

Treatment of Silicosis using Cells

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DESCRIPTION

The industrialization process gradually increased workers' occupational exposure to breathing particles in a variety of job situations. When it comes to the burden of occupational respiratory disorders, silicon dioxide, often known as silica, plays a significant role. A prolonged inflammation with granuloma formation brought on by silica particle inhalation is known as silicosis, which also affects lung function and promotes tissue remodelling. Some common side effects of silicosis include rheumatoid arthritis, chronic obstructive lung disorders, and tuberculosis. Lung cancer can also be brought on by extended silica exposure. As of yet, there is no medicine that can stop or reverse the evolution of the disease; instead, available management of silicosis is concentrated on managing comorbidities and related symptoms. In the latter stages of lung disease, respiratory failure causes the patient to pass away. Despite numerous attempts over the years to stop workers from inhaling silica dust, silicosis remains a global public health concern with a higher prevalence in developing nations 33% of pit diggers in Ceará state had silicosis, according to research by Holanda and colleagues, while over 4,500 cases of the disease were linked to gold miners between 1978 and 1988 in Minas Gerais state. Over 6 million workers are currently anticipated to be exposed to silica on a daily basis across all industries in the country. Between 1991 and 1995, China reported having more than 500,000 silicosis patients, with 6,000 new cases and over 24,000 deaths every year. There is a considerable risk of illness development for 10 million workers who are exposed to silica dust in India. In wealthy nations, silicosis is another problem with occupational health. Between 1990 and 1993, 600,000 workers in the UK were among the more than 3 million in Europe who were exposed to silica particles. Over 100,000 workers in the US were exposed to silica dust, and from 1987 to 1996, 3,500 new cases were reported annually. Both the number of new cases of silicosis and the mortality rate have decreased

since preventative measures were put in place. Despite this, there are still fresh outbreaks of silicosis, as the exposure of quartz conglomerate workers in Spain, whose cohort's median age was 33 years. Additionally, there is an increase in the variety of workplaces where silica dust exposure is a possibility, including quartz and jeans sandblasting. A growing number of studies have demonstrated the effectiveness of administering stem cells intravenously or systemically to various animal models of lung damage. The bone marrow cells are the ones that have been examined the most. They were able to lessen tissue remodelling, modify the immunological response, and encourage lung parenchyma reepithelization. The phagocytosis and release of silica particles in the lung tissue, which is a unique pathogenic process for silicosis, is what propels the disease's advancement. This study outlines the primary processes by which silica dust affects the alveolar environment and discusses how cell therapy may benefit silicosis patients by lowering fibrosis and inflammation while also enhancing lung function. The pathogenic cascade is started when silica particles get past the mucociliary defence system in the airways and reach the distant parts of the lung.

CONCLUSION

Cell-based therapy represents a promising silicosis treatment due to the dearth of effective therapeutic treatments. The reduction of harmful proinflammatory and profibrotic processes, the reduction of apoptosis, and the promotion of healing after lung damage are the main outcomes of this therapy. These positive outcomes appear to result from paracrine/endocrine action rather than cell engraftment (e.g., secretion of anti-inflammatory, antifibrotic mediators, and extracellular vesicles). Given the variety of cell therapy alternatives available, improving cell therapy procedures and advancing clinical trials may result in a significant development in the treatment of individuals with this chronic illness.

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