INPLASY PROTOCOL

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None declared.

Efficacy comparison of intraoperative radiotherapy and external boost irradiation therapy for early-stage breast cancer: a systematic review and meta-analysis

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Review question / Objective: **In the past 10 years, multiple randomized controlled trials (RCTs) have been conducted to evaluate the efficacy of intraoperative IORT and postoperative EBRT on reducing LR, preventing distant metastasis, and prolonging DFS and OS in early-stage breast cancer patients .However, due to the diversity of demographics, histopathology, and systemic treatment patterns in different clinical trials, the comparative effect of these two therapies remains controversial . Thus, we have conducted this systematic review and meta-analysis to critically compare the efficacy of IORT and EBRT for the treatment of early-stage breast cancer, so as to provide evidence-based support for clinical decision-making.**
Eligibility criteria: **Inclusion criteria ·Patients diagnosed with early-stage breast cancer·Breast-conserving surgery combined with IORT or EBRT as intervention or control.·Outcome measures included LR, distant metastasis, DFS, or OS. Exclusion criteria ·Non-RCT design (literature review, case reports, conference summary, observational study, etc.). Participants less than 10.·Inappropriate outcome measures.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 May 2023 and was last updated on 05 May 2023 (registration number INPLASY202350025).

INTRODUCTION

Review question / Objective: **In the past 10 years, multiple randomized controlled trials (RCTs) have been conducted to evaluate the efficacy of intraoperative IORT and postoperative EBRT on reducing LR, preventing distant metastasis, and prolonging DFS and OS in early-stage breast cancer patients .However, due to the diversity of demographics, histopathology, and systemic treatment patterns in different clinical trials, the comparative effect of these two therapies remains**

controversial . Thus, we have conducted this systematic review and meta-analysis to critically compare the efficacy of IORT and EBRT for the treatment of early-stage breast cancer, so as to provide evidence-based support for clinical decision-making.

Condition being studied: Patients diagnosed with early-stage breast cancer.

METHODS

Participant or population: 1.Patients diagnosed with early-stage breast cancer. 2.Breast-conserving surgery combined with IORT or EBRT as intervention or control.

Intervention: Breast-conserving surgery combined with IORT or EBRT as intervention or control.

Comparator: External boost irradiation therapy is performed after the breast surgery

Study designs to be included: randomized controlled trials.

Eligibility criteria: Inclusion criteria ·Patients diagnosed with early-stage breast cancer·Breast-conserving surgery combined with IORT or EBRT as intervention or control.·Outcome measures included LR, distant metastasis, DFS, or OS. Exclusion criteria ·Non-RCT design (literature review, case reports, conference summary, observational study, etc.). Participants less than 10.·Inappropriate outcome measures.

Information sources: PubMed, Embase, Cochrane Library, and Web of Science were searched

Main outcome(s): A total of 8 studies were finally included.Meta-analysis showed that there was an inconsistent conclusion in long-term risk of LR between the two radiotherapies and no significant difference in short-term risk, and there was no significant difference in the metastasis rate, DFS, and OS between the two radiotherapies.

Quality assessment / Risk of bias analysis: Risk of bias of included studies were assessed by two reviewers independently using the Cochrane Risk of Bias Assessment Tool. Two researchers (LJX and SXW) cross-checked their work afterwards. Any disagreement was settled via consulting the third reviewer (ZJB). The Cochrane Risk of Bias Assessment Tool contains the following 6 domains: Selection bias (Random sequence generation and Allocation concealment), Performance bias (Blinding of participants and personnel), Detection bias (Blinding of outcome assessment), Attrition bias (Incomplete outcome data), Reporting bias (Selective reporting), and Other bias. Each domain can be graded as “high”, “low”, or “unclear”. In addition, the NOS scale (Newcastle-Ottawa Scale) was applied to assess the quality of the studies using Propensity Score Matching for grouping (11), which contains selection of participants (4 items), comparability (1 item) and outcome evaluation (3 items), with a total score of 9. Study scored for 7 to 9 would be considered of high-quality.

Strategy of data synthesis: Stata 15.0 (StataCorp LLC, College Station, TX) software was used for meta-analysis. Risk ratio (RR) with the 95% confidence interval (95%CI) were applied to pool the effects of LR and distant metastasis. Hazard ratio (HR) with the 95%CI were used to pool the effects of DFS and OS. Heterogeneity test was performed using Cochrane Q test and Higgins I2 statistic. An I2 ranges within 0-25%, 26%-50%, 51%- 75%, and 76%-100% would indicate non-significant, moderate, significant, and remarkably significant heterogeneity, respectively. Random-effect model would be applied for meta-analysis if an I2 greater than 50%. Funnel plot was provided and Egger’s test was performed to assess the publication bias. A p value less than 0.05 indicated statistical significance.

Subgroup analysis: Meta-analysis showed that there was an inconsistent conclusion in long-term risk of LR between the two radiotherapies and no significant difference in short-term risk.

Sensitivity analysis: **Sensitivity analysis showed that after removing each study one by one, the results did not reverse, indicating the robustness of the results.**

Country(ies) involved: **China.**

Keywords: **intraoperative radiation therapy; external irradiation therapy; breast cancer; meta-analysis; RCT.**

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