

Introduction

Foramen Magnum Decompression (FMD) is a common operation used to treat Chiari Malformation. Different surgical techniques are used to decompress the foramen magnum, with some reported to be more effective than others, but also linked more often to post-operative complications, such as severe nausea and headache. Our aim in this study is to determine whether there is a superior technique in FMD for Chiari malformation with or without syrinx.

Methods

This is a retrospective analysis of the FMDs we performed in the last 5 years for Chiari Malformation (2012-2017). Three types of operations were analyzed: 1) bony decompression without dural opening, 2) opening of dura without duroplasty, 3) opening of dura with duroplasty. We compared these techniques regarding severity of post-operative symptoms and in particular post-operative headache and nausea lasting months after surgery, revision rates as well as change in syrinx size in patients presenting with syringomyelia. The patients were followed up in clinic either 3 or 6 months after surgery.

Results

168 patients had 185 FMDs. Of the 168 primary operations, in 66 the dura was not opened (39%), 86 had durotomy (51%) and 16 had duroplasty (10%). 17 out of 185 operations were revision surgeries and in these surgeries, 7 patients had durotomy and 10 had duroplasty. For **primary** procedures the revision rates were: 12 (18%) if the dura was not opened ($p=0.021$), 4 (5%) if the dura was left open and 1 (6%) when duroplasty was performed. Severe post-operative headache and nausea occurred in 2 patients (3%) after the dura was not opened, 4 (25%) patients after primary duroplasty ($p=0.025$) and 64 patients (74%) after primary durotomy ($p<0.001$). After **revision** surgery severe headache and nausea occurred in 6 patients (86%) following durotomy and none following duroplasty. 66 out of 168 patients presented with **syringomyelia** and they had 74 operations (66 primary and 8 patients needed revision surgery). 6 patients were excluded from this analysis (missing data, syringoperitoneal shunt in situ), therefore we examined 60 patients and 68 operations. Using the Kruskal-Wallis test we compared the medians of each one of the 3 groups of operations and we found that in the bony decompression alone group there was no change in the syrinx size post-operatively ($p<0.05$), while the durotomy group had slightly better outcomes in the reduction of syrinx size when compared with the duroplasty group, however this difference was not statistically significant.

Limitations

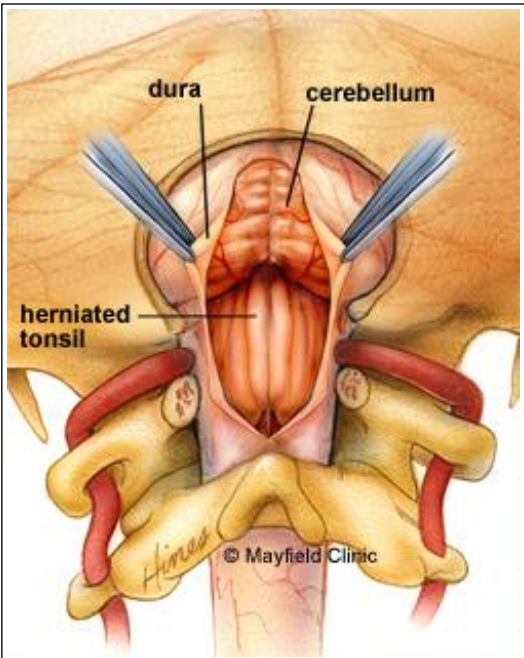
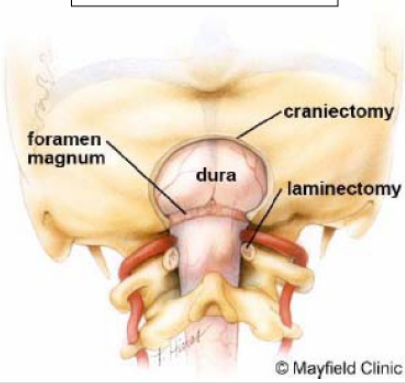
- Retrospective study (selection bias)
- Different surgical technique even in the same group (different extent of bony decompression)
- Unequal number of patients in each group (small number of patients in the duroplasty group)
- Different follow-up intervals

Conclusions

The rate of revision surgery and unchanged syrinx size was highest in the group who had bony decompression without dural opening. The rate of post-operative headache and nausea was highest in the durotomy group. Overall duroplasty had the best results.

1. Bony decompression without dural opening

<http://www.mayfieldclinic.com/pdf/pe-chiari.pdf>



FMD with duroplasty

