INPLASY

Effectiveness and mechanisms of curcumin in animal models of paraquat-associated lung injury: A preclinical systematic review and meta-analysis

INPLASY202370074

doi: 10.37766/inplasy2023.7.0074

Received: 18 July 2023

Published: 18 July 2023

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ADMINISTRATIVE INFORMATION

Support - NO.2019YFC1712000.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202370074

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 Paraquat (PQ) is widely used as a potent herbicide, and the annual poisoning rate of PQ is more than 2000 cases, with a mortality rate of more than 60%.PQ poisoning can cause multiple organ damage, and the lungs are the main target organ of PQ action.Paraquat poisoning is characterised by acute lung injury (ALI) at early stage, which is mainly caused by early destruction of alveolar epithelial cells of type I and II and alveolar inflammation, pulmonary oedema, and inflammatory cell infiltration, and intra-alveolar and pulmonary fibrosis (PF) in the late stage, and patients mostly die of respiratory failure caused by PF. manifested as intra-alveolar and pulmonary fibrosis (PF), patients mostly died of respiratory failure due to PF.

Condition being studied Curcumin (CUR) is a fat-soluble natural compound widely found in the rhizomes of a variety of plants, such as turmeric, curcuma longa, tulip, calamus, and others. There is growing evidence that curcumin can resist viral and microbial infections, has anti-tumour, lipid and glucose lowering, antioxidant and free radical scavenging effects, and is active against a wide range of diseases including cardiovascular, pulmonary, neurological, and autoimmune disorders, among many other chronic diseases. Meanwhile CUR can be used as a potential drug for the prevention and treatment of PQ-induced lung injury by exerting anti-inflammatory, antioxidant and antifibrotic effects.

METHODS

Search strategy To identify relevant animal studies without language restrictions, a systematic search was conducted from eight electronic databases, Pubmed, Embase, Web of Science, Cochrane Library, Wanfang Database, China national knowledge infrastructure(CNKI), CQVIP Database and China Biomedical Literature Database (Sinomed), for the period from the Publications from the period of database construction to 19 April 2023 were systematically searched in eight electronic databases.

Participant or population Animal studies.

Intervention The treatment group received any dose, duration, and number of curcumin monotherapy sessions.

Comparator This includes moulding only, or receiving the same amount of non-functional fluid or no treatment.

Study designs to be included Only animal studies evaluating the protective role of curcumin in animal models of PQ-induced lung injury (including acute lung injury and pulmonary fibrosis) were included, regardless of publication status and language.

Eligibility criteria We included controlled studies evaluating curcumin dosing in animal models of PQ-induced lung injury (including acute lung injury and pulmonary fibrosis), irrespective of animal species, age, body weight and sex.

Information sources Electronic searches were conducted from the date of construction to 19 April 2023 in eight databases without language restrictions: Pubmed, Embase, Web of Science, Cochrane Library, Wanfang Database, China national knowledge infrastructure (CNKI), CQVIP Database and China Biomedical Literature Database (Sinomed).

Main outcome(s) The primary outcome was the concentration of TNF-α.

Additional outcome(s) The additional outcome measures interleukin (IL)-6, IL-1β concentration, myeloperoxidase (MPO) activity, broncho-alveolar lavage fluid (BALF) protein content, PaO2, malondialdehyde (MDA), superoxide dismutase (SOD) and, hydroxyproline (HYP) content. superoxide dismutase (SOD) and, hydroxyproline (HYP) content.

Quality assessment / Risk of bias analysis The Systematic Review Center for Laboratory Animal Experiments (SYRCLE) risk of bias was used.

Strategy of data synthesis R 4.3.1 and Stata 16. were used to integrate data from all included studies, and given that all outcome indicators were continuous variables, effect sizes were expressed using standardised mean differences (SMDs) and 95% confidence intervals (CIs). Heterogeneity between studies and subgroups was assessed using I2, and analyses were conducted using a fixed-effects model when heterogeneity of included studies was small (I2 ≤50%) and a random-effects model when I2 >50%. Sensitivity analyses were performed to assess the stability of the overall results if the heterogeneity of the included studies was large, and subgroup analyses were performed to assess the heterogeneity and the sources of publication bias by funnel plots, Egger's test, and Begg's test if there were sufficient studies.

Subgroup analysis None.

Sensitivity analysis If the heterogeneity of the included studies was high, sensitivity analyses were performed to assess the stability of the overall results.

Country(ies) involved China.

Keywords Curcumin; PQ;PF; ALI; Animal Models.

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