P186

Auditory Objective Measures - Electrophysiology & Auditory Evoked Potentials

Modifications on the Auditory P300 induced by ventriculoperitoneal shunting on normal pressure hydrocephalus: preliminary results

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Abstract

Normal pressure hydrocephalus (NPH) is a neurological syndrome resulting from increased cerebrospinal fluid volume without significant increase in intracranial pressure. It is based on the following symptom triad: gait disturbance, urinary incontinence and cognitive impairment. Diagnosis is based on clinical symptoms, imaging exams and the Tap Test (TT), which consists of neuropsychological and gait evaluations prior to and after a lumbar tap, and is used to predict the treatments effectiveness. The treatment is often a surgically implanted cerebral shunt, therefore, accurate diagnostic methods are essential. Cortical Auditory Evoked Potentials (CAEP) can be used to assess the integrity of the auditory pathway and monitor cognitive auditory functions, in addition to being a non-invasive, fast and low-cost test. That being said, the CAEP could be used as an auxiliary tool on evaluating the shunting prognosis.

Objective

Considering the need to better understand idiopathic Normal Pressure Hydrocephalus (iNPH), and to propose new diagnostic methods, the aim of this study was to compare the CAEP results of patients with suspected iNPH who underwent ventriculoperitoneal shunting (VPS) with the results of patients with a positive response to the TT who did not undergo the surgical procedure.

Materials and Methods

The assessments:

CAEP assessments were conducted on three different moments

- 1st evaluation - Before lumbar puncture;
- 2nd evaluation - After lumbar puncture;
- 3rd evaluation - From three to six months after TT.

The population:

16 patients with positive TT results divided into two groups

- Study Group (SG), five males and three females, from 62 to 84 years old, who underwent VPS;
- Control group (CG), four males and four females, from 72 to 88 years old, who did not undergo VPS.

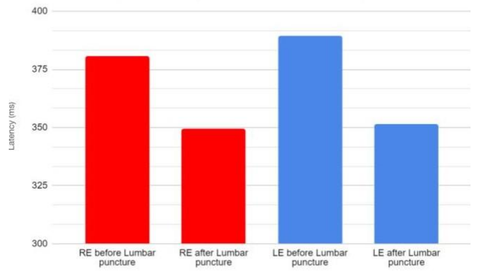
The Analysis:

Comparison analysis were performed between groups and moments of evaluation

Results

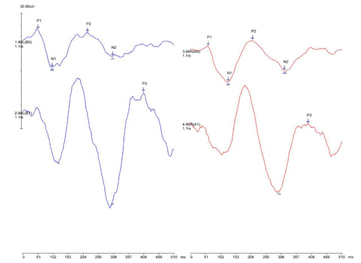
A statistically significant difference was observed when comparing the results before and after the lumbar puncture, with more evident improvements in the P3 latency after the lumbar puncture in the SG (Graph 1). Comparing the results before lumbar puncture and after VPS, a tendency towards shorter P3 latencies can be observed in the SG, even though the results of both groups in the third evaluation were very similar. Among the participants of the CG, no difference was observed in the P3 latency between the evaluations.

Graph 1. Mean P3 latency values of the SG, before and after lumbar puncture

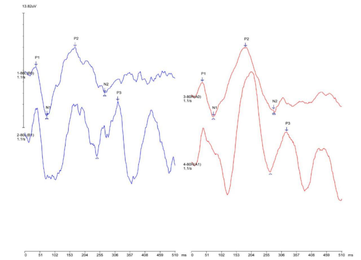


Legend: RE - Right Ear; LE - Left Ear; ms - milliseconds

CG - 3rd evaluation



SG - 3rd evaluation



Conclusion

The present study suggests that, in positive TT cases, undergoing VPS has an effect on the CAEP results, especially regarding the latency of the P3 component, which tends to get reduced after the procedure. Although this tendency has already been observed, an analysis with a bigger sample size is required for a more accurate assessment.

References

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