Minimally Invasive Durectomy for Treatment of Syringomyelia with or without Chiari Malformation Type I

Mauricio Mandel MD, PhD; Hugo Sterman; Igor Araujo MD
Hospital Israelita Albert Einstein - São Paulo - Brazil

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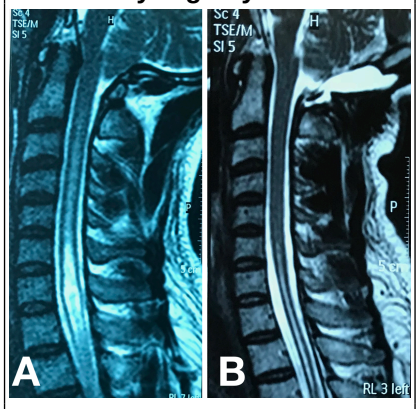
INTRODUCTION

Several different surgical techniques have been used in the treatment of patients with symptomatic, persistent, recurrent, or increasing syringomyelia. The pathophysiology is controversial but most authors explains it due to enlarged cervical subarachnoid pressure waves that compress the spinal cord from without, not from within, and propagate syrinx fluid caudally with each heartbeat, which leads to syrinx progression. We propose a minimally invasive alternative by ressecting the foramen magnum dura mater.

METHODS

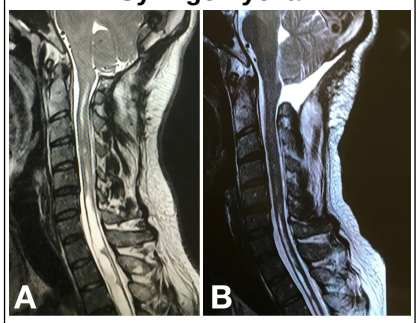
This was a prospective study of 26 symptomatic patients. The majority of patients (21) had Chiari malformation type I associated Syringomyelia. Five patients had persistent syringomyelia after standard decompressive craniectomy with duroplasty. Three patients had idiopathic syringomyelia. Two patients had arachnoiditis at the craniocervical junction. Pre- and postoperative clinical status and MRI findings were recorded. The decompression was performed by 1.2 - 2.5 cm midline incision via different sorts of speculum retractors. All patients underwent a limited suboccipital craniectomy and C1 laminectomy. All patients underwent a foramen magnum durectomy. No duroplasty was performed and the dura mater was left open. In all patients, the arachnoid was opened and

Case Example 1. Chiari Malformation Type I with Syringomyelia



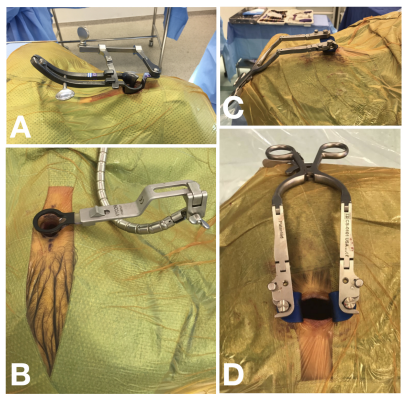
(A) Preoperative MRI. (B) Post operative MRI 3 months after surgery.

Case Example 2. Persistent Syringomyelia



(A) This is a 35 years old male patient that had been submitted to a standard decompressive craniectomy with duroplasty. As the syrinx persisted after the first procedure, he was reoperated with the MIS durectomy technique. (B) Resolution of the syringomyelia was observed after 2 months.

Surgical Retractors



Different kinds of surgical retractors can be used but the one that allows the smallest skin incision is the classical Gelpi retractor. (A) Lumbar caspar retractor. (B) Vycor retractor. (C) and (D) Cervical caspar retractor

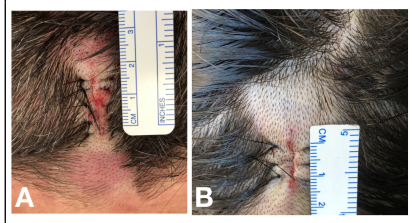
RESULTS

Age of patients ranged from 26 to 61 years old. All patients experienced radiographic improvement in syringomyelia (decreased size or resolution) during the follow-up period. Most patients (88,4%) experienced postoperative headaches due to CSF hypotension that lasted approximately 2-3 weeks. Twenty four (92,3%) patients experienced symptomatic improvement. The median time to symptom improvement was 2 months after surgery. No patients had CSF fistula or meningitis. Follow-up ranged from 9 to 37 months.

CONCLUSIONS

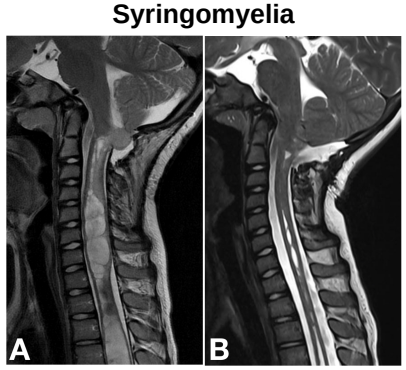
Although the study is limited by the small number of patients with a short follow-up, minimally invasive durectomy of the foramen magnum was a safe and effective alternative to standard treatment for different spectrum of syringomyelia cases.

Skin Incisions



(A) and (B) 1.3-1.5 cm

Case Example 3. Reccurent Syringomyelia

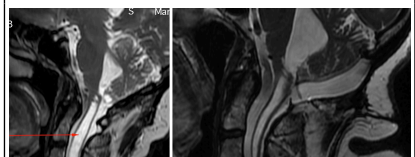


This is a 9 years old male child that had been submitted to a standard decompressive craniectomy with classical duroplasty when he had 2 years old. (A) During the follow-up , the syringomyelia reccurred. (B) Resolution after 3 months of the MIS durectomy.

LEARNING OBJECTIVES

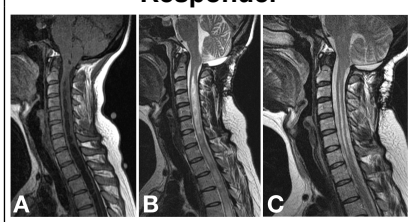
- Durectomy of the foramen magnum may function by decreasing the cervical subarachnoid pressure
- CSF fistula was not observed, probably due to the small skin incision

Case Example 5. Syringomyelia due to Arachnoiditis at the Craniocervical Junction



(A) Preoperative MRI. (B) Postoperative MRI 30 months after surgery.

Case Example 4. Late Responder



This is a 44 years old woman that had a late response to the surgery. (A) Preoperative MRI. (B) 3 months postoperative MRI. (C) 1 year post operative MRI