PURPOSE: We performed a cadaver study to evaluate the accuracy of measurements of the optic nerve and the optic nerve sheath for high resolution US (HRUS) and magnetic resonance imaging (MRI).

MATERIALS AND METHODS: Five Thiel-fixated cadaver specimens of the optic nerve were examined with HRUS and MRI. Measurements of the optic nerve and the ONSD were performed before and after the filling of the optic nerve sheath with saline solution. Statistical analysis included the calculation of the agreement of measurements and the evaluation of the intraobserver and interobserver variation.

RESULTS: Overall a good correlation of measurement values between HRUS and MRI can be found (mean difference: 0.02 - 0.97 mm). The repeatability coefficient (RC) and concordance correlation coefficient (CCC) values were good to excellent for most acquisitions (RC 0.2 - 1.11 mm; CCC 0.684 - 0.949). The highest variation of measurement values was found for transbulbar sonography (RC 0.58 - 1.83 mm; CCC 0.615 / 0.608).

CONCLUSION: If decisive anatomic structures are clearly depicted and the measuring points are set correctly, there is a good correlation between HRUS and MRI measurements of the optic nerve and the ONSD even on transbulbar sonography. As most of the standard and cut-off values that have been
published for ultrasound are significantly lower than the results obtained with MRI, a reevaluation of sonographic ONSD measurement with correlation to MRI is necessary.