

# INPLASY

## Systematic review of the metabolic outcomes in adult-onset craniopharyngioma

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### ADMINISTRATIVE INFORMATION

**Support** - None.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202450087

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 May 2024 and was last updated on 17 May 2024.

### INTRODUCTION

**Review question / Objective** Systematically review the literature in order to compile evidence of metabolic outcomes in adult-onset craniopharyngioma, performed meta-analysis to compare prevalence of metabolic disease with Childhood Onset Craniopharyngioma (COCP).

**Rationale** Craniopharyngioma is a rare brain tumour with a bi-modal age distribution that can be subcategorised into adult-onset (AOCP) and childhood-onset craniopharyngioma (COCP). Whilst histologically benign, these tumours are locally aggressive and damage to structures may occur due to compression by tumour or during treatment. Damage may lead to hypothalamic obesity and a range of metabolic diseases - Type 2 diabetes (T2DM), Hypertension (HTN), lipid disorders, and Metabolic Syndrome (MetS).

**Condition being studied** Craniopharyngioma, metabolic diseases - Type 2 diabetes (T2DM), Hypertension (HTN), lipid disorders, and Metabolic Syndrome (MetS).

### METHODS

**Search strategy** Three databases (PubMed, Embase, and Scopus) were searched for relevant published articles on 04/10/2023. The detailed search strategies for each database are presented in Appendix 1. Search terms were as follows: (metabolism) OR (obesity) OR (hypertension) OR (health) OR (quality of life) OR (metabolic syndrome) AND (craniopharyngioma). Adult-onset was not specified in the search to avoid missing studies which did not explicitly state age of onset.

**Participant or population** Inclusion criteria  
• Studies that investigate metabolic sequelae\* of craniopharyngioma

- Studies that investigate metabolic sequelae\* of craniopharyngioma treatment such as surgery and radiotherapy

- Adult -onset craniopharyngioma
- Cohort studies, case-control studies, and cross-sectional studies.

\*Metabolic sequelae - metabolic syndrome, hypertension, diabetes mellitus, biochemical markers.

Exclusion criteria

- Childhood-onset craniopharyngioma
- Studies not in the English language
- Case reports and secondary literature.

**Intervention** NA.

**Comparator** NA.

**Study designs to be included** Systematic review.

**Eligibility criteria** Inclusion criteria

- Studies that investigate metabolic sequelae\* of craniopharyngioma
- Studies that investigate metabolic sequelae\* of craniopharyngioma treatment such as surgery and radiotherapy
- Adult -onset craniopharyngioma
- Cohort studies, case-control studies, and cross-sectional studies.

\*Metabolic sequelae - metabolic syndrome, hypertension, diabetes mellitus, biochemical markers.

Exclusion criteria

- Childhood-onset craniopharyngioma
- Studies not in the English language
- Case reports and secondary literature.

**Information sources** Three databases (PubMed, Embase, and Scopus) were searched for relevant published articles on 04/10/2023.

**Main outcome(s)** Initial search retrieved 2295 articles with 11 included after screening, 4 studies were suitable for meta-analysis. In total 523 patients were included F=253 (48%). Reporting of metabolic outcomes was heterogeneous throughout the studies. Pooled prevalence was 117/292 (40%) MetS, 75/315 (24%) T2DM, 205/363 (56%) HTN, and 211/425 (50%) lipid disorders. Meta-analysis suggested significantly greater likelihood of T2DM (Odds Ratio (OR) 2.49, Confidence interval (CI) 1.3 – 4.79, p=0.01) and HTN (OR 4.21, CI 1.28 – 13.81, p=0.02) with no significant difference in likelihood of MetS in AOC (OR 0.75, CI 0.48 – 1.17, p=0.21) compared to COCP.

**Data management** Zotero will be used to catalogue all the studies from the searches, and then used to process the studies utilising specified inclusion and exclusion criteria. Endnote 2.0 will be used to manage references for the study but not for the searches themselves.

**Quality assessment / Risk of bias analysis**

Systematic review will be performed according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) framework.

Studies will be included and excluded according to a pre-specified inclusion / exclusion criteria which will include criteria such as exclusion of paediatric craniopharyngioma and studies not written in the English language. Studies will be included / excluded by title and abstract, after this full texts will be reviewed to assess for eligibility. If applicable the references of included studies can also be reviewed in order to identify additional studies to include.

**Strategy of data synthesis** Basic descriptive statistics were performed to determine pooled sample prevalence, range and mean prevalence across the studies. Wilson's score interval was used to calculate 95% confidence intervals for the pooled prevalence. Coefficient of variation was calculated to describe variability across studies.

A meta-analysis was performed for 3 outcomes - T2DM, HTN, MetS using the 4 studies which compared AOC and COCP. Binary meta-analysis was performed where effect size was derived from pooled odds ratio and 95% confidence intervals. Random effects model was utilised to take into account variation in studies. Results were displayed as a forest plot. Chi2 test of homogeneity and I2, Tau2, H2 tests of heterogeneity were performed. Publication bias could not be assessed by funnel plot due to the low number of studies included.

Meta-analysis was performed in IBM SPSS Statistics Version 29.0.1.1 (244) (Released 2022. IBM Corp., Armonk, New York).

**Subgroup analysis** Meta analysis.

**Sensitivity analysis** Meta analysis.

**Language restriction** English.

**Country(ies) involved** UK.

**Other relevant information** Supervisor - Dr Pratibha Natesh (previously known as Pratibha Machenahalli).

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**Keywords** Craniopharyngioma, Metabolic syndrome, Type 2 Diabetes Mellitus, Hypertension.

**Dissemination plans** 1. Publication in a journal 2. Poster presentation at a scientific conference.

**Contributions of each author**

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