

# INPLASY PROTOCOL

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**Corresponding author:**  
Luisa Figueredo

lf.figueredo1341@gmail.com

**Author Affiliation:**  
Mayo Clinic Florida

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None declared.

## Current role of Endoscopic Endonasal Approach for Craniopharyngiomas. A 10-year Systematic review and Meta-Analysis Comparison with the Open Transcranial Approach

Figueredo, L<sup>1</sup>; Martinez, L<sup>2</sup>; Almeida, JP<sup>3</sup>.

**Review question / Objective:** To identify and review studies published in the last ten years, presenting the efficacy and outcomes of EEA and TCA for patients with craniopharyngiomas.

**Eligibility criteria:** Studies meeting the following criteria were included: (a) retrospective and prospective studies and (b) observational studies (i.e., cross-sectional, case-control, case-series). The outcomes included visual outcomes (improvement, no changes, worsening), endocrinological outcomes (permanent diabetes insipidus and hypopituitarism), operatory site infection, meningitis, cerebrospinal fluid leak, stroke, hemorrhage, and mortality. Studies were excluded if they were determined to be: (a) case-report studies, (b) studies testing genetic disorders, (c) poster presentation abstracts without full-text availability, (d) systematic reviews, and (e) metanalyses.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 15 January 2023 and was last updated on 15 January 2023 (registration number INPLASY202310045).

### INTRODUCTION

**Review question / Objective:** To identify and review studies published in the last ten years, presenting the efficacy and outcomes of EEA and TCA for patients with craniopharyngiomas.

**Rationale:** Currently, EEA is applied in many centers as the approach of choice for pituitary adenomas and has also achieved a “gold standard” status for many suprasellar tumors, including craniopharyngiomas. The development of high-quality visualization tools, such as 3D

and 4K technology, improved dedicated surgical instruments. Refinement of techniques for tumor resection and skull base reconstruction have positively impacted the results of endoscopic craniopharyngioma surgery [3], likely leading to improved surgical outcomes compared to the results observed in previous decades (1990-2000s).

**Condition being studied:** Cranio-pharyngiomas.

## METHODS

**Search strategy:** A systematic review of the literature was performed following the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (<http://prisma-statement.org/P R I S M A S t a t e m e n t / PRISMAStatement.aspx>). We performed a MEDLINE, Embase, and LILACS search, including articles in English and Spanish from the last ten years (2011-2021). No restrictions were placed on neither study periods, subjects' age, nor sample size. Search words such as “craniopharyngiomas”, “endoscopic endonasal”, and “open transcranial” combined with terms such as “follow-up”, “recurrence”, “outcome”, and “complications” were used.

**Participant or population:** Studies meeting the following criteria were included: (a) retrospective and prospective studies and (b) observational studies (i.e., cross-sectional, case-control, case-series). The outcomes included visual outcomes (improvement, no changes, worsening), endocrinological outcomes (permanent diabetes insipidus and hypopituitarism), operatory site infection, meningitis, cerebrospinal fluid leak, stroke, hemorrhage, and mortality. Studies were excluded if they were determined to be: (a) case-report studies, (b) studies testing genetic disorders, (c) poster presentation abstracts without full-text availability, (d) systematic reviews, and (e) meta-analyses.

**Intervention:** Endoscopic Endonasal Approach.

**Comparator:** Open Transcranial.

**Study designs to be included:** Studies meeting the following criteria were included: (a) retrospective and prospective studies and (b) observational studies (i.e., cross-sectional, case-control, case-series). The outcomes included visual outcomes (improvement, no changes, worsening), endocrinological outcomes (permanent diabetes insipidus and hypopituitarism), operatory site infection, meningitis, cerebrospinal fluid leak, stroke, hemorrhage, and mortality. Studies were excluded if they were determined to be: (a) case-report studies, (b) studies testing genetic disorders, (c) poster presentation abstracts without full-text.

**Eligibility criteria:** Studies meeting the following criteria were included: (a) retrospective and prospective studies and (b) observational studies (i.e., cross-sectional, case-control, case-series). The outcomes included visual outcomes (improvement, no changes, worsening), endocrinological outcomes (permanent diabetes insipidus and hypopituitarism), operatory site infection, meningitis, cerebrospinal fluid leak, stroke, hemorrhage, and mortality. Studies were excluded if they were determined to be: (a) case-report studies, (b) studies testing genetic disorders, (c) poster presentation abstracts without full-text availability, (d) systematic reviews, and (e) meta-analyses.

**Information sources:** We performed a MEDLINE, Embase, and LILACS search, including articles in English and Spanish from the last ten years (2011-2021).

**Main outcome(s):** The outcomes included visual outcomes (improvement, no changes, worsening), endocrinological outcomes (permanent diabetes insipidus and hypopituitarism), operatory site infection, meningitis, cerebrospinal fluid leak, stroke, hemorrhage, and mortality.

**Quality assessment / Risk of bias analysis:** The quality of evidence was assessed using the Oxford Center for Evidence-

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Based Medicine-Levels of Evidence and Grading Recommendations, Assessment, Development, and Evaluation (GRADE).

**Strategy of data synthesis:** Data Extraction and Quality Assessment - Data extractions were classified into a) article characteristics (year, type of publication, country), b) demographics (age, gender), and c) treatment-specific variables (type of treatment, pre-surgical baseline, EOR, intraoperative complications, and post-surgical outcomes). The quality of the information of the eligible studies were compared using the Methodological Index for Non-Randomized Studies (MINORS) tool [6]. With this tool, the classification was: Items that scored 0, not reported; 1, reported but inadequate; 2, reported and adequate. Though the ideal global score is 16 for non-comparative studies and 24 for comparative studies. The Cochrane GRADE approach was used to assess the quality of evidence, grading the studies from very low to high quality in a 4-tiered system.

**Statistical Analysis** - Data from the individual studies were combined by cohort and compared between the groups. Statistical analysis of categorical variables was performed through an X<sup>2</sup> and Fisher exact test, comparing three variables through a Kruskal-Wallis method and verified with post hoc Bonferroni analysis. The significance level was established at  $p < 0.05$ , and all the confidence intervals (CI) were set to 95%. The statistical analysis was performed using GraphPad Prism version 8.0.0 for Windows, GraphPad Software, San Diego, California, USA, <http://www.graphpad.com>. The study adhered to the relevant sections of the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines.

**Subgroup analysis:** None reported.

**Sensitivity analysis:** Post-Hoc Bonferroni.

**Language restriction:** English - Spanish.

**Country(ies) involved:** United States.

**Keywords:** Craniopharyngioma, microscopic transsphenoidal, endoscopic endonasal, systematic review, meta-analysis.

**Contributions of each author:**

**Author 1 - Luisa Figueredo** - Conceptualization, methodology, investigation, formal analysis, original draft preparation, writing, and editing.

Email: [lf.figueredo1341@gmail.com](mailto:lf.figueredo1341@gmail.com)

**Author 2 - Liliana Martinez** - Contributed to conceptualization and methodology.

Email: [al.martinez1433@uniandes.edu.co](mailto:al.martinez1433@uniandes.edu.co)

**Author 3 - Joao Paulo Almeida** - Conceptualization, validation, supervision, original draft preparation, review, and editing.

Email: [almeida.joao@mayo.edu](mailto:almeida.joao@mayo.edu)