

Spontaneous pneumothorax secondary to tuberculosis

Le pneumothorax spontané secondaire à la tuberculose

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R É S U M É

Introduction : le pneumothorax spontané est une complication fréquente de la tuberculose pulmonaire et une forme sévère de la maladie. Malgré que la tuberculose soit une cause fréquente de pneumothorax, très peu de séries, ont été rapportées. Pour cette raison, nous avons analysé rétrospectivement notre expérience à partir des observations de pneumothorax spontané secondaire à la tuberculose pris en charge dans notre service entre 2005 et 2015.

Résultats : La moyenne d'âge de nos patients était de $38,5 \pm 19$ années. Deux patients avaient des antécédents de tuberculose pulmonaire. La radiographie du thorax a montré un pneumothorax (5 cas), un hydropneumothorax (5 cas) et des lésions parenchymateuses excavées associées au pneumothorax dans 5 cas. La recherche des bacilles acido-alcool- résistants à l'examen direct dans les expectorations était positive chez tous les patients. Le traitement a associé une chimiothérapie antituberculeuse conforme aux recommandations du programme national de lutte contre la tuberculose, un drainage thoracique et une kinésithérapie respiratoire. La durée moyenne de drainage thoracique était de 23 jours.

Deux patients ont été opérés. L'évolution a été favorable dans 5 cas. Nous avons noté un retard de négativation des bacilloscopies (> 1 mois) chez 2 patients et une pachypleurite nécessitant la décortication pleurale chirurgicale chez 2 patients.

Conclusion : Dans notre étude, le pneumothorax tuberculeux était toujours associé à la tuberculose cavitaire active. L'évolution est le plus souvent favorable sous chimiothérapie antituberculeuse et drainage thoracique. Cependant, des séquelles pleurales telles que la pachypleurite persistaient parfois.

M o t s - c l é s

Tuberculose, pneumothorax spontané secondaire, drainage pleural, pachypleurite.

S U M M A R Y

Introduction: Spontaneous pneumothorax (SP) is a frequent complication of pulmonary tuberculosis (TB) and a severe form of the disease. In spite of the fact that TB is a common cause of pneumothorax, a very few series, have been reported. For this reason, we retrospectively analysed the experience of SP secondary to TB in patients who were hospitalized in our department between 2005 and 2015.

Results: The mean age of patients was $38,5 \pm 19$ years. Two patients had a history of pulmonary tuberculosis. The chest x-ray showed a pneumothorax in 5 cases, a hydropneumothorax in 5 cases and cavitory lesions accompanying SP in 5 cases. Acido-alcohol-resistant bacilli were isolated in the expectorations in all patients. Treatment associated antitubercular chemotherapy in compliance with the national plan of struggle against tuberculosis, chest drainage and respiratory physiotherapy. The average duration of chest tube drainage was 23 days. Two patients underwent surgery. The course was favourable in 5 cases. A delay (>1 month) to bacilli negativation was noticed in 2 patients and pachypleuritis requiring surgical pleural decortications in 2 patients.

Conclusion: In our study, tubercular pneumothorax was always associated with active cavitated tuberculosis. The course was most of the time favourable with antitubercular chemotherapy and chest drainage. However, pleural sequelae such as pachypleuritis persisted sometimes.

Key - words

Tuberculosis, Secondary spontaneous pneumothorax, Pleural drainage, Pachypleuritis.

Tuberculosis (TB) is a well-known cause of spontaneous pneumothorax (SP) especially in areas with endemic TB. SP secondary to TB usually occurs after extensive TB involvement of the lung, and the sudden onset of bronchopleural fistulization and empyema with severe cavitary formations or occasionally with miliary TB (1-4). Despite that TB is a frequent cause of SP, a very few series, have been reported. Therefore, presentation, therapeutic management, and prognosis of this complication have been poorly studied. With the aim of shedding some light on these matters, we present our experience of SP secondary to TB over the past 10 years.

METHODS

The present study is descriptive and retrospective. It analyses data corresponding to clinical reports of all patients with secondary spontaneous pneumothorax (SSP) and TB treated in the department of Pulmonary Diseases I of the Abderrahman Mami hospital in Tunisia between January 2005 and December 2015. The following data were collected from the medical files: age, sex, socioeconomic conditions, comorbidity and past medical history (smoking, alcoholism, drug addiction, previous TB), clinical data (dyspnoea, chest pain, fever, night sweating, cough, expectoration, hemoptysis, asthenia, appetite loss and weight loss, diagnosis of active TB and whether the patient was in treatment with anti-TB drugs), laboratory findings and radiological characteristics (presence of pleural effusion associated with pneumothorax, pulmonary infiltrates, caverns and pachypleuritis), data related to pleural drainage (PD) (duration in days), hospital stay, clinical, radiological and bacteriological course, necessity for surgery and type of surgery performed and finally recurrence of tuberculosis. In our study, diagnosis of SSP was performed by simple thoracic radiography in all patients. Diagnosis of tuberculosis has been confirmed by bacteriological evidence.

Statistical analysis

Analyses were performed using SPSS version 22.0. A descriptive analysis of the sample was performed, estimating the mean±standard deviation (SD).

RESULTS

Out of 368 patients treated for pulmonary and/or pleural tuberculosis during this period, 10 (2,7%) had SP secondary to TB. The mean age was $38,5 \pm 19$ years (22-63 years). Socioeconomic conditions were bad in 6 patients. Two patients had a history of pulmonary tuberculosis which has been well treated. Active smoking was present in all cases and diabetes in 2 cases. Five patients was chronic alcohol drinker and one was an addict. HIV serology was negative in all patients.

The clinical manifestations presented by the patients were dominated by chest pain (10 cases). For other respiratory functional symptoms, cough was noted in 6 patients, dyspnea in 3 patients and hemoptysis in 2 patients. All patients had poor general health status represented by asthenia, appetite loss and weight loss. Seven patients had episodes of fever and night sweating. These general signs dated back on average 6 weeks (4 to 12 weeks). The physical examination on admission revealed fever in all cases (the average axilar temperature was $38,3^{\circ}\text{C}$) and polypnea in 3 cases.

Laboratory findings revealed a normal WBC count in 6 cases, hyperleukocytosis in 4 cases and an elevated CRP in all cases. Chest X-ray showed pneumothorax in 5 cases and hydropneumothorax in 5 other (figures 1, 2).



Figure 1: Chest X-ray posteroanterior view showing left-sided hydropneumothorax.



Figure 2: Chest radiograph showing right-sided encysted hydropneumothorax.

In all cases, SSP was unilateral. It was found on the right side in 5 cases. Five SSP patients had cavitary lesions and reticulonodular opacities showed through conventional thoracic radiography (figure 3).



Figure 3: Chest radiograph showing reticulonodular shadows at both upper portions of the lungs

A chest CT scan done in 2 patients to guide the chest drainage showed an encysted hydropneumothorax associated with parenchymal lesions suggestive of TB. Bacteriological proof was obtained in 10 cases. Acid-alcohol-resistant bacilli were found in the expectorations on direct examination and culture in all patients. The search of bacilli in the pleural fluid in the 5 patients with hydropneumothorax was negative. Standard anti-tuberculosis treatment in compliance with the national plan of struggle against tuberculosis was initiated in all patients adjusted to weight: isoniazid (5 mg/kg/day), rifampin (10 mg/kg/day), pyrazinamid (25 mg/kg/day) and ethambutol (20 mg/kg/day). These anti-TB drugs were administered for 2 months in 10 patients. Then the treatment was switched to only isoniazid and rifampin for a total average duration of 6 months (3-8 months). An intercostal chest tube connected to an underwater seal bottle was put in all patients for a mean duration of 23 days (14-43 days). The chest tube has brought a purulent fluid in 5 cases. All patients underwent from a prolonged pleural physiotherapy (6 months) after the removal of the chest tube. The average length of hospital stay was 34 days (14-60 days). Favourable clinical bacteriological and radiological outcomes were noted in only 5 cases. In the other patients, there was a delay (>1month) to bacilli negativation (2 cases), the occurrence of pulmonary embolism during antituberculous treatment (1 case) and development of pachypleuritis (2 cases). Pleural decortication was realized through a lateral thoracotomy in 2 patients with the pleural thickening. There were no

post-operative complications and no post-operative mortality. No recurrence of tuberculosis was observed in all patients (mean follow-up between eight months and 10 years).

DISCUSSION

Despite the introduction of medical TB treatment during the 20th century, TB remains a frequent cause of mortality among curable infections. In areas with endemic TB, such as in Tunisia, the disease complications are increasing in prevalence. Pneumothorax is one of the important TB complications with an incidence of approximately 5% in post primary pulmonary TB patients (4). It usually occurs after extensive TB involvement of the lung, and the sudden onset of bronchopleural fistulization and empyema with severe cavitary formations or occasionally with miliary TB (1, 2, 5, 6). The bacteria invades the pleura and causes liquifactive necrosis, then pleural rupture. The incidence of tubercular pneumothorax differs from one study to another. Weisberg et al. (7) in a study dealing with the etiologies of 505 secondary SP, found 9 cases of tuberculosis, ie an incidence of 1.8%. In a study concerning 5480 cases of tuberculosis achieved by Aktogu et al (8), the incidence of SP secondary to TB was 1, 5%. Hassine et al. (9) reported in a study of 875 cases of pulmonary tuberculosis recorded between 1990 and 1999, 28 cases of empyema among whom 9 cases of pyopneumothorax, ie an incidence of 1%. In the study of Mezghani et al (10), SP due to TB represented 2.3% of all hospitalizations for tuberculosis between 1985 and 2003. In our department, tubercular SP represented 2,7% of all cases of tuberculosis hospitalized in the same period. Pneumothorax complicating tuberculosis usually occurs in young persons (10,11). In the study achieved by Blanco-Perez et al. (12) the average age of patients presenting tubercular pneumothorax was 30 years, versus 49 years in those without active tuberculosis. In the study of Masoud et al (13), the mean age of patients presenting a SP related to TB was 34 years.

As for clinical manifestations, symptoms are various but the chest pain is the most common sign (14). In the studies achieved by Blanco-Perez and Mezghani, chest pain, cough, and fever were more frequent in patients with tubercular pneumothorax (10,12). On the other hand, we found that worse clinical condition (10 cases), chest pain (10 cases), fever (7 cases), and sweating (7 cases) are the most frequent functional signs. All our patients initially presented for pneumothorax, and diagnosis of TB was made thereafter. In the study done by Masoud et al (13), 42% of the patients had pneumothorax as a first presentation. In the study achieved by Mezghani et al (10), pneumothorax has revealed TB in 91.5% of cases. This indicates the importance of a precise bacteriologic study, including sputum smear for acid-fast bacilli, in patients who present with pneumothorax. In regard to the

radiological findings, there is a statistically significant association between cavitory lesions and pneumothorax (12,13,15). Thus, the diagnosis of tubercular pneumothorax is easily evoked when the chest radiograph shows cavitory lesions. In our study, cavitory lesions and reticulonodular opacities were associated with pneumothorax in 7 cases but acido-alcoolo-resistant bacilli were found in the expectorations in all patients. The diagnosis of TB is sometimes difficult to be confirmed when the pneumothorax is isolated without cavitory lesions. In this case, the acid-fast bacilli can be negative in the sputum. Mycobacterium tuberculosis is rare in pleural fluid and evidence of TB can sometimes be confirmed by histological examination of the pleura obtained by a decortication and/or a pulmonary resection. The polymerase chain reaction is a technique of gene amplification which can be performed on pleural fluid samples or on biopsy fragments of the pleura, but a negative response will not exclude the diagnosis of TB (16). The treatment of SP secondary to TB is based on a correct anti-tuberculous chemotherapy, chest tube drainage, daily and repeated washing-aspirations with physiological saline and prolonged pleural physiotherapy. Response to pleural drainage is as high as 85% (17). In our study, the outcome was favourable after pleural drainage with resorption of the pneumothorax. Surgery was indicated in only 2 patients with pleural thickening requiring pleural decortications. In the literature, surgery is indicated for specific situations. It is mainly consisting on pleural decortications in cases of pachypleuritis or

pulmonary resections in case of parenchymal destruction (10). In these cases, operations were usually carried out by lateral thoracotomy. Surgical intervention (thoracotomy or video thoracoscopy) can also be indicated in case of failure of PD (presence of air leaks lasting for many days) and when there was a recurrence of SSP (17,18). For these indications, the general performance status of the patient was taken into account as well as pulmonary parenchymal involvement, and the presence of pleural sequelae. Generally surgery yields to a favourable outcome. Post-operative complications and deaths often occur in patients with poor general health status and serious respiratory insufficiency.

CONCLUSION

In our experience, tuberculous pneumothorax was always associated with active cavitated tuberculosis when there is a delay to diagnosis. The course was almost favourable with antitubercular chemotherapy and chest drainage. However, pleural sequelae such as pachypleuritis may persist causing respiratory functional impairment. For this reason, we emphasize on primary prevention and early diagnosis of pulmonary tuberculosis which will allow in the future, the disappearance of the severe forms of tuberculosis particularly the pneumothorax.

Conflict of interests: the authors have nothing to disclose.

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