- Removed excess granulations
- Leave matrix insitu / cholesteatoma was exteriorised
- Meatoplasty

Case

- Postoperative
  - No vertigo
  - Smiling pt
- Pusswab MC+S = P.mirabilis (S)
- Histology = organising inflammatory tissue
- Followup 2/52: says hearing better, feels fine

- Labyrinthine fistula associated with cholesteatoma

Clinical

- Incidence in cholesteatomatous COM
  - 5 to 8.5%
- Symptoms/ Signs
  - Cholesteatoma/ granulations 97%
  - Hearing loss 81% (profound 6%-25%)
  - Vertigo 58%
  - Fistula test 50-60%
  - Tinnitus 20%
  - CT 42% - 50%

Labyrinthine fistula

- **Horisontal SCC** – 66-90%
  - CT (+) 28 – 42%
  - Fistula test (+) 54%
- **ESF (extended site fistulae)**
  - Vertigo + deaf + VII weak + (+) FT = ALERT
  - Advanced / aggressive disease process
  - More than one SCC, or cochlea
  - CT (+) 89%
  - Fistula test (+) 80%

Pathophysiology

- **Erosion**
  - Mechanisms
    - Enzymatic theory (Glasscock 1990) : acid/ proteolytic enzymes / osteoblast factor/ collagenase/ expose mineral to osteoclast act
      - Pressure: osteoclast induction
  - Blue line visible, endosteum intact
- **Fistula**
  - Not true fistula into perilymphatic space
  - Erode bony lab; matrix onto membranous lab
    - Pressure transmitted with F.test causing cupular displacement

Surgery options

- (developments)
- 1. Leave once exteriorised
- 2. Remove and “patch” fistula
- 3. Remove matrix and portion of membranous labyrinth (SCC) and “patch”

Unresolved debate

- Palva 70's: **"remove"**
  - 30 pt (3.6%)
  - Leave: retain / improved hearing but otorrhea
  - Remove: 3/10 dry but HL
- Ritter 1980: **"leave"**
  - 50 pt (7.2%)
  - 11 granulations: remove 8; 4 deaf
    leave 3; 0 deaf
  - 39 cholesteatoma: remove 7; 3 deaf
    leave 6; 2 deaf

“Leave”

Leave matrix over fistula and Exteriorise (M)

* stop infective / inflammatory process (chemical erosion)
* stop pressure effect
* drying effect

Parisier 1991, 41pt (abstract)

preserve matrix if only hearing ear/ elderly/ large fistula

no s.difference in HL/ vertigo/ recividism (no figures)

Remove and patch

- Remove all cholesteatoma + granulations elsewhere then lift matrix off fistula using high magnification
- Leave membranous labyrinth intact
- Remove matrix and cover defect in SCC with fascia / perichondrium / periosteum/ bone chips
  - Eradicate disease
  - Can improve BC
- Risk postop dead ear

Gacek

14 pt, remove cholesteatoma/ mastoidectomy, TP

Size:

< 2mm — matrix supported by bony lab — 84%

> 2mm — adhere to membranous lab — > risk of damage if remove — 16%

No loss of SN component in 8, 5 improve AC

Cochlear F:

remove 3 (2 x atraumatic) all SNHL (profound)

leave 2 all retain hearing

reason: exposed endosteum over spiral ligament; damage RM/BM/SV/etc

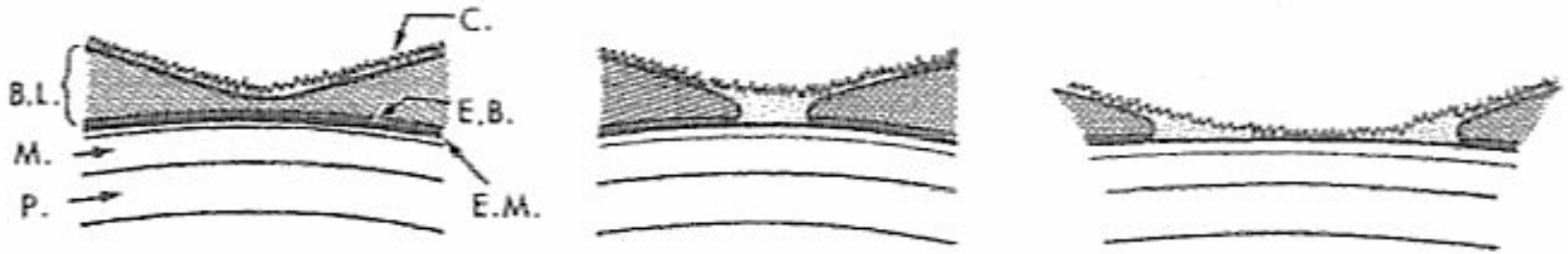


Fig. 1. Diagram of the histological structures involved in erosion and fistulization of a bony semicircular canal. (BL = Bony labyrinth, C = Cholesteatoma matrix, EB = Endosteal bone, EM = Endosteal membrane, M = Membranous semicircular canal, P = Perilymphatic space)

Gace

- Pictu

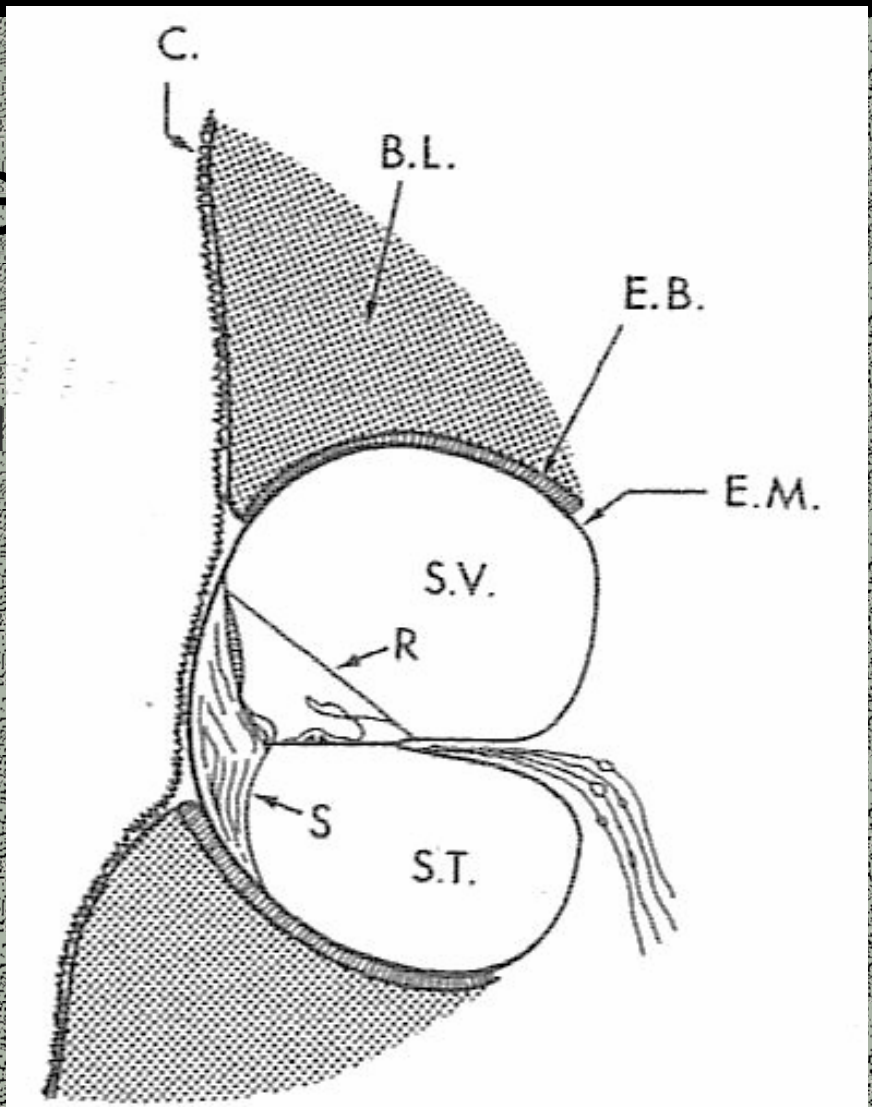


Fig. 2. Diagram of histological features in a cochlear fistula. (BL = Bony labyrinth, C = Cholesteatoma matrix, EB = Endosteal bone, EM = Endosteal membrane, R = Reissner's membrane, S =

Guidelines

- Multifactorial
  - 1. **Skill**
    - If surgeon any doubt as to remove, then leave
  - 2. **Location and size**
    - SCC < 2mm: remove
    - SCC > 2mm: attempt with care
      if adheres then exteriorise
    - Cochlea: leave.

Guidelines

- 3. **Hearing preoperative**
  - Profound HL: as aggressive as needed
  - Good vestibular and cochlear reserve: preserve function
  - Only hearing ear: AVOID (unless SCC < 2mm with very experienced surgeon attempt to remove matrix)
- 4. **Mechanism of bone erosion**
  - Pressure most likely: permissible to leave

Grewal / Kumar, 2003

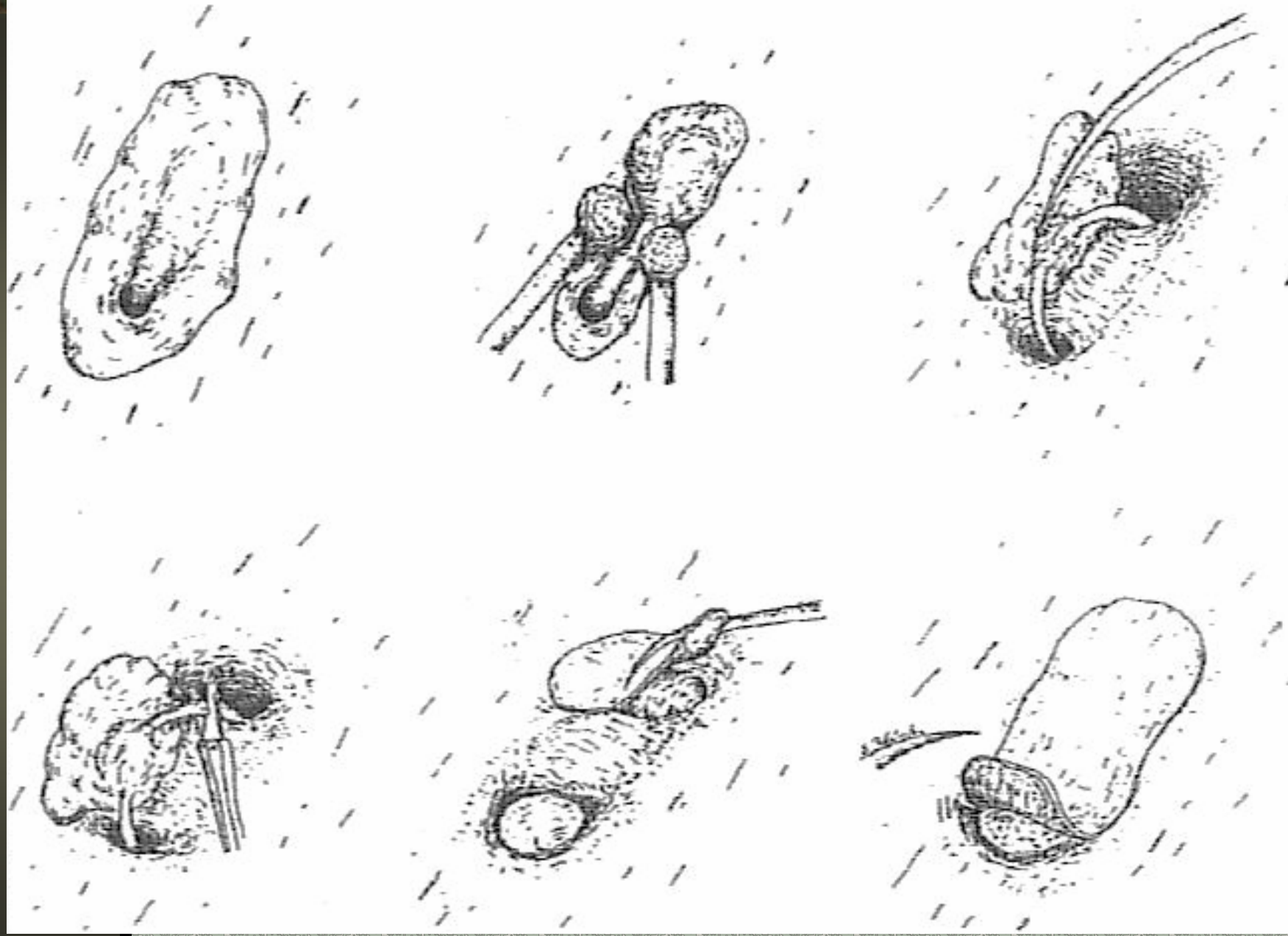
- 50 pt, Remove matrix and sealed
- 28% preop profound SNHL; postoperative no worsening in any BC
- 12% of granulations = TB
- Split cases into size:
  - <1 mm = 60%
  - 1-2mm = 24%
  - > 2mm = 16%

Grewal / Kumar, 2003

- Close <1mm with TF
- Close 1-2mm with bone dust
- Close > 2mm fistula in 2 layers:
  - 1. 2x temporalis fascia (6%)
  - 2. Perichondrium + TF (4%)
  - 3. Periosteum + TF (6%)
  - Not bone dust if >2mm: enter into SCC - post op dysequilibrium

Interrupt SCC to remove

- Thinking: remove **all** disease involving membranous labyrinth
- Kobayashi et al. 1996
- Drill SCC doesn't change cochlear potentials
  - Guinea pigs / AN in humans
- Procedure:
  - Remove matrix and affected membranous lab
  - "plug" 2 ends of SCC using bone chips
  - "patch" with autologous material
    - Fascia/ perichondrium (cartilage)



Kobayashi

- Results:
  - 8 pt
  - Follow up 9 mth – 3.3yrs
  - 7/8 same / improve hearing
  - 1/8 HL worsen by 12 dB
  - Nystagmus 1/8 postop (2/52)
  - Dysequilibrium 5/7 less than 2 wks
    2/7 recovered @ 2 and 5 mnth
  - Fistula test (-) 8/8

Kobayashi

rs in Eight Patients*

Fistula		Interrupted Semicircular Canal	Preoperative		Postoperative	
Site	Size, mm		Air, dB	Bone, dB	Air, dB	Bone, dB
L	2	L	83	40	58	18
L	1	S	50	27	52	18
L	1	L	68	40	38	18
L	3	L	75	32	82	30
S, L	4	S, L	88	43	100	SO
L	2	L	115	SO	87	SO
L	3	L	38	22	38	22
P	1.5	P	33	17	35	13

Conclusion

- Cholesteatoma can complicate by forming a labyrinth fistula
- Fistula test low % positive (ESF)
- Risk of postoperative SNHL exists
- Surgery: leave vs remove/patch vs more aggressive
- Conservative if only hearing ear or cochlea fistula
- Surgeon must decide on confidence in his/her own skills

Literature Review

- T.Kobayashi; Rx of LF with interruption of SCC
  - Arch Otolaryngol Head Neck Surg 121:469-75
- D Grewal; LF: a complication of CSOM
  - The Journal of Laryngol + Otol 2003 May, Vol 117, pp 353-357
- P. Gormley; Surgical Mx of LF with cholesteatoma
  - The Journal of Laryngol + Otol 1986 Oct, Vol 100.pp 1115-1123
- R. Gacek; surgical Mx of LF in COM with Cholesteatoma