Can we really trust calorics?

Since the Nobel prize-winning work of Bárány early last century, caloric testing has been the mainstay of vestibular assessment. Only relatively recently have other tests of vestibular function become available and these are often confined to specialist units. The caloric stimulation of the vestibular system and the resulting ENG/VNG tests have become relied upon to determine the presence of a vestibular lesion, but it is becoming more and more apparent that a caloric test can be normal in a wide range of vestibular lesions. One of the most important principles in the theory that underlies this is that fact that the vestibular system must function in a different way at varying head velocities to produce a gain of 1.0 to prevent oscillopsia through the vestibulo-ocular reflex (VOR).

Magnetic scleral search coil (MSSC) measurement of eye movement during head perturbations of increasing velocities show that there can be a difference in gain depending on the velocity of the head; it is possible to have a normal gain with low angular velocities, but have a very diminished gain at higher velocities. Of 168 patients, attending a tertiary balance unit, sent for caloric testing, 68 had normal results; MSSC testing was positive in 32 patients. Although low velocity gains were normal, high velocity gains for the left and right ears were 0.84(SD=0.15) and 0.78(SD=0.14) respectively, well below normal. Clinical evaluation of the 32 patients showed a positive head thrust test or reduced DVA in 30 patients; showing that the abnormality was clinically detectable in 30/32 patients.

Other anomalies suggest that using caloric testing as a screening test may be problematic. Asymmetries in Jonkee's formula when temperatures below 30°C are used against warm calorics suggest that the arbitrary nature of the 30/44°C separation cannot be relied upon. Thermodynamic and conceptual problems with caloric/ENG/VNG testing are discussed in greater detail in this lecture.

Biography

Dr Pothier attended medical school at the University of Cape Town, South Africa. He then undertook his Otolaryngology training in London and the South West of England. Fellowship trained in Neurotology in Toronto, Canada where he now works as an Otologist/Neurotologist with an interest in middle ear and vestibular disorders, as well as Health Informatics. He has a primary research interest in bilateral vestibular loss. He has published over 80 peer-reviewed articles and has a Bacon number of 4.

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