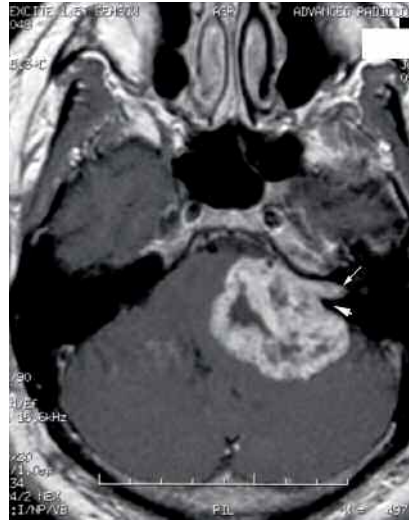


## Patient Safety and Quality Measures

### Safely Reducing Spinal Fluid Leakage after Removal of Acoustic Neuromas

Great advances have been made in the microsurgical technique of removing acoustic neuromas, but cerebrospinal fluid (CSF) rhinorrhea had been—until recently—one of the few remaining sources of perioperative morbidity.

Following craniotomy and removal of temporal bone surrounding the tumor, previously air-filled spaces can become flooded by CSF, which then flows into the ear and then the nose via the eustachian tube. These fistulas increase the risk of meningitis if untreated and are associated with additional days in the hospital and the risks of additional invasive procedures. This complication, which occurs in as many as 16 percent of cases, has encouraged surgeons to seek changes in technique aimed at eliminating fistulas and reducing CSF rhinorrhea.



Axial T1-weighted MRI with gadolinium showing large acoustic neuroma (vestibular schwannoma) occupying the left cerebellopontine angle and extending into the internal auditory canal (arrow) where it is surrounded by petrous bone (black on MRI). This tumor was removed via a suboccipital craniotomy with removal of the posterior lip of petrous bone (arrowhead) for optimal removal and preservation of auditory and facial nerves. When air cells in this bone are opened, a CSF fistula may develop.

Johns Hopkins neurosurgeons and neurotologists found that a new technique using hydroxyapatite bone cement (HAC) at the site of surgery to reconstruct the drilled posterior wall of the porus acusticus significantly reduces the incidence of CSF leak when compared to previous methods. Traditional methods included the use of bone wax, fat, muscle, fibrin glue or a combination of these placed in the drilled bone. Less than 6 percent of cases in which surgeons have used HAC required revision surgery for management of CSF leak.

“Lowering CSF leak reduces the chance for meningitis and other complications that can accompany prolonged hospitalization and bed rest, which is used to encourage spontaneous healing of the fistula,” says neurotologist Howard Francis. “The safety of the surgical management of acoustic neuromas is now greater than it was even two years ago as we update our techniques.

“We will strive to do even better by continuing to examine our results and seeking additional opportunities to increase safety and reduce risks.”