The Development Of Acquired Chiari I Malformation Following Lumboperitoneal Shunting In Patients with Idiopathic Intracranial Hypertension.

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Introduction

Lumboperitoneal (LP) shunting has been used as a treatment option for cerebrospinal fluid (CSF) diversion in the setting of patients with pseudotumor cerebri also known as idiopathic intracranial hypertension (IIH). One of the potential complications with the procedure is the development of an acquired Chiari malformation, type I (CM).

Methods

A retrospective chart review of adult patients diagnosed with IIH who underwent an initial CSF shunt diversion surgery from from 2003 - 2008 was performed. We reviewed the incidence of acquired Chiari malformation in 35 consecutive patients who received lumboperitoneal shunts as part of their management. All had preoperative imaging showing normal anatomy at the foramen magnum with no evidence of cerebellar tonsilar descent.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of potential development of the acquired Chiari malformation in patients with IIH treated with LP shunting

Results

Ten of the 35 (29%) patients developed CM following shunt placement. Time to onset varied between 3 months and 6.5 years. Seven patients underwent further surgeries (range 1 to 14). Three patients did not. Five patients (14%) underwent sub occipital decompressions from 4 months to 4.7 years following radiographic diagnosis.

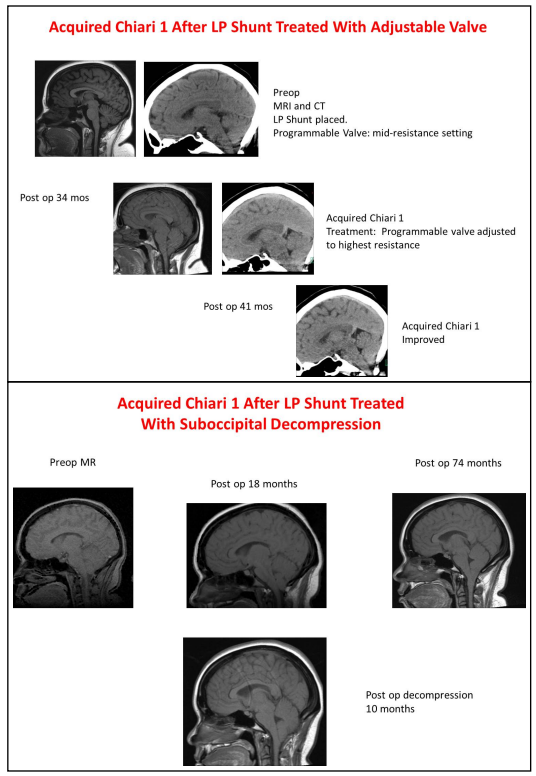
Patient	Weight (lbs)	Sex	Age at LP Shunt Surgery (years)	Time to Chiari Diagnosis (months)	Subocciptial Decompression (SOD)	Time to SOD (months)	Follow up (months)
1	303	F	19	87	No	Na	94
2	332	M	26	6	No	Na	96
3	172	F	44	3	No	Na	108
4	218	F	32	7	No	Na	114
5	204	F	30	81	No	Na	125
6	222	F	19	18	Yes	56	107
7	293	F	24	8	Yes	43	71
8	235	F	27	3	Yes	30	102
9	200	F	33	39	Yes	5	76
10	224	F	27	10	Yes	34	92

Conclusions

CSF diversion in patients with IIH is associated with a known potential for revision surgery. LP shunting is known to be a risk factor for development of CM. In our current small series, the incidence of radiographic CM was 29%. The incidence of symptomatic CM requiring suboccipital decompression was 14%. These figures should be taken into account when recommending CSF diversion in this patient population.

Discussion

Patients with IIH will present with headaches, visual obscurations, papilledema, tinnitus, double vision, and no localizing findings on exam (modified Dandy criteria). Diagnostic studies are normal except for increased ICP > 20 cm H2O. MRI findings of increased ICP may be noted (empty sella, optic nerve sheath dilatation, smooth venous sinus narrowing). Patients are at risk for permanent visual loss. Treatment options aim at vision preservation, symptom relief, and normalization of ICP. Patients that fail medical management are candidates for CSF diversion. Lumbar placement of CSF shunts has a relative advantage because these patients frequently have very small intracranial ventricles. LP shunts, however, are associated with development of the acquired Chiari type 1 malformation. We noted a 29% incidence in our small study. The time to diagnosis of an acquired Chiari 1 malformation was up to 6.5 years after shunt surgery. For these patients management options include: 1) provide a higher resistance system (adjust a programmable valve), 2) occlude or remove the shunt, 3) convert to or add a ventricular shunt, 4) perform a suboccipital decompression. 14% of our population required suboccipital decompression surgery.



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