

Parietooccipital ventricular catheter

The [occipital approach](#) to [ventricular catheter](#) insertion provides the narrowest margin of error with regard to trajectory but has less aiming point variability than the parietal approach. The use of patient-specific [stereotaxy](#) rather than generic guides is required for totally reliable, first-pass ventricular catheterization via a posterior approach to shunt placement surgery in adults. ¹⁾

The aim of a paper is to compare the accuracy of the freehand technique versus the use of intraoperative guidance (either [ultrasound](#) guidance or frameless [stereotaxy](#)) for placement of parietooccipital [ventricular catheters](#) and to determine factors associated with reduced proximal shunt failure.

This retrospective cohort study included all patients from 2 institutions who underwent a ventricular [cerebrospinal fluid shunting](#) procedure in which a new parietooccipital ventricular catheter was placed between January 2005 and December 2013. Data abstracted for each patient included age, sex, method of ventricular catheter placement, side of ventricular catheter placement, Evans ratio, and bifrontal ventricular span. Postoperative radiographic studies were reviewed for accuracy of ventricular catheter placement. Medical records were also reviewed for evidence of shunt failure requiring revision. Standard statistical methods were used for analysis.

A total of 257 patients were included in the study: 134 from the University of [Michigan](#) and 123 from Washington University in [St. Louis](#). Accurate ventricular catheter placement was achieved in 81.2% of cases in which intraoperative guidance was used versus 67.3% when the freehand technique was used. Increasing age reduced the likelihood of accurate catheter placement (OR 0.983, 95% CI 0.971-0.995; $p = 0.005$), while the use of intraoperative guidance significantly increased the likelihood (OR 2.809, 95% CI 1.406-5.618; $p = 0.016$). During the study period, 108 patients (42.0%) experienced shunt failure, 79 patients (30.7%) had failure involving the proximal catheter, and 53 patients (20.6%) had distal failure (valve or distal catheter). Increasing age reduced the likelihood of being free from proximal shunt failure (OR 0.983, 95% CI 0.970-0.995; $p = 0.008$), while both the use of intraoperative guidance (OR 2.385, 95% CI 1.227-5.032; $p = 0.011$), and accurate ventricular catheter placement (OR 3.424, 95% CI 1.796-6.524; $p = 0.009$) increased the likelihood.

The use of intraoperative guidance during parietooccipital ventricular catheter placement as part of a CSF shunt system significantly increases the likelihood of accurate catheter placement and subsequently reduces the rate of proximal [shunt failure](#) ²⁾.

¹⁾

Lind CR, Tsai AM, Law AJ, Lau H, Muthiah K. Ventricular catheter trajectories from traditional shunt approaches: a morphometric study in adults with hydrocephalus. J Neurosurg. 2008 May;108(5):930-3. doi: 10.3171/JNS/2008/108/5/0930. PubMed PMID: 18447709.

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Wilson TJ, McCoy KE, Al-Holou WN, Molina SL, Smyth MD, Sullivan SE. Comparison of the accuracy and proximal shunt failure rate of freehand placement versus intraoperative guidance in parietooccipital ventricular catheter placement. Neurosurg Focus. 2016 Sep;41(3):E10. doi: 10.3171/2016.5.FOCUS16159. PubMed PMID: 27581306.

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