Review Article

Comparative efficacy of doxycycline and its analogues with autologous blood patch pleurodesis for persistent air leak following secondary spontaneous pneumothorax in adults—a systematic review

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Background: The presence of free air in the pleural space of lungs is termed pneumothorax and in individuals with underlying lung disease, it is known as secondary spontaneous pneumothorax. The incidence of spontaneous pneumothorax is 16 to 18 per lakh population. The most common causes for secondary spontaneous pneumothorax are chronic obstructive pulmonary disease (COPD), tuberculosis (TB), human immunodeficiency virus (HIV), cystic fibrosis of lung, and history of smoking. The clinical signs and symptoms include acute dyspnea, thoracic pain and cough. Persistent air leaks are frequently seen in secondary spontaneous pneumothorax. The incidence of persistent air leaks in post-surgical patients varies from 8% to 43%. The aim of the study is to compare the efficacy of doxycycline, tetracycline, and minocycline to other pleurodesis agents in the cessation of air leaks and reducing the recurrence of pneumothorax in adults with persistent air leaks following secondary spontaneous pneumothorax.

Methods: A systematic search from PubMed, Cochrane, Embase, Web of Science, and clinical trials.gov was performed. After screening, three studies were selected which includes 2 randomized controlled trials (RCTs) and 1 prospective study with a pooled sample size of 168.

Results: The mean age and standard deviation of the study participants was 50.57±13.23 years. The success rate of autologous blood patch pleurodesis (ABPP) was reported as 94.70% followed by doxycycline with 84.20%, talc with 84% and tetracycline 63%. The mean time of cessation of air leaks was lowest with doxycycline (11 and 36 hours) and ABPP (24 and 27 hours). Furthermore, ABPP is reported having fewer complications when compared with other agents.

Conclusions: Among chemical pleurodesis agents, doxycycline is reported to be having higher success rate and less recurrences. However, it is found to be inferior when compared directly to ABPP.

Keywords: Doxycycline; pleurodesis; air; pneumothorax; tetracycline; minocycline

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Introduction

Background

The presence of free air in the pleural space of lungs is termed pneumothorax and in individuals with underlying lung disease, it is known as secondary spontaneous pneumothorax (1). Globally, the incidence of spontaneous pneumothorax is 16 to 18 per 100,000 population (2). The common underlying causes for the secondary spontaneous pneumothorax worldwide are chronic obstructive pulmonary disease (COPD), tuberculosis (TB), human immunodeficiency virus (HIV), cystic fibrosis, and smoking etc. (3,4). The clinical signs and symptoms include acute dyspnea, thoracic pain, and cough (1,5). Another important condition associated with spontaneous pneumothorax is persistent air leak (PAL). Studies observed that PALs for 5 to 7 days in patients with secondary spontaneous pneumothorax can lead to adverse outcomes like pneumonia, pleural space infections, and increased readmission rate and hospital length of stay (6,7). The incidence of PALs in patients with lung volume reduction surgery was 46%, and 8.3% in lobectomies (8). Reported prevalence of PAL in non-surgical secondary spontaneous pneumothorax was 81% for 2 days and 43% for more than 7 days (9). The treatment for secondary spontaneous pneumothorax includes pleurodesis with chemical agents or surgical pleurodesis. Pleurodesis is a procedure where the pleural space is obliterated to prevent the recurrence of pneumothorax and pleural effusions by introducing a chemical agent or sclerosant into the pleural space, which causes intense inflammation and fibrosis subsequently leading to adhesions between the two pleural membranes. Different chemical agents available for pleurodesis include doxycycline, tetracycline, minocycline, talc and autologous blood patch (10).

Irrespective of the type of chemical agent used, the treatment outcomes are measured in terms of time taken for the cessation, recurrence of pneumothorax and other complications like pain, fever and length of stay in hospital. The cessation of air leak is reported to vary from 12 hours to 5 days post pleurodesis. The mean time for cessation varies from 24 to 67 hours depending upon the type of agent used (11,12). The recurrence rates are high in chest tube drainage only with 25% to 41% (4). In contrast, the recurrence rates with chemical agents ranges between 3% to 25% depending on the agent used (4,11,13). In recent years, few studies have reported the efficacy of doxycycline as a pleurodesis agent in reducing the recurrence and time taken for cessation of air leak as well (11,14).

Highlight box

Key findings

- Doxycycline is reported to be having higher success rate and less recurrences. However, it is found to be inferior when compared directly to autologous blood patch pleurodesis (ABPP).
- The median time of cessation of air leak was 24 and 36 hours respectively for autologous blood patch and doxycycline group.

What is known and what is new?

- The treatment for secondary spontaneous pneumothorax includes pleurodesis with chemical agents or surgical pleurodesis. Pleurodesis is a procedure where the pleural space is obliterated to prevent the recurrence of pneumothorax and pleural effusions by introducing a chemical agent or sclerosant into the pleural space, which causes intense inflammation and fibrosis subsequently leading to adhesions between the two pleural membranes. Different chemical agents available for pleurodesis include doxycycline, tetracycline, minocycline, talc and autologous blood patch.
- ABPP is reported to be having superior efficacy when compared to all other interventions. On the other hand, among tetracyclines, doxycycline demonstrated better efficacy in terms of success rate, time needed for cessation of air leaks and recurrences.

What is the implication, and what should change now?

- For determining clear clinical guidelines over the choice of pleurodesis agent there is a need for well designed, scientifically robust randomized controlled trials on the subject.

Rationale and knowledge gap

Evidence on the efficacy of doxycycline as a pleurodesis agent in comparison with other chemical agents is limited. Hence our study aims at comparing the efficacy of doxycycline in cessation of air leak and reducing the recurrence of pneumothorax in adults with PAL following secondary spontaneous pneumothorax when compared to other pleurodesis.

Objective

To compare the efficacy and safety of pleurodesis by doxycycline and its analogues (doxycycline, tetracycline, minocycline) with pleurodesis by other interventions (autologous blood patch, talc and surgical pleurodesis) for PAL among patients with secondary spontaneous pneumothorax. We present this article in accordance with the PRISMA reporting checklist (available at https://jtd.amegroups.com/article/view/10.21037/jtd-24-832/rc).

Methods

The study protocol was registered in PROSPERO registry (PROSPERO ID is CRD42023461390) (15).

Eligibility criteria

The review included randomized control trials (RCTs) and prospective comparative studies, conducted on secondary spontaneous pneumothorax in adults comparing chemical pleurodesis by doxycycline and analogues (including tetracycline and minocycline) *vs.* pleurodesis by other agents (including autologous blood patch, talc pleurodesis and surgical pleurodesis). The primary outcomes assessed were successful cessation of air leak, time taken for cessation of air leak, recurrence of pneumothorax following pleurodesis and other outcomes like length of stay in hospital, acute respiratory distress syndrome (ARDS) and side effects [pain, bleeding, pleural effusion (PE) and mortality]. We have excluded retrospective case control studies, case series and case reports for the study.

Information sources

Studies published in the English language, in academic peer-reviewed journals are included in the review. The systematic literature search is performed in PubMed, Embase, Cochrane, Web of Science (WoS), and clinicaltrials.gov through May 2023. Two independent authors conducted a literature search using a structured search strategy.

Search strategy

The search strategy adopted to identify relevant studies was by using the MeSH terms. These terms included secondary spontaneous pneumothorax, pleurodesis, doxycycline, tetracycline, minocycline, alveolar pleural fistula, PAL, prolonged air leak, and persistent air leak.

In the first step, free text searching of the keywords and their synonyms was done using appropriate truncations, wildcards, and proximity searching. Search is also conducted for key concepts using corresponding subject headings (MeSH for PubMed and Emtree for Embase) of each database. The final search is carried out by combining the individual search results using appropriate Boolean operators. Researchers who are working on these topics were contacted. Also, the references of the relevant articles were screened to find further studies. This study did not require ethics approval or informed consent, as no patient information was collected.

A search was conducted via Google for grey literature and unpublished data. Researchers who are working on these topics were contacted.

Study selection process

All the studies that are identified through different databases are appended to Zotero for duplicate removal process. After de-duplicating, the studies are imported to Rayyan.ai tool. In Rayyan by automated duplicate identification, few studies were removed and screening was initiated. In the first stage of screening, titles and abstracts were screened. Studies that are in line with the inclusion criteria are shortlisted and carried for second stage of screening. In the second stage, all the shortlisted studies are screened for full text. The studies which are relevant to the objectives fulfilling the inclusion criteria and outcome measures of interest are taken ahead to data extraction. The studies which are relevant and not satisfying few aspects of eligibility criteria are labelled as "may be" or "conflict" by the individual researcher. These contentious studies were later resolved by the third reviewer. Each stage involved two researchers, and a third reviewer settled disagreements regarding study eligibility

Data collection process

In the next stage, entire articles were screened and data was extracted using the data extraction methodology. Demographics, research description (first author, publication year, aims, study design, and sample size), inclusion and exclusion criteria, type of intervention, type of comparison, sample size in each group, outcomes like successful cessation of air leak, time taken for cessation of air leak, recurrences, complication like ARDS, pain were retrieved.

Risk of bias in studies

The two RCTs included in the review were assessed for risk of bias in five domains as recommended i.e., the randomization process, deviation from intended interventions, bias due to missing outcome data, bias in the measurement of outcome data, and bias in the selection of reported result according to the Risk of Bias 2 (ROB 2) tool (16). ROBINS_I (17) tool was used to assess the risk of bias in prospective study.

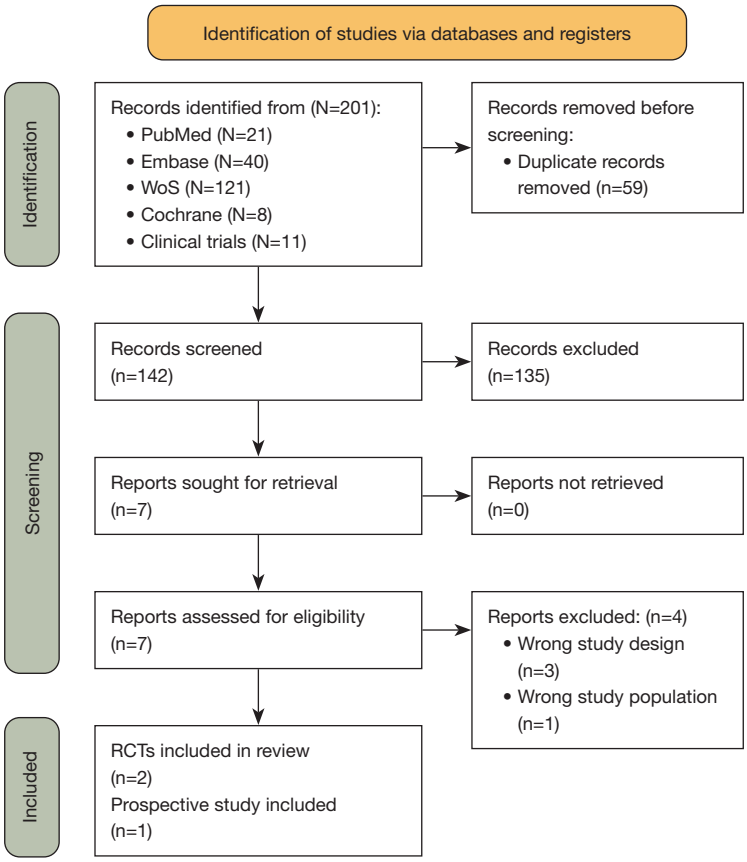

Figure 1 PRISMA flow chart. RCT, randomized controlled trial.

Strategy for data synthesis

We have assessed all studies for clinical and methodological heterogeneity with respect to population, intervention, outcomes and study design. We intended to perform meta-analysis in case of absence of clinical and methodological heterogeneity. As the included studies exhibit significant heterogeneity, we have presented the results qualitatively.

Reporting bias assessment

Considering small number of heterogeneous studies, we could not assess the reporting bias using funnel plot.

Results

Study selection

Out of 201 studies, we found from all the sources, 59 duplicates were identified and deleted through Zotero and 142 studies were uploaded to Rayyan.ai for level 1 screening. At level 1 screening, all the studies were screened by their title and abstract. A total of 135 studies that did not satisfy the eligibility criteria were excluded. The remaining seven studies were taken ahead for level 2 or full text screening. From the seven, four studies were excluded and three were included with a pooled sample size of 168 in qualitative synthesis, and data were extracted (*Figure 1*).

Among the four studies excluded, three were due to wrong study design and one due to wrong study population.

Study characteristics

Out of the three studies included, there are two RCTs and a prospective study. The studies are from India, Poland and Turkey, conducted on secondary spontaneous pneumothorax. Study population in RCTs was adults with secondary spontaneous pneumothorax presenting with grade 1 and 2 PAL, and patients with alveolar air leaks from the lung after its resection, where air leak lasted more than 5 postoperative days in another RCT (18). In the

Table 1 Characteristics of included studies

Author & year	Country	Study design	Intervention	Comparison	Outcomes
Narenchandra 2022 (11)	India	RCT	Doxycycline	Autologous blood patch	Cessation of air leak at day 7 Median time of closure of air leak. Recurrences
Jabłoński 2018 (18)	Poland	RCT	Doxycycline	Tincture of iodine, drainage	Duration of air leak, recurrences, pain. Length of stay
Cobanoglu 2009 (12)	Turkey	Prospective	Tetracycline	Autologous blood patch, talc	Air leak termination duration, pulmonary function test results (VC, FVC, FEV1) of the patients at month 1 and month 3

RCT, randomized control trial; VC, vital capacities; FVC, forced vital capacity; FEV1, forced expiratory volume in 1 second.

Table 2 Summary of patient characteristics and interventions in the included studies

Author & year	Mean age (years)	Sex	Diagnosis	Inclusion criteria	Intervention	Dosage	Sample size
Narenchandra 2022 (11)	47.7	M: 29 F: 9	1. Clinical history 2. X-ray features 3. Air leak by ICT 4. CT chest	PAL after 72 h of drainage with ICD	Doxycycline ABPP	500 mg 50 mL	19 19
Jabłoński 2018 (18)	65	M: 65 F: 34	1. Lung resection 2. PAL till 5th POD	PAL for more than 5 days after lung resection	Doxycycline Iodine Drainage	200 mg 20 mL in 80 mL normal saline Lidocaine solution	34 30 35
Cobanoglu 2009 (12)[‡]	39[†]	NR	1. PAL for more than 7 days	PAL for more than 7 days and excluded persistent and recurrent pneumothorax with surgery	Tetracycline Talc ABPP	20 mg/kg 5 gm in 40 mL normal saline 50 mL	11 19 20

[†], median; [‡], this study reported primary and secondary spontaneous pneumothorax together. M, male; F, female; PAL, persistent air leak; ICD, intercostal chest drainage; ABPP, autologous blood patch pleurodesis; ICT, intercostal chest tube; POD, post-operative days; NR, not reported.

prospective study, subjects with PAL of more than seven days study were included (12). The outcomes were reported in the RCT by Narenchandra *et al.* (11). while comparing efficacy of autologous blood patch and doxycycline were cessation of air leak, median time for closure of air leak and complications like recurrences and pain. Jabłoński *et al.* (18) in his RCT comparing doxycycline, iodine and drainage alone observed duration of PAL, intensity of pain, recurrences, length of stay in the hospital and adverse events as outcomes. The prospective study by Ufuk Cobanoglu measured success rate, duration of air leak, lung capacities and adverse events in their study (12). The mean age of the participants varied from 39 to 65 with male preponderance of 67.38% and females 32.62%. The description of each study is shown in *Tables 1*,*2*.

The participants included for the study are reported for having PALs for 5 to 7 days across the studies. Further diagnosis is made by presence of air leak by intercostal chest tube (ICT) followed by chest X-ray and computed tomography (CT) of chest. In the study by Jabłoński *et al.* (18) the included participants were those with air leak for 5 days following lung resection. The dosage of autologous blood was 50 mL and uniform in all studies. The dosage of doxycycline was 500 and 200 mg in the

Table 3 Summary of outcomes reported in the studies

Author & year	Intervention	Outcomes			
		Success rate	Mean time of closure (hours)	Recurrence	Avg hospital stay in days
Narenchandra 2022 (11)	Doxycycline (n=19)	84.20%	36† (IQR, 24.72)	5%	NR
	ABPP (n=19)	94.70%	24† (IQR, 12.24)	5%	NR
Jabłoński 2018 (18)	Doxycycline (n=34)	NR	11 (SD, 3.34)	20%	16.5
	Iodine (n=30)	NR	8.5 (SD, 3.07)	13%	12.6
	Drainage (n=35)	NR	12 (SD, 3.32)	23%	15.8
Cobanoglu 2009 (12)‡	Tetracycline (n=11)	63.65%	67 (SD, 12.39)	NR	NR
	Talc (n=19)	84%	51 (SD, 15.38)	NR	NR
	ABPP (n=20)	75%	27.2 (SD, 17.87)	NR	NR

†, median time; ‡, this study reported primary and secondary spontaneous pneumothorax together. IQR, interquartile range; NR, not reported; ABPP, autologous blood patch pleurodesis; SD, standard deviation.

RCTs by Narenchandra *et al.* (11) and Jabłoński *et al.* (18), respectively. A 20 mL iodine in 80 mL normal saline was used in the iodine group. Cobanoglu *et al.* (12) reported the dosages used as 20 mg/kg body weight in the tetracycline group and in the talc group dosage was 5 gm in 40 mL normal saline. In all the groups, a 2% lidocaine is injected into pleural cavity through ICT. All the patients were asked to change their positions every 15 to 30 minutes to ensure even distribution of the pleurodesis agent. The details are presented in *Table 2*.

Outcomes

Success rate and recurrence rate of pleurodesis

The success rate of pleurodesis was observed in two studies. In the RCT by Narenchandra *et al.* (11) they reported the success rate of autologous blood patch at 94.70% and doxycycline at 84.20% at 7 days after the procedure. The recurrence rate was 5% in both groups by the end of 28 days. Cobanoglu *et al.* (12) observed the success rate in talc, autologous blood patch and tetracycline as 84%, 75% and 63.65% respectively. Jabłoński *et al.* (18) reported the recurrence rate in the doxycycline group as 20% and in the iodine group as 13%.

Mean time for cessation of air leaks

Time taken for the cessation of air leak was the primary outcome reported in all the 3 studies. In the RCT by Narenchandra *et al.* (11), the reported median time of cessation of air leak was 24 and 36 hours respectively for autologous blood patch and doxycycline group. The other study by Jabłoński *et al.* (18), evaluating the different methods of pleurodesis concluded the mean time of closure was less in the iodine group with 8.5 hours followed by 11 hours in doxycycline. The mean time of closure in autologous blood patch was 27.2 hours, in talc it was 51 hours and in tetracycline it was 67 hours as reported by Cobanoglu *et al.* (12).

Length of hospital stay

The RCT by Jabłoński *et al.* (18) is the only study that reported the length of stay in hospital. The average length of hospital stay was fewer in the iodine group (12.6 days) followed by drainage alone group and doxycycline group with 15.8 and 16.5 days respectively. Details of outcomes are presented in *Table 3*.

Complications

The most common complications observed in the study by Narenchandra *et al.* (11) were fever and pain. Fever was reported as 10% in ABPP and 36.84% in doxycycline. The perceived pain following pleurodesis was 7 and 2 measured by visual analog scale (VAS) in doxycycline group and ABPP group. The most common adverse outcomes observed by Jabłoński *et al.* (18), were tachycardia 41% (doxycycline), 40% (iodine), and 40% (drainage) followed by dyspnoea 38% (doxycycline), 46% (iodine), and 37% (drainage) and emphysema 35% (doxycycline), 26% (iodine), and 34% (drainage). The perception of pain was reported on a Chen *et al.* scale of [0–5] (19) and it was 2 and 3 respectively in doxycycline and iodine groups as shown in *Table 4*. Cobanoglu *et al.* (12) in his study reported the complications as fever and dyspnea. In tetracycline group,

Table 4 Summary of complications reported in the included studies

Author & year	Intervention	Complications observed						
		Tachycardia	Dyspnea	Fever	ARDS	Emphysema	Empyema	Avg pain on VAS (SD)
Narenchandra 2022 (11)	Doxycycline	NR	NR	36.84%	NR	NR	NR	7
	ABPP	NR	NR	10.50%	NR	NR	NR	2
Jabłoński 2018 (18)	Doxycycline	41%	38%	NR	NR	35%	5.8%	2.12† (0.77)
	Iodine	40%	46%	NR	NR	26%	6.6%	2.60† (0.72)
	Drainage	40%	37%	NR	NR	34%	8.5%	0.83† (0.98)
Cobanoglu 2009 (12)	Tetracycline (n=11)	0%	36.36%	81.81%	0%	0%	9%	NR
	Talc (n=19)	5%	57.89%	63.15%	5.26%	0%	0%	NR
	ABPP (n=20)	0%	0%	0%	0%	0%	5%	NR

†, pain on Chen *et al.* scale [0–5] (19). NR, not reported; SD, standard deviation; ARDS, acute respiratory distress syndrome; ABPP, autologous blood patch pleurodesis.

Figure 2 Risk of bias assessment in RCTs by ROB 2. RCTs, randomized controlled trials; ROB 2, Risk of Bias 2 tool; ABPP, autologous blood patch pleurodesis.

fever was reported as 81.81%, dyspnea as 36.36 while in talc pleurodesis 63% and 57% of fever and dyspnea are observed. The results of complications are shown in *Table 4*.

Risk of bias assessment

ROB 2 tool evaluated the degree of bias in the two RCTs, and bias is quantified as some concerns in the studies. Risk of bias assessment for RCT are depicted in *Figure 2*. The level of bias in prospective study is serious as the participant selection and methods to control confounding are not mentioned. Combined risk of bias assessment is presented in *Table 5*.

Discussion

The current systematic review is an attempt to synthesize the available evidence on efficacy and safety of doxycycline or tetracycline pleurodesis for PAL following secondary spontaneous pneumothorax. As per this review, studies have compared the efficacy of chemical pleurodesis agents with autologous blood patch, talc and iodine pleurodesis. The outcomes looked for are time taken for cessation of air leaks, success rate, length of stay in hospital and complications like recurrence, pain, fever and dyspnea.

Key findings

Doxycycline is reported to be having higher success rate and less recurrences. However, it is found to be inferior when compared directly to ABPP. The length of hospitalization is 12.6 days in the iodine group followed by drainage alone group and doxycycline group with 15.8 and 16.5 days respectively.

Strengths and limitations

Comprehensive search of major databases, methodological

Table 5 Combined risk of bias assessment

Authors, year	Study design	D1 randomization process	Bias due to confounding	Bias in selection	Bias in classification of interventions	D2 bias due to deviation from intervention	D3 bias due to missing data	D4 bias in outcome measurement	D5 selective reporting	Overall
Narenchandra 2022 (11)	RCT	Low	NA	NA	NA	Low	Low	Low	Low	Some concerns
Jabłoński 2018 (18)	RCT	Low	NA	NA	NA	Low	Low	Low	Low	Some concerns
Cobanoglu 2009 (12)	Prospective study	NA	Serious	Serious	Low	Low	Low	Low	Low	Serious

adherence to PRISMA guidelines and detailed presentation of multiple outcomes related to pleurodesis are the strengths of the current review.

Significant methodological heterogeneity precluding quantitative synthesis is the key limitation. Lack of uniformity in the inclusion criteria and varying operational definitions with respect to outcomes are also limitations in generalizing the observed findings. As the topic of interest is secondary spontaneous pneumothorax and comparing with various pleurodesis agents, we are able to arrive at less number of studies with a limited pooled sample size. Inability to retrieve the full text of few articles and protocols of included articles is another limitation. The risk of bias in the 2 RCTs was low and one study had some concerns. The prospective study has serious risk of bias as it doesn't mention the subject selection process. Overall quality and trustworthiness of the summary conclusions of this review is moderate due to varying risk of bias. RCTs which can compare various comparator groups will provide more reliable scientific evidence.

Comparison with similar researches

In both the studies which have reported success rate, doxycycline and tetracycline are having a lower success rate when compared to ABPP. In studies reporting time taken for closure of air leak, ABPP had lesser time followed by doxycycline and tetracycline. The prospective study comparing cessation of air leak between doxycycline and iodine reported iodine needed lesser time for closure of air leak. Previously similar kind of success rates by ABPP was reported by Evman *et al.* (20). The time taken for cessation of air leak was outstandingly minimal in ABPP group and this is on par with the findings from a systematic review and meta-analysis by Umar *et al.* (21). Among chemical pleurodesis agents, doxycycline had higher success rate and less complications when compared to tetracycline and talc. While reporting the recurrence rates, a study observed doxycycline having similar rates as ABPP (11). One study comparing doxycycline and iodine reported higher recurrences in doxycycline and minimal time of cessation in iodine (18). This review found higher incidence of complications in tetracycline and talc (12).

Explanations of findings

The higher success rate of ABPP is likely due to closure of small air leaks by fibrinogenic activity leading to clot formation, blood in the pleural cavity cause inflammation and irritation of pleura leading to cessation of leak (12). The lower complication of ABPP is because it does not cause intense inflammatory reaction or allergic reactions which is common in tetracycline and talc pleurodesis (12,22). In the study by Narenchandra *et al.* (11). the reported success rate of pleurodesis is 94% when compared to the doxycycline which was 83%. The lesser success rate in the doxycycline group may be due to the number of participants with COPD and interstitial lung disease in this group despite of proper randomization. Cobanoglu *et al.* (12) reported the success rate of ABPP as 75% and tetracycline as 63.65% this can be attributed to preferring a lesser age group of fewer than 40 years to the ABPP group. Moreover, for the cessation of air leak all the studies reported lesser time for ABPP when compared to doxycycline and tetracycline. Physiologically, these drugs act by causing inflammation in pleural cavity, thus forming adhesion, which may take 3 to 5 days. Existence of huge variability in results can also be due to nonuniform study population in across the studies. Narenchandra *et al.* (11) included the study population with air leak of more than 72 hours, Jabłoński *et al.* (18) had taken

population of PAL for more than 5 days after anatomical and nonanatomical lung resection, whereas Cobanoglu *et al.* (12) had taken the study population with PAL of more than 7 days and excluded subjects who underwent surgery. Furthermore, the age of the study population in the studies ranged from 39 to 65 years. Though secondary spontaneous pneumothorax is common in advanced age with underlying causes, the rationale of taking the younger population in two of the studies is unanswered. Since there are different dosages used for the tetracyclines with a dose dependent effect seen, the variability in the results underscores the importance of elucidating optimal dosing strategies to maximize therapeutic efficacy while minimizing recurrence rates. For better quality scientific evidence, there is dearth of RCTs comparing these chemical pleurodesis agents.

The current review is the first attempt to synthesize the available evidence to compare the efficacy and safety of various chemical pleurodesis agents in terms of success rates of pleurodesis and complications.

Implications and actions needed

For determining clear clinical guidelines over the choice of pleurodesis agent there is a need for well designed, scientifically robust randomized controlled trials on the subject. No clear practice recommendations can be made from current review, considering the diversity and inadequacy of comparison groups. Scientifically robust RCTs with head-to-head comparison of different pleurodesis agents is needed to establish relative superiority, acceptability and cost effectiveness to guide clinical decisions.

Conclusions

Tetracycline pleurodesis (doxycycline, tetracycline, minocycline) has been compared with other pleurodesis agents like autologous blood, talc among patients with secondary spontaneous pneumothorax. ABPP is reported to have superior efficacy compared to all other interventions followed by talc. On the other hand, among tetracyclines, doxycycline demonstrated better efficacy in terms of success rate, time needed for cessation of air leaks and recurrences.

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Footnote

Reporting Checklist: The authors have completed the PRISMA reporting checklist. Available at https://jtd.amegroups.com/article/view/10.21037/jtd-24-832/rc

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://jtd.amegroups.com/article/view/10.21037/jtd-24-832/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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