



Dynamic remodeling of the posterior fossa and supratentorial structures after open in-utero spina bifida repair

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Objectives

- To describe serial neurosonography trajectories after open prenatal repair of spina bifida aperta.
- To identify practical markers associated with postoperative ventricular enlargement and postnatal VP-shunt.

Methods

Single-centre cohort, 2019–2025, 40 fetuses.

Scans: T0 pre-op; T1–T4 at 2–3-week intervals.

-CSA (clivus–supraocciput angle), hindbrain herniation, ventricular width, CSP, HC and SOI were assessed.

Key results

CSA increased early: $72.8^\circ \rightarrow 87.7^\circ$ ($p < 0.05$), with stabilization by 4–6 weeks.

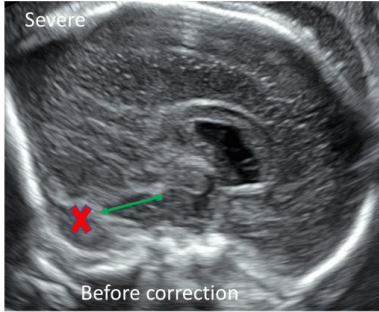
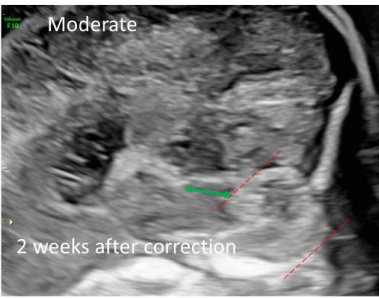
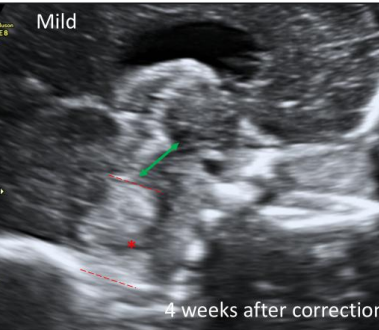
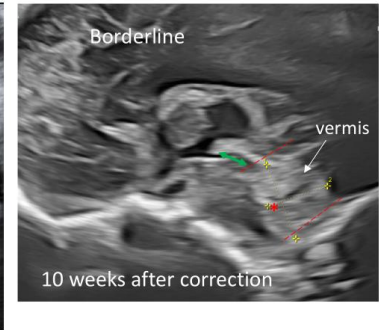
Postoperative ventriculomegaly >15 mm: 11/40 (27.5%); associated with baseline ≥ 15 mm and midline abnormalities.

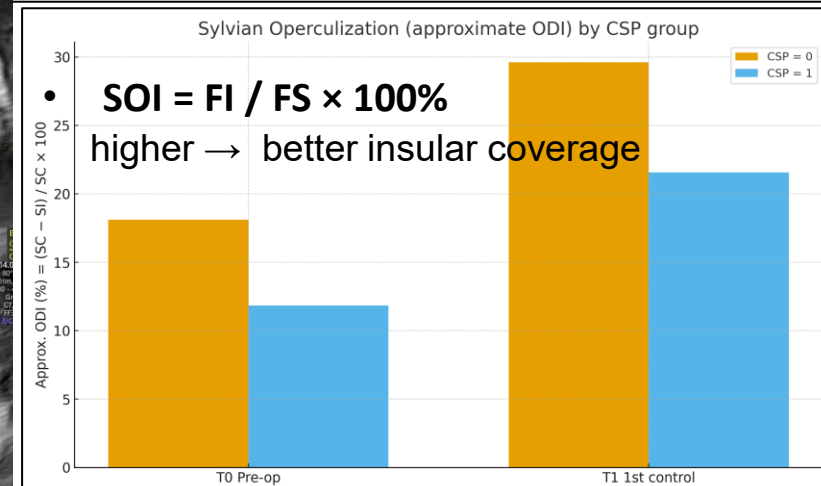
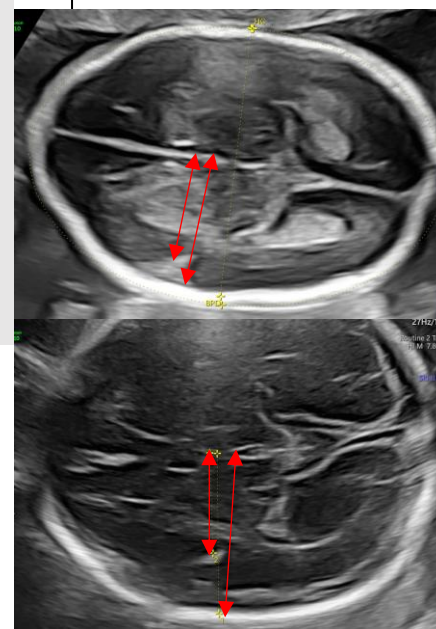
SOI rose early and then stabilized; attenuated SOI trajectories were seen with severe ventriculomegaly and / or midline/CSP abnormalities.

- HC growth rate peaked in the first postoperative interval: median 3.04 cm / 2 weeks.
- HC growth correlated inversely with baseline ventricular size ($p = -0.43$, $p = 0.007$).
- Hindbrain herniation grades shifted toward lower grades after repair.
- VP-shunt: 2/40 (5%); both had severe baseline ventriculomegaly + midline abnormalities.

Conclusion

Most cerebral remodeling occurs within 4–6 weeks after repair.
Severe baseline ventriculomegaly and CSP/midline abnormalities identify higher-risk fetuses.

Hindbrain herniation grade				
No		US Landmarks		
0	Norma	Vermis and 4th ventricle fully within fossa; cisterna magna ≥ 2 mm.		
1	Borderline	Vermis edge at foramen line; cisterna magna < 2 mm.		
2	Mild	Vermis mostly within fossa; 4th ventricle low; cisterna magna absent.		
3	Moderate	$>50\%$ of vermis below foramen; 4th ventricle at its level.		
4	Severe	Vermis prolapses through foramen magnum; 4th ventricle not visualized; no cisterna magna.		



SOI, Sylvian operculization index; FI (Falx-to-Insula) and FS (Falx-to-Skull) on axial transventricular plane