Cerebellar Tonsil Resection for Treatment of Chiari I Malformation in Children

Bruno Braga MD; Dale Swift MD
Children's Medical Center of Dallas
University of Texas Southwestern

Introduction

Surgical treatment of Chiari I malformation continues to have a relatively high recurrence rate. Although more invasive, resection of the cerebellar tonsils may improve outcome in selected cases.

Methods

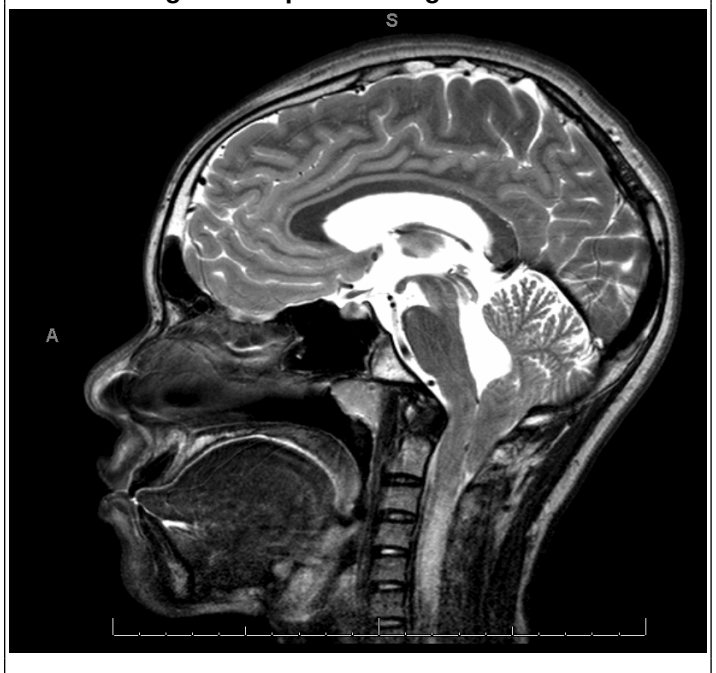
We reviewed 125 children surgically treated for Chiari I malformations between 1995 and 2012. Surgical indications were the presence of symptoms or an expansile syrinx.

Procedures were classified into 3 groups:

- foramen magnum decompression by bone removal and duraplasty with or without arachnoid dissection (SOC),
- SOC with bilateral coagulation of tonsils (SOC+TC) and
- SOC with subpial resection of the cerebellar tonsils (SOC+TR).

The extent of surgery was determined by the pre-operative appearance of the relationship of the posterior fossa to its contents, according to the surgeon's discretion (figures 1 and 2).

Fig 1. Pre operative sagital T2 MRI

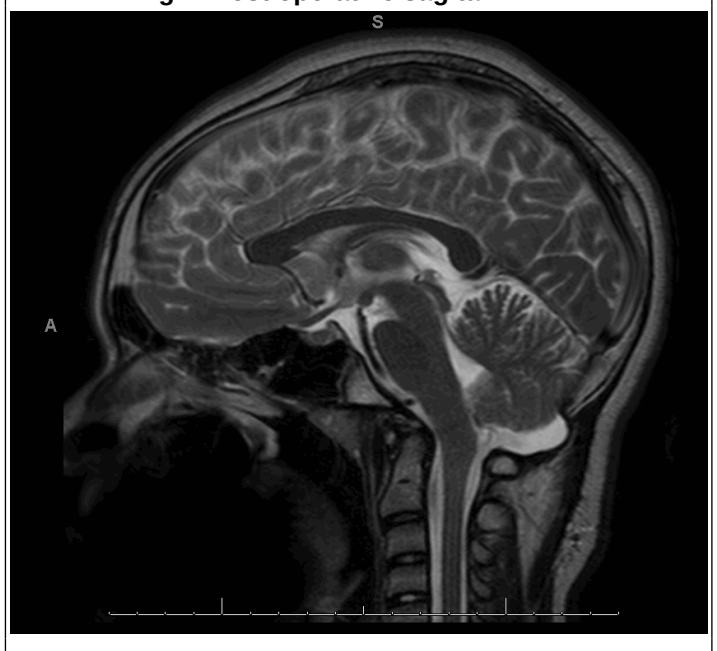


Note medullary compression and tonsilar herniation to C2

Results

Mean age was 7.4 ± 5 years. Forty-seven patients (37.6%) had syringomyelia upon presentation. SOC was performed in 26 patients (20.8%), SOC+TC in 23 (18.4%), and SOC+TR in 76 (60.8%). Mean follow up was 35 ± 37.3 months and ranged from 6 months to 12 years. Improvement in symptoms and in syringomyelia was not statistically different between the 3 groups. There was no mortality. Complications occurred in 10 patients (8%) and did not differ significantly among groups. There was no vascular or neural injury secondary to tonsil manipulation. Four (3.2%) patients were re-operated because of persistent symptoms or syrinx, and the rate of reoperation was not statistically different between groups. There was no recurrence. Statistical data is shown in table 1.

Fig 2. Post operative sagital T2 MRI



Note decompression, no tonsilar herniation, intact C1 arch

Conclusions

Surgical treatment of Chiari I malformation in children with SOC+TR provide excellent long term decompression of the cervicomedullary junction without an increase in surgical morbidity.

Learning Objectives

By the conclusion of this section, participants should be able to consider suboccipital decompression with tonsil resection as an effective and safe modality in the treatment of children with Chiari I malformation.

Table 1 Results of different procedures in the treatment of Chiari I patients

Procedure	SOC	SOC+TC	SOC+TR	p value
Number of patients	26	23	76	
Improvement of symptoms	18/26 (69.2%)	20/23 (87%)	60/76 (79%)	0.18
Improvement of syrinx	9/13 (69.2%)	8/9 (88.9%)	23/25 (92%)	0.15
Complications	4/26 (15.4%)	2/23 (8.7%)	4/76 (5.2%)	0.19
Reoperations	1/26 (3.8%)	0	3/76 (3.9%)	1

References

1. Schijman E, Steinbok P. International survey on the management of Chiari I malformation and syringomyelia. Childs Nerv Syst 20:341-348, 2004
2. Tubbs R, Beckman J, Naftel R, Chern J, Wellons J, Rozzelle C et all. Institutional experience with 500 cases of surgically treated pediatric Chiari malformation type I. J Neurosurg Pediatr 7(3):248-256, 2011
3. Klekamp J. Surgical treatment of Chiari I malformation: analysis of intraoperative findings, complications, and outcome for 371 foramen magnum decompressions. Neurosurg 71(2):365-380, 2012