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SILICOSIS DISEASE: PREVENTION AND TREATMENT METHODS

Ibragimova Noila Umarovna
Musa-akhmatova Saidabonu Alisherovna
Haqberdiyeva Jasminabonu Mamatqulovna
Kimyo International University in Tashkent

Abstract
This article is devoted to the study of silicosis from the perspective of practical medicine, providing an analytical approach for identifying, assessing, and improving the quality of life of patients facing this disease as medical specialists. Silicosis is a chronic interstitial pneumonia caused by the prolonged inhalation of silicon dioxide dust, leading to irreversible fibrotic changes in the lungs. In clinical practice, this disease is often diagnosed at late stages and complicated by acute conditions, which further underscores the importance of early diagnosis and preventive measures.
The article describes the clinical presentations of the disease, diagnostic criteria (including radiological signs, spirometry indicators, medical history, and occupational risk factors), as well as symptomatic and supportive treatment protocols. The need for the use of broncholytics, mucolytics, oxygen therapy, and antituberculosis drugs in cases complicated by tuberculosis is highlighted.
In addition, the article provides practical recommendations for physicians on the prevention of silicosis: ensuring safety in the working environment, using respiratory protective equipment, conducting regular medical screenings, and observing occupational hygiene play a crucial role in preventing the widespread occurrence of this disease.
Based on this, the article scientifically and practically highlights the ways of comprehensive assessment of silicosis, minimization of occupational hazards, and reduction of the consequences of the disease through modern medical approaches.

Keywords Silicosis, occupational pneumoconiosis, silicon dioxide, pulmonary fibrosis, occupational hygiene, diagnosis and treatment, medical practice, oxygen therapy, industrial health.

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Introduction

Silicosis is a chronic interstitial lung disease that develops as a result of prolonged exposure of the respiratory tract to silicon dioxide (SiO_2) dust. It is widespread among workers in mining, construction, metallurgy, ceramics, and other industrial sectors and is one of the most common occupational pneumoconioses, leading to severe socio-economic consequences.

The late diagnosis of the disease, the long-term engagement of patients in occupational activities, and the delayed manifestation of clinical signs complicate its early detection and effective treatment. In the context of Uzbekistan, early identification of this disease, determination of risk groups, and development of practical treatment approaches remain urgent issues.

Within the framework of this article, we conducted a medical research study among 150 industrial workers (mainly those employed in construction and mining sectors) operating in the industrial regions of the republic during 2023–2024. Participants underwent detailed clinical, radiological, and functional examinations. In addition, their anamnesis related to occupational hazards, factors influencing the clinical course of the disease, and the effectiveness of treatment methods applied in practice were evaluated.

The aim of the study was to identify silicosis at an early stage, to study the practical effectiveness of modern diagnostic methods, to analyze symptomatic and preventive treatment approaches, and to develop practical recommendations on occupational hygiene.

Methodology

During 2023–2024, a medical research study was conducted among 150 industrial workers (including 96 men and 54 women; mean age — 42 ± 8.7 years) operating in the industrial regions of Uzbekistan to diagnose silicosis, assess treatment effectiveness, and develop preventive measures. Among the participants, 112 patients were employed in the construction and mining sectors, while the rest worked in the ceramics and metallurgy industries.

The study included the following stages:

Anamnesis collection — work experience, use of protective equipment, and complaints related to the respiratory tract;

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Physical examination — general inspection, percussion, and auscultation methods were used to assess lung function;
Radiography — performed to detect typical fibrotic changes in the upper and central zones of the lungs;
Spirometry — evaluation of respiratory function using FEV1, FVC, and FEV1/FVC indicators;
Laboratory tests — complete blood and sputum analysis, and PCR tests to exclude tuberculosis;
Psychosocial assessment — analysis of the relationship between disease status and work capacity.The treatment group included 78 patients who received broncholytics, mucolytics, inhalation steroids, and oxygen therapy along with rehabilitation measures. The remaining 72 patients were under symptomatic observation only (control group).

Research Results

According to the results of the study, silicosis of varying degrees was identified in 94 out of 150 participants (62.7%).
Radiography revealed first-degree fibrotic changes in 39 patients (41.5%), second-degree changes in 31 patients (33%), and third-degree changes in 24 patients (25.5%).
Spirometry results showed moderate obstructive or restrictive respiratory insufficiency in 68% of patients diagnosed with silicosis.
In the treatment group, within three months, dyspnea decreased by 41%, cough intensity decreased by 55%, and clinical assessment of general condition improved in 63% of patients.
In the control group, these indicators were significantly lower (dyspnea decreased by 12%, cough decreased by 18%).

Discussion

The results of the conducted study showed that silicosis remains a pressing issue among industrial workers. The disease was mainly identified in workers with more than 10 years of work experience who did not regularly use protective equipment. In diagnosis, functional spirometric assessments, along with radiological methods, play a significant role. In treatment, a comprehensive approach — combining

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broncholytics, inhalation steroids, oxygen therapy, and physiotherapeutic measures — significantly improved patients' conditions and quality of life. However, faster progression of the disease was noted among workers who did not adhere to preventive measures such as protective masks, ventilation systems, and regular medical examinations.

The study results indicate that early detection of silicosis, active treatment, and strict occupational hygiene measures can reduce its complications and the risk of disability.

Practical Recommendations

Implement modern ventilation and dust extraction systems to reduce dust levels in workplaces.

Provide workers with individual respiratory protective equipment and ensure its proper use.

Continuously monitor working conditions and strictly adhere to occupational hygiene regulations.

Conduct regular medical examinations of workers, especially radiography and spirometry tests within designated intervals.

Provide patients diagnosed with silicosis with comprehensive symptomatic treatment, including oxygen therapy and rehabilitation measures.

Strengthen collaboration between health authorities and employers and conduct awareness campaigns on the prevention of silicosis.

Conclusion

The conducted study showed that silicosis has a high prevalence among industrial workers, with occupational risk factors and working conditions playing a significant role in its development. The combination of radiological and functional examinations was proven to be an effective tool for early diagnosis of silicosis. Comprehensive treatment methods help improve respiratory function and reduce symptoms; however, complete elimination of the disease is still not possible. To prevent the disease, it is necessary to ensure the implementation of hygienic requirements and the use of protective equipment. Improving working conditions and conducting regular medical examinations to detect silicosis at its earliest stages is one of the main tasks of the healthcare system.

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