

Supplementary Online Content

Davis AL, Tessaro M, Schuh S, et al. Change in optic nerve sheath diameter and cerebral ventricular shunt failure in children. *JAMA Netw Open*. 2025;8(5):e2511009. doi:10.1001/jamanetworkopen.2025.11009

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eFigure 1. (A) Probe Orientation; (B) Optic Nerve Sheath Diameter (ONSD) Measurement; (C) Optic Disc Elevation (ODE) Measurement

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eFigure 3. (A) Relationship Between Age at Emergency Department Assessment (Years) and the Highest Delta Measurement in ONSD Taken From Either Right or Left Eye; (B) Relationship Between Age at Baseline and Average Baseline ONSD Between Right and Left Eyes

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Seven-Point Likert Scale Depicting Patient Tolerance of Ocular Point-Of-Care Ultrasound for Left and Right Eyes (n=58 Patients)

Ocular Ultrasound Tolerance	
Left Eye	Counts n (%)
Vigorous movement of body and eyes	3 (7.0)
Moving body and eyes >50% of the time	1 (2.3)
Moving body and eyes <50% of the time	2 (4.7)
Still body, moving eyes >50% of the time	5 (11.6)
Still body, moving eyes <50% of the time	8 (18.6)
Still body and eyes but not following orders about eye motion	9 (20.9)
Still body and eyes, following orders about eye motion	15 (34.9)
Right Eye	
Vigorous movement of body and eyes	1 (2.3)
Moving body and eyes >50% of the time	1 (2.3)
Moving body and eyes <50% of the time	2 (4.7)
Still body, moving eyes >50% of the time	6 (14.0)
Still body, moving eyes <50% of the time	8 (18.6)
Still body and eyes but not following orders about eye motion	9 (20.9)
Still body and eyes, following orders about eye motion	16 (37.2)

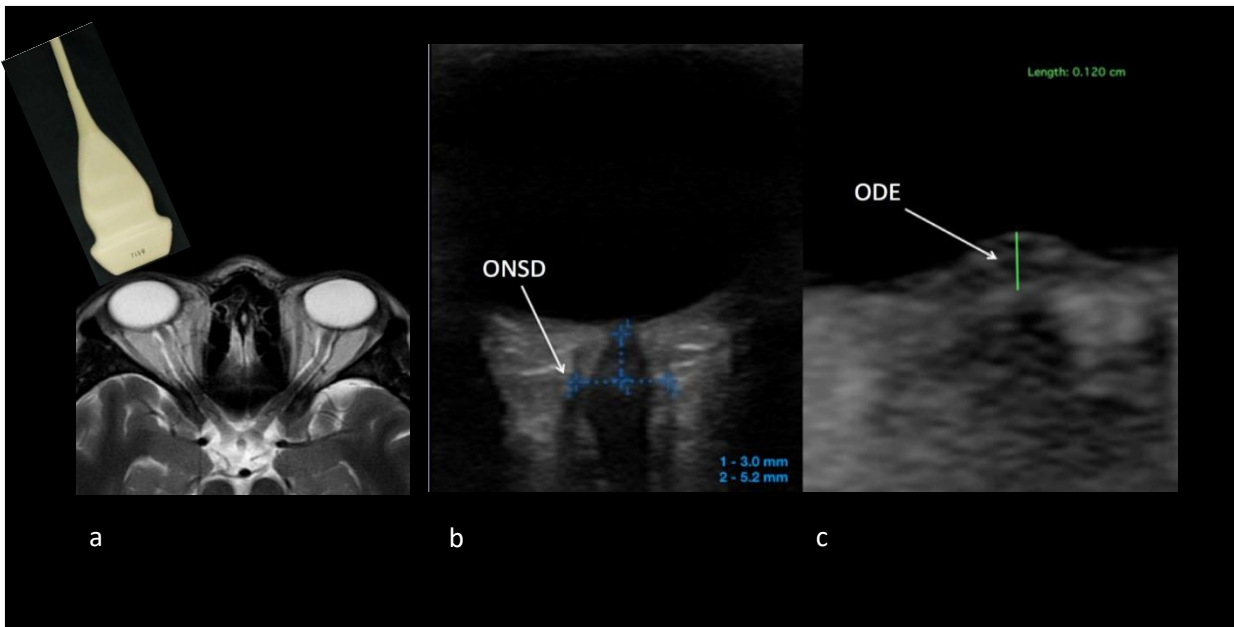
eTable 2. Univariate Logistic Regression Results Depicting Odds Ratio (OR) for Full Shunt Failure Associated With 0.1 mm, 1 mm and Optimal Threshold of ≥ 0.40 mm Increase in Highest Δ ONSD (Δ ONSD-H) and Highest Δ ODE (Δ ODE-H) Measures of the Right OR Left Eye. Additionally, sensitivity analysis results are presented for patients with either intermittent or full shunt failure.

Outcome	Full Shunt Failure Primary Outcome)			Full or Intermittent Failure (Sensitivity Analysis)		
	Estimate (OR)	95% CI	p-value	Estimate (OR)	95% CI	p-value
Ocular Ultrasound Measure						
Δ ONSD-H (per 0.1 mm)	1.43	1.21 – 1.78	<0.001	1.59	1.30 – 2.10	<0.001
Δ ONSD-H (per 1 mm)	35.43	6.49 – 327.77		103.67	13.93 – 1665.26	
Δ ONSD of $\geq +0.40$ mm	29.42	5.29 – 553.78		43.00	7.81 – 808.05	
Δ ODE-H (per 0.1 mm)	1.20	0.89 – 1.65	0.23	1.31	0.99 – 1.81	0.08
Δ ODE-H (per 1 mm)	6.21	0.32 – 149.20		14.84	0.87 – 369.59	

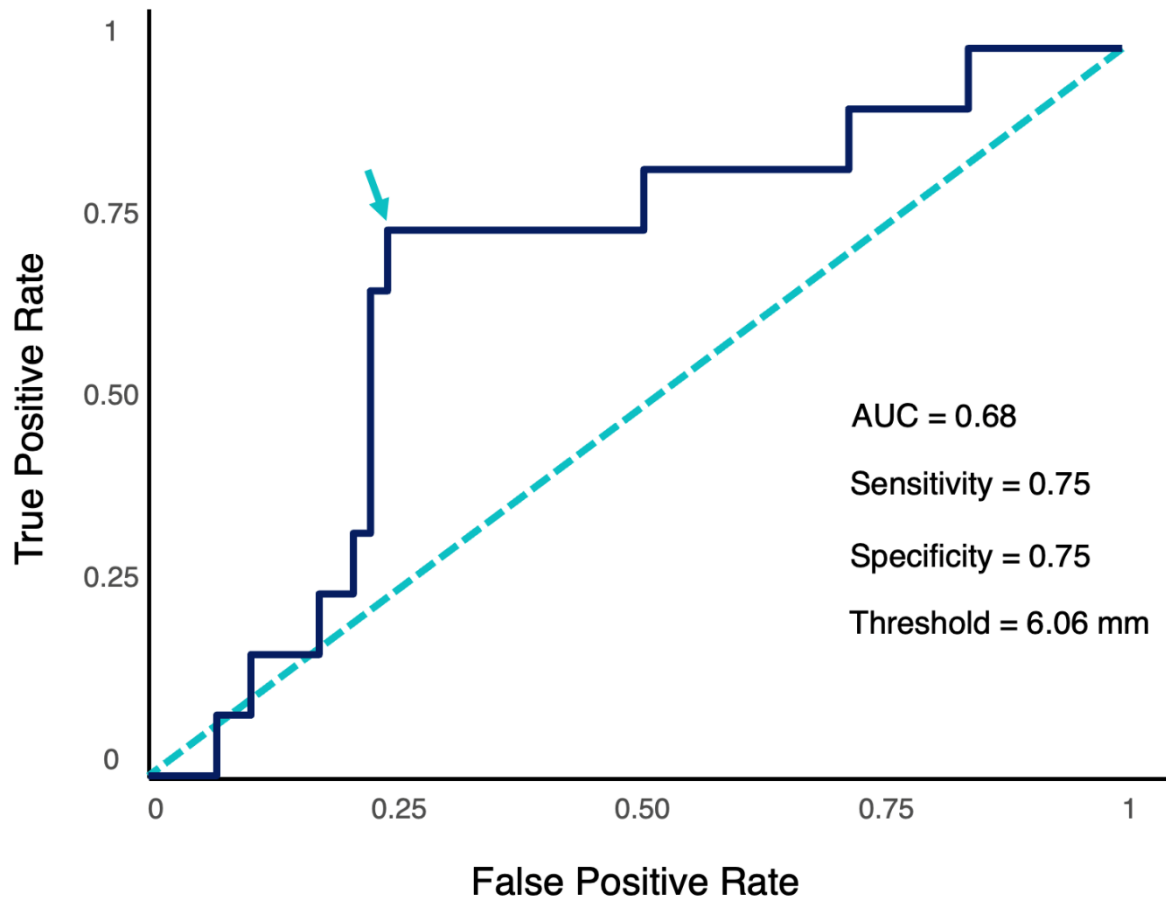
eTable 3. Contingency Table Results Using Optimized Threshold Value for Delta Optic Nerve Sheath Diameter (Δ ONSD) From Receiver Operating Characteristic Curve to Predict Shunt Failure. Sensitivity analysis contingency results using full or intermittent obstruction outcome presented below. Optimal threshold for highest Δ ONSD (Δ ONSD-H) between eyes (≥ 0.40) derived from ROC analysis.

Labels	Test + (Δ ONSD-H ≥ 0.40)	Test – (Δ ONSD-H < 0.4)	Overall
Primary Analysis: Shunt Failure			
Failure	13	1	14
No Failure	17	45	62
Overall	30	46	76
Sensitivity Analysis: Full or Intermittent Failure			
Failure	16	1	17
No Failure	14	45	59
Overall	30	46	76

eFigure 1. (A) Probe orientation: High frequency linear probe was oriented parallel to the optic nerve in transverse plane. (B) Optic Nerve Sheath Diameter (ONSD) Measurement: ONSD was measured 3mm behind the globe, from where the outer hypoechoic border meets the retrobulbar fat to the other contralateral hypoechoic border. (C) Optic Disc Elevation (ODE) measurement: ODE was measured by drawing a perpendicular line from the base of the retina to the maximal point of disc elevation when the optic nerve was at the center of the image.

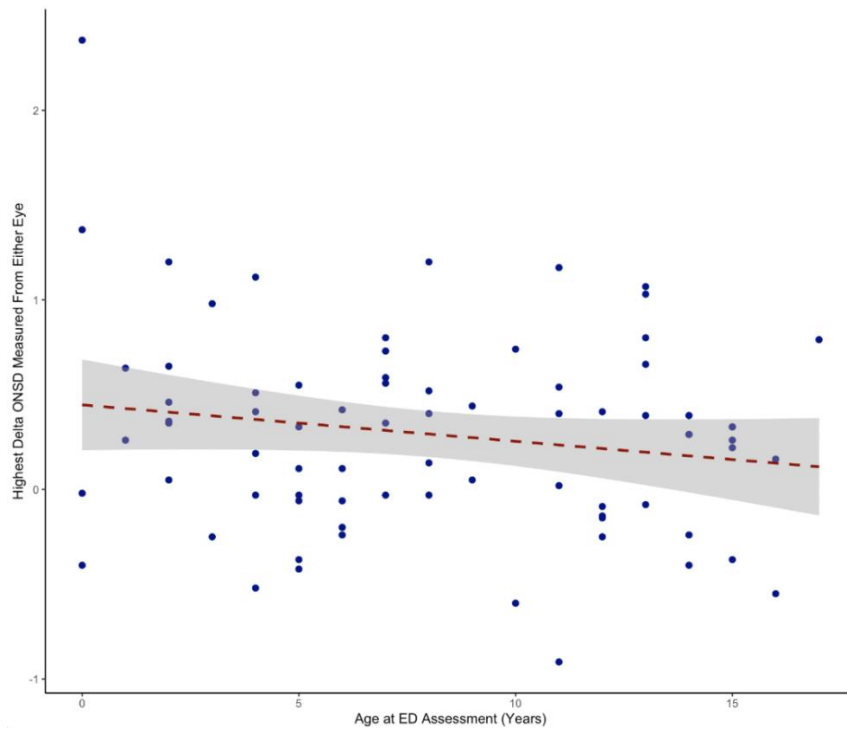


eFigure 2. Receiver Operating Characteristic Curve Depicting Test Properties of the Highest Static ONSD Measure From Either Eye at Emergency Department Presentation Using Outcome of Full Shunt Failure. We additionally present the threshold value minimizing the difference between true positive rate and false positive rate (blue arrow).



eFigure 3. (A) Relationship Between Age at Emergency Department Assessment (Years) and the Highest Delta Measurement in ONSD Taken From Either Right or Left Eye. (B) Relationship Between Age at Baseline and Average Baseline ONSD Between Right and Left Eyes.

a)



b)

