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Low-dose computed tomography-guided biopsy for pulmonary nodules: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202370073

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 July 2023 and was last updated on 18 July 2023.

INTRODUCTION

Review question / Objective This meta-analysis is conducted to assess the diagnostic performance and safety of low-dose CT-guided biopsy for pulmonary nodules.

Condition being studied CT-guided biopsy has been widely used for diagnosis of pulmonary nodules. However, unlike the CT screening, the CT-guided biopsy required repeat scanning during the biopsy procedure, and therefore, CT-guided biopsy may be associated with significantly higher radiation doses relative to normal diagnostic CT imaging techniques. Therefore, many researchers have used low-dose CT technique during the biopsy procedure.

METHODS

Search strategy (((((computed tomography) OR (CT)) AND ((lung) OR (pulmonary)))) AND (nodule)) AND (biopsy)) AND (low-dose).

Participant or population Pulmonary nodule patients.

Intervention Low-dose CT-guided lung biopsy.

Comparator Normal-dose CT-guided biopsy.

Study designs to be included Comparative articles.

Eligibility criteria (a) a definite pulmonary nodule on CT; (b) lesion size < 30mm and ≥5mm; (c) solid nodule (solid component >80% of the total nodule); and (d) no definitive pathological diagnosis.

Information sources PubMed, Web of science, and Wanfang.

Main outcome(s) Radiation dose.

Quality assessment / Risk of bias analysis The Cochrane risk-of-bias tool was used to establish the quality of randomized controlled trials (RCTs),

with each of the following being assigned a low, high, or unclear risk of bias: performance, attrition, detection, selection, reporting, and other bias. Observational study quality was assessed using the Newcastle-Ottawa scale (NOS), which assigns points to each study based on selection (4 points), comparability (2 points), and outcome (3 points) criteria. A NOS score ≥ 7 was considered indicative of a high-quality study.

Strategy of data synthesis Pooled analyses were conducted using RevMan v5.3. For dichotomous variables, pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated, while continuous variables were compared using mean differences (MD) values with 95% CIs. The I² statistic and Q test were used to assess heterogeneity, with an I² > 50% being considered indicative of significant heterogeneity. When heterogeneity was significant, random-effects models were used, whereas fixed-effect models were otherwise used. Sensitivity analyses were conducted via a “leave one out” approach in an effort to detect sources of heterogeneity. Publication bias was analyzed using Egger’s test by Stata v12.0, with P < 0.05 as the significance threshold.

Subgroup analysis None.

Sensitivity analysis Yes.

Country(ies) involved China.

Keywords Biopsy, CT, Low-dose.

Contributions of each author

Author 1 - Ying Zhao.

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