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Research Article

Evolution Profile of Patients with Silicosis at the Tenkodogo Regional Hospital Center

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Abstract

Objectives: We propose to conduct a study on the evolutionary profile of patients with silicosis received in the Pneumology Department of the Tenkodogo Regional Hospital.

Materials and Methods: This was a prospective cohort study to follow all cases of silicosis recruited in the CHRT pneumology department over the 3-year period from 01 May 2020 to 30 April 2023.

Results: A total of 151 patients were included in our study. The mean age was 29.66 ± 7.11 (15 - 50 years old). The management of patients was carried out on an outpatient basis in 81 or 53.64% and in hospitalization in 70 patients (46.36%). A worsening of the clinical condition of patients was observed in 66 patients (43.71%) with a death rate of 29.80%. The survival rate in our study was 70.10% at 6 months, 66.10% at 01 year and 59.70% at 2 years. An exposure duration of more than 10 years was statistically associated with death ($p < 0.001$) as was impairment of general condition and cardiac impact.

Conclusion: The evolution of patients with silicosis in our context remains worrying in view of the severe respiratory disability and high mortality rate.

Keywords: *Silicosis; Evolution; CHRT*

Introduction

Silicosis is a pathological condition of the lungs caused by the inhalation of free silica dust, in the form of silicon dioxide (SiO_2). It is the most common and most serious pneumoconiosis [1]. Its course is chronic, leading to serious complications such as respiratory failure. Mortality linked to this pathology, which is declining in industrialized countries, is still a concern in developing countries and concerns more young and male subjects working in gold mining sites [2]. In the United States of America, 200 to 300 deaths were reported each year during the period 1992-1995 [3,4]. In Burkina Faso, artisanal mining, which is booming, really exposes gold miners to this disease. Tenkodogo, the capital of the central-eastern region of Burkina Faso, like other regions, is affected by this phenomenon [5]. We propose to conduct a study on the evolution profile of patients with silicosis received in the Pulmonology Department of the Tenkodogo Regional Hospital Center (CHRT) in order to carry out actions and take preventive measures for the population.

Patients and Methods

This was a prospective cohort study aimed at following all cases of silicosis recruited in the pulmonology department of the CHRT over the 3-year period from May 1, 2020 to April 30, 2023. Silicotic patients consulted or hospitalized during the study period and who gave their consent were included in our study.

Practical conduct of the study

At the first contact, a written questionnaire was administered during an interview accompanied by a complete clinical examination. An additional assessment was also carried out according to the clinical presentation of the patients. Patients were seen again at a clinical and radiographic follow-up appointment at 1 month, 3 months, 6 months and 1 year after their enrolment.

Data management and analysis

The collection of individual data was done electronically using the Kobocollect software and included the patient's identity as well as the variables studied. The analysis was performed using the statistical software R version 4.2.2.

The Chi^2 test or the Fisher's exact test have been used to study the statistical correlations between sociodemographic, clinical, paraclinical factors and death. The linkages between variables were considered to be statistically associated with the 0.05 probability threshold.

Results

During our study, we included 151 patients with a mean age of 29.66 ± 7.11 (15 - 50 years). Patient management was performed on an outpatient basis in 81 (53.64% and hospitalization in 70 patients, i.e. 46.36%.

Length of hospital stay

Patients admitted to inpatient had a mean hospital stay of 20.77 ± 28.60 days with extremes of 03 and 216 days.

Therapeutic data

Antibiotics and corticosteroids were used in 106 and 104 patients, respectively. Specific anti-tuberculosis treatment was used in 74 patients. Bronchoalveolar lavage was performed in 37.08% of patients. Other therapies related to clinical complications, particularly cardiac complications, were used.

Clinical course

Worsening of the patients' clinical status was observed in 66 patients (43,71%) with a death rate of 29.80% (Table 1). The complications recorded were infectious, including tuberculosis in 74 patients, including a resistant form, pyothorax in 23 patients, pneumothorax in 08 patients and Covid 19 in 03 patients. There were cardiac complications such as Chronic Pulmonary Heart (CPC) in 23 patients, pulmonary hypertension (PH) in 07 patients, acute pulmonary heart (APC) in 06 patients and pericarditis in 02 patients. Chronic respiratory failure (CKD) was observed in 13 patients.

Patients	Workforce	Percentage
	N	% (n/151)
Clinical Improvement	66	43,71
Deceased	45	29,80
Clinical Worsening	22	14,57
Lost to Follow-Up	18	11,92
Total	151	100

Table 1: *Clinical course of patients during follow-up.*

Survival rate

The survival rate of silicosis in our study was 70.10% at 6 months, 66.10% at 01 year and 59.70% at 2 years. The Kaplan-Meier curve (Figure 1) represents the distribution of survival times in our cohort.

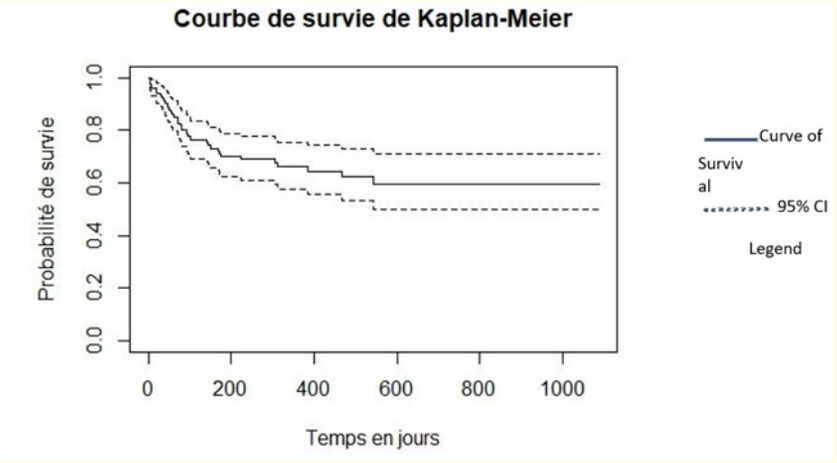

Figure 1: *Cohort survival curve.*

A duration of exposure of more than 10 years was statistically associated with death ($p < 0.001$) as was deterioration in general condition, cardiac repercussions and the existence of a complication (Table 2).

Variables	Total	No	Yes	p-value[2]
Age	N = 1511	N = 1061	N = 451	0.010
25+ years	113	73 (65%)	40 (35%)	
< 25 years	38	33 (87%)	5 (13%)	
Duration				<0.001
Exhibition				
5 to 10 years	90	70 (78%)	20 (22%)	
10+ years	46	22 (48%)	24 (52%)	
<5 years	15	14 (93%)	1 (6.7%)	
Tuberculosis				<0.001
No	77	64 (83%)	13 (17%)	
Yes	74	42 (57%)	32 (43%)	
General status (WHO status)				<0.001
Stage 3	89	71 (80%)	18 (20%)	
Stage 4	35	08 (23%)	27 (77%)	
Stage 2	27	27 (100%)	00 (0%)	
Impact				<0.001
Cardiac				
No	112	93 (83%)	19 (17%)	
Yes	39	13 (33%)	26 (67%)	
1n (%)				

Table 2: *Factors associated with death.*

2: Pearson's chi-square test; Fisher's exact test.

Discussion

In this cohort, 46.36% of patients were admitted to hospitalization with a mean duration of hospitalization of 20.77 ± 28.60 days with extremes of 03 and 216 days.

Silicosis causes long periods of hospitalization due to the oxygen-dependence of patients due to respiratory failure.

Among the therapeutics, antibiotics and corticosteroids were used in 106 and 104 patients respectively, anti-tuberculosis treatment was used in 74 patients. Bronchoalveolar lavage was performed in 37.08% of patients. According to the literature, the best treatment for pneumoconiosis remains preventive [6]. Several studies have shown the benefits of corticosteroids and bronchoalveolar lavage [7-9]. The traditional and often illicit practice of gold panning explains the fact that none of our patients are registered and therefore do not receive compensation.

The complications found in our cohort, which are infectious, cardiac and chronic respiratory failure, are the prerogative of this condition according to the literature.

The death rate in our study was 29.80%. This rate is slightly lower than that observed by Wang in the city of Wuxi in China. Indeed, he had found a death rate of 34.24% in a larger sample of silicotic patients [10]. These data confirm the dangerousness of silicosis, the complications of which are usually serious and can lead to death. However, the overall mortality in our series is well above the current rates in developed countries [11-13]. Indeed, the low level of protective measures in artisanal sites exposes gold miners to high concentrations of dust and therefore to more severe forms of silicosis.

The survival rate of our patients was 70.10% at 6 months, 66.10% at 1 year and 59.70% at 2 years. The delay in consultation in our context and the lack of health monitoring of gold miners are factors that may explain this rapid decrease in the survival rate.

An exposure duration of more than 10 years was linked to death in our study.

Tuberculosis, alteration of general condition (stage 3 and stage 4 of the WHO status), dyspnea and cardiac repercussions were also significantly associated in our study with death with $p = 0.001$. The negative evolution in these situations had also been proven by several other studies [14-16].

Conclusion

The evolution of patients with silicosis in our context remains worrying in view of the high mortality rate and respiratory disability. There is a crucial need to raise awareness the populations of gold-mining areas on the dangers of artisanal gold panning. Pending a change in mentalities, a strengthening of the technical platform in health centers will make it possible to better care for patients already suffering from this pathology in order to improve the survival rate.

Conflicts of Interest

The authors do not declare any conflicts of interest.

Bibliography

1. Dewitte JD., *et al*. "Pathologies due to the inhalation of silica dust". *EMC - Pathologie Professionnelle et de l'environnement* 2.3 (2023): 1-10.

2. Van Sprundel MP. "Pneumoconioses: the situation in developing countries". *Experimental Lung Research* 16.1 (1990): 5-13.

3. Cocco P. "The long and winding road from silica exposure to silicosis and other health effects". *Occupational and Environmental Medicine* 60.3 (2003): 157-158.

4. NIOSH hazard review: health effects of occupational exposure to respirable crystalline silica. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (2002).

5. Permanent Secretariat of Non-Governmental Organizations. Mapping of artisanal mines, artisanal miners and the level of use of banned chemicals (especially mercury and cyanide) / Land degradation in the Cascade and Centre-East regions. Burkina Faso. Final report. October 2021.

6. Mlika M., *et al*. "Silicosis". In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing (2022).

7. Begin R., *et al*. "Recent advances in the pathogenesis and clinical assessment of mineral dust pneumoconioses: asbestosis, silicosis and coal pneumoconiosis". *European Respiratory Journal* 2.10 (1989): 988-1001.

8. Zeng Y., *et al*. "The effectiveness of whole lung lavage in pneumoconiosis: a systematic review and meta-analysis". *Journal of Occupational and Environmental Medicine* 64.8 (2022): e492-e499.

9. Tsai W and Morgan WK. "The pneumoconiosis". *Current Opinion in Pulmonary Medicine* 2.2 (1996): 116-120.

10. Wang W., *et al*. "Survival analysis of silicosis patients in Wuxi City". *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi* 39.6 (2021): 430-433.

11. Leso V., *et al*. "Artificial stone associated silicosis: a systematic review". *International Journal of Environmental Research and Public Health* 16.4 (2019): 568.

12. M'Rad SB., *et al*. "Epidemiology of occupational respiratory diseases in Tunisia". *I. M. Sfax* 1.5-6: 15-19.

13. Senhaji L., *et al*. "Epidemiology, risk factors and pathophysiology of silicosis". *Journal of Practical Medicine* 93 (2019).

14. Hedlund Ulf., *et al*. "Exposure-response of silicosis mortality in Swedish iron ore miners". *Annals of Occupational Hygiene* 52.1 (2007): 3-7.

15. Cullinan P and Reid P. "Pneumoconiosis". *Primary Care Respiratory Journal* 22.2 (2013): 249-252.

16. Cui JW., *et al*. "Survival analysis of patients with pneumoconiosis from 1963 to 2014 in Yueyang". *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi* 34.5 (2016): 360-362.

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