Reviewer’s report

Title: Reproducibility and accuracy of optic nerve sheath diameter assessment using ultrasound compared to magnetic resonance imaging

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Reviewer: Thomas GEERAERTS

Reviewer’s report:

This article aims at studying the reproducibility of optic nerve sheath diameter (ONSD) measurements using ocular sonography and MRI, and also to compare ultrasound and MRI measurements of ONSD.

As ONSD measurement has been described to be useful in estimating the risk of intracranial hypertension, but also hypotension, this study is of interest.

In this small prospective study (n=15), in healthy volunteers, the authors have found a good correlation and agreement for scan-rescan, inter and intra-observer measurements, but also for the comparison between ultrasound and MRI ONSD.

The main interest of this study is the direct comparison between ultrasound and MRI for ONSD measurements. ONSD measure variability using sonography has been already studied and published. The paper is well written and the methods for ONSD measurement using ultrasound and MRI appear to be adequate.

I have however some major comments that need to be addressed.

1. The statistical method for inter and intra-observer variability study is probably not sufficient. A method using the Kappa coefficient would be of interest, and give additional information.

2. The limits of agreements can be regarded as being large for ONSD when exceeding 0.3-0.4 mm. This is the case in the majority of the comparisons. This should be discussed more profoundly in the discussion section as a limit of the method.

3. The main limit of this study is that only healthy volunteers has been studied. These subjects are very unlikely to have abnormal ICP. The results of this study can therefore only be applied to subjects with normal ICP. Having patients with intracranial hypertension or hypotension would be of major interest to study the variability of the measurement in such conditions. This should be discussed.

4. The figure 1, panel A and B are not clear to the reviewer.
   • For the panel A, the external border of the hypoechogenic area can be regarded as an artefact (acoustic shadow) as already described by Copetti (Intensive Care Med).
   A better example of ONSD measurement using ocular sonography could probably be presented in the Panel A.
   • The Panel B shows ONSD measurement in several axes. However in the
method section, only the coronal section is mentioned to be used for ONSD measurement using MRI. Please precise.

5. If I understand well the following sentences « For calculation of inter-observer variability, observer 2 quantified ONSD in two volunteers at the first visit and in 8 volunteers at the second visit. » the inter-observer variability has been evaluated in only 10 measurement for ultrasound ONSD, correct ? This is probably a limit of the study.

6. The fact that ONSD measurement was performed using ultrasound only in one plane (transversal) should be discussed, as previous studies have used several axis to determine ONSD.

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**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests