Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Prophylactic antibiotics for the prevention of fever and infectious complications after bronchoscopy: a systematic review and meta-analysis of comparative studies

Juan Ricardo Lutz
Hospital Universitario Mayor, Mederi
Ericarolina Ospino
eospinol@javeriana.edu.co

Hospital Universitario San Ignacio
Dolfus Santiago Romero
Hospital Universitario San Ignacio

Article

Keywords:

Posted Date: November 5th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11323028/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Bronchoscopy is a widely used diagnostic and therapeutic procedure that is generally considered safe, although it may be followed by fever and infectious complications such as pneumonia. The use of prophylactic antibiotics to prevent these events remains controversial, with inconsistent recommendations across clinical settings. This study aimed to evaluate the effectiveness of prophylactic antibiotics in reducing post-bronchoscopy fever and infectious complications through a systematic review and meta-analysis of available evidence. A comprehensive search identified six studies, including randomized controlled trials and observational designs, encompassing a broad range of patient populations and procedural indications. The pooled analysis showed that prophylactic antibiotics were not associated with a statistically significant reduction in the combined outcome of post-procedural fever and pneumonia. The results were characterized by substantial variability between studies and wide uncertainty in the estimated effect, limiting the confidence in a consistent benefit. Sensitivity analyses confirmed the robustness of the overall findings, although certain individual studies contributed to heterogeneity. Overall, current evidence does not support the routine use of prophylactic antibiotics in patients undergoing bronchoscopy. These findings highlight the need for more rigorous and adequately powered studies to better identify patient subgroups that may benefit from targeted preventive strategies and to inform clinical decision-making.

Introduction

Flexible bronchoscopy is an essential diagnostic and therapeutic procedure in contemporary respiratory medicine. It is routinely used for airway inspection, bronchoalveolar lavage, endobronchial and transbronchial sampling, microbiological diagnosis, staging of thoracic malignancies, and evaluation of pulmonary infiltrates in both immunocompetent and immunocompromised patients. Although generally considered safe, bronchoscopy is an invasive procedure that may be followed by transient adverse events, including cough, hypoxemia, bleeding, pneumothorax, fever, and, less frequently, clinically relevant respiratory infection (1).

Post-bronchoscopy fever is a common clinical concern because it may generate diagnostic uncertainty, additional laboratory or imaging studies, empirical antibiotic use, unplanned medical visits, or delayed discharge. However, fever after bronchoscopy does not necessarily indicate bacterial infection. Several mechanisms have been proposed, including transient bacteremia, mucosal manipulation, bronchoalveolar lavage-induced inflammatory responses, cytokine release, aspiration of oropharyngeal secretions, and procedure-related inflammatory activation. The British Thoracic Society guideline describes post-bronchoscopy fever as particularly frequent after bronchoalveolar lavage and associated with an acute inflammatory response, often in the absence of bacteremia (1). This distinction is clinically relevant because an inflammatory, self-limited febrile response would not be expected to benefit from routine antimicrobial prophylaxis.

The use of prophylactic antibiotics before bronchoscopy remains controversial. Some clinicians administer antibiotics empirically in selected patients perceived to be at higher risk, particularly those undergoing bronchoalveolar lavage, transbronchial biopsy, or procedures in the setting of structural lung disease, malignancy, immunosuppression, or suspected airway colonization. Nevertheless, international recommendations have generally discouraged routine antibiotic prophylaxis for the prevention of post-bronchoscopy fever, pneumonia, or endocarditis (1, 2). This position is based on the low absolute frequency of severe infectious complications, uncertainty about the causal role of bacteria in post-procedural fever, and concerns regarding antimicrobial resistance, adverse drug reactions, and unnecessary healthcare costs.

Despite these recommendations, the evidence base remains limited and heterogeneous. A randomized controlled trial by Park et al. found that prophylactic antibiotics before bronchoscopy did not reduce the frequency of post-bronchoscopy fever and did not modify serum levels of pyrogenic cytokines, suggesting that microbiological factors may not be the main driver of fever in this setting (3). However, available studies differ in bronchoscopy technique, patient population, type and route of antibiotic administration, timing of prophylaxis, and definitions of outcomes such as fever, pneumonia, respiratory tract infection, hospitalization, and antibiotic requirement after the procedure.

More recent evidence has reopened the discussion by suggesting that oral prophylactic antibiotics may reduce post-bronchoscopy infections in selected noninfectious populations, although the decision should be individualized according to patient profile and the specific antibiotic used (4). This discrepancy raises an important clinical question: whether prophylactic antibiotics should be considered ineffective for all post-bronchoscopy outcomes, or whether their potential benefit may depend on patient risk profile, procedural characteristics, and the outcome being evaluated.

A preliminary prospective single-center study in high-risk lung cancer patients reported no protocol-defined cases of post-bronchoscopy pneumonia among 24 patients receiving prophylactic antibiotics, compared with 17 of 144 historical controls, although the difference was not statistically significant (5).

A systematic synthesis of the available evidence is therefore needed to clarify the effect of prophylactic antibiotics on post-bronchoscopy fever and infectious complications. This systematic review and meta-analysis aims to evaluate whether prophylactic antibiotics, administered by any route before or around the time of bronchoscopy, reduce the risk of post-procedural fever, pneumonia, respiratory infection, or related clinical outcomes when compared with placebo, no antibiotics, or usual care.

Methods

Study design and reporting

We conducted a systematic review and meta-analysis of comparative interventional and observational studies evaluating the efficacy or effectiveness of prophylactic antibiotics for the prevention of post-bronchoscopy fever and infectious complications. The review was designed and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement.

Eligibility criteria

We included comparative interventional and observational studies evaluating adult patients undergoing diagnostic bronchoscopy. Eligible studies compared systemic prophylactic antibiotics, administered orally or intravenously before, during, or immediately after bronchoscopy, with placebo, no antibiotic prophylaxis, or usual care.

Studies were eligible if they reported at least one outcome related to post-bronchoscopy fever, post-bronchoscopy pneumonia, or respiratory infectious complications. Randomized controlled trials, non-randomized clinical trials, prospective comparative studies, retrospective cohort studies, and database-based comparative studies were considered eligible.

We excluded case reports, case series without a comparator group, narrative reviews, editorials, letters without original outcome data, pediatric studies, animal studies, and studies in which antibiotics were administered for treatment of an established infection rather than prophylaxis.

Outcomes

The primary outcome was a composite endpoint of post-bronchoscopy fever and/or post-bronchoscopy pneumonia. Fever and pneumonia were accepted according to the definitions used in each included study.

Secondary outcomes included post-bronchoscopy fever analyzed separately, post-bronchoscopy pneumonia analyzed separately, respiratory tract infection when reported, need for therapeutic antibiotics after bronchoscopy, and adverse events related to antibiotic prophylaxis.

Information sources and search strategy

A systematic literature search was conducted in PubMed/MEDLINE and Embase from database inception to February 2026. The search strategy combined controlled vocabulary and free-text terms related to bronchoscopy, antibiotic prophylaxis, fever, pneumonia, and respiratory infection. Reference lists of included articles and relevant reviews were also screened manually to identify additional eligible studies.

Study selection

All records identified through the search strategy were imported into a reference manager, and duplicates were removed. Two reviewers independently screened titles and abstracts. Full-text articles were then assessed for eligibility according to the predefined inclusion and exclusion criteria. Disagreements were resolved by discussion and consensus.

According to the PRISMA flow diagram, 72 records were identified through database searching. After removal of duplicates, 68 records were screened. Sixty-two records were excluded after title and abstract screening. Six full-text reports were assessed for eligibility, and six studies were included in the systematic review.

Data extraction

Two reviewers independently extracted data using a standardized form. Extracted variables included first author, year of publication, country, study design, sample size, patient population, bronchoscopy indication, bronchoscopic procedure, antibiotic regimen, route of administration, timing and duration of prophylaxis, comparator group, outcome definitions, follow-up period, and number of events in each group.

For studies with multiple antibiotic arms, each eligible antibiotic arm was extracted separately when appropriate. When an included study reported more than one relevant outcome, data were extracted for the composite outcome and for individual outcomes whenever possible.

Data Availability

All data generated or analyzed during this study are included in this published article and its Supplementary Information files. The data extraction spreadsheet used for the meta-analysis is provided as **Supplementary Data 1**.

Risk of bias assessment

Risk of bias was assessed independently by two reviewers. Randomized controlled trials were evaluated using the Cochrane Risk of Bias 2 tool. Non-randomized interventional and observational studies were assessed using the Risk Of Bias In Non-randomized Studies of Interventions tool. Disagreements were resolved by consensus.

Statistical analysis

For dichotomous outcomes, treatment effects were summarized as risk ratios (RRs) with 95% confidence intervals (CIs). The primary meta-analysis evaluated the effect of prophylactic antibiotics on the composite endpoint of post-bronchoscopy fever and/or post-bronchoscopy pneumonia.

Because substantial clinical and methodological heterogeneity was anticipated across studies, a random-effects model was used as the primary analytic approach. The inverse variance method was applied, and between-study variance was estimated using the restricted maximum-likelihood estimator. The Hartung-Knapp adjustment was used to calculate confidence intervals for the random-effects model. A continuity correction of 0.5 was applied in studies with zero-cell frequencies.

Statistical heterogeneity was assessed using Cochran's Q test, τ^2, and the I^2 statistic. I^2 values were interpreted as low, moderate, or substantial heterogeneity when approximately 25%, 50%, or 75%, respectively. A leave-one-out sensitivity analysis was performed by sequentially excluding one study at a time and recalculating the pooled effect estimate to assess the influence of individual studies on the overall result.

A prediction interval was calculated to estimate the expected range of effects in a future comparable study. Publication bias was not formally assessed because fewer than ten studies were included. All analyses were performed using R software with the meta package.

Results

Study selection

The systematic search identified 72 records from electronic databases. After removal of four duplicates, 68 records were screened by title and abstract. Sixty-two records were excluded at this stage. Six full-text reports were assessed for eligibility, and all six were included in the systematic review and quantitative synthesis.

Study characteristics

Six comparative studies evaluating prophylactic antibiotics for the prevention of post-bronchoscopy fever, pneumonia, or respiratory infectious complications were included. The studies were published between 2007 and 2025 and were conducted in East Asian populations, including Japan and Korea.

The included studies differed substantially in design, population, antibiotic regimen, timing of prophylaxis, and outcome definition. Two studies were randomized controlled trials. Kanazawa evaluated azithromycin and cefcapene compared with no antibiotic prophylaxis in patients undergoing bronchoscopic biopsy. Park et al. evaluated oral amoxicillin/clavulanate administered before bronchoscopy compared with no prophylaxis, with post-bronchoscopy fever as the main outcome. Yamamoto et al. conducted an open-label prospective controlled study evaluating antibiotics administered after diagnostic bronchoscopy. Hayama et al. evaluated intravenous sulbactam/ampicillin before bronchoscopy followed by oral amoxicillin/clavulanate in high-risk patients with lung cancer, using historical controls. Bo-Guen Kim et al. evaluated short-term oral amoxicillin/clavulanate after radial endobronchial ultrasound-guided transbronchial biopsy. Akaba et al. used a nationwide database to evaluate oral prophylactic antibiotics for diagnostic bronchoscopy in patients without active infection.

Across studies, prophylactic antibiotics included macrolides, beta-lactam/beta-lactamase inhibitor combinations, cephalosporins, aminopenicillins, and fluoroquinolones. Antibiotics were administered before bronchoscopy in some studies and after bronchoscopy in others. Follow-up periods and outcome definitions also varied. Some studies focused on post-bronchoscopy fever, whereas others evaluated pneumonia or broader respiratory infectious complications.

Quantitative synthesis

All six studies were included in the meta-analysis of the composite outcome of post-bronchoscopy fever and/or post-bronchoscopy pneumonia. The pooled population included 70,674 participants, of whom 11,666 received prophylactic antibiotics and 59,008 were included in comparator groups. Overall, 694 events were reported.

In the random-effects model, prophylactic antibiotics were not associated with a statistically significant reduction in the composite outcome of post-bronchoscopy fever and/or pneumonia. The pooled risk ratio was 0.63, with a 95% confidence interval ranging from 0.07 to 5.74, and the result was not statistically significant ($p = 0.61$).

Substantial heterogeneity was observed across studies. The I^2 statistic was 82.2%, indicating marked between-study variability. The estimated between-study variance was $\tau^2 = 3.49$, and Cochran's Q test was statistically significant ($Q = 28.14$; $p < 0.0001$).

Individual study effects

The direction and magnitude of effect varied notably across studies. Park et al. showed no meaningful difference between prophylaxis and control groups. Yamamoto et al. showed a point estimate favoring the control group, although with a very wide confidence interval. Kanazawa et al. suggested a possible reduction in infectious complications, but the confidence interval crossed the null. Akaba et al. showed a statistically significant protective association in a large nationwide observational study. Hayama et al. showed a strong apparent protective effect in a high-risk lung cancer population, although the study used a small intervention group and historical controls. In contrast, Bo-Guen Kim et al. showed an effect estimate favoring the comparator group in the overall analysis, despite subgroup findings suggesting potential benefit among patients with radiological risk factors.

Leave-one-out sensitivity analysis

A leave-one-out sensitivity analysis was performed to evaluate the influence of individual studies on the pooled effect estimate. The overall conclusion remained unchanged after sequential exclusion of each study: none of the leave-one-out analyses showed a statistically significant association between prophylactic antibiotics and reduction of the composite outcome.

When Hayama et al. was omitted, the pooled estimate moved close to the null (RR 1.01; 95% CI 0.37–2.74), and heterogeneity decreased from 82.2% to 61.7%. This suggests that Hayama et al. contributed importantly to the magnitude of between-study heterogeneity. In the remaining leave-one-out analyses,

the pooled estimates remained imprecise and heterogeneity remained substantial, with I^2 values ranging from 80.3% to 85.7%.

Prediction interval

The prediction interval was wide, indicating substantial uncertainty regarding the expected effect of prophylactic antibiotics in a future comparable study. This finding is consistent with the high heterogeneity observed across study designs, patient populations, antibiotic regimens, timing of administration, and outcome definitions.

Summary of findings

Overall, the available comparative evidence did not demonstrate a statistically significant benefit of prophylactic antibiotics for reducing the composite outcome of post-bronchoscopy fever and/or pneumonia. Although some individual studies suggested potential benefit in selected high-risk populations or specific procedural contexts, the pooled estimate was highly imprecise and the certainty of the overall effect was limited by substantial heterogeneity.

Discussion

In this systematic review and meta-analysis of comparative interventional and observational studies, prophylactic antibiotics were not associated with a statistically significant reduction in the composite outcome of post-bronchoscopy fever and/or pneumonia. Although the pooled point estimate suggested a possible protective effect, the confidence interval was wide, crossed the null, and was accompanied by substantial heterogeneity. Therefore, the available evidence does not support the routine use of prophylactic antibiotics for all patients undergoing bronchoscopy.

The interpretation of this finding requires caution because post-bronchoscopy fever and post-bronchoscopy pneumonia are clinically distinct outcomes. Fever after bronchoscopy is frequently transient and may reflect procedure-related inflammation rather than bacterial infection. In the randomized study by Park et al., prophylactic amoxicillin/clavulanate did not reduce post-bronchoscopy fever or post-bronchoscopy pneumonia and did not modify serum pyrogenic cytokine levels, suggesting that microbiological factors may not be the main driver of fever in many patients (5). Similarly, Yamamoto et al. found that prophylactic antibiotics administered after routine diagnostic bronchoscopy did not reduce infectious events requiring therapeutic antibiotics or prevent worsening of post-procedural symptoms(6). These findings support the concept that routine prophylaxis is unlikely to provide meaningful benefit in unselected patients undergoing standard diagnostic bronchoscopy.

Current bronchoscopic guidelines are consistent with this interpretation. The British Thoracic Society guideline does not recommend routine antibiotic prophylaxis for the prevention of post-bronchoscopy fever, pneumonia, or infective endocarditis (1). The Indian Chest Society/National College of Chest Physicians/Indian Association for Bronchology guideline also states that routine antibiotic prophylaxis is not recommended for diagnostic flexible bronchoscopy (2). However, these recommendations are largely based on limited and heterogeneous evidence, and they may not fully address selected high-risk subgroups.

A key finding of this review is that the potential benefit of prophylactic antibiotics may be concentrated in patients with lung cancer or lesion-related risk factors. Hayama et al. was the most influential study in the meta-analysis and behaved as a clinical and methodological outlier. This study included only patients with lung cancer at high risk of post-bronchoscopy pneumonia, defined by age ≥ 70 years, current smoking, and central tumors on chest computed tomography. No protocol-defined cases of post-bronchoscopy pneumonia occurred in the prophylaxis group, whereas 17 cases occurred among historical controls (5). When this study was excluded from the leave-one-out analysis, the pooled estimate moved toward the null and heterogeneity decreased substantially. This suggests that the strong apparent protective effect observed in Hayama et al. is unlikely to be generalizable to all bronchoscopy patients, but it may identify a subgroup in whom prophylaxis deserves targeted evaluation.

This hypothesis is biologically plausible. Patients with lung cancer, particularly those with central tumors, tracheobronchial stenosis, endobronchial abnormalities, necrosis, cavitation, or post-obstructive changes, may have impaired airway clearance and higher local bacterial burden. Recent data on bronchial bacterial colonization in patients with lung malignancy support the concept that the lower airways of these patients may harbor potentially pathogenic microorganisms (7). In this setting, bronchoscopic manipulation, lavage, brushing, or biopsy could facilitate bacterial translocation, worsen post-obstructive infection, or precipitate pneumonia.

Several studies support this risk-adapted interpretation. Kanazawa reported that all respiratory tract infections after bronchoscopic biopsy occurred in patients with abnormal bronchoscopic findings, and the apparent benefit of azithromycin was more evident in this subgroup (8). Sato et al. identified tracheobronchial stenosis as an independent risk factor for post-bronchoscopy pneumonia (9). Souma et al. found that cavitation, low-density areas within the lesion, and stenosis of the responsible bronchus were associated with infectious complications after endobronchial ultrasound-guided transbronchial biopsy with a guide sheath (10). Similarly, Kim et al. found that cavitation, low-density attenuation, and obstructive pneumonic consolidation were important predictors of infectious complications after radial endobronchial ultrasound-guided transbronchial biopsy; in their subgroup analysis, infectious complications were less frequent among patients with at least one radiological risk factor who received prophylactic antibiotics (4).

The recent nationwide database study by Akaba et al. also supports a possible role for selective prophylaxis. In that study, oral prophylactic antibiotics were associated with a lower risk of post-bronchoscopy infection after adjustment, and the association was more evident in patients older than 70 years, those undergoing bronchoscopy for malignancy, and those undergoing biopsy or bronchoalveolar lavage (4). Although observational data cannot establish causality, these findings are consistent with the hypothesis that the absolute benefit of prophylaxis may be greater in patients with higher baseline risk.

Taken together, these findings suggest that the relevant clinical question may not be whether all patients undergoing bronchoscopy should receive prophylactic antibiotics, but whether selected high-risk patients should receive targeted prophylaxis. A risk-adapted approach could be more consistent with

antimicrobial stewardship principles than routine prophylaxis. Such an approach would avoid unnecessary antibiotic exposure in low-risk patients, while focusing prophylaxis on patients with a higher absolute risk of clinically relevant infection, such as those with lung cancer and central or obstructive lesions.

Nevertheless, the available evidence remains insufficient to recommend prophylactic antibiotics routinely even in patients with lung cancer. The studies suggesting benefit in this subgroup have important limitations, including non-randomized designs, historical controls, small sample sizes, subgroup analyses, and variable outcome definitions. In Hayama et al., the small intervention arm and zero-event result may have amplified the estimated treatment effect (5). In observational studies, residual confounding is possible because the decision to administer antibiotics may be influenced by clinical features that are also related to the risk of infection. Therefore, the apparent signal of benefit in patients with cancer or obstructive lesions should be considered hypothesis-generating rather than definitive.

This review has several limitations. First, only six studies were included, which precluded formal assessment of publication bias. Second, the included studies used heterogeneous definitions of fever, pneumonia, respiratory tract infection, and infectious complications. Third, the antibiotic regimens, timing of administration, and duration of prophylaxis varied across studies. Fourth, the included populations were clinically diverse, ranging from unselected diagnostic bronchoscopy patients to patients undergoing bronchoscopic biopsy, radial endobronchial ultrasound-guided transbronchial biopsy, or bronchoscopy for suspected malignancy. Finally, the evidence base included both randomized and non-randomized studies, limiting causal inference.

In conclusion, this systematic review and meta-analysis did not demonstrate a statistically significant benefit of prophylactic antibiotics for preventing post-bronchoscopy fever and/or pneumonia in the overall population. Routine prophylaxis for all patients undergoing bronchoscopy is not supported by the current evidence. However, patients with lung cancer, central or obstructive lesions, cavitation, necrosis, low-density attenuation, or post-obstructive changes may represent a subgroup in whom prophylaxis could be beneficial. Future adequately powered randomized trials should specifically target these high-risk populations, use standardized definitions of post-bronchoscopy infectious complications, and compare pre-procedural targeted antibiotic prophylaxis with placebo or no prophylaxis.

Conclusions

In this systematic review and meta-analysis of comparative interventional and observational studies, prophylactic antibiotics were not associated with a statistically significant reduction in the composite outcome of post-bronchoscopy fever and/or pneumonia. The overall estimate was highly imprecise and showed substantial heterogeneity, limiting the certainty and generalizability of the findings.

Current evidence does not support the routine use of prophylactic antibiotics in all patients undergoing diagnostic bronchoscopy. However, the available data suggest that selected high-risk patients—particularly those with lung cancer, central or obstructive lesions, cavitation, necrosis, low-density attenuation, or post-obstructive changes—may represent a subgroup in whom prophylaxis could be beneficial.

These findings should be interpreted as hypothesis-generating. Future adequately powered randomized trials should focus on predefined high-risk populations, use standardized definitions of post-bronchoscopy infectious complications, and evaluate targeted prophylactic regimens initiated before bronchoscopy. Until such evidence is available, antibiotic prophylaxis should not be used routinely, but may be considered on an individualized basis in patients with a high baseline risk of clinically relevant post-bronchoscopy infection.

Declarations

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Author Contribution

J.L. contributed to the conceptualization, development, drafting, and critical revision of the manuscript.E.O. contributed to the conceptualization, development, drafting, and critical revision of the manuscript.D.R. contributed to the conceptualization, development, drafting, and critical revision of the manuscript.All authors reviewed, edited, and approved the final version of the manuscript.

Data Availability

All data generated or analyzed during this study are included in this published article and its Supplementary Information files. The data extraction spreadsheet used for the meta-analysis is provided as Supplementary Data 1.

References

1. Du Rand IA, Blaikley J, Booton R, Chaudhuri N, Gupta V, Khalid S, et al. British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults: accredited by NICE. Thorax. agosto de 2013;68(Suppl 1):i1-44. doi:10.1136/thoraxjnl-2013-203618
2. Mohan A, Madan K, Hadda V, Tiwari P, Mittal S, Guleria R, et al. Guidelines for diagnostic flexible bronchoscopy in adults: Joint Indian Chest Society/National College of chest physicians (I)/Indian association for bronchology recommendations. Lung India. 2019;36(8):37. doi:10.4103/lungindia.lungindia_108_19

3. Park JS, Lee CH, Yim JJ, Yang SC, Yoo CG, Chung HS, et al. Impact of antibiotic prophylaxis on postbronchoscopy fever: a randomised controlled study. Int J Tuberc Lung Dis. 1 de abril de 2011;15(4):528-35. doi:10.5588/ijtld.10.0386
4. Akaba T, Jo T, Suzuki J, Kimura Y, Matsui H, Fushimi K, et al. Effectiveness of Oral Prophylactic Antibiotics for Diagnostic Bronchoscopy: A Nationwide Database Study. Ann Am Thorac Soc. 1 de mayo de 2025;22(5):707-14. doi:10.1513/AnnalsATS.202407-796OC
5. Hayama N, Takiguchi H, Enokida K, Hattori S, Takahashi G, Takeuchi T, et al. Efficacy of Prophylactic Antibiotic Use in Preventing Post-bronchoscopy Pneumonia in Lung Cancer Patients. Tokai J Exp Clin Med. 20 de julio de 2022;47(2):56-9. PubMed PMID: 35801548.
6. Yamamoto M, Nagano T, Okuno K, Nakata K, Takenaka K, Kobayashi K, et al. An open-label, prospective clinical study to evaluate the efficacy of prophylactic antibiotics after diagnostic bronchoscopy. Kobe J Med Sci [Internet]. 13 de diciembre de 2012;58 4. Disponible en: https://consensus.app/papers/an-openlabel-prospective-clinical-study-to-evaluate-the-yamamoto-nagano/63ac0a83dd3652beab20f3e18fd9538c/
7. Petrovic S, Beović B, Tomič V, Bitenc M, Malovrh M, Dimitrić V, et al. Bronchial bacterial colonization and the susceptibility of isolated bacteria in patients with lung malignancy. Radiol Oncol. 27 de febrero de 2025;59:147-52. doi:10.2478/raon-2025-0018
8. Kanazawa H. Azithromycin administration is effective in patients with abnormal bronchoscopic findings. Respirology. 1 de julio de 2007;12. doi:10.1111/j.1440-1843.2007.01093.x
9. Sato Y, Murata K, Yamamoto M, Ishiwata T, Kitazono-Saitoh M, Wada A, et al. Risk factors for post-bronchoscopy pneumonia: a case–control study. Sci Rep. 17 de noviembre de 2020;10. doi:10.1038/s41598-020-76998-z
10. Souma T, Minezawa T, Yatsuya H, Okamura T, Yamatsuta K, Morikawa S, et al. Risk factors of infectious complications after endobronchial ultrasound-guided transbronchial biopsy. Chest. 4 de marzo de 2020. doi:10.1016/j.chest.2020.02.025

Table

Table 1. Characteristics of studies included in the systematic review and meta-analysis

Study	Country	Study design	Population / procedure	Sample size	Antibiotic prophylaxis	Comparator	Timing of prophylaxis	Main outcome assessed
Kanazawa, 2007	Japan	Randomized controlled trial	Adult outpatients undergoing bronchoscopic biopsy	930	Azithromycin 500 mg/day for 3 days or cefcapene pivoxil 300 mg/day for 3 days	No antibiotics	Started immediately after bronchoscopy	Respiratory tract infection after bronchoscopic biopsy
Park et al., 2011	South Korea	Randomized controlled trial	Immunocompetent adults undergoing flexible bronchoscopy	131 analyzed	Oral amoxicillin/clavulanate 1 g	No antibiotics	30 minutes before bronchoscopy	Post-bronchoscopy fever and pneumonia
Yamamoto et al., 2012	Japan	Open-label prospective controlled clinical study	Adult outpatients undergoing diagnostic flexible bronchoscopy	311 analyzed	Oral antibiotics for 3 days, including amoxicillin/clavulanate, amoxicillin, cefditoren pivoxil, or cefcapene pivoxil	No antibiotics	After bronchoscopy	Infectious events requiring therapeutic antibiotics and worsening of symptoms
Hayama et al., 2022	Japan	Prospective single-center study with historical controls	Patients with lung cancer at high risk of post-bronchoscopy pneumonia, defined by age ≥70 years, current smoking, and central tumor on CT	168	Intravenous sulbactam/ampicillin followed by oral amoxicillin/clavulanate for 3 days	Historical control without prophylaxis	IV antibiotic within 1 hour before bronchoscopy; oral antibiotic after bronchoscopy	Post-bronchoscopy pneumonia
Kim et al., 2021	South Korea	Retrospective cohort study	Patients undergoing radial endobronchial ultrasound-guided transbronchial biopsy	484	Oral amoxicillin/clavulanate for 3 days	No antibiotics	Immediately after bronchoscopy	Infectious complications after rEBUS-TBB
Akaba et al., 2025	Japan	Nationwide database observational study	Adults undergoing inpatient diagnostic bronchoscopy for noninfectious diseases	68,660	Oral prophylactic antibiotics, including aminopenicillins, third-generation cephalosporins, macrolides, or fluoroquinolones	No prophylactic antibiotics	On the day of bronchoscopy	Post-bronchoscopy lung infection, including pneumonia, lung abscess, or bacterial pleuritis

Figures

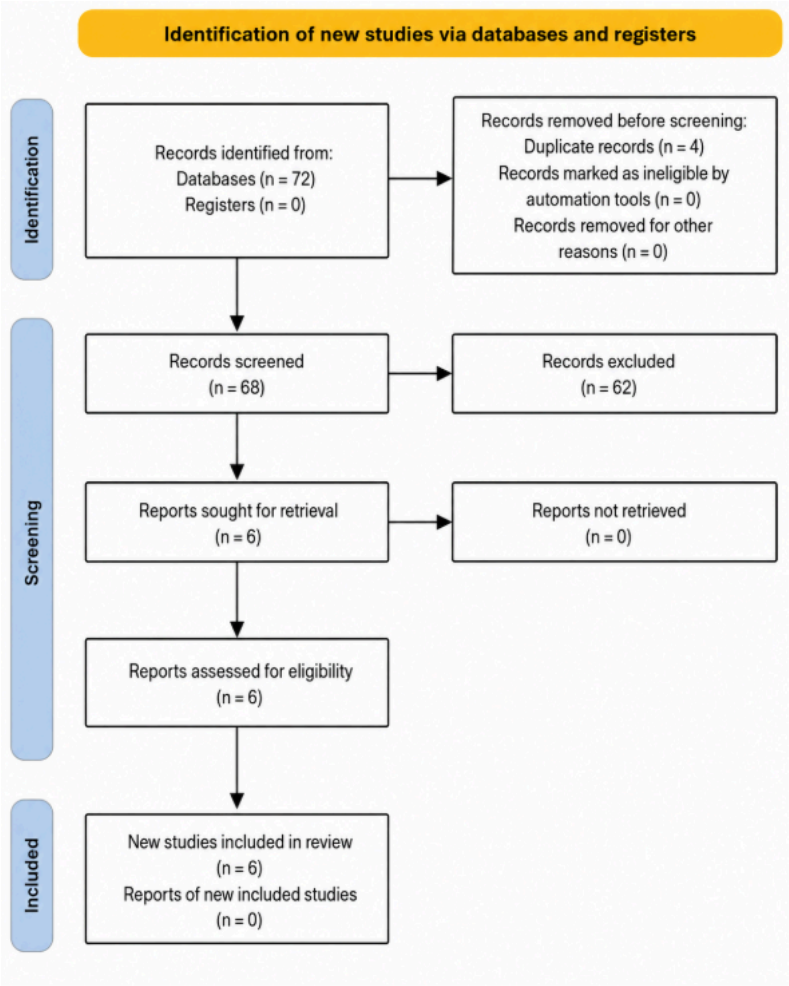


Figure 1

PRISMA 2020 flow diagram of study selection.
The systematic search identified 72 records from electronic databases. After removal of four duplicates, 70 records were screened by title and abstract, of which 63 were excluded. Six reports were retrieved and assessed for eligibility, and all six were included in the systematic review and quantitative synthesis.

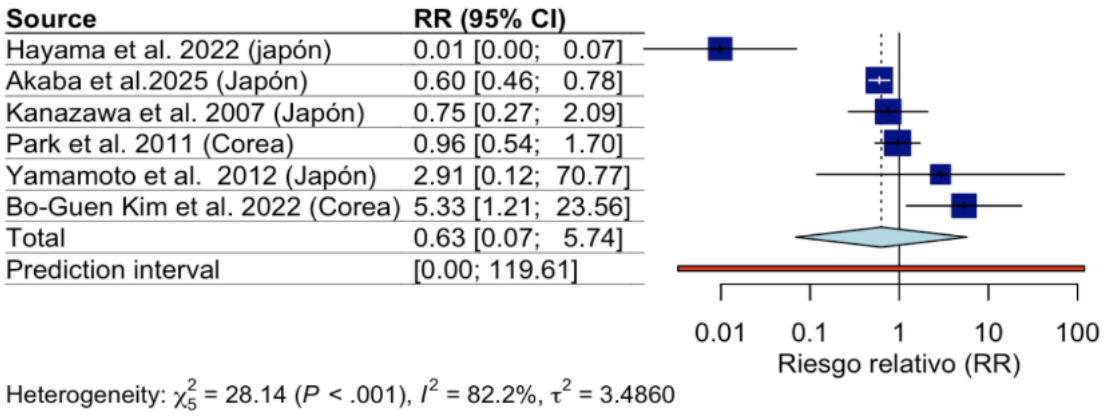


Figure 2

Forest plot of prophylactic antibiotics for the prevention of post-bronchoscopy fever and/or pneumonia.
Risk ratios were pooled using a random-effects model with Hartung-Knapp adjustment. Overall, prophylactic antibiotics were not associated with a statistically significant reduction in the composite outcome of post-bronchoscopy fever and/or pneumonia (RR 0.63; 95% CI 0.07–5.74). Substantial

heterogeneity was observed across studies (I^2 = 82.2%; τ^2 = 3.486; χ^2 = 28.14; $p < 0.001$). The wide prediction interval indicates considerable uncertainty regarding the expected effect in future studies.

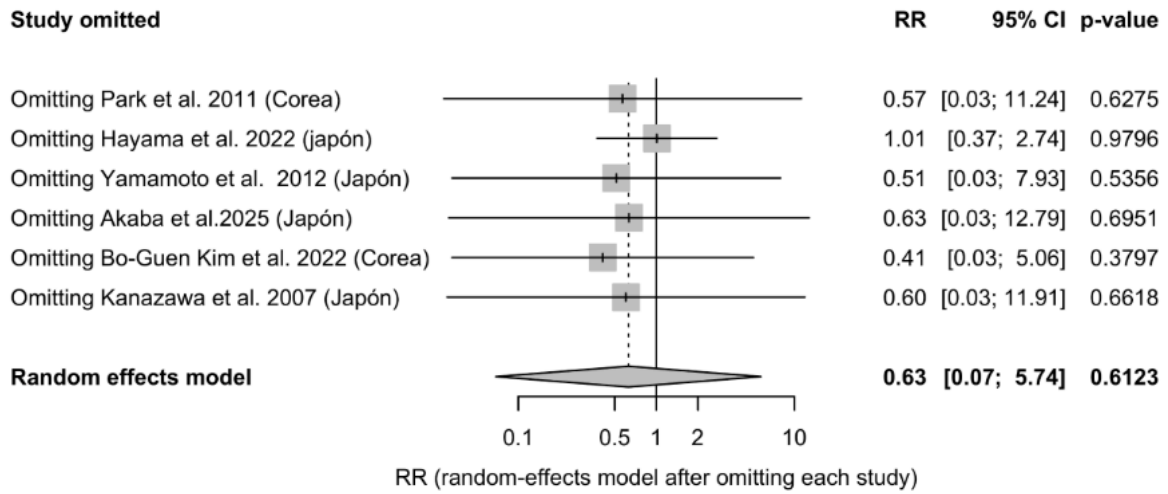


Figure 3

Leave-one-out sensitivity analysis for the composite outcome of post-bronchoscopy fever and/or pneumonia.
Each row shows the pooled risk ratio after sequentially omitting one study from the random-effects meta-analysis. The overall estimate remained statistically non-significant in all scenarios. Exclusion of Hayama et al. had the greatest impact, shifting the pooled estimate toward the null and reducing heterogeneity, suggesting that this study contributed importantly to the between-study variability.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- PRISMA2020checklist1.pdf
- ROB2Prophylacticantibiotics1.pdf