O-HID-12 - Automated analysis of continuous ICP recording using fuzzy logic: Diagnostic accuracy in idiopathic normal pressure hydrocephalus

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Resumen

Introduction: It is still difficult to preoperatively identify shunt responders in iNPH. For some authors, overnight continuous ICP recording is the most powerful ancillary test for this purpose, but it requires dedicated equipment, is time-consuming, and its diagnostic accuracy has not been fully tested. Fuzzy logic algorithms have demonstrated its utility for biomedical signal processing in other areas like cardiology. We present the AI-ICP, an automated fuzzy logic algorithm for the preoperative identification of surgical candidates using continuous ICP recording.

Objectives: To determine the diagnostic accuracy of AI-ICP in iNPH.

Material and methods: From October 2005 to June 2015, 146 patients referred with the diagnosis of iNPH were invasively studied by continuous ICP recording with our computerized platform. Outcome was prospectively evaluated at six-month, defining shunt response and good outcome as an increase in Normal Pressure Hydrocephalus Score of at least 15% and 25% respectively. The AI-ICP algorithm was developed employing the ICP recordings of all patients irrespective of its final outcome, and then tested against a mixed sample composed by shunt responders and non-responders.

Results: 19 patients were diagnosed of ex-vacuo ventricular dilation and 127 of iNPH. Of those, 107 were finally shunted: 93 responded and 64 had at least good outcome. The AI-ICP algorithm showed a diagnostic accuracy of 0.92 for shunt candidacy, 0.84 for shunt response and 0.65 for good outcome.

Conclusions: Fuzzy logic seems to be a promising technique for identification of surgical candidates in iNPH by means of automated analysis ofICP recordings.