INPLASY

The controversy of intrapartum management in parturients with Chiari-1 malformation: a protocol for a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

INTRODUCTION

Review question / Objective Systematic review and meta-analysis of available literature regarding the intrapartum management of parturients with C1M to (a) assess safety of anesthetic techniques and delivery modalities among parturients with C1M, and (b) provide clear recommendations regarding the management of this patient population and need for neurosurgical consultation.

Rationale There is an on-going controversy regarding the best anesthetic technique and delivery modality in pregnant patient with Chiari 1 malformation. Some providers have advocated for general anesthesia and cesarian section over neuraxial anesthessia and vaginal delivery.

Condition being studied Chiari 1 malformation in pregnant women.

METHODS

Search strategy The search strategy encompassed a combination of keywords and MeSH terms related to "Chiari 1 malformation," "pregnancy," "delivery," "anesthesia," "cesarean section," and "vaginal delivery."

Participant or population PICO criteria: Population: Parturient females with C1M with or without syrinx; Intervention: GA, c-section; Comparison: NA, vaginal delivery; Outcomes: worsening headache, development of new or worsening neurological deficit, anesthetic complications and delivery complication.

Intervention General anesthesia vs neuraxial anesthesia; Cesarian section vs vaginal delivery.

Comparator General anesthesia vs neuraxial anesthesia; Cesarian section vs vaginal delivery.

Study designs to be included RCT, prospective cohort studies, retrospective cohort studies, case series.

Eligibility criteria Exclusion criteria were utilized: no Chiari 1 malformation or Chiari I in fetus (wrong population), not parturient females (wrong population), lacking quantitative outcomes, lack of intrapartum/post-partum neurological outcomes, not undergoing GA/C-section AND/OR spinal/vaginal delivery (wrong intervention), ex-vivo/not-in-human research (wrong population), not primary literature (e.g. review articles, editorials, commentaries, meta-analyses), conference abstracts and manuscripts not published in English.

Information sources Indexed studies in Pubmed, EMBASE and Scopus databases.

Main outcome(s) The binary outcome for worsening/new neurological deficit (+/-) in the setting of delivery modality and anesthesia.

Data management Excel spreadsheet in cloud environment

The Rayyan platform was utilized to facilitate article screening. After automatic duplicate removal, two reviewers (APS, SS) independently and iteratively screened titles, abstracts, and full-text articles based on the pre-defined exclusion criteria. Screening disagreements were adjudicated by two reviewers (TF, DDG) blinded to the original screening decisions.

Data extraction:
Data extraction was performed independently by two reviewers (APS, SS) using a standardized data extraction form for included studies. Extracted variables included author, year of publication, article title, study type, number of patients in study, patient age, gravidity/parity numbers, gestational age at delivery, history of prior Chiari malformation decompression, prepartum Chiari symptoms, presence of syringomyelia, presence of hydrocephalus, change in neurologic symptoms intrapartum/postpartum, anesthesia technique and delivery modality.

Quality assessment / Risk of bias analysis Study quality/bias assessment was performed using the National Institutes of Health/National Heart, Lung, and Blood Institute (NIH/NHLBI) tool, which assesses studies on nine criteria of study quality and is specifically designed for small retrospective studies as opposed to other bias/quality assessment tools more applicable to prospective studies. Quality/bias was assessed independently by two reviewers (TF, DDG) per NIH/NHLBI instructions. Study quality/bias assessments were visualized using the Risk of Bias Visualization (Robvis) tool. Risk of publication bias among studies included in meta-analysis was performed via logarithmic transformations of ORs and calculation of standard errors for each study followed by creation of funnel plots. Egger's regression test was used for asymmetry assessment.

Strategy of data synthesis Descriptive statistics were calculated as means and standard deviations for continuous variables and counts for categorical variables. Pairwise meta-analysis of the binary outcome for worsening/new neurological deficit (+/-) in the setting of delivery modality and anesthesia technique was performed. For anesthesia technique, NA was reference (i.e., GA vs NA). For delivery modality, vaginal delivery was reference (i.e., CD vs VD). Random-effects modeling was utilized to account for heterogeneity between studies and small n values in many included studies. All included studies except for case reports of a single patient were included in the initial meta-analysis. Odds ratios (OR) and 95% confidence intervals were calculated for all model iterations. Heterogeneity was assessed using I2 statistic. For all analyses, an α level of 0.05 was used to determine statistical significance. Statistical analyses were performed using Comprehensive Meta-Analysis software (version 3; Biostat, Englewood, NJ) and Python v 3.11.11. Python packages used for statistical analysis and visualization were pandas, numpy, matplotlib, and scipy packages.

Subgroup analysis Insufficient n values for subgroup analysis of outcomes in patients with hydrocephalus or syrinx.

Sensitivity analysis Sensitivity analysis was performed by excluding studies with n < 20 and re-running the random-effects model.

Language restriction English.

Country(ies) involved United States.

Keywords Chiari 1 malformation, cesarian section, vaginal delivery, systematic review, meta-analysis.

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