



Change in optic nerve sheath parameters are a sensitive radiological marker of ETV outcome in children

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Introduction

The clinical response of pediatric patients after an ETV remains quite varied. Numerous radiological features correlating with ETV outcome have been described, but there still remains a distinct group of patients in which the outcome of the procedure remains uncertain.

Methods

We reviewed MR imaging for all ETV's performed between 2008 and 2012, to identify whether a change in the optic nerve sheath diameter (ONSD), as well as the optic nerve to sheath ratio (ONSR), as measured on T2 axial MRI imaging provided a useful radiological marker of ETV outcome. Suitable pre-operative and post-operative imaging (acquired within 3 months of the procedure) was necessary for inclusion into the study. The ONSD, as well as the ONSR in both eyes were calculated, and the average change in these parameters was compared to conventional imaging features associated with ETV outcome. These findings were then also correlated with the clinical assessment of ETV outcome.

Conclusions

Change in optic nerve sheath parameters, specifically ONSD and ONSR are good independent radiological markers of ETV outcome, but are probably most useful when combined with the historical radiological features of ETV outcome.

Results

MRI imaging in 21 patients was adequate to measure and calculate the change in ONSD, and ONSR respectively. In successful ETV's (n=17), the mean change in ONSD was a decrease of 0.9 ± 0.13 mm, whereas in failed ETV's (n=4), the mean change was an increase of 0.14 ± 0.12 mm ($p < 0.0001$). The ONSR increased from 0.48 to 0.66 (change of 0.22) in successful ETV's and decreased from 0.44 to 0.43 (change of 0.01) in failed ETV's. Change in ONSD of more than 6.1% has a sensitivity of 96% and a specificity of 75% (ROC=0.97) for ETV outcome.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) describe the importance of radiological features as an adjunct in assessing ETV outcome, 2) identify the optic nerve sheath as a reliable marker for raised intracranial pressure.