INPLASY PROTOCOL

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Preoperative computed tomography-guided localization for multiple lung nodules: a meta-analysis

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Review question / Objective: This meta-analysis was developed to assess the safety and efficacy of computed tomography-guided localization for multiple lung nodules by comparing with single lung nodule localization.

Eligibility criteria: Studies eligible for inclusion met the following criteria:(a) Types of studies: comparative studies regarding of preoperative localization for MLNs and SLN; (b) Localization materials: not limited.(c) Languages: not limited.Studies were excluded if they were: (a) single-arm studies; (b) studies without English titles and/or abstract;(c) case reports, reviews, and conference abstracts.

Information sources: The PubMed, Embase, and Cochrane Library were searched to identify relevant articles published as of February 2022.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 April 2022 and was last updated on 06 April 2022 (registration number INPLASY202240029).

INTRODUCTION

Review question / Objective: This meta-analysis was developed to assess the safety and efficacy of computed tomography-guided localization for multiple lung nodules by comparing with single lung nodule localization.

Condition being studied: Lung nodules (LNs) are usually detected during the computed tomography (CT) screening for lung cancers. When the LN is larger than 6 mm, regular CT follow-up is needed. The probability of malignancy increases as the diameter of LN increases and approximate 50%-70% of LNs are malignant. Video-assisted thoracic surgery (VATS) sublobar

(wedge or segmental) resection is the standard approach to resecting LNs suspected of being malignant due to its minimally invasive nature. To improve the successful rate of VATS sublobar resection and decrease the conversion to thoracotomy rate, preoperative CT-guided localization has been widely used to guide the VATS procedure. Among the patients with LNs, approximate 20% of patients have multiple LNs (MLNs) which are presented with moderate-high risk of lung cancer. Simultaneous resection of MLNs can reduce the risk of disease progression during the interval between staging operations, shorten the treatment time, and reduce the patients' economic burden. Under this condition, successful simultaneous localization of all target LNs is an important step in one-stage VATS resection for MLNs. A previous meta-analysis showed that preoperative CT-guided localization is effective in guiding VATS-guided wedge resection in patients with MLNs with the pooled successful localization rates of 97% based on LNs and 92% based on patients. However, that previous meta-analysis only included single-arm studies and this situation resulted in high risk of bias. Therefore, a meta-analysis based on the comparative studies is needed.

METHODS

Search strategy: ((((localization) OR (localize)) AND ((lung) OR (pulmonary))) AND (multiple)) AND ((nodule) OR (lesion)).

Participant or population: Patients with lung nodules.

Intervention: Multiple lung nodules.

Comparator: Single lung nodule.

Study designs to be included: Studies eligible for inclusion met the following criteria:(a) Types of studies: comparative studies regarding of preoperative localization for MLNs and SLN; (b) Localization materials: not limited.(c) Languages: not limited.Studies were excluded if they were: (a) single-arm studies; (b) studies without English titles and/or abstract;(c) case reports, reviews, and conference abstracts.

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Main outcome(s): Successful localization rate.

Additional outcome(s): localization duration, pneumothorax rate, lung hemorrhage rate, and hospital stay.

Quality assessment / Risk of bias analysis: All studies identified for inclusion in the present meta-analysis had a non-randomized design. Their quality was assessed using the Newcastle-Ottawa scale (NOS), which contains selection (4 points), comparability (2 points), and exposure (3 points) criteria. A NOS score ≥ 7 was considered indicative of a high-quality study.

Strategy of data synthesis: The data of these endpoints were pooled 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. Random-effects or fixed-effect models were used when significant heterogeneity was found or not. Sensitivity analyses were conducted via a "leave one out" approach in an effort to detect sources of heterogeneity. Subgroup

analyses were conducted based on different localization (coil, hook-wire, or liquid materials) materials. Publication bias was analyzed using Egger's test by Stata v12.0. $P < 0.05$ was considered as the significance threshold.

Subgroup analysis: Subgroup analyses were conducted based on different localization (coil, hook-wire, or liquid materials) materials.

Sensitivity analysis: Sensitivity analyses were conducted via a "leave one out" approach in an effort to detect sources of heterogeneity.

Language: English.

Country(ies) involved: China.

Keywords: Localization; Lung nodule; Multiple; Single.

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Author 3 - Feng-Fei Xia.
Author 4 - Er-Liang Li.