Atomized paclitaxel liposome inhalation treatment of bleomycin-induced pulmonary fibrosis in rats

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ABSTRACT. We sought to determine the efficacy of atomized paclitaxel liposome inhalation treatment of pulmonary fibrosis in a bleomycin-induced rat model. Forty male Sprague-Dawley rats were randomly divided into four groups: healthy control, pulmonary fibrosis without treatment, paclitaxel liposome inhalation-treated, and intravenous paclitaxel liposome-treated. Fibrosis was induced by bleomycin injection. A total of 20 mg/kg paclitaxel liposome was administered by inhalation every other day for a total of 10 doses. The intravenous group received 5 mg/kg paclitaxel liposome on days 1, 7, 14, and 21. We observed the general condition, weight change, survival index, and pathological changes in the lung tissue of the rats. Quantitative analysis of collagen types I and III and transforming growth factor (TGF)-β1 expression in the lungs was also performed. The paclitaxel liposome inhalation and intravenous delivery methods improved survival index and pulmonary fibrosis Ashcroft score, and decreased the thickness of the alveolar interval. No obvious difference was found between the two groups. Compared with the untreated group, paclitaxel liposome inhalation and intravenous injection significantly reduced the levels of collagen types I and III and TGF-β1 expression equally. In conclusion, atomized

paclitaxel liposome inhalation protects against severe pulmonary fibrosis in a bleomycin-induced rat model. This delivery method has less systemic side effects and increased safety over intravenous injection.

Key words: Pulmonary fibrosis; Bleomycin; Liposomal paclitaxel; Collagen type I; Collagen type III; TGF-β1

