Effect of carbocisteine on patients with Chronic Obstructive Pulmonary Disease: A Systematic Review and Meta-analysis.

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Abstract

Background： COPD is the fourth leading cause of death in the world. Many medications were recommended for prevent the exacerbations of COPD. This study will summarise the efficacy of carbocysteine as a treatments for COPD.

Findings: This review aimed: to evaluate the efficacy of carbocysteine as a treatments for COPD. We will search the following electronic bibliographic databases: MEDLINE, EMBASE, The Cochrane Library (Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Methodology Register), and Web of Science (science and social science citation index). The search for randomized, controlled trials published up to September 1, 2016. Two authors checked the relevant studies from the literature search independently and independently assess the risk of bias in included studies. Studies have used the same type of intervention and comparator, with the same outcome measure, we will pool the results using meta-analysis.

Discussion: This study will provide recommendations on the prevent the exacerbations of COPD and will guide future work on and primary research in this field.

Background

Chronic obstructive pulmonary disease(COPD), the fourth leading cause of death in the world ,is a common, progressive, treatable and preventable disease. It is characterized by predominantly fixed airway obstruction through a variety of processes. The pathogenesis involves many components including mucus hypersecretion, oxidative stress, and inflammation in the airway and lungs[1]. COPD is not only involved the lung in the later phase, but also has effects on the other organs. In the later phase, the patients usually have the symptoms of low-body weight, malnutrition and depression. It also can induce pulmonary heart disease, pulmonary encephalopathy et al.

Carbocysteine is a dibasic amino acid, commonly used as a mucolytic drug. As a cysteine derivatives, carbocisteine seem have an effect in antioxidation, anti-inflammation and mucolysis[2]. In Europe and Asia, carbocisteine is widely use to treatment of COPD. Carbocysteine usually used as a mucolytic drug. Its thioether group may react with ROS, which had a ability of antiodant property. Some studies show carbocysteine may had a anti-inflammatory property for the decrease the production of pro-inflammatory cytokines[3].

In patients with COPD, the exacerbations accelerated the rate of decline of lung function. Many medications were recommended for prevent the exacerbations of COPD. The use of carbocisteine may cause a reduction in acute exacerbations of COPD[4], but conflicting results were reported. This review aimed: to evaluate the efficacy of carbocysteine as a treatments for COPD.

Methods and Design

Review Inclusion Criteria

Types of studies

We used randomized controlled trials (RCTs) to assess the effects of the treatments.

Types of participants

We included studies of adults (over 18 years of age) with COPD . We excluded studies that were published as protocol, or written in non-English language.

Types of interventions

We included trials assessing the systemic use or inhaled use of carbocysteine, regardless of the dose regimen.

Types of outcome measures

Primary outcomes

The rate of total number of exacerbations.

An exacerbation of COPD is an acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication[5].

Secondary outcomes

1. Measures of lung function, including forced expiratory volume in one second (FEV1).
2. The rate of hospitalisation and mortality.
3. The number of patients with at least one exacerbation
4. The quality of life(St George's Respiratory Questionnaire scores)

Literature search

Electronic bibliographic databases

We will search the following electronic bibliographic databases: MEDLINE, EMBASE, The Cochrane Library (Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Methodology Register), and Web of Science (science and social science citation index). The search for randomized, controlled trials published up to September 1, 2016.

Data collection and analysis

Selection of studies

Two authors checked the relevant studies from the literature search independently. Trials were selected from identified studies, based on previously agreed inclusion criteria. Study characteristics and outcomes were collected by two authors .

Data extraction and management

A standardized, pre-piloted form will be used to extract data from the included studies for assessment of study quality and evidence synthesis. We double-checked all entries against the original paper.

Assessment of risk of bias in included studies

Two authors will independently assess the risk of bias in included studies by considering the following characteristics, as recommended by the International Cochrane Collaboration.

Disagreements between the review authors over the risk of bias in particular studies will be resolved by discussion, with involvement of a third author where necessary. The level of risk of bias in each of these domains will be presented separately for each study in tables in the final review publication.

Measures of treatment effect

We will provide a narrative synthesis of the findings from the included studies, structured around the type of intervention, target population characteristics, type of outcome and intervention content. We will provide summaries of intervention effects for each study by calculating risk ratios (for dichotomous outcomes) or standardised differences (for continuous outcomes).

Statistical analysis

We anticipate that there will be limited scope for meta-analysis because of the range of different outcomes measured across the small number of existing trials. However, where studies have used the same type of intervention and comparator, with the same outcome measure, we will pool the results using a random-effects meta-analysis, with standardized differences for continuous outcomes and risk ratios for binary outcomes, and calculate 95% confidence intervals and two sided P values for each outcome. In studies where the effects of clustering have not been taken into account, we will adjust the standard deviations for the design effect. Heterogeneity between the studies in effect measures will be assessed using both the x^2 test and the I^2 statistic. We will conduct sensitivity analyses based on study quality. We will use stratified meta-analyses to explore heterogeneity in effect estimates according to: dose, duration, race ,We will also assess evidence of publication bias.

Conclusion

This systematic review of carbocisteine interventions will provide a detailed summary of the evidence for the effectiveness of COPD to improve the total number of exacerbations.

Authors' contributions

Zhengliang Xiao initiated and designed the study. Zheng Zeng,Xiaoling Huang,Dan Yang participated in study design. Zheng Zeng participated in study design and drafted the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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