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Abstract

Published 03/05/2025

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Comparative Analysis of Ventriculoperitoneal Shunt Placement for Post-Treatment Hydrocephalus Following Vestibular Schwannoma Management: Surgical Intervention versus Stereotactic Radiosurgery

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Categories: Medical Physics, Radiation Oncology

Keywords: hydrocephalus, stereotactic radiosurgery, surgical intervention, ventriculoperitoneal shunt

How to cite this abstract

Park D J, Akhavan-Sigari A, Persad A, et al. (March 05, 2025) Comparative Analysis of Ventriculoperitoneal Shunt Placement for Post-Treatment Hydrocephalus Following Vestibular Schwannoma Management: Surgical Intervention versus Stereotactic Radiosurgery. Cureus 17(3): a1395

Abstract

Objectives:

Hydrocephalus may present in patients with vestibular schwannoma (VS) at initial diagnosis, primarily due to the obstructive effects of tumor mass on cerebrospinal fluid (CSF) dynamics. Notably, occurrences of hydrocephalus following either radiosurgery or surgical interventions have also been documented in clinical literature.

The objective of this study was to compare the clinical features of patients who have undergone surgical resection or radiosurgery for VS and subsequently developed hydrocephalus necessitating shunt placement.

Methods:

Patients treated for vestibular schwannomas at our medical center between 1998 and 2023 were screened based on specific inclusion criteria. The study included patients over 18 years of age who underwent surgery or radiosurgery for vestibular schwannoma and subsequently developed hydrocephalus requiring shunt placement. Patients diagnosed with neurofibromatosis, those who had shunt placement before or during their initial intervention, or those with hydrocephalus unrelated to vestibular schwannoma management were excluded from the study. Cerebrospinal fluid (CSF) data were retrieved from electronic health records (EHRs) at our center, and comparisons were made for patients with available pre-shunt lumbar puncture (LP) and CSF laboratory data.

Results:

A total of 30 patients with VS underwent shunt placement due to hydrocephalus after tumor treatment; 5 patients (16.7%) were managed with radiosurgery and 25 patients (83.3%) with surgery. The median age at treatment was 64 years versus 57 years for the radiosurgery and surgery groups, respectively. There were no significant differences in age, sex, tumor volume, largest diameter at treatment, and tumor Koos grades, between the two groups. Nonetheless, the median time from tumor treatment to shunt placement was significantly longer in the radiosurgery group compared to the surgery group (21.53 versus 1.17 months, p-value=0.002). Regarding CSF parameters, mean white blood cell (WBC) and red blood cell (RBC) counts prior to shunt placement was significantly higher in the surgery versus the radiosurgery group (WBC=83.6 versus 2.0/mm³, p-value=0.001, RBC=3453.4 versus 313.33/mm³, p-value=0.02). CSF protein and glucose were not significantly different between the groups.

Conclusion(s):

The median time from VS treatment to shunt placement due to hydrocephalus was longer in the radiosurgery group compared to the surgery group. Furthermore, pre-shunt CSF WBC and RBC counts were higher in the surgery group. Future studies are needed to better understand treatment outcomes and optimize management strategies for these patients.