



Pulmonary abscess in resource-limited countries. Case of Burundi

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Abstract

Aim : *To determine the epidemiological, clinical, radiological, diagnostic, therapeutic, and evolutionary aspects of pulmonary abscess in Burundi.*

Patients and Methods : *Our work was a retrospective and prospective study. It was carried out over a period of 43 months, from 1 January 2016 to 31 July 2019, on patients hospitalized in the internal medicine departments of the Kamenge University Hospital Centre for lung abscesses.*

Results: *Out of 6038 patients hospitalized in the Internal Medicine Department of Kamenge University Hospital during the 4-year study period, the frequency was 0.14%(9 patients). Men were in the majority (55.5%) and the average age was 50.4 years. A risk factor was found in 77.7%. General signs were marked by fever and weight loss in 55.5% and 57.2% respectively. Vomiting was found in only 11.11% of cases. A parenchymal opacity with a hydroaerobic image was observed on the chest X-ray in almost all cases (87.5%) with involvement of the right lung in more than half the cases. The combination of Amoxicillin-Clavulanic acid or 3rd generation cephalosporins or Ampicillin + imidazole + aminoglycoside was the most common (66.6%) in association with physiotherapy for bronchial drainage (33.33%) and management of the contributing factor in 11.1% of cases. The outcome was favorable in the majority of cases (88.9%) with one death (11.1%) in acute respiratory distress. Complications such as hydropneumothorax were reported (22.2%) and 2 of them undergone decortication.*

Conclusion: *Controlling the risk factors for pulmonary abscesses and improving diagnostic and therapeutic methods will certainly help to reduce its prevalence and limit its complications.*

Keywords: *abscess, lung, watery image, antibiotics*

Introduction

A lung abscess is a localised focus of suppuration that collects in a neofomed cavity in the lung caused by acute non-tuberculous inflammation [1]. This definition excludes suppurations in pre-existing cavities: emphysema bullae, sequelae of tuberculosis, excavated tumours. The etiologies are multiple and dominated by anaerobic germs or gram negative bacilli [2]. Lung abscesses always occur in cases of poorly chosen or inappropriate antibiotic therapy or in the presence of certain risk factors such as

smoking, alcoholism or diabetes [3]. The diagnosis of lung abscess is based on clinical findings but is confirmed by chest imaging, which shows a characteristic image of lung abscess. Initial management is based on broad-spectrum probabilistic antibiotic therapy, which is then adapted according to sensitivity. Failure of the initial treatment may result in sepsis or complications requiring percutaneous or endoscopic drainage, or surgery in the case of major complications of large haemoptysis, aspergillus grafts, infectious fistulae or pachypleuritis. The frequency of lung abscesses is decreasing significantly in developed countries, at 0.0055% in the USA [4]. This decrease in frequency is linked to the availability of high-performance technical facilities and early management of acute respiratory infections [4]. However, this prevalence varies between 1 and 3% in developing countries, particularly in sub-Saharan Africa [5]. The frequency of lung abscesses in Burundi is not well known, particularly because of the inaccessibility of care for many patients who do not come to see a doctor because of poverty or the remoteness of health centres or hospitals, under-diagnosis due to insufficient training of medical staff, and the impossibility of carrying out a thoracic X-ray, which is the key to diagnosis. Chest CT scans, which can help to clarify the diagnosis, are not available in most hospitals in the country either. The aim of our study was to investigate the epidemiological, diagnostic and therapeutic aspects of lung abscess in resource-limited countries, including Burundi.

Patients and methods

This was a retrospective and prospective descriptive study, from 1 January 2016 to 31 July 2019. It was conducted in the Internal Medicine Department of the Kamenge University Hospital (CHUK) in Bujumbura. Patients hospitalized in the internal medicine department of CHUK for lung abscesses diagnosed on the basis of clinical and radiological evidence were included. The variables studied included analysis of epidemiological parameters, identification of risk factors, clinical characteristics, medical imaging, treatment and evolution under treatment.

Results

Out of 6038 patients hospitalised in the Internal Medicine Department of Kamenge University Hospital during the 4-year study period, 9 patients, i.e. a frequency of 0.14%, presented with pulmonary abscesses. The majority were men (55.5%) and the average age was 50.4 years. A risk factor was found in 77.7% of patients. General signs were marked by fever and weight loss in 55.5% and 57.2% respectively. Vomiting was found in only 11.11% of cases. A parenchymal opacity with a hydroaerobic image was observed on the chest X-ray in almost all cases (87.5%) with involvement of the right lung in more than half the cases. The combination of Amoxicillin-Clavulanic acid or 3rd generation cephalosporins or Ampicillin + imidazole + aminoglycoside was the most common (66.6%) in association with physiotherapy for bronchial drainage (33.33%) and management of the contributing factor in 11.1%

of cases. The outcome was favourable in the majority of cases (88.9%) with one death (11.1%) in acute respiratory distress. Complications such as hydro pneumothorax were reported (22.2%) and 2 of them undergone decortication.

Table I: Distribution of patients by age group.

| Tranche d'âge (ans) | Effectif n= 9 | Percentage |
|---------------------|------------------|----------------|
| 20 - <39 | 2 | 22,22% |
| 39 - <59 | 1 | 11,11% |
| >59 | 6 | 66,67% |
| TOTAL | 9 | 100,00% |

Table II: Distribution of patients by risk factors.

| Facteurs de risqué | Effectif n = 7 | Percentage |
|--------------------------|-------------------|------------|
| Pneumopathie bactérienne | 3 | 42,85% |
| Abcès dentaire | 1 | 14,28% |
| Tabagisme | 2 | 28,57% |
| Alcohol | 4 | 57,14% |

Discussion

In our series, lung abscesses represent 0.14% of all patients hospitalised in the Department of Internal Medicine of Kamenge University Hospital during the study period. Kouassi et al [3] in Abidjan, Tall Madina [5] in Mali in 2017 reported a frequency of lung abscesses of less than 1% or respectively 0.74% and 0.30% while Ayoub, Tidiani, Fall and Sergent found a frequency of lung abscesses at 2% in their respective studies [2,7,8]. In the USA, the frequency of lung abscesses is 0.0055% [4]. The frequency of

lung abscess has decreased significantly in developed countries due to the adequate use of antibiotic therapy [4]. Different authors have reported the following risk factors for lung abscess in their respective series. Ibrahim Fall in Mali identified smoking in 40% of cases, dental abscess in 13.33% of cases and bacterial pneumonia in 40% of cases as risk factors for lung abscess [8].

HIV infection was found in 11 cases out of 40 patients screened among 60 patients in his series, i.e. 27.5% of cases [8]. Ayoub in Tunisia found a dental abscess in 11% of cases and bacterial pneumopathy in 7% of cases [2]. The risk factors for lung abscess in our series were dental abscess in 14.28% of cases, smoking in 28.57% of cases, bacterial pneumonia in 42.85% of cases and alcoholism in 57.14% of cases. In our series, HIV serology was negative in most cases (88.9% of cases) and therefore HIV was not an important risk factor. Medical imaging is the key to the diagnosis of lung abscess. The classic radiological appearance of lung abscess is as a watery-aqueous image within a poorly bounded parenchymal opacity [6]. Our series shows a watery image within a parenchymal opacity in 87.5% of cases.

Other African, European and Asian series, notably that of Madhusmita Mohanty Mohapatra et al in India [10]; Ibrahim Fall in Mali [8]; Ayoub in Tunisia [2], Sergent in Paris [8] and Tidjani in Togo [7] find the most frequent radiological sign to be a hydroaeric image within a parenchymal opacity. The standard film may not show a watery image and the thoracic CT scan plays an important role in the diagnosis of these frustrated forms of lung abscess. In addition, CT is a good element of radiological surveillance. None of our patients was able to perform a chest CT scan. Other African series show a low rate of use of chest CT in the radiological diagnosis of lung abscesses: 4.5% in Madagascar [11] and 21.42% in Mali [5]. One of the main reasons for this is the high cost of this examination for patients with low socio-economic status. The right lung is the preferential location of radiological lesions in lung abscesses in the various series that have been done to date. This is notably the case of Ibrahim Fall in Mali in 2004 who found radiological lesions in the right lung in 86.7% of cases [8], Ayoub et al in Tunisia in 59% of cases [2], Kouassi et al in 75% of cases [3] and Maouhak et al in 55% of cases [4]. On the other hand, Madina Tall in Mali in 2017 found right lung involvement in 42.84% of cases [5].

Our study shows a location of the pulmonary radiological lesions in the right lung in more than half of the cases. The preferential location of the pulmonary radiological lesions in the right lung found in most of the studies already done on lung abscesses is explained by the vertical anatomical position of the right stem bronchus, which is more receptive to inhaled septic particles, thus exposing the right lung to infections originating from the upper airways [8]. Triple antibiotic therapy in combination with respiratory physiotherapy was chosen in the majority of cases in the different series and in our case. Our series shows a probabilistic antibiotic association made of Amoxicillone+Clavulanic acid or Ampicillin or 3rd generation Cephalosporins +imidazole+aminoside instituted in 66.67% of the cases; a physiotherapy of bronchial drainage made in 33.33% of the cases and a management of the favouring factor (treatment of dental caries) found in 11.11% of the cases. Rakotoson JL et al [11] in Madagascar

found a probabilistic antibiotic combination of Penicillin G or 3rd generation of cephalosporin+imidazole+aminoside in 82.9% of cases; physiotherapy for bronchial drainage carried out in 51.3% of patients and management of the contributing factor in 17.1% of cases [11]. Tall Madina in Mali in 2017 found the antibiotic combination Amoxicillin-clavulanic acid and Metronidazole more used in the treatment of lung abscess in 78.58% of cases [5].

The evolution can be unfavourable and we can deplore deaths [5] or chronic complications such as abundant haemoptysis or aspergillary grafting in a sequelae cavity [7]. In our study we observed a favourable clinical evolution in the majority of cases (88.89%), complications such as hydro pneumothorax in 22.2% of cases and death in 11.1% of cases. Among the hydro pneumothorax cases, 2 of them undergone decortication. Tall Madina in Mali in 2017 observed a favourable evolution in 12 patients, i.e., 85.72% of cases, one complication and one death [5]. Benjelloun found a favourable outcome in all his patients [13]. Of 111 patients in their study, Rakotoson JL et al in Madagascar found a favourable outcome in 93 patients, i.e. 83.7% of cases; 18 deaths, i.e. 16.2% of cases, in acute respiratory failure or septic shock [11]. The clinical evolution of lung abscesses under antibiotic treatment is favourable according to the different series and the main complications are death and sequelae in the form of cavities. Inaccessibility to care, the high cost of treatment and associated comorbidities could explain the unfavourable evolution.

Conclusion

Controlling the risk factors for pulmonary abscesses and improving diagnostic and therapeutic methods will certainly help to reduce its prevalence and limit its complications.

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