Ventricular size

- Bone Graft Expansion in Cranioplasty Using a Split-Bone Technique
- Volumetric predictors for shunt-dependency in pediatric posterior fossa tumors
- Endoscopic assessment of ventricular anomalies diagnosed by MRI in hydrocephalus associated with myelomeningocele
- Deformation of brain in normal pressure hydrocephalus is more readily associated with slow vasomotion rather than heartbeat related pulsations of intracranial pressure
- Bedside Sonographic Ventricular Monitoring Through a Sonolucent Cranial Implant for Weaning of External Ventricular Drain After Aneurysmal Subarachnoid Hemorrhage
- Intraoperative neurovascular considerations for efficient intraventricular meningioma surgery: illustrative case
- Minimally Invasive Surgery Versus Conventional Neurosurgical Treatments for Patients with Subcortical Supratentorial Intracerebral Hemorrhage: A Nationwide Study of Real-World Data from 2016 to 2022
- Differences in brain development and need for CSF diversion based on MMC level: Comparison between prenatal and postnatal repair

Measurement of ventricular size is important in pediatric patients with hydrocephalus, especially those who are being followed with cerebrospinal fluid (CSF) shunts. While volumetric techniques are a more accurate estimate of true ventricular volume, they are often impracticable when multiple modalities including ultrasound are used. Volumetric area and linear measurements were compared to find the most reasonable measurement method.

Sixty-four computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound (US) scans from 25 children aged 0-17 years with hydrocephalus, before and after treatment, were measured. Measurements included ventricular volume, a ventricular/brain ratio, and four standard linear measures (Evans' ratio, Huckman's measurement, minimal lateral ventricular width, and lateral ventricular span at the body). We also included a new ratio, which accounts for often disproportionate occipital horn expansion in pediatric patients, called the frontal and occipital horn ratio. Volume and linear measurements were compared using the Spearman's correlation coefficients and correlations were further differentiated using a Z test statistic. The frontal and occipital horn ratio was also measured on CT, MRI, and US scans from 44 normal children aged 0-17 years to identify normal values. The effect of age was determined by linear regression.

The best linear correlation with ventricular size was the frontal + occipital horn ratio ($r = 0.852$) and was equivalent to the ventricular/brain ratio ($r = 0.891$), previously shown to have the highest correlation with ventricular volume. Evans' ratio correlates less well ($r = 0.423$). The normal frontal and occipital horn ratio is 0.37 and is independent of age.

The frontal and occipital horn ratio is a simple method of evaluating ventricular size in pediatric hydrocephalus patients with CSF shunts [1].

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Intermittent change in ventricular size is a recognised ventriculoperitoneal shunt complication but definitive imaging evidence is rare.

Aly et al. report a 3 years old boy with a spinal cord astrocytoma and ventriculoperitoneal shunt placement who demonstrated intermittent ventriculomegaly during a single MRI scan [2)]

[1)]
O'Hayon BB, Drake JM, Ossip MG, Tuli S, Clarke M. Frontal and occipital horn ratio: A linear estimate of ventricular size for multiple imaging modalities in pediatric hydrocephalus. Pediatr Neurosurg. 1998 Nov;29(5):245-9. PubMed PMID: 9917541.

[2)]
Aly A, El-Beshlawi I, Howarth S, Smith S. MRI capture of intermittent ventriculomegaly in a patient with ventriculo-peritoneal shunt. Br J Neurosurg. 2017 Oct;31(5):601-602. doi: 10.1080/02688697.2017.1333571. Epub 2017 Jun 2. PMID: 28574289.