INPLASY PROTOCOL

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None declared.

Association between radiotherapy and follow-up obesity in craniopharyngioma: a mini-review and meta-analysis

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Review question / Objective: **The effect of radiotherapy on post-treatment weight is incompletely defined. We determined the associations between radiotherapy and follow-up obesity in patients with craniopharyngioma (CP).**
Eligibility criteria: **The inclusion criteria were as follows: (1) Participants: Patients who were clinically diagnosed with craniopharyngioma; (2) Intervention/control: For the control group, patients have not received radiotherapy, and the patients of the intervention group received radiotherapy alone, or surgery combined radiotherapy, or radiotherapy combined adjuvant therapy; (3) Outcome: The outcome was postoperative BMI or postoperative obesity. We excluded studies with (1) in vitro or animal experiments; (2) not written in English; (3) conference abstracts, reviews, correspondence, and comments; (4) case reports that included less than 10 patients.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 02 December 2022 and was last updated on 02 December 2022 (registration number INPLASY2022120008).

INTRODUCTION

Review question / Objective: **The effect of radiotherapy on post-treatment weight is incompletely defined. We determined the associations between radiotherapy and follow-up obesity in patients with craniopharyngioma (CP).**

Condition being studied: **Currently, surgical tumor resection is the mainstay of the treatment of Craniopharyngioma (CP), and radiotherapy is added when complete resection is not feasible. Due to improvements in surgical skills and refinements in adjuvant therapy, including radiotherapy, hormone substitution, and**

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molecular targeted therapy(3), the overall survival rate of CP is high(4). However, CP still presents a unique challenge due to frequent recurrences and significant treatment-related morbidity, including cognitive dysfunction, chronic neuroendocrine deficiencies, low quality of life (QOL), and high cardiovascular and cerebrovascular mortality related to obesity(5).

Obesity has been proven to contribute to low self-esteem, attractive behaviors, nonalcoholic fatty liver disease, low QOL, and high vascular or metabolic mortality(5–7). While obese patients with CP show resistance to lifestyle intervention, pharmacological treatment, and bariatric treatment(8), identifying the risk factors for new-onset obesity is of great clinical value in preventing lean patients from becoming obese by taking comprehensive and early measures. Radiotherapy, as the primary adjuvant therapy, plays an essential role in managing CP, but its relationship with follow-up obesity of CP is still unknown.

Thus, to address knowledge gaps regarding the influence of radiotherapy on follow-up weight control of patients with CP, we conducted this extensive review and meta-analysis. Our conclusions will provide insight into the weight control of patients with CP who received radiotherapy.

METHODS

Search strategy: We used the following keywords to establish the search protocol: "craniopharyngioma," "obesity," and "radiotherapy" by two independent authors, and 'AND' was used as the set operator to combine different sets of results.

Participant or population: Patients with craniopharyngioma.

Intervention: Iradiation therapy.

Comparator: No iradiation therapy.

Study designs to be included: No limit.

Eligibility criteria: The inclusion criteria were as follows: (1) Participants: Patients who were clinically diagnosed with craniopharyngioma; (2) Intervention/control: For the control group, patients have not received radiotherapy, and the patients of the intervention group received radiotherapy alone, or surgery combined radiotherapy, or radiotherapy combined adjuvant therapy; (3) Outcome: The outcome was postoperative BMI or postoperative obesity. We excluded studies with (1) in vitro or animal experiments; (2) not written in English; (3) conference abstracts, reviews, correspondence, and comments; (4) case reports that included less than 10 patients.

Information sources: A comprehensive literature search was performed in four electronic databases, including Embase, PubMed, The Cochrane Library, and Web of Science. The bibliographies of relevant review articles and included eligible articles were reviewed, and the OpenGrey database (www.opengrey.eu) was also searched for potential records.

Main outcome(s): The post-treatment weight or body mass index was the main outcome we focused on.

Additional outcome(s): No additional outcome.

Data management: Two researchers independently extracted the following data: first author, year of publication year, country, study design, follow-up time, type of patient, treatments, index and method of detecting obesity, the criteria of obesity, sample size, time points of outcome collection, number of patients with postoperative obesity in two groups, odds ratio (OR) and its 95% confidence interval (CI).

Quality assessment / Risk of bias analysis: The qualities of selected studies were assessed based on the modified Newcastle–Ottawa Scale (NOS) , with scores ranging from 0to9, and studies with a score ≥6 were considered high quality.

Strategy of data synthesis: RevMan v5.3.0 (The Cochrane Collaboration, Oxford, UK)

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was employed for pooled OR and 95% CI; firstly, the log(OR) and stand error were calculated based on OR and 95% CI or relevant data; secondly, generic inverse variance method was used to calculate pooled OR and 95% CI.The Higgins I-squared (I2) inconsistency test estimated heterogeneity across studies, and the fixed/random-effects model was selected on the basis of the size of heterogeneity (I2 < 50%, P > 0.05, fixed-effects model; I2 ≥ 50%, P < 0.05, random-effects model).

Subgroup analysis: When significant heterogeneity exists (I2≥50%) , subgroup analysis is needed. And the subgroup analysis will conduct based on publication year, sample size, cutoff of obesity, and index for weight. et al.

Sensitivity analysis: When significant heterogeneity exists across studies, sensitivity analysis is often used to analyze the source of heterogeneity, and we still performed a sensitivity analysis to confirm the stability of the pooled OR in the absence of significant heterogeneity.

Language restriction: English.

Country(ies) involved: China.

Other relevant information: No.

Keywords: radiotherapy, follow-up obesity, craniopharyngioma, hypothalamic damage, energy expenditure.

Dissemination plans: No.

Contributions of each author:

Author 1 - Youchao Xiao - contributed conception of the study, formal analysis, manuscript preparation, and writing.
Email: youchaoxiao@163.com
Author 2 - Wentao Wu - Contributed statistical method and constructive discussions.
Author 3 - Lu Jin - contributed data extraction, data curation.
Author 4 - Yanfei Jia - contributed data extraction, data curation.
Author 5 - Kefan Cai - contributed statistical method and constructive discussions.
Author 6 - Ning Qiao - contributed statistical method and constructive discussions.
Author 7 - Lei Cao - contributed statistical method and constructive discussions.
Author 8 - Songbai Gui - contributed academic instruction, funding acquisition, and manuscript reviewing.

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