INPLASY

Advancing Meta-Analysis of Post-Radiotherapy Nasopharyngeal Carcinoma Complications through Recurrent Neural Network-Enabled Natural Language Processing

Corresponding author:
Tsair-Fwu Lee

tflee@nkust.edu.tw

Author Affiliation:
National Kaohsiung University of Science and Technology.

Lee, TF.

ADMINISTRATIVE INFORMATION

INTRODUCTION

*R*eview question / Objective Population (P): The population of interest comprises individuals diagnosed with nasopharyngeal carcinoma. The study does not limit itself to specific patient subgroups but aims for a broad assessment of predictive models across various stages and subtypes of nasopharyngeal carcinoma to evaluate the generalizability and efficacy of the models.
Intervention (I): The intervention involves the application of different predictive models post-radiation therapy. These models are used to forecast treatment outcomes, focusing on the occurrence of the disease and related complications.

Comparison (C): The study compares various predictive models and their influencing factors to determine which models perform best in predicting treatment outcomes for nasopharyngeal carcinoma patients.
Outcomes (O): The primary outcome measure is the Area Under the Curve (AUC), which assesses the predictive accuracy of the models. A higher AUC indicates a model with better predictive ability.
Study Design (S): The analysis includes studies of diverse designs, such as Randomized Controlled Trials (RCTs), observational studies, as well as retrospective and prospective studies, that report on predictive models for nasopharyngeal carcinoma incidence and post-radiation complications.

Condition being studied The condition being studied is post-radiotherapy complications in nasopharyngeal carcinoma (NPC). Nasopharyngeal carcinoma is a cancer located in the nasopharynx, and radiotherapy is often the primary treatment. However, radiotherapy can lead to various complications, ranging from mild issues such as dry mouth to severe difficulties like swallowing impairment, significantly impacting patients' quality of life. Predicting and managing these complications is a major clinical challenge. This study aims to improve the accuracy of predicting these post-treatment complications using different predictive models, enabling the development of personalized treatment and monitoring plans for patients.

METHODS

Search strategy The search strategy for this review included terms related to nasopharyngeal carcinoma, post-radiotherapy complications, and predictive models. The study conducted a comprehensive search across three major electronic databases: Web of Science、PubMed、Cochrane Library.

Participant or population The participants addressed in this review are patients diagnosed with nasopharyngeal carcinoma (NPC) who have undergone radiotherapy. The study does not restrict itself to a specific subgroup of NPC patients but includes individuals across different stages and subtypes of the disease.

Intervention The focus of the analysis is on the choice of predictive models and influencing factors post-radiation therapy. These models are intended to predict treatment outcomes, including the occurrence of the disease and potential complications.

Comparator Comparisons will be made between different predictive models and their factors to evaluate which models perform best in predicting treatment outcomes for patients with nasopharyngeal carcinoma.

Study designs to be included The review includes a wide range of study designs to comprehensively address its objectives. Specifically, it incorporates:Randomized Controlled Trials (RCTs)、Observational studies (both cohort and case-control studies)、Retrospective and prospective studies.

Eligibility criteria Inclusion Criteria:

1. Studies must provide data on predictive models specifically applied to post-radiotherapy complications in nasopharyngeal carcinoma (NPC) patients.
2. Articles should report the Area Under the Curve (AUC) as a metric for model accuracy.
3. Full-text availability of studies in English, ensuring comprehensive data access and assessment.

Exclusion Criteria:
1. Studies focusing on non-NPC patient populations or unrelated cancer types.
2. Systematic reviews, meta-analyses, or other forms of secondary research that do not contribute original data.
3. Studies lacking essential data points, such as the number of patients or AUC values, required for evaluating the predictive models.

Information sources Web of Science (WOS)、PubMed、Cochrane Library.

Main outcome(s) Area Under the ROC Curve (AUC).

Quality assessment / Risk of bias analysis PROBAST TOOL.

Strategy of data synthesis Model Comparison: Predictive models for post-radiotherapy complications in nasopharyngeal carcinoma (NPC) will be compared based on their Area Under the ROC Curve (AUC) values. Models with higher AUC scores are considered more effective in predicting complications.

Statistical Effect Models:
The review employs both fixed-effect and random-effects models to synthesize data. The fixed-effect model is used when studies are assumed to estimate the same effect size, while the random-effects model is applied in cases of significant heterogeneity among studies, indicated by an I^2 statistic above 50%.

Heterogeneity Assessment:
The I^2 statistic will quantify heterogeneity among studies. If high heterogeneity is present, a random-effects model will be preferred to account for variability across studies.

Forest plots will be used to visually assess the effect sizes and confidence intervals for each study.

Publication Bias:
A funnel plot will assess publication bias, indicating whether smaller studies might be overemphasized or overlooked.

Subgroup analysis No subgroup analysis will be conducted in this review.

Sensitivity analysis No Sensitivity analysis will be conducted in this review.

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

Keywords META analysis, Nasopharyngeal carcinoma, Complications, Recurrent Neural Network, Artificial Intelligence, Radiotherapy.

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