MEASURING VESTIBULAR SCHWANNOMAS

Intra- and inter observer variations

Dan Dupont Hougaard, MD
ENT Department, Aarhus University Hospital

Background

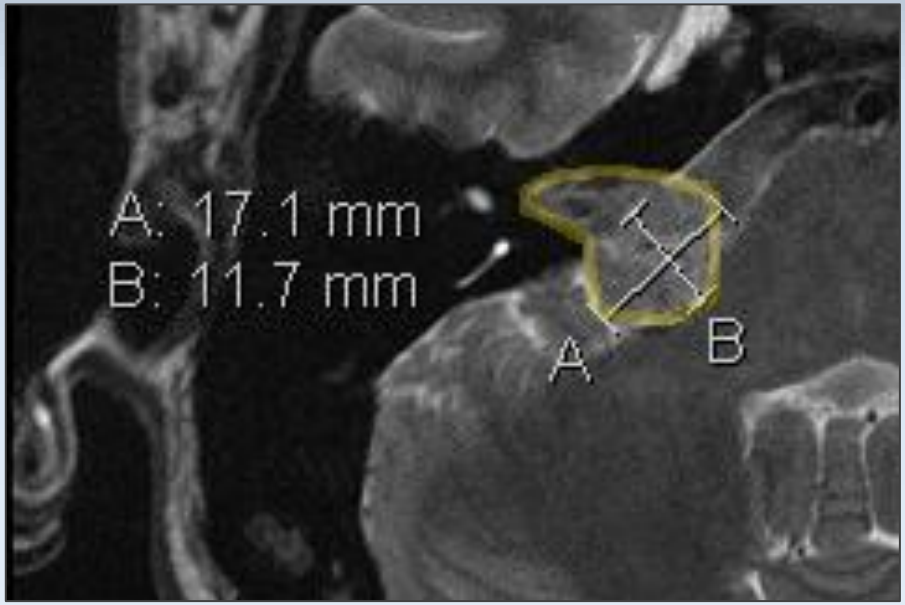
- The Natural History of VS is enigmatic
- Treatment modalities
- Incidence in Denmark
  - 2008: 105 (19.4 per million per year)
- How to measure growth
- Definition of growth

Design

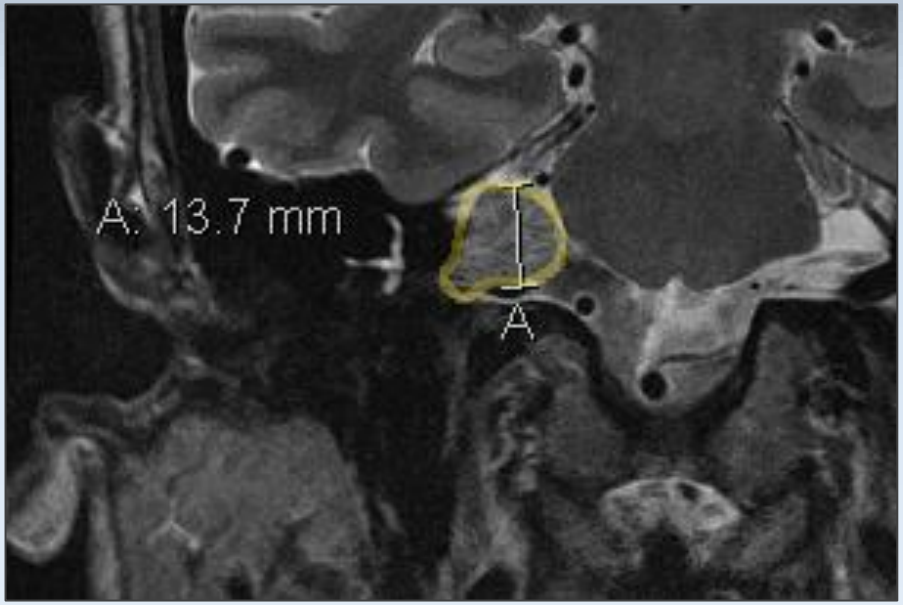
- Retrospective cohort study
- Inclusion criteria
  - Patients diagnosed with VS (code DD33.3B)
- Primary outcome:
  - Intra- and inter observer variability in measuring VS

Method

- T1 weighted Gadolinium MRI
- Three orthogonal linear measurements



d1, d2 (axial slide)

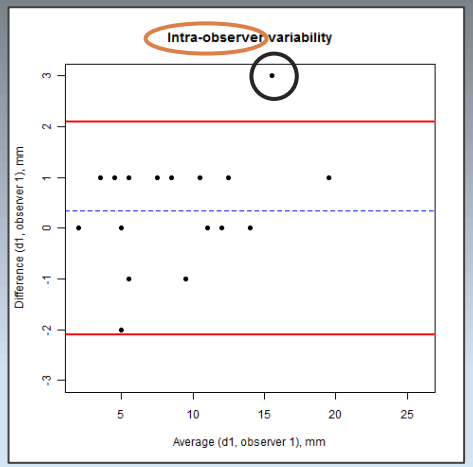


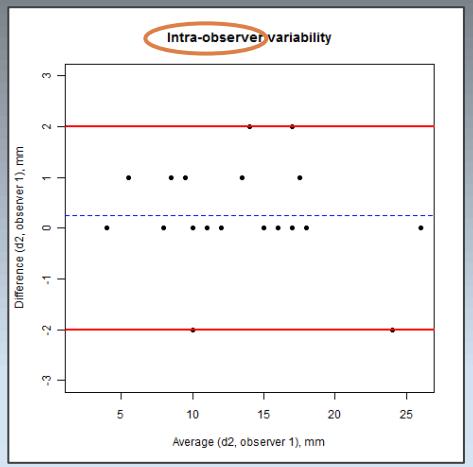
d3 (coronal slide)

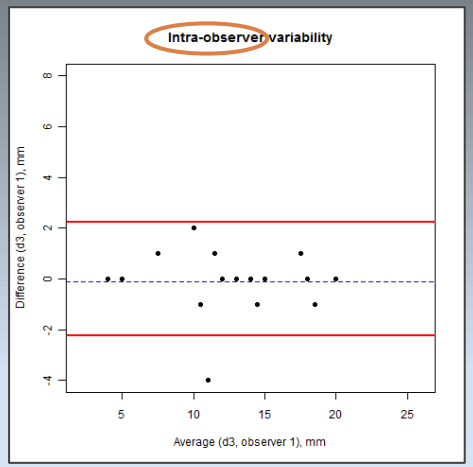
Method

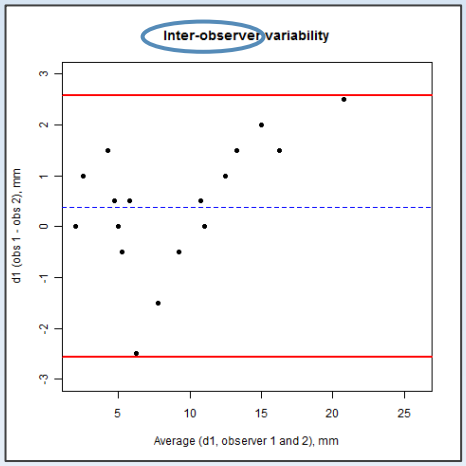
- Assume VS is ellipsoidal
- All patients measured in three dimensions by observer 1
- 20 scans (20 patients) randomly selected for re-measurements by observer 1 and 2

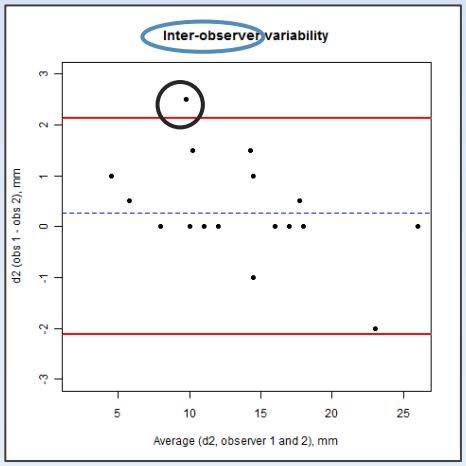
Results

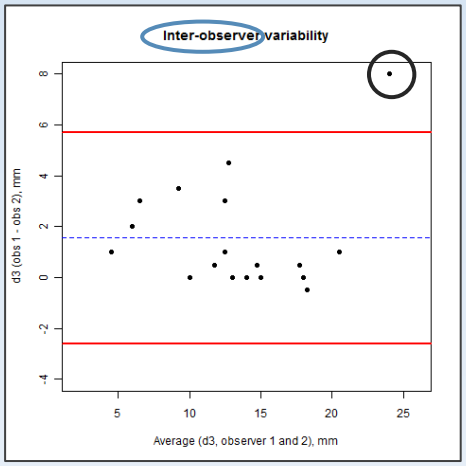

Intra-observer variability
Difference (d1, observer 1), mm
Average (d1, observer 1), mm


Intra-observer variability
Difference (d2, observer 1), mm
Average (d2, observer 1), mm


Intra-observer variability
Difference (d3, observer 1), mm
Average (d3, observer 1), mm


Inter-observer variability
d1 (obs 1 - obs 2), mm
Average (d1, observer 1 and 2), mm


Inter-observer variability
d2 (obs 1 - obs 2), mm
Average (d2, observer 1 and 2), mm


Inter-observer variability
d3 (obs 1 - obs 2), mm
Average (d3, observer 1 and 2), mm

Results

	Intra observer	Inter observer
d1, mm	2.10	2.52
d2, mm	*2.01*	*2.10*
d3, mm	2.23	4.16
Volume, mm^3	441.94	1010.19

Limits of Agreement

Results

- Inter observer
  - Outliers ¾ BA Plots
  - Wider LOA
- Intra observer
  - Outliers ¼ BA Plots
  - Narrower LOA

Conclusion

- All intra- and inter observer variations > 2 mm
- Inter observer variations wider
- d2 smallest intra- and inter observer variations

Perspective

- Wide use of single (axial) linear measurement
- Significant variability when measuring VS
  - Intra- and inter-observer variability
- Definition of growth
- (Re-)definition of surgical criteria's?