

## **Bed-side ultrasound of the optic nerve sheath in a patient with bilateral acutely dilated pupils**

Sir,

Now-a-days, point of care ultrasound (USG) has become an integral part of management of critically ill patients. From routine invasive procedural guidance to lung and cardiac USG has changed our routine practice. Here, we highlight one more possible role of USG in managing these sick patients.

A 52-year-old male, who met with road traffic accident while driving his car 2 weeks ago, referred to our hospital with diagnosis of fracture right femur shaft, fracture left sided ribs (2<sup>nd</sup>-4<sup>th</sup>), severe acute respiratory distress syndrome on mechanical ventilation, acute kidney injury, and requiring vasoactive agents. 2 days later in the morning round, during the examination he was found to have bilateral dilated pupils (5 mm in size) and light reflex was absent. At that time, he was deeply sedated with continuous infusion of midazolam (5 mg/h) and fentanyl (150 µg/h) and there was no new insult that could lead to intra cranial event. Computed tomography (CT) of the head was planned, but it was hold due to the presence of high ventilatory

support (Positive end-expiratory pressure, PEEP 14) and vasoactive (Nor-adrenaline at 0.3 µg/kg/min) requirement. Bed-side USG of the optic nerve sheath (ONS) showed diameter of 0.3 cm. Meanwhile, during further evaluation we realized that the pupillary dilatation could be attributed to the accidental use of tropicamide eye drops (instead of methylcellulose) by morning nursing staff. Both types of eye drops were kept by the bedside as tropicamide was used to aid fundus examination the day before. The pupillary size had returned to normal a few hours later.

ONS comprises of the optic nerve enclosed within cerebrospinal fluid and dura mater. The diameter of ONS is thus influenced by CSF pressure variation making it a useful tool to predict raised intracranial pressure (ICP). In recent years, the role of ultrasonography of ONS has been evaluated mainly in trauma patients in the emergency department.<sup>[1-3]</sup> A cut-off for ONS diameter of 5 mm was considered positive for elevated ICP in most of the studies. In a study by Rajajee *et al.*, the authors found that ONS diameter  $\geq 0.48$  cm has a sensitivity of 96% (95% CI 91-99%) and a specificity of 94% (92-96%) for raised intracranial pressure  $>20$  mmHg in neurological patient.<sup>[4]</sup>

Presently there is little evidence that optic nerve USG could replace the need for CT scan to assess raised intracranial pressure among critically ill patients. However, this can be a useful tool for rapid and safe assessment of unstable patients.

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