HOT CALORIC TEST IN PATIENTS WITH PERIPHERAL VERTIGO

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The Present study was carried out in order to evaluate the efficacy of warm monothermal test in patients of peripheral vertigo. Thirty patients were diagnosed to have peripheral vertigo based on clinical, audiometric and vestibular evaluations. The vestibular evaluation was done using clinical bithermal caloric test (Fitzgerald & Hallpike), ice cold caloric (Kobark) and bithermal test with ENG recordings. The data of clinical evaluations were compared with the normative one, obtained from a control population consisting of 15 subjects. The sensitivity of warm monothermal test following clinical evaluation and with ENG was 84% and 79% respectively. The sensitivity of the ice cold caloric test was 71% thus suggesting a greater sensitivity of warm monothermal test. Warm monothermal test is a cost effective screening procedure for patients of peripheral vertigo.

INTRODUCTION

Caloric test happens to be one of the most important clinical methods of investigating the equilibril sense organ and its central neural substrates. Despite being unphysiological and non-reflective of the normal response of vestibular subsystem in any way because of its being a suprathreshold test, it has immense diagnostic value. The aim of any test procedure is its simplicity, being less time consuming, having minimal unpleasant effects, simplicity of interpreting the results and test/retest reproducibility with reliability. For these reasons some simpler techniques have been used in replacement of the conventional bithermal caloric test. A monothermal caloric test, as compared to standard bithermal caloric test, is a step in that direction. Hart (1965) and Bernstein (1965) suggested that warm monothermal test would shorten the time of examination and be able to show common abnormalities. Barber et al (1971) were first to investigate the efficacy of a warm monothermal stimulation using ENG technique.

This study has attempted at assessing the results of hot caloric test as a reliable parameter for evaluating patients of vertigo with peripheral localisation and compare it with kobrak minimal cold caloric test and standard bithermal test clinically and using electronystagmography.

MATERIALS & METHODS

The present study was conducted on forty five subjects which were divided into two groups:

a) Normal Subjects - which constituted the control group.

b) Patients with peripheral vertigo hence called the pathologic group.

Control Group: This group comprised of fifteen young subjects. They were free of any ear complaints and vertigo. A thorough history and general physical examination were followed by Otolaryngological, audiological and neuro- otologic investigations viz.

1. Pure tone audiometry.
2. Clinical bithermal caloric testing and Kobrak's minimal cold caloric test.

There were 12 males and 3 females between the age group of 16-35 years.

Pathological Group: This group was constituted by 30 patients, diagnosed to have
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investigations on the basis of history, clinical examination, audiometry and vestibular evaluations. These patients also underwent investigations in order to rule out a retrocochlear pathology where ever indicated. The test battery included special audiometric tests viz; SISI, difference limen, and Tone Decay, X-ray of the internal auditory meatus, Brainstem evoked response audiometry, CT of the temporal bone and in patients with a high suspicion, Magnetic resonance imaging was done. The patients ranged between the age 19 years to 70 years. There were 20 males and 10 females. There were 16 patients complaining of impairment of hearing out of whom 13 had sensorineural and 3 had conductive hearing loss.

The clinical diagnosis of the patients in this group were as follows:

- Vascular: 9
- Vestibular Neuronitis: 4
- Meniere's: 3
- Post-head injury: 2
- Otospongiosis: 2
- Age related: 2
- Ototoxicity: 2
- Cervical spondylosis: 1
- Benign Paroxysmal positional vertigo: 1
- Cause Undetermined: 4

**Vestibular Evaluation**: The clinical bithermal test was carried out as described by Fitzgerald and Hallpike (1942). Having induced the nystagmus the duration of nystagmus i.e. the time period between the start of stimulus and the end of nystagmus was noted. An interval of 5 minutes between successive tests was given with a view to avoiding possible vestibular fatigue or adaptation.

**Cold Caloric Test**: The test was performed with ice cold water as advocated by Kobrak with some modifications. The patient was seated on a chair with a head rest. First the horizontal canal was stimulated with the head tipped at 60 degrees backward and then vertical one by putting the head in erect position with a forward inclination of 30 degrees, 5 ml. of water was slowly irrigated towards the postero-superior quadrant of the tympanic membrane and the adjoining canal wall over a period of half minute from a 40 ml. syringe with a 21 gauge needle through an ear speculum and if no reaction was noted within 45 secs, 10 ml. of water was irrigated. If necessary the quantity of water was increased by 5-10 ml, every time till there was no reaction with 40 ml. of water.

As soon as the nystagmus started the patient was asked to close the eyes and tested for past pointing to see if there was any dissociation or bilateral conjugate deviation of the superior extremities. Then the nystagmus was noted carefully as to its amplitude, character, direction and duration. The subjective sensation of vertigo were enquired and the vegetative reactions were looked for. The head was then tipped forward 30 degrees and the nystagmus was carefully scrutinised for any change of character (whether rotating or horizontal), direction and dissociation. Normally stimulation of the horizontal canal gives horizontal nystagmus and vertical ones, rotatory nystagmus in frontal plane both to the opposite side.

Electronystagmography was carried out to note the following:

- a. Spontaneous nystagmus
- b. Deviation maintenance nystagmus
- c. Optokinetic nystagmus
- d. Positional nystagmus
- e. Pendular eye tracking test
- f. Nystagmus after bithermal caloric stimulations.

All with eyes closed-lights off, then eyes open lights off and later eyes open lights on.

**OBSERVATION**

The normative data obtained from the control group showed that the difference between right and left ear was not significant in warm caloric (44 degrees C), Cold caloric (30 degrees C) and ice cold caloric (Kobrak's) clinical test.

The clinical test procedure showed two characteristic features:

1. The cold caloric test both with 30 degrees C and ice cold water had more severe responses than warm caloric test.
2. The cold caloric test was more uncomfortable to the patient than the warm one in the control group.

In the pathological group of patients the criteria for hypofunction was taken as greater than 15% difference between the two ears. The normative data for the clinical test were obtained from control group and for ENG the parameters that are being used in our laboratory i.e. (R) 44 deg.