INPLASY

Accelerating Systematic Literature Review with Combined BERT and RoBERTa Models: Application in Studying Survival Rates of Proton vs. Photon Therapy in Lung Cancer

Corresponding author:
Tsair-Fwu Lee

tflee@nkust.edu.tw

Author Affiliation:
National Kaohsiung University of Science and Technology.

Lee, TF.

ADMINISTRATIVE INFORMATION

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

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 20 November 2024 and was last updated on 20 November 2024.

INTRODUCTION

Review question / Objective Patient: The study focuses on literature involving lung cancer patients.
Intervention: Lung cancer patients who underwent photon radiotherapy, including various photon treatment methods.
Comparison: Lung cancer patients who received proton radiotherapy, including different proton treatment approaches.
Outcome: overall survival rate.
Study Design: No specific restrictions.

Condition being studied Non-Small Cell Lung Cancer (NSCLC) and Small Cell Lung Cancer (SCLC) are being studied to evaluate the effects of different radiation therapies, specifically Proton Therapy versus Photon Therapy, on patient survival rates. This study focuses on assessing whether Proton Therapy offers superior outcomes in terms of reducing complications and improving overall survival when compared to conventional Photon Therapy, particularly in patients undergoing radiation as a treatment for lung cancer.

METHODS

Search strategy We used PubMed's Medical Subject Headings (MeSH) as search keywords and conducted literature searches across databases including Web of Science, PubMed, and Scopus.

Participant or population Covers all lung cancer patients and includes all types.

Intervention Patients with lung cancer receiving photon radiation therapy, where the type of radiation technique is not restricted and may include various forms of photon therapy.

Comparator Patients with lung cancer receiving proton radiation therapy, where the type of

radiation technique is not restricted and may include various forms of proton therapy.

Study designs to be included Includes all types of study designs.

Eligibility criteria
Inclusion Criteria:
1. Patients with lung cancer, including Non-Small Cell Lung Cancer (NSCLC) and Small Cell Lung Cancer (SCLC).
2. Patients receiving either proton radiation therapy or photon radiation therapy.
3. Studies that explicitly record the type of radiation therapy and specific survival rate data.
4. Studies that compare survival rates or other treatment outcomes between proton and photon therapy.
Exclusion Criteria:
1. Systematic review articles, as they do not contain original experimental data.
2. Studies that involve only a single treatment method (e.g., only photon therapy or only proton therapy).
3. Studies that do not focus on the target cancer types (e.g., breast cancer, prostate cancer).

Information sources Web of Science, PubMed, Scopus.

Main outcome(s) Hazard Ratio(HR).

Quality assessment / Risk of bias analysis Newcastle Ottawa Scale.

Strategy of data synthesis Meta-Analysis Approach: A meta-analysis will be conducted using a combination of fixed-effect and random-effect models.
Heterogeneity Analysis: To assess the variation between studies, statistical metrics such as I^2 and Cochran's Q will be calculated.
Bias Assessment: Potential publication bias will be assessed using funnel plots.
Effect Size Measurement: Hazard Ratio (HR) is the primary measure of effect size used to compare survival between proton and photon therapy groups；Odds Ratio (OR) and Risk Ratio (RR) are used as secondary measures to evaluate the occurrence of treatment-related complications.
The synthesis will be carried out using software tools such as Review Manager for generating forest plots and statistical summaries.

Subgroup analysis We conducted subgroup analyses by evaluating different complications, specifically radiation pneumonitis, radiation esophagitis, and lymphopenia, to investigate potential sources of heterogeneity and compare the performance of these different subgroups.

Sensitivity analysis We employed a "leave-one-out" method, systematically removing one study at a time from the pooled analysis to observe its impact on the overall effect size.

Language restriction Studies publish in English language.

Country(ies) involved Republic of China (Taiwan).

Keywords Meta-analysis、Lung Cancer、Proton Therapy、Overall survival、BERT、RoBERTa.

Contributions of each author
Author 1 - Tsair-Fwu Lee.
Email: tflee@nkust.edu.tw