

Serial ocular ultrasound as a surrogate of fundoscopic examination in a parturient with suspected elevated intracranial pressure

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Background:

- Arnold Chiari malformations (ACM) - associated with an impaired flow of cerebrospinal fluid (CSF) that has a risk for herniation of brain tissue ¹.
- Parturient with type I manifest symptoms: headache and findings associated with increased intracranial pressure (ICP) such as papilledema.
- Anesthesiologists must determine if neuraxial anesthesia is safe. An unintentional dural puncture might produce a CSF pressure gradient between brain and spinal cord with resultant cerebral herniation.
- No prospective randomized trials conducted for practical reasons, the majority of the literature regarding anesthetic management of parturient with ACM-I are case reports and series.
- A fundoscopic exam can reveal papilledema - a tell-tale sign of raised ICP yet often needs practice and precision often performed by an ophthalmologist.
- Point of care ultrasound of the eye has now shown to be useful in measuring raised ICP. Often going by neurologic signs such as headache can be confusing as in this case where a parturient presented both with ACM and preeclampsia.

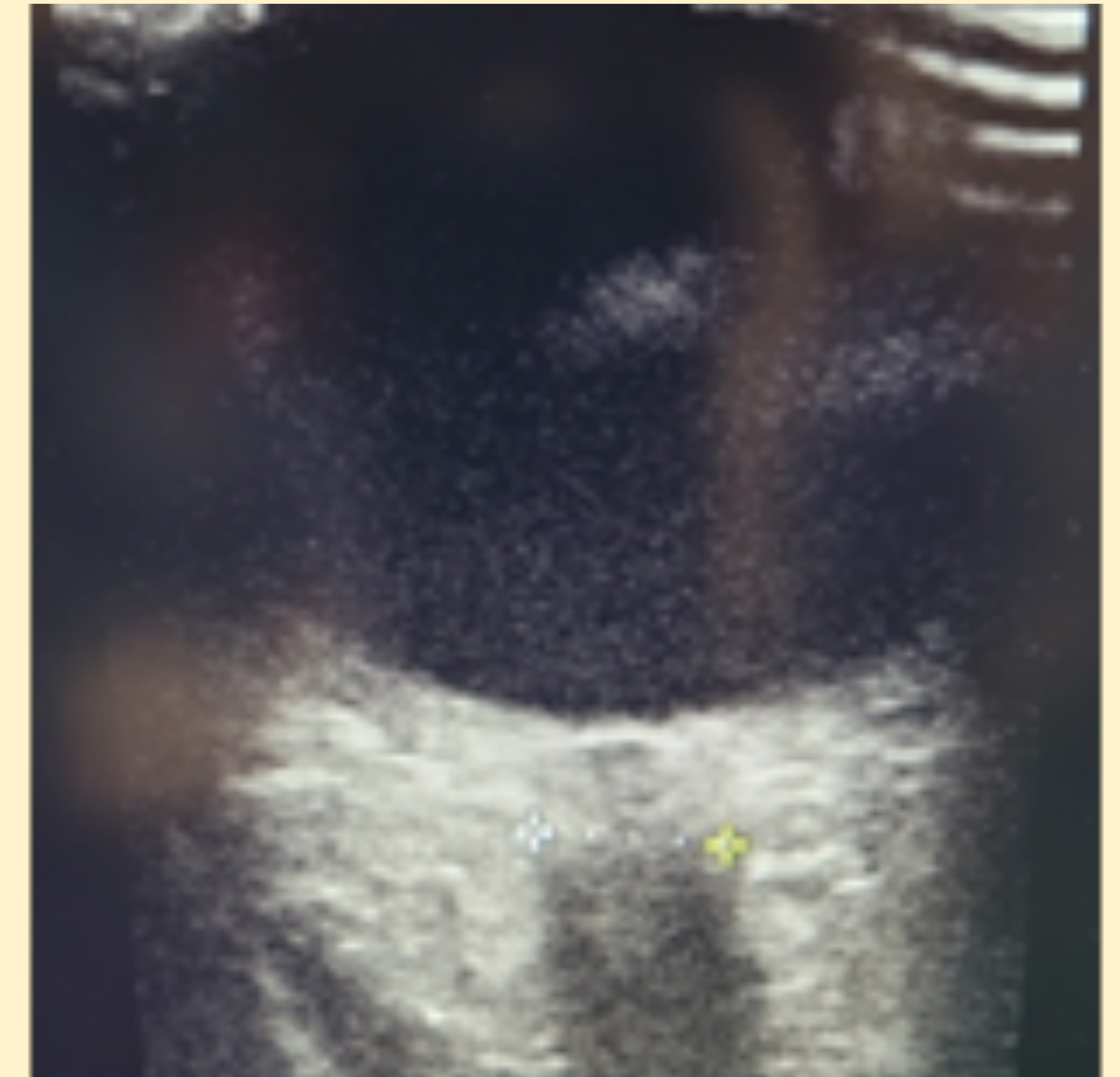
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Case description:

- 36-year-old preterm parturient G1P0 at 34W3D - history of ACM I surgically decompressed (2013), pituitary microadenoma, OSA, and, asthma was admitted with preeclampsia.
- Symptoms were chronic headaches - worsened with valsalva maneuver.
- Bedside fundoscopic exam was notable for unclear disc margins bilaterally. MRI brain showed ACM with normal CSF flow. Neurosurgery was consulted with no relative contraindication to neuraxial anesthesia.
- The patient also had baseline optic nerve sheath diameters (ONSD) using ultrasound guidance with the average measurement in left and right eye were 5mm and 5.4mm respectively.
- Later in her hospital course, she developed preeclampsia with severe features requiring an urgent need for a caesarean section but without neurological changes thus not warranting a repeat ocular ultrasound.
- A 27G pencil point needle was used to perform spinal anesthesia without any complications.



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Discussion:

- Ocular ultrasonography is another modality that can be used in lieu of fundoscopic exam and has been shown to correlate well with invasive measurements of ICP. In the literature [an ONSD >5.8 mm](#) indicates increased ICP with a sensitivity of 90% and a specificity of 84%³.
- Performing a baseline ocular diameter followed by serial measurements will allow for comparison if any major neurological/headache change occurs and will thus determine if there is any increase in ICP.
- A noninvasive bedside method for recognizing cerebral edema and increased ICP could- be beneficial in the management of patients with ACM who has superimposed preeclampsia as both conditions can be associated with increased ICP.
- Ocular ultrasonography - non-invasive + easy-to-learn technique that may provide useful information about cerebral edema and intracranial hypertension in patients with ACM. Further studies are required to determine clinical relevance of ocular US in parturients.