

LETTERS TO THE EDITOR



A Proposal for a New Protocol for Sonographic Assessment of the Optic Nerve Sheath Diameter: The CLOSED Protocol

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To the Editor,

We read with great interest the article by Aspide et al. [1] concerning a proposal for a new protocol for sonographic assessment of the optic nerve sheath diameter (ONSD): The CLOSED protocol.

We congratulate the authors for their very interesting idea, but we would like to make some comments.

In this article, the authors performed ultrasound B scan technique to measure the ONSD. B scan is largely used as a noninvasive method to detect lesions, and it is very useful to distinguish optic nerve drusen, but it is not very suitable to notice ONSD changes [2].

Several reasons, which have not been taken into account in this protocol, could influence the reliability of the ONSD measurements and among these there is the so-called blooming effect. This effect is related to the acquisition gain: with low gain, the ONSD will appear larger due to the decreased wall brightness, and vice versa.

Furthermore, authors stated that “ONSD should be measured 3 mm behind the optic disk, because at this distance the sheath is subject to maximum diameter fluctuations due to ICP.” We are aware that is the most frequent point used in the literature, but unfortunately this is not a fixed point, as in cases of papilledema the optic disk is elevated and becomes flat after the ICP is normalized, making the effective measurement points different.

Another important point is that the ONSD should be measured in primary gaze position. In fact, in the other positions the optic nerve could be stretched and a different ONSD value will be measured. In case the examination is performed with closed eyelids, as shown in Fig. 3 in Aspide et al. [1], not only the gaze detection will be difficult, but the lids will attenuate the ultrasound, decreasing the image quality score, resulting in an even more unpredictable estimation [3]. For this reason, to operate all the examination with open eye lids and with eye in primary position after the use of anesthetic eye drops, using some methylcellulose as a coupling medium between the probe and the eye should be suggested. As the authors correctly stated, to keep the procedure safe and to avoid possible ocular damage is mandatory. For this reason, in case ocular structure needs to be examined, we suggest that only dedicated devices built to be used for the ocular structures, which have been proven to be safe, should be used.

A key element of CLOSED protocol is to use Color Doppler to identify central retinal artery (CRA), central retinal vein, and ophthalmic artery to better detect the nerve course. We have some concerns on this statement. In Fig. 4g in Aspide et al. [1], in our opinion, it is not the ON that does not run straight but the US scan that takes a slight oblique section, making almost oval its appearance and still including the CRA. Performing the scan along the visual axis should still allow one to see the CRA in its natural straight course, causing the artifact to disappear.

In conclusion, the presence of several artifacts makes B scan measurements quite inaccurate. In our opinion, a better way to obtain precise and well discernible images is to use Standardized A scan, as this scan shows very

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high reflective spikes from the arachnoid layer and makes the perpendicularity to the ON structures and the results more objective and reliable [4].

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References

1. Aspide R, Bertolini G, Albini Riccioli L, Mazzatenta D, Palandri G, Biasucci DG. A proposal for a new protocol for sonographic assessment of the optic nerve sheath diameter: the CLOSED protocol. *Neurocrit Care*. 2020;32(1):327–32.
2. Rosa N, De Bernardo M, Abbinante G, Vecchio G, Cione F, Capasso L. Optic nerve drusen evaluation: a comparison between ultrasound and OCT. *J Clin Med*. 2022;11(13):3715.
3. Vitiello L, De Bernardo M, Capasso L, Cornetta P, Rosa N. Optic nerve ultrasound evaluation in animals and normal subjects. *Front Med (Lausanne)*. 2022;8:797018.
4. Rosa N, De Bernardo M, Di Stasi M, Cione F, Capaldo I. A-scan ultrasonographic evaluation of patients with idiopathic intracranial hypertension: comparison of optic nerves. *J Clin Med*. 2022;11(20):6153.