Comparison of Minimally Invasive Occipito-Cervical Decompression with Standard Open Surgery For Type I Chiari Malformation: Surgical Technique and Early Clinical Results Juan P Sardi MD; Roberto C. Diaz MD; Jorge MD Camacho; David Gomez MD; Miguel E. Berbeo HOSPITAL UNIVERSITARIO SAN IGNACIO PONTIFICIA UNIVERSIDAD JAVERIANA



Introduction

Chiari-I Malformation (CM-I) is characterized by a shallow posterior fossa and hindbrain herniation through the foramen magnum. Posterior fossa decompressive craniectomy (PFDC) is the standard treatment for symptomatic patients. However, there are many variations to this approach, definitive treatment remains unresolved and there is no consensus on the optimal surgical technique. The authors report their experience with a minimally invasive occipitocervical decompression (MIOCD) for patients with CM-I and compare it with the traditional open approach.

Methods

We conducted a retrospective review of 23 consecutive patients who underwent surgical treatment for symptomatic CM-I. Patient records were appraised and statistical analyses were performed on clinical status, intraoperative factors, length of hospitalization and postoperative results. Findings were used to compare the outcomes after minimally invasive and standard open approaches.

Results

Ten patients underwent MIOCD and 13 received standard PFDC. All 23 procedures included duraplasty and resection of the posterior arch of C1. Patient age ranged from 9 to 60 years and follow-up duration varied from 1 to 57 months. There were no statistically significant differences between the 2 groups in terms of neurological recovery, pain scores, length of stay, craniectomy diameter and complications. Nevertheless, the MIOCD group showed a tendency to present better results when compared to PFDC in terms of blood loss (320ml Vs. 400ml), operation time (134min Vs. 164min) and immediate POP VAS pain scores (1.9 Vs. 2.9).

Conclusions

We present a novel technique for minimally invasive decompression of the posterior fossa that provides similar outcomes as the standard PFDC in the surgical treatment of CM-I. Preservation of the posterior



MIS posterior fossa decompression and duraplasty. (A) 4cm horizontal skin incision under the inion. (B) Right paramedian transmuscular dissection through the trapezius and the semispinalis capitis, exposing the occipital squama and posterior arch of C1 which is being resected with a Kerrison Rongeur. (C) Posterior fossa decompression is completed with 3cm vertical durotomy, notice the underlying cerebellar tonsils under the

arachnoid. (D) Dural graft covering the dural incision.

Learning Objectives

By the conclusion of this session, participants should be able to identify the minimally invasive occipitocervical decompression approach as an effective treatment alternative for patients with Chiari Type I malformation. Furthermore, they should understand the anatomical and biomechanical implications of preserving the posterior tension band and neck musculature. Finally, we seek to open a window for further studies that aim to validate the advantages of an MIS approach and improve postoperative results in patients with Chiari Type I malformation

Table 1			
	MIOCD	Open PFDC	Overall
Patients (No.)	10	13	23
Mean Patient age in years (Range)	32.7 (13 - 57)	32.2 (9 - 60)	32.4
Mean Follow-up in months (Range)	21 (1 - 57)	10.3 (1 - 24)	14.7
Mean Pre-Operative Pain score in the Visual Analogue Scale (Range)	5.8 (0 – 10)	6 (0 – 10)	5.91
Mean Immediate POP Pain score in the Visual Analogue Scale (Range)	1.9 (0 – 5)	2.93 (0 – 5)	2.47
Mean One-month follow-up POP Pain score in the Visual Analogue Scale (Range)	0.9 (0 – 5)	0.85 (0 – 5)	0.87
Mean Duration of Surgery in minutes (Range)	134.9 (85 – 245)	164.5 (92 – 360)	151.3
Mean Blood loss in mL (Range)	320 (100 – 1500)	400 (50 – 1400)	365.2
Mean Hospital Stay in days (Range)	2.4 (1- 4)	2.23 (1 – 3)	2.3
Surgery Related Complications No. (%)	4 (40)	4 (31)	8 (35)
- Pseudomeningocele (%) - Bacterial Meningitis (%) - Others (%) - Associated Sequels	2 (20) 1 (10) 1 (10) 0	2 (15) 2 (15) 0 0	4 (17) 3 (13) 1 (4) 0
Overall percentage of patient satisfaction with the	88%	81%	85%

Demographic and baseline characteristics. (MIOCD) Minimally invasive occipito-cervical decompression. (PFDC) Posterior fossa decompressive craniectomy. Significance was set at p <0.05, there was no statistically significant difference among any of the variables.

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