An Analysis of Factors Determining the Need for CSF Diversion Procedures After Posterior Fossa Tumor Surgery in Children

Gopalakrishnan Chittur Viswanathan MD; Girish Ramachandran Menon; Suresh Nair MBBS; Amit Dhakoji MS, MCh

Sree Chitra Tirunal Institute for Medical Science and Technology
Trivandrum, INDIA

Introduction

- No consensus exists regarding the management of hydrocephalus in children with posterior fossa tumors before, during or after surgery.
- Prophylactic ETV in all patients reduces the risk of post-resection hydrocephalus from 26.8-6%.
- But potentially exposes ~ 70% of patients to an unnecessary procedure.

Why analyze the same topic?

- Referral pattern in developing countries.
- Limited resources & long waiting list.
- Avoid unnecessary shunt surgery.
- Help in patient counseling and surgical planning.

Methods

- 84 children - Jan 2007 - Dec 2010.
- Extent of hydrocephalus calculated based on
- Evans index=mild : 0.27 to 0.33, moderate: 0.34 to 0.40 and severe: >0.40
- Frontal and occipital horn ratio (FOHR) >0.47= significant hydrocephalus

Objectives

- We analysed the factors that predispose to persistent hydrocephalus and the need for a postoperative CSF diversion procedure.
- Children with preoperative shunt excluded.

Factors evaluated

- age at diagnosis
- duration of symptoms
- severity of preoperative hydrocephalus
- tumor size/ location
- tumor histology
- extent of tumor resection
- infiltration of fourth ventricle floor

Our Strategy

Early primary tumor resection with no routine preoperative CSF diversion procedure.
Possibly followed by ETV or shunt placement in cases of persistent/ progressive hydrocephalus

Results

- 84 consecutive patients
- M:F = 1.62:1
- Age range: 1.5 to 18 years (mean: 8 years)
- 25/ 84 (29.8%) underwent postoperative shunt insertion
- 15VP and 10ETV
- Mean time to hydrocephalus treatment after surgery was 9 days (range: 2 to 91 days)
- Indications for shunt insertion were persistent symptomatic hydrocephalus, CSF leak and pseudomeningocele not subsiding with conservative measures or by lumbar drain

Conclusions

- Routine use of preoperative CSF diversion in pediatric posterior fossa tumors is unjustified.
- Less than one-third of these patients actually require a shunt.
- A predictive model is essential that will guide management of children with posterior fossa tumors.
- This mandates a multicenter trial to devise a practical scoring system.

Factors	CSF diversion (n =25)	P value
Age <3 years	3	0.25
Symptom duration < 3 months	18	0.016
Tumor location		
midline	23	0.04
lateral	02	
Hydrocephalus		
Evan's ratio ≤ 0.33	9	0.001
Evan's ratio > 0.33	16	
FOHR ≤ 0.46	10	<0.001
FOHR > 0.46	15	
Intraoperative EVD insertion	19	<0.001
Extent of resection		
Gross total	21	0.125
Near total	04	
Tumor histology		
Ependymoma	7	0.016
Medulloblastoma	14	<0.001
Meningitis	8	0.008
Pseudomeningocele	7	0.016

Learning Objectives

- Factors that can predict persistent postoperative hydrocephalus is essential for patient counselling, surgical planning and to decide regarding postoperative clinical and radiological monitoring.
- Few patients might selectively be exposed to the risks of preresection ETV to improve outcome.