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## Letters to the Editor

**BEDSIDE OCULAR  
ULTRASOUND EVALUATION OF  
PEDIATRIC OPTIC NEURITIS**



**To the Editor:**

In a previous issue of the *Journal of Emergency Medicine*, Badron and Ong discussed an interesting case report describing pediatric optic neuritis and its challenging diagnosis (1). For this purpose, the authors utilized B-scan ocular ultrasonography. In recent years, use of this diagnostic tool has become widespread in various medical fields, especially in emergency departments, due to its safety, low cost, sensitivity, and specificity in detecting several pathological conditions. Although ocular echography may seem easy to perform, we would like to point out that it requires good practical skill and knowledge of eye anatomy, which are essential to obtain trustworthy data (2–6). Moreover, other relevant aspects of this ultrasound technique should be considered to get reproducible results.

First of all, this examination should be performed with the patient in the supine position and with open eyelids, thus avoiding errors in detecting gaze direction, which could alter the data reliability (7–9). Furthermore, when dealing with B-mode ultrasound evaluation of small structures, it is mandatory to consider the absence of standardization in gain setting, which causes the so-called “blooming effect” (10–15). This effect makes the measurement of structures < 0.5 mm, such as optic nerve sheath diameter (ONSD) and other ocular structures, nonobjective and inaccurate, and it could be disregarded if larger lesions need to be assessed, as happens for other organs such as liver, kidney, and ovary (16,17).

In the early 1970s, Karl Ossoinig introduced the standardized A-scan technique in the ophthalmic field to overcome the problems of B-scan sonography (18,19). This technique uses an 8-MHz nonfocused A-scan probe with a special S-shaped amplification that is free of the blooming effect and permits more exact measurements for ONSD. In fact, this procedure shows easily discernible high reflective spikes from the interface between arachnoid and subarachnoid fluid, overcoming the problem of locating the caliper and providing more precise

measurements (20,21). In addition, regarding a more detailed ONSD assessment, the standardized A-scan could also be used to perform the “30 degree test,” a very useful test that is able to determine if an ONSD enlargement is related to an increase of subarachnoid fluid or to other conditions, such as an optic neuritis or an optic nerve meningioma (22–24).

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**RESPONSE TO DR. VITIELLO ET AL. LETTER TO THE EDITOR**



**The Reply:**

We thank Dr. Vitiello et al. for their commentary on the merits of a detailed, standardized ocular sonographic examination as advocated by Ossoinig (1).

We fully concur on the benefits of a “standardized” approach, especially in the evaluation of optic nerve sheath diameter, optic disc height, and other ocular pathologies, especially if small. This is especially useful for stable patients or for research purposes. The benefits of using the standardized approach are appreciated. However, this is not always possible in the emergency department (ED) setting.

In the pediatric population, especially for younger children, the need for patients to follow instructions (for example, to look straight ahead) may be difficult. This would be especially so in the ED setting when young pa-

tients are in distress or in pain or are unable to comply (e.g., during seizures) (2,3).

In general, the clinical role of a point-of-care ultrasound (POCUS) may be slightly different from the aims and objectives of a more formal sonography examination, and it tends to be more ED centric. Point-of-care tests are often used for ED rapid screening and evaluation to help in the evaluation of potentially time-critical conditions, to assist in risk stratification of the patient, and to determine the need for further evaluation and investigations, including imaging. Having stated that, it is also true that in many instances, diagnostic findings when performing POCUS can be definitive.

In our case report, we performed transorbital POCUS as part of our clinical evaluation while awaiting the formal eye review. We hoped to highlight the interesting transorbital POCUS findings of our pediatric patients with optic neuritis: 1) the markedly different optic nerve sheath diameter between eyes; 2) the presence of a unilateral raised optic nerve disc height (papilledema) of the affected eye; and most interestingly, 3) an irregularly enlarged optic nerve sheath (with good correlations with the findings on magnetic resonance imaging).

We employed the approach advocated by the American College of Emergency Physicians (4,5), but made a slight modification by using a “no touch” technique to avoid applying pressure on the eye (using copious gel as an acoustic standoff). We believe that the transorbital POCUS can be performed by both experts and nonexperts, with the appropriate training.

Perhaps further studies can be done to evaluate the clinical merits of using the “standardized” ocular ultrasound approach proposed by Ossoinig specifically in the ED setting.

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