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Autor(en) des Beitrags:
Steinborn, M; Fiegler, J; Ruedisser, K; Hapfelmeier, A; Denne, C; Macdonald, E; Hahn, H

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Abstract:
PURPOSE: To evaluate the accuracy of measurements of the optic nerve sheath diameter (ONSD) in children by comparing transbulbar sonography with magnetic resonance imaging (MRI).

MATERIALS AND METHODS: 65 children (age: 3 mo-17 y; mean age: 11.3 y) underwent MR imaging of the brain including a heavily T 2-w sequence of the orbit and transbulbar sonography using a 17 MHz linear array transducer. Measurements of the ONSD were performed retrospectively by two experienced readers and all images were evaluated regarding the image quality. Bland-Altman Plots were produced to assess the accuracy of measurements. The correlation between readers and between MR imaging and transbulbar sonography was calculated by the concordance correlation coefficient (CCC).

RESULTS: Overall the mean values of the ONSD for MRI (5.86 ± 0.66 mm) and transbulbar sonography (5.86 ± 0.71 mm) were identical. There was a high correlation between readers for measurements of the ONSD both for transbulbar sonography (CCC = 0.93) as well as for MRI (CCC = 0.9). Comparing the measurement values between transbulbar sonography and MRI, the correlation of ONSD values was good to moderate with a high dependency on image quality (CCC [0.31, 0.68]).

CONCLUSION: We were able to
demonstrate that the ONSD values of transbulbar sonography in children correlate well with MRI if the relevant anatomic structures are depicted and the measuring points are set correctly. Based on the findings of our study, it seems necessary to define normal and cut-off values for the ONSD in children again to finally assess the clinical relevance of the ONSD as a noninvasive parameter for the evaluation of intracranial pressure.