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Feasibility, efficacy and safety of pressurized intraperitoneal aerosol chemotherapy (PIPAC) in the treatment of peritoneal metastasis from ovarian cancer: A single-arm meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 September 2025 and was last updated on 13 September 2025.

INTRODUCTION

Review question / Objective To systematically evaluate the feasibility, efficacy, and safety of PIPAC in patients with peritoneal metastases from ovarian cancer.

Condition being studied Peritoneal metastases from ovarian cancer.

METHODS

Participant or population Adult patients with ovarian cancer and peritoneal metastases treated with PIPAC.

Intervention Pressurized intraperitoneal aerosol chemotherapy (PIPAC).

Comparator Not applicable (single-arm studies).

Study designs to be included Clinical studies of any design (prospective, retrospective, cohort studies, case series, and randomized controlled trials if available) reporting on PIPAC in ovarian cancer patients with peritoneal metastases.

Eligibility criteria Inclusion criteria: Clinical studies (prospective or retrospective, cohort studies, case series, or randomized controlled trials if available) that investigated pressurized intraperitoneal aerosol chemotherapy (PIPAC) in patients with ovarian cancer and peritoneal metastases; studies reporting at least one of the following outcomes: feasibility (such as completion rate or intervention-to-enrollment ratio), efficacy (such as radiological, pathological, or clinical response), or safety (such as adverse events, complications, morbidity, or mortality); articles published in peer-reviewed journals with full text available.
Exclusion criteria: Non-human studies, reviews, editorials, letters, and conference abstracts without sufficient data; studies not focusing on ovarian cancer or not including patients with

peritoneal metastases; duplicate publications of the same dataset (the most complete or latest version will be included); studies for which the full text could not be obtained; studies with irrelevant content or insufficient data to extract target outcomes; non-English publications.

Information sources Information sources: The following electronic databases will be systematically searched: PubMed, Embase, Web of Science, and the Cochrane Library. The search will include all available years up to the date of the search. In addition, the reference lists of relevant articles will be screened manually to identify additional eligible studies. Only studies published in English will be included. Conference abstracts without sufficient data will be excluded.

Main outcome(s) Main outcome(s): The primary outcomes will include feasibility, defined as the proportion of patients who received PIPAC among those enrolled or the completion rate of planned PIPAC procedures; efficacy, assessed by clinical, radiological, or pathological tumor response; and safety, evaluated by treatment-related adverse events, complications, morbidity, and mortality.

Quality assessment / Risk of bias analysis Quality assessment / Risk of bias analysis: The methodological quality of included studies will be assessed independently by two reviewers. For randomized controlled trials, the Cochrane Risk of Bias tool (RoB 2.0) will be applied. For non-randomized studies (prospective or retrospective cohort studies and case series), the Newcastle–Ottawa Scale (NOS) will be used. Any disagreements will be resolved by discussion or consultation with a third reviewer.

Strategy of data synthesis Strategy of data synthesis: Data from eligible studies will be extracted and synthesized both qualitatively and quantitatively. A meta-analysis will be performed when at least two studies report comparable outcomes. For proportion-type data (such as feasibility, response rate, or adverse event rate), pooled estimates with 95% confidence intervals will be calculated using a random-effects model with appropriate transformations (e.g., Freeman–Tukey double arcsine). Statistical heterogeneity will be assessed using the I^2 statistic and chi-square test. When quantitative synthesis is not feasible, a narrative descriptive summary will be provided. Subgroup or sensitivity analyses will be conducted if sufficient data are available.

Subgroup analysis If sufficient data are available, subgroup analyses will be performed according to study design (prospective vs retrospective), chemotherapy regimen used in PIPAC, number of PIPAC cycles (single vs multiple), and patient characteristics such as prior systemic therapy or extent of disease. Additional subgroup analyses may be conducted for different outcome domains (feasibility, efficacy, safety).

Sensitivity analysis Sensitivity analyses will be performed to test the robustness of the pooled results. Approaches will include excluding studies with high risk of bias or low methodological quality, using alternative statistical models (fixed-effects vs random-effects), and applying different effect size transformations for proportion data. A leave-one-out method will also be conducted to assess the influence of individual studies on the overall estimates.

Country(ies) involved China - Department of Gastrointestinal Surgery, Guangdong Provincial People's Hospital (Guangdong Academy of Medical Sciences), Southern Medical University, Guangzhou, Guangdong, P. R. China.

Keywords ovarian cancer, peritoneal metastases, pressurized intraperitoneal aerosol chemotherapy, meta-analysis.

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