Cerebrospinal Fluid Shunting in Pediatric Posterior Fossa Tumors

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Introduction

Central nervous system (CNS) tumors comprise the most common solid neoplasms in children. The majority of these tumors are found in the posterior fossa. Many develop obstructive hydrocephalus given the tumor's close proximity to the fourth ventricle and require ventricular shunt placement. In an attempt to evaluate the need for permanent cerebrospinal fluid (CSF) diversion after craniotomy, a series of pediatric patients was identified and evaluated for risk factors for shunting.

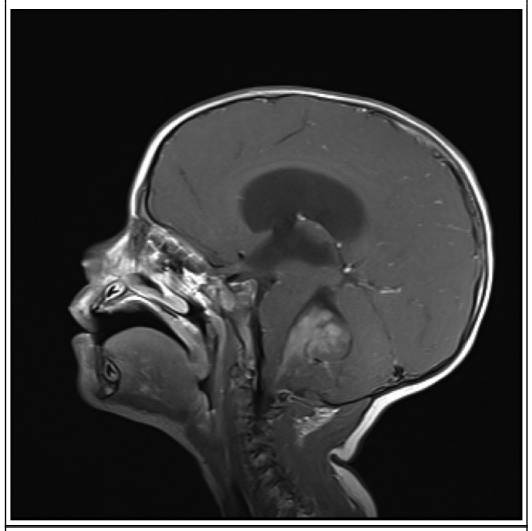
Methods

All children with posterior fossa tumors from January 1, 2009 to December 31, 2010 at Children's Mercy Hospital in Kansas City, MO were retrospectively reviewed.

Each case was screened for the following criteria: 1) tumor that was newly diagnosed during this period; 2) patient had received all care (diagnosis to follow-up) at Children's Mercy Hospital; and 3) patient had at least a 3 month survival period to monitor for development of hydrocephalus following tumor resection.

Twenty-one patients were evaluated retrospectively for shunt placement within three months following surgical removal of their posterior fossa tumors. Several factors were evaluated including hydrocephalus at presentation using Evan's index, age at diagnosis, gender, location of the tumor (midline versus cerebellar hemispheres), tumor pathology, and duration of presenting symptoms.

Pediatric Posterior Fossa Tumor



Obstructive Hydrocephalus

	Shunt	No Shunt
Female	5	7
Male	3	6

(P = 1) Gender was not significantly correlated with shunt placement.

	Shunt	No Shunt
Age < 10 yr old	8	9
Age > 10 yr old	0	4

(P = 0.131) Age was not significantly correlated with shunt placement.

	Shunt	No Shunt
Hydrocephalus	7	5
No Hydrocephalus	1	8

(P = 0.03) Presence of hydrocephalus on presentation was significantly correlated with postoperative shunt placement within 3 months following surgical resection.

	Shunt	No Shunt
Location Midline	7	7
Not Midline	1	6

(P = 0.174) Location of tumor was not significantly correlated with shunt placement.

	Shunt	No Shunt
Duration < 3 mo	6	10
Duration > 3mo	1	2

(P = 1) Duration of symptoms pre-operatively was not significantly correlated with shunt placement.

	Shunt	No Shunt
Malignant	4	7
Non-Malignant	4	6

(P = 0.608) Malignancy of tumor was not significantly correlated with shunt placement.

Results

Using the Fisher Exact test, the presence of hydrocephalus upon presentation using the Evan's index was found to be statistically significant when correlated with shunt placement within 3 months of tumor resection ($p = 0.03$).

Variables not statistically significant include: gender, age (< or > 10 years old), location (midline versus hemispheres), malignancy of tumor, and duration of presenting symptoms (< or > 6 months).

Conclusions

Hydrocephalus on admission was a statistically significant predictor of need for ventricular shunting following posterior fossa tumor resection. Other variables such as age and malignancy of tumor were not statistically significant, yet other authors suggest these may be risk factors for close observation. Of note, age < 10 years old and midline location approached, but failed to reach statistical significance. Information about the likelihood of shunt placement can be helpful for the neurosurgeon as well as the patient's family members for counseling and to prepare for the clinical outcome, which may include placement of a permanent CSF shunt.

References

Available upon request.