Vestibular schwannoma: Surgery or not?

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Introduction

The early detection of smaller vestibular schwannomas and a better knowledge of surgical outcome has led to a progressive change in the therapeutic strategy.
Decision making

• Therapeutic indications depend on:
  ✓ size
  ✓ ipsi- and contra lateral hearing
  ✓ age and general status
  ✓ growth rate (for stages 1 and 2)

• Consideration of individual benefit/risk ratio.

Management

- Surgery
- Conservative
- Radiotherapy
**Surgery**

*Population and Methods*

- 1990 - 2006: 1006 operated solitary VS
- Mean age: 51 years (range: 13-85)
- 54% of females and 46% of males (sex ratio: 0.9)

**Types of approach:**
- **Middle cranial fossa (MCF):** Intracanalar VS with class A or B hearing (AAO-HNS)
- **Retrosigmoid:** VS < 15 mm in CPA, class A or B hearing, fundus free of tumor
- **Translabyrinthine:** VS > 15 mm or < 15 mm with class C or D hearing or fundus involved
- **Transotic:** SV > 15 mm with anterior or intracochlear extension

**Tumor stages and approaches**

- Stage 4: 18%
- Stage 3: 28%
- Stage 2: 46%
- Stage 1: 8%

- Translabyrinthine: 65%
- Retrosigmoid: 18%
- Transotic: 10%
- MCF: 7%
Approaches

Evolution of tumor stages and approaches
Postoperative facial function

Grade 1: 61 %
Grade 2: 18 %
Grade 3: 11 %
Grade 4: 6 %
Grade 5: 4 %
Grade 6: 0.4 %

House et Brackmann, 1 year postop., n=740

Prognosis of facial function

- **Anatmical factors:**
  - Tumor size
  - Adhesion
  - Strech
  - Position

- **Electrophysiological factors:**
  - Stimulation thresholds
  - Response to supramaximal stimulation

Hearing preservation

- Preoperative hearing class A, B or C operated through MCF or retrosigmoid approach ($n = 141$)

- **Prognostic factors:**
  - Tumor stage
  - MAI involvement
  - Preoperative hearing

- **Complications:**
  - Neurological: 1.6%
  - Infectious: 3%
  - Miscellaneous: 3%
  - Décès: 0.4%

- **Resection quality:**
  - Near total resection: 0.4%
  - In case of total resection:
    - Nodular enhancements on postop MRI: 2% ($n=640$)
    - Documented recurrences: 0.2%
Conservative management

Material and methods

- 1990 – 2001: 111 patients
- Mean age = 59 years (range: 19-87)
- Mean follow-up period: 33.4 months (6-111 months)

Include criteria:
- Intracanalar (stage 1, 57%) tumours or tumours extending less than 15 mm in CPA (stage 2, 43%)
- Age > 60 years and/or surgical contra-indication
- No past history of tumour growth at first visit
- Or surgery refusal, and stable stage 1 or 2 tumours

Results

Hearing function during Conservative management
(n=105)

First visit (LA classification):
- Class D: 34%
- Class C: 23%
- Class B: 17%
- Class A: 25%

Last visit with follow-up > 36 months (n=32):
- Initial Class D: 28%
- 2-3 class deterioration: 25%
- One class deterioration: 31%
- Stable: 16%

Estimated Annual hearing loss: 4.2 ± 0.82 dB / year

Follow-up status at the end of the study

Followed-up: 65%
- External Rx: 1%
- Surgery: 15%
- Followed-up elsewhere: 2%
- Lost: 17%
Conservative management

- The rapidly growing schwannomas justify a first follow-up MRI 6 months after the diagnosis.
- Hearing function deterioration concerns the majority of patients, and is correlated to tumour growth.
- Except in the elderly, there is no advantage for conservative treatment if there is no serviceable hearing.


Radiosurgery

- Two techniques: Stereotactic radiosurgery (SR), and fractionated stereotactic radiosurgery (FSR)
- SR used extensively in a variety of benign intracranial lesions
- No controled study showed that SR or FRS are better than no treatment
**Limits of Radiosurgery**

- Absence of tissue diagnosis
- Hampers secondary surgical resection
- Uncertain long-term risks:
  - Brainstem ischemia
  - Injury to cranial nerves
- Documented malignant change (*Shin et al., The Lancet, 2002*)

**Radiosurgery**

- With appropriate constraints and safeguards, SR can be a safe, and effective therapy
- In case of contra-indicated surgery
- In small lesions
245 CPA tumors managed in 2005

- 226 vestibular schwannomas
- 14 meningiomas
- 2 miscellaneous
- 3 facial schwannomas
- 14 NF2
- 1 intracochlear

Management in 2005

- **Stage 1 (34%)**: 
  - Conservative 86 %
  - Surgery 14%
- **Stage 2 (36%)**: 
  - Surgery 53%
  - Conservative 40 %
  - Irradiation 7%
- **Stage 3 (22%)**: 
  - Surgery 82%
  - Conservative 11 %
  - Irradiation 7%
- **Stage 4 (7%)**: 
  - Surgery 100%
Conclusions

- The functional outcome of surgery improves with an earlier detection of VS.
- Improvements of imaging and intra operative electrophysiology lead to a more precise planning and prognostic information.
- Today, surgery remains the main therapeutic option especially in mid-size and large lesions.