

# Sensitivity of vestibular tests in 137 vestibular schwannoma patients

K.S.Nilsen<sup>1,2</sup>; S.H.G.Nordahl<sup>1,2</sup>; J.E.Berge<sup>1,2</sup>; D.Dhayalan<sup>2,3</sup>; F.K. Goplen<sup>1,2</sup>

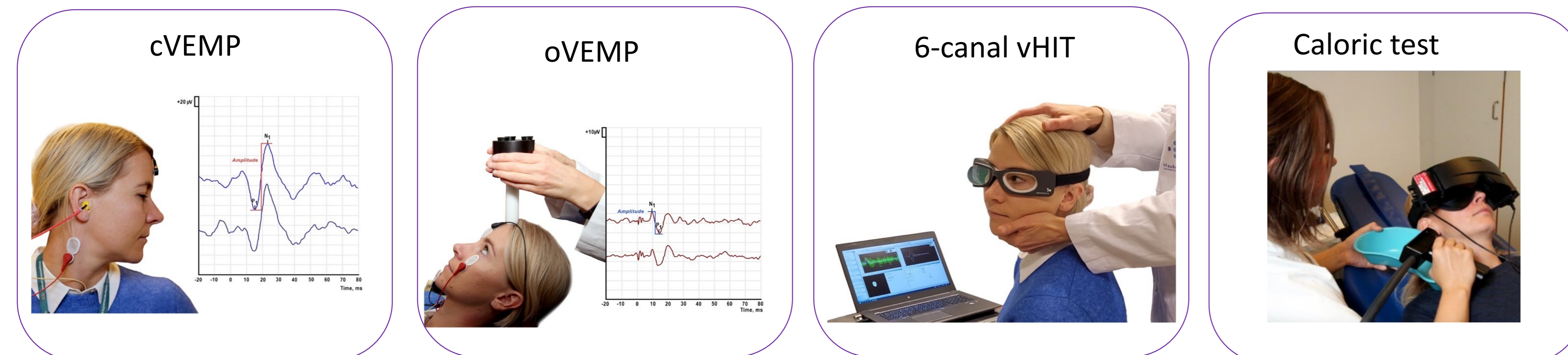
<sup>1</sup>Dep.of Head and Neck Surgery, Haukeland University Hospital, Norwegian National Advisory Network on Vestibular Disorders, Bergen, Norway  
<sup>2</sup>Dep.of Clinical Medicine, University of Bergen, Norway. <sup>3</sup>Dep.of Neurosurgery, Haukeland University Hospital, Norway

## Background and objective:

- The video head impulse test (vHIT) and the cervical and ocular vestibular evoked myogenic potentials (cVEMP and oVEMP) are new methods for measuring peripheral vestibular function.
- The aims of this study were to compare these tests and the traditionally used caloric test in patients with untreated vestibular schwannoma (VS) and to measure correlation between the tests's results and tumor volume.

## Material and methods

- Cross-sectional study of consecutive patients referred to a university clinic for newly diagnosed, untreated small-to medium sized vestibular schwannoma ( $\leq 25$  mm in the cerebellopontine angle on MRI ) enrolled in 2017-2019.
- Prevalence of abnormal test results on the tumor side and the non-tumor side of the following vestibular tests were compared and related to tumor volume with regression analyses:



## Results:

- 137 patients were included and mean age was 55 years (range 28-78 years).
- Median tumor volume was 0.26 cm<sup>3</sup> and mean maximum tumor diameter was 10.5 millimeter.
- Main findings were sensitivity of caloric test, 6-canal vHIT, cVEMP and oVEMP, as shown in the table.
- A significant relationship was found between canal paresis on the tumor side and tumor volume (cm<sup>3</sup>) (Coeff. 20, P=0.001) and between vHIT gain of semicircular canals on the tumor side and tumor volume (Coeff. -0.06 to -0.09 and P  $\leq 0.03$ ). A significant relationship between VEMPs and tumor volume was not found.

## Sensitivity and percentage of abnormal test results related to tumor side:

Abnormal vestibular test	Sensitivity (%)	Tumor side (%)	Both sides (%)	Non-tumor side (%)
Caloric	47	47	0	2
vHIT lateral	28	23	5	4
vHIT anterior	16	15	1	1
vHIT posterior	41	31	10	7
cVEMP**	39	39	0	4
oVEMP**	25	25	0	3
Any vHIT*	51	36	15	8
Caloric or cVEMP**	65	64	1	5
Caloric or any vHIT*	64	47	17	8
cVEMP or oVEMP**	52	51	1	6
Any of all tests**	79	56	23	8

\*Abnormal vHIT in at least one semicircular canal; \*\* Bilateral absent VEMP responses defined as normal

## Conclusion:

- Caloric test and the 6-canal vHIT** showed the **highest sensitivity** in detecting vestibulopathy in untreated vestibular schwannoma patients.
- vHIT, and especially the **posterior canal, was limited** with a high prevalence of **abnormal results** on the **non-tumor side**.
- A **combination of cVEMP and caloric test** was **favorable** in terms of a relatively high sensitivity and a low prevalence of abnormal results on the non-tumor side.
- Prevalence of **canal paresis** and **abnormal vHIT gain** were **dependent on tumor volume**.