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Pan-immune-inflammation value as a robust prognostic biomarker across therapeutic strategies in lung cancer: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No.

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 7 April 2025 and was last updated on 7 April 2025.

INTRODUCTION

Review question / Objective Lung cancer is a major global health issue with high variability in incidence and mortality. However, reliable predictive biomarkers for lung cancer prognosis remain lacking. The pan-immune-inflammation value (PIV) has emerged as a promising prognostic tool by reflecting systemic immune and inflammatory responses. However, despite extensive research and reliable findings regarding PIV, there had yet to be a comprehensive analysis exploring its role in lung cancer. Therefore, we performed a meta-analysis to systematically examine the association between PIV and lung cancer prognosis, with the goal of highlighting the clinical relevance of PIV in the treatment of lung cancer.

Condition being studied Lung cancer was one of the most prevalent and deadly cancers worldwide. The incidence and mortality rates of lung cancer varied significantly across different regions, influenced by factors such as smoking prevalence and exposure to environmental pollutants. As the tobacco epidemic continued to evolve, especially in low- and middle-income countries, the global burden of lung cancer was expected to change, highlighting the ongoing public health challenge posed by this disease.

METHODS

Search strategy We utilized English-language databases such as Web of Science, PubMed, and PMC, employing the keyword "Pan-immune inflammation value" for our search, we also included its alias, the Systemic Inflammation Composite Index (AISI).

Participant or population The study must be a clinical study involving lung cancer patients.

Intervention A correct method for calculating PIV must be used, and patients must be divided into high and low groups based on PIV levels, and the study must stratify patient survival according to these PIV groups.

Comparator Patients must be divided into high and low groups based on PIV levels, and the study must stratify patient survival according to these PIV groups.

Study designs to be included Retrospective cohort study will be included.

Eligibility criteria (1) The study must be a clinical study involving lung cancer patients. (2) A correct method for calculating PIV must be used, and patients must be divided into high and low groups based on PIV levels. (3) The study must stratify patient survival according to these PIV groups and provide prognostic data, including hazard ratio (HR) and 95% confidence interval (CI). (4) Non-clinical studies, non-lung cancer populations, inadequate PIV calculation or grouping, lack of survival stratification and prognostic data, online database-based studies, and overlapping or duplicate data were excluded.

Information sources We utilized English-language databases such as Web of Science, PubMed, and PMC.

Main outcome(s) High PIV level was associated with poor prognosis in lung cancer patients.

Additional outcome(s) Subgroup analyses showed that PIV's prognostic value remained consistent across different treatment strategies, lung cancer types, analytical methods, PIV cutoff values, sample sizes, and study regions.

Data management Data extraction from the selected articles was conducted independently by two researchers, with a third researcher overseeing the synthesis. The collected data included essential details such as the author, publication year, study region, sample size, cancer type, cutoff values, treatment strategy, and outcomes (including HR estimation).

Quality assessment / Risk of bias analysis To evaluate the quality of the included studies, the Newcastle-Ottawa Scale (NOS) was employed, studies scoring no less than 6 on the NOS were classified as high quality. Publication bias was assessed using both Begg's and Egger's test.

Strategy of data synthesis To evaluate the prognostic significance of PIV in lung cancer patients, we combined HRs and their 95% CIs for each outcome. HRs from multivariable analyses were prioritized unless otherwise specified. Heterogeneity was determined through the chi-square test and I-squared statistic, with a random-effects model employed for P-values 50%; otherwise, a fixed-effects model was used.

Subgroup analysis Subgroup analyses were based on different treatment strategies, lung cancer types, analytical methods, PIV cutoff values, sample sizes, and study regions.

Sensitivity analysis Sensitivity analysis was performed by sequentially excluding individual studies to evaluate the robustness of the results.

Language restriction English.

Country(ies) involved China.

Keywords Pan-immune-inflammation value, Lung cancer, Meta-analysis, Prognosis, Biomarker.

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