Predictive factors for early facial nerve function after vestibular schwannoma surgery

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Predictive factors for early facial nerve function afterVS surgery

- 7 to 48% of the patients still experience temporary or lasting deterioration of facial nerve function even in large series.

- Facial nerve palsy, even if temporary, is one of the most troublesome impairments after VS treatment and a major factor determining the QoL of the patients

Predictive factors for early facial nerve function afterVS surgery: Goal

To define preoperatively assessable parameters that correlate with immediate facial nerve outcome following VS surgery.

These parameters might reflect some of the following aspects: facial nerve vulnerability and/or more difficult facial nerve dissection that requires increased nerve manipulation.

Predictive factors for early facial nerve function afterVS surgery: Methods

- Retrospective study of 99 consecutive patients operated over 18 months
- Retrosigmoid approach
- Analysis of: patient's demographics, initial symptoms, neurological status at presentation, and early postoperative neurological status.
- The facial nerve function was assessed 2 weeks after surgery (House-Brackmann scale).

Predictive factors for early facial nerve function afterVS surgery: Statistical analysis

- Commercially available statistical software (SPSS, version 13.0, Inc., Chicago, IL)
- Parametric independent t-test and paired t-test, the nonparametric Kruskal-Wallis (KW) and Mann-Whitney U (MWU), Chi-square (CS) and Pearsons correlation tests
- Significance if error probability of $p<0.05$. All data are expressed as mean ± standard error of mean

Predictive factors for early facial nerve function afterVS surgery: Patients

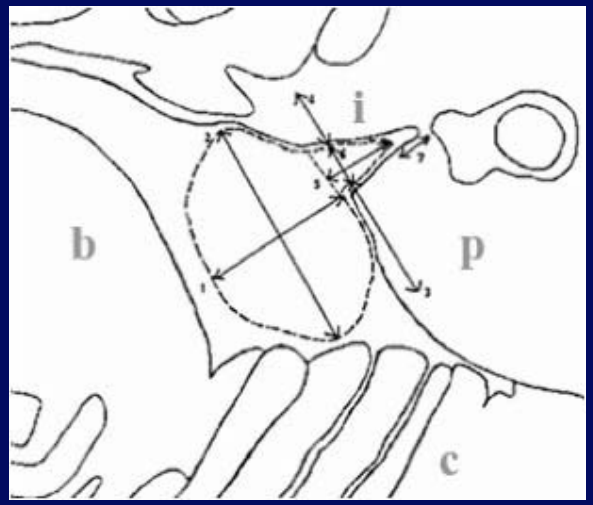
99 patients; 47 years median age

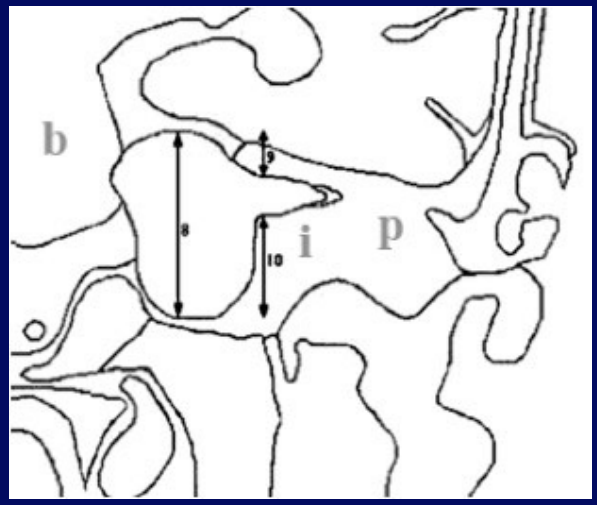
At presentation:

- hearing deficit - 81%
- tinnitus - 43%
- vertigo - 30%
- cerebellar signs - 22%

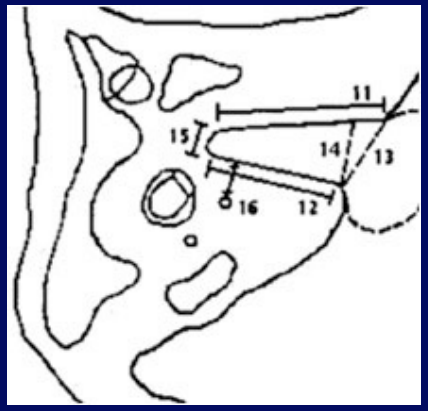
Tumor extension: T1- 9%; T2- 10%; T3- 35%; T4- 46%

Predictive factors for early facial nerve function afterVS surgery: Radiological analysis





Predictive factors for early facial nerve function afterVS surgery: Radiological analysis

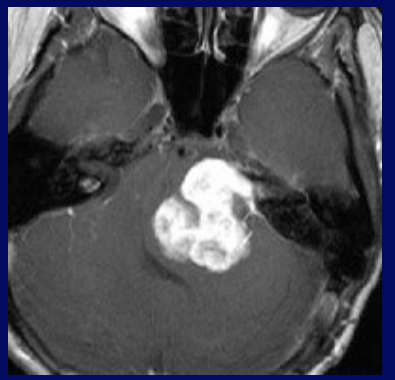


Predictive factors for early facial nerve function after VS surgery: Radiological analysis

- cystic tumor changes: microcysts or large cysts and superficial or deeply located cysts
- shape of extrameatal tumors: oval, round and polycyclic

57% 19% 8%





Predictive factors for early facial nerve function afterVS surgery: Outcome

Total removal- 100%

Preservation of the anatomical integrity of the facial nerve: 98%

Excellent and good function: 78%

- HB Grade I: 53%
- HB Grade II- III: 25%
- HB Grade IV-V: 19%
- HB Grade VI: 3%

Predictive factors for early facial nerve function afterVS surgery: Results

Clinical factors that do not correlate with facial nerve function:

- age, symptoms duration, gender
- preoperative vertigo or tinnitus
- trigeminal nerve dysfunction and lower cranial nerves deficit- insignificant correlation

Predictive factors for early facial nerve function afterVS surgery: Results

Clinical factors that correlate:

- headache as initial symptom
- gait instability at presentation
- preoperative facial nerve function

Predictive factors for early facial nerve function afterVS surgery: Results

	HB I	HB II - III	HB IV - V	HB VI
Mediolateral diameter (cm)	1.53 ±-0.15	2.22 ±0.17	2.04 ±0.18	2.33 ±0.71
Anteroposterior diameter(cm)	1.85 ±0.20	2.71 ±0.26	2.77 ±0.20	2.48 ±0.12
Sagittal diameter (cm)	1.80 ±0.18	2.48 ±0.23	2.44 ±0.16	2.45 ±0.58
Cranial extension (cm)	0.66 ±0.09	1.03 ±0.13	0.97 ±0.10	0.94 ±0.09
Caudal extension (cm)	0.56 ±0.06	0.83 ±0.11	0.86 ±0.08	0.81 ±0.49
Posterior extension (cm)	0.70 ±0.10	1.02 ±0.14	1.03 ±0.11	1.05 ±0.34
Anterior extension (cm)	0.37 ±0.06	0.69 ±0.11	0.70 ±0.08	0.83 ±0.20
Intrameatal length (cm)	0.85 ± 0.05	0.98 ±0.08	0.98 ±0.06	0.88 ±0.05
Intrameatal width (cm)	0.58 ±0.04	0.70 ±0.05	0.62 ±0.04	0.65 ±0.02
Tumor-fundus distance (cm)	0.17 ±0.03	0.19 ±0.04	0.14 ±0.04	0.19 ±0.02
Tumor volume (ml)	4.30 ±1.27	8.36 ±1.92	8.83 ±1.90	7.50 ±3.19
Maximal IAC diameter (cm)	1.10 ±0.03	1.09 ±0.05	1.13 ±0.05	0.86 ±0.04
90° IAC diameter (cm)	0.84 ±0.03	0.84 ±0.05	0.87 ±0.07	0.73 ±0.10
3 point angle (degrees)	39.4 ±1.40	39.61 ±2.18	40.34 ±2.77	34.18 ±4.5
Lateral angle (degrees)	53.3 ±1.57	49.88 ±2.49	49.71 ±2.35	48.28 ±5.25
Continued angle (degrees)	29.4 ±1.60	28.70 ±2.19	28.66 ±2.34	22.68 ±2.44
Lateral IAC diameter (cm)	0.20 ±0.01	0.18 ±0.01	0.19 ±0.01	0.24 ±0.01

Predictive factors for early facial nerve function afterVS surgery: Results

Radiological factors:

- tumor size and volume ($p<0.05$)
- tumor stage: no significant difference up to stage T4a. However, tumor stages T4a and T4b were associated with worse facial function compared with all other stages

Predictive factors for early facial nerve function afterVS surgery: Results

Radiological factors:

- anterior extension - more significant correlation than posterior extension (p:0.001)
- caudal extension - more significant correlation than cranial extension (p:0.004)
- tumor shape: polycyclic VS had the worst prognosis, followed by the oval tumors ($p<0.05$)

Predictive factors for early facial nerve function afterVS surgery: Conclusion

- Intra-meatal growth-pattern and IAC characteristics do not correlate with postoperative facial nerve function.
- Tumor shape, volume, extrameatal tumor size and direction of growth are the most closely associated factors.
- Preoperative gait instability and poor facial nerve function, and headache as the initial symptom have significant correlation.