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Case Report **Pneumophthisiology**

Primary Ciliary Dyskinesia Associated with Rheumatoid Lung at The Koulikoro Reference Health Center, Mali

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Abstract

Primary ciliary dyskinesia is a cause of bronchial dilatation, associated with rheumatoid lung is rare. This is why we report a case with the aim of discussing the clinical, diagnostic characteristics and therapeutic possibilities of ciliary pathology and showing the link between it and rheumatoid arthritis. ***Observation***: This is a 40-year-old African patient, married without children, from a consanguineous couple, with a family history of a brother who died in adulthood in a picture of respiratory failure and productive cough. She presented with recurrent rhinorrhea since childhood and bronchorrhea in a picture of progressively worsening dyspnea and clubbing. During the evolution of the disease, inflammatory polyarthralgia was associated. The ultrastructural ciliary study by electron microscopy and the measurement of nasal nitrogen oxide are the confirmatory examinations of primary ciliary dyskinesia. They are not achievable in our practice. However, based on the history and clinical findings, the patient presented several elements in favor of this pathology. additional investigations, notably the rheumatoid factor and the chest CT scan, allowed us to suggest rheumatoid lung. Our therapeutic conduct was the administration of antibiotic therapy, oxygen therapy, immunosuppressant, anti-inflammatory and the practice of respiratory physiotherapy. ***Conclusion*:** Primary ciliary dyskinesia associated with pulmonary involvement in rheumatoid arthritis increases the risk of developing respiratory failure.

Keywords: Bronchial dilatation, primary ciliary dyskinesia, rheumatoid lung, Reference Health Center.

INTRODUCTION

PCD is a rare autosomal recessive disease, due to abnormalities in the structure and/or function of mobile cilia with accumulation of bronchial mucus leading to chronic and/or recurrent infections of the upper and lower airways of possibly neonatal onset [1, 2]. It manifests itself in adults by dilation of the bronchi; chronic oto-sinus disease; often fertility disorders and situs inversus [3]. Rheumatoid arthritis is a systemic pathology that causes joint and extra-articular damage. It reflects an immune disorder which explains its tropism for organs rich in immune cells such as the bronchopulmonary system. The latter is achieved in 50% of cases [4, 5]. It seems difficult to assert a true causal link between the two pathologies [6]. Bronchial dilatation in primary ciliary dyskinesia associated with rheumatoid lung is rare. This is why we report a case with the aim of discussing the clinical, diagnostic characteristics and therapeutic possibilities of ciliary pathology and showing the link between it and rheumatoid arthritis.

OBSERVATION

This was a 40-year-old African patient, married without children, from a consanguineous couple with a brother who died as an adult with chronic respiratory distress and productive cough. She has had repeated rhinorrhea with nasal obstruction since childhood (1 year after birth); for which three surgical interventions were carried out in 2001, 2002 and 2003. The aftermath was marked by a wet cough bringing mucous expectoration like morning bronchorrhea, progressively worsening for which anti-tuberculosis treatment was unsuccessful with persistence of symptoms. For 05 years and faced with progressive dyspnea on exertion associated with deterioration in general condition (weight loss, asthenia,

polypnea) and worsening cough with abundant bronchorrhea, she was admitted to a clinic in Tunisia. The biological assessment carried out revealed an inflammatory syndrome with fibrinemia at 5.2g/L and C-reactive protein (CRP) at 19 mg/L. Frontal chest radiography showed bilateral alveolar-interstitial syndrome (Figure 1). Chest CT revealed mediastinal lymphadenopathy associated with a diffuse and bilateral reticulonodular infiltrate. This is associated with multiple foci of bronchiectasis, particularly cystic middle lobar, lingular and lower lobar (Figures 2 and 3). Bronchial fibroscopy noted an overall inflammatory bronchial tree with thick and abundant purulent mucosal secretions. Analysis of the bronchial aspirate revealed a greasy but sterile liquid. The test for Koch's bacillus was negative. Other assessments (metabolic and cardiac Doppler ultrasound, abdominopelvic tomography) were normal. Given the clinical symptoms, the endemicity of tuberculosis, the radiological image and despite the negativity of the tuberculosis test results, a resumption of anti-tuberculosis treatment was instituted for six (06) months, combined with broad-based antibiotic therapy. spectrum and corticosteroid therapy for acute respiratory failure for 10 days. The initial progress would have been satisfactory according to his doctor.

The new episode dates back six months, marked by the occurrence of respiratory distress accompanied by cough with abundant non-fetid purulent mucous expectoration associated with polyarthralgia of an inflammatory schedule affecting the knee, ankle and wrist in a context of headaches, nasal obstruction and dizziness. The physical examination revealed apyrexia, respiratory distress (polypnea at 38 cycles/min, signs of respiratory struggle, percutaneous pulse at 83% in ambient air), clubbing (Figure 4), weight loss with body mass index (BMI) at 14 kg/m² for a weight of 47 kg and a height of 1.58 m. There was no joint deformity. Pleuropulmonary auscultation noted squick rales in both hemithoraxes. The blood count was normal as well as the serum creatinine and blood urea nitrogen. Cytobacteriological examination of sputum revealed the presence of *Candida albicans*, sensitive to fluconazole. The geneXpert for Koch's bacillus came back negative. The immunological assessment was disturbed with a positive rheumatoid factor at 147 IU/ml. Testing for anti-native DNA antibodies, anti-cyclic citrullinated peptide (CCP) antibodies, and creatinine phosphate kinase (CPK) was negative. Chest CT revealed a worsening of the initial alveolar-interstitial lesions with fibrosis extended to both lung fields associated with mediastinal lymphadenopathy and images of cystic dilatation of the bronchi. Maxillofacial CT noted hypertrophic rhinitis of the lower turbinates associated with chronic bilateral sphenoid-maxillary sinusitis. Blood gases showed chronic respiratory failure (pH: 7.44, PaO2: 58.20 mmHg, PaCO2: 42.60mmHg, SaO2: 88.40%).

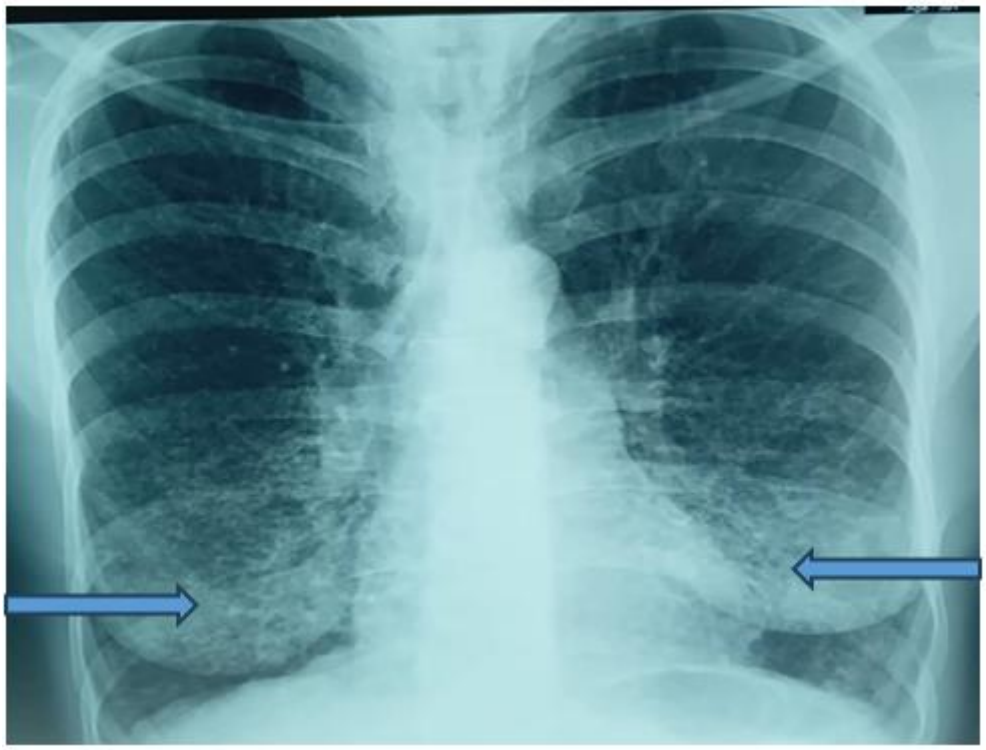

Figure 1: Frontal chest x-ray showing alveolar-interstitial lesions predominantly at the pulmonary bases (⇒)

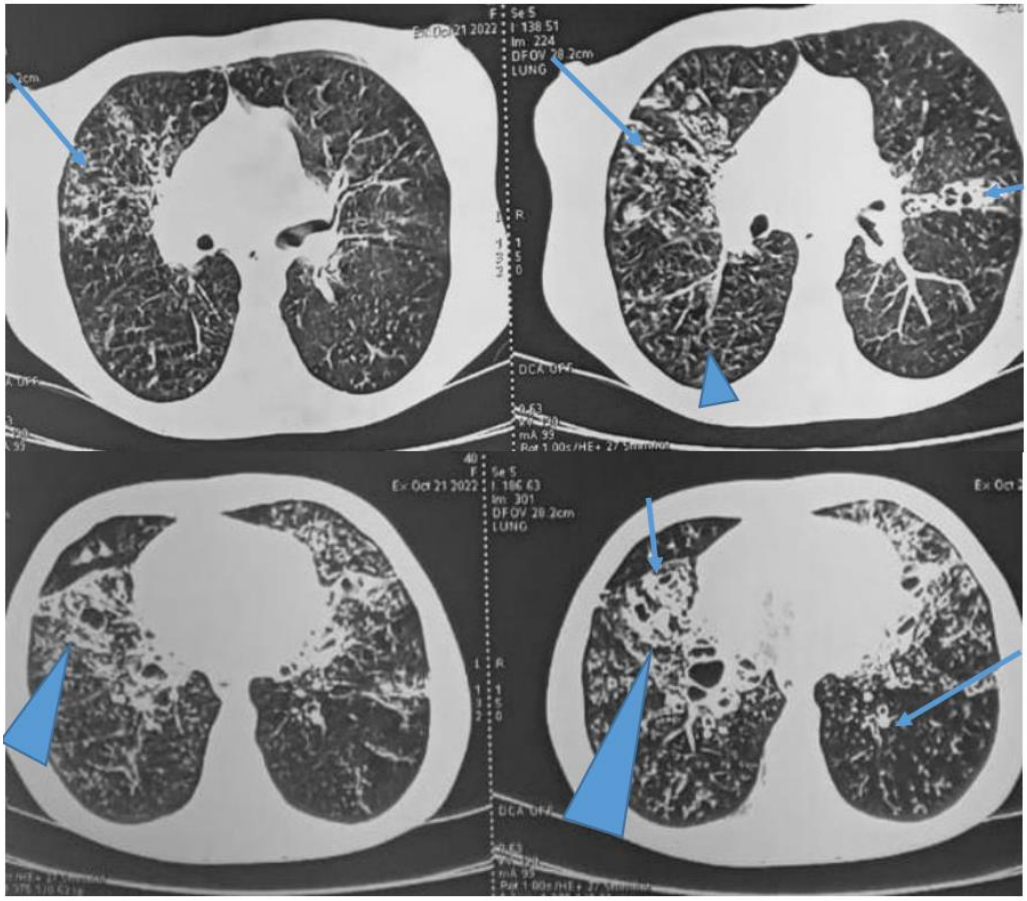

Figure 2: Chest CT scan, cross section (parenchymal window); Image A: shows alveolar-interstitial damage ( ); Image B: shows the dilations of the bronchi ( )

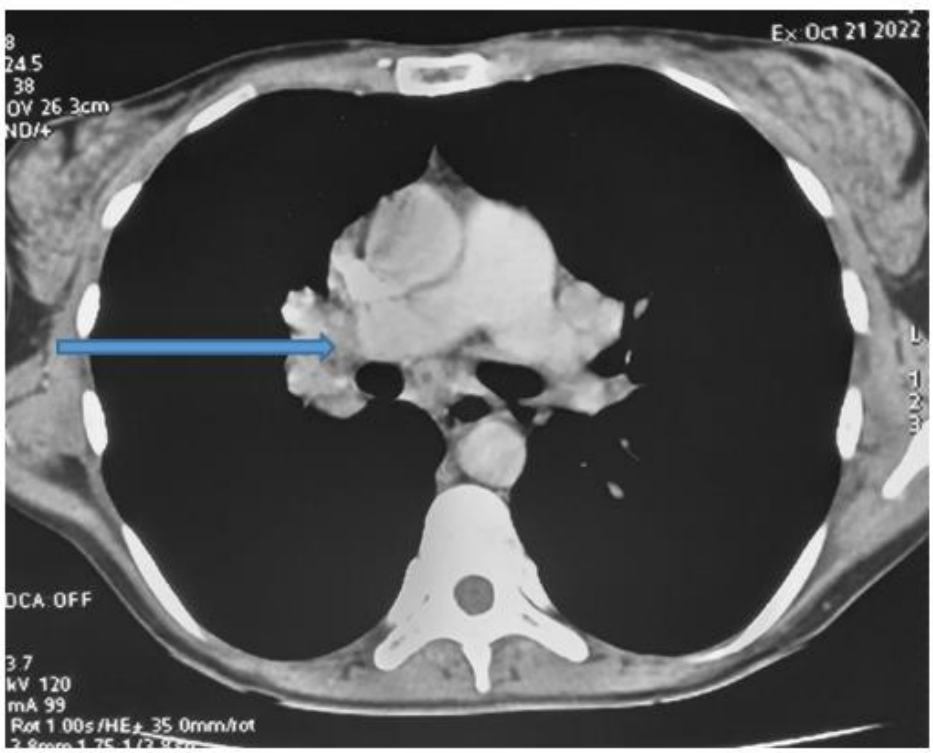

Figure 3: Chest CT scan, cross-section (mediastinal window) showing mediastinal lymphadenopathy ( )

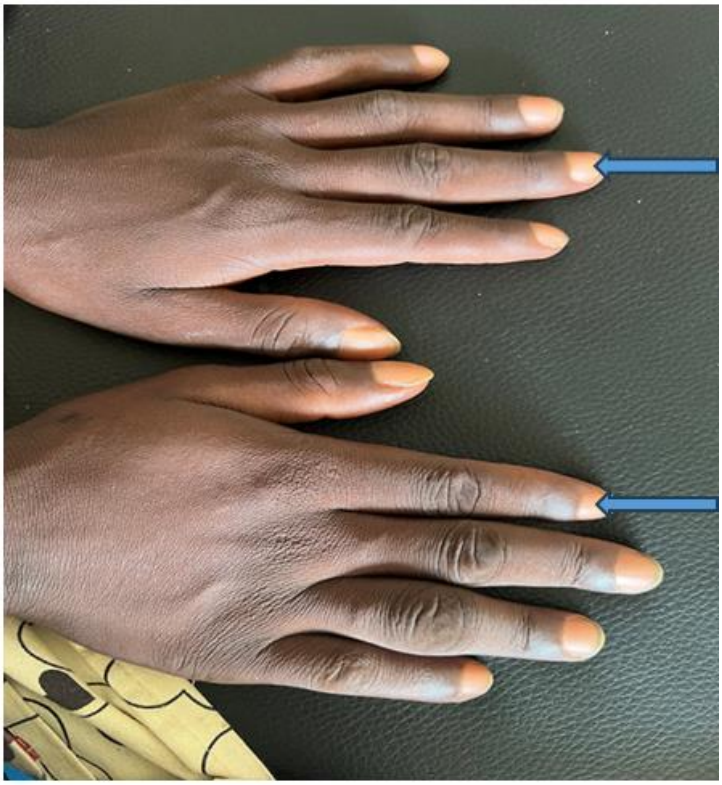

Figure 4: Digital clubbing (⟹)

We discussed DCP subject to confirmatory examinations in the face of: Early onset of respiratory symptoms (rhino sinusitis, bronchorrhea); Digital clubbing; parental consanguinity; the history of death of a brother in a similar table; diffuse bronchiectasis lesions, bilateral predominant at the pulmonary bases.

The diagnosis of rheumatoid lung was made in the face of polyarthralgia and rheumatoid factor positivity; the presence of pulmonary fibrosis lesions and mediastinal lymphadenopathy on chest CT.

The patient benefited from bronchial drainage physiotherapy, long-term oxygen therapy titrated according to percutaneous saturation, antibiotic therapy based on (azithromycin) 500 mg/day for 3 days, antifungal (Fluconazole) 50mg/d for 4 weeks, immunomodulator (Sulfasalazine) 500mg: 1g *2/d long term, anti-inflammatory (Aceclofenac) 100mg*2/d for 15 days with gastric protection and nasal decongestant spray (Marimer) 1 spray 3*/d. Despite this behavior, the evolution was marked by the persistence of respiratory symptoms then the occurrence of edema of the lower limbs and systemic arterial hypertension. Antihypertensives such as calcium channel blockers and loop diuretics were administered, with close monitoring.

DISCUSSION

Primary ciliary dyskinesia is linked to structural and/or functional abnormalities of the motor cilia which are present on the surface of the cells of the respiratory epithelium. The first cases of PCD were reported by Siewert in 1904 then by Kartagener in 1933 [3]. According to Braum et al, its prevalence in the general population in France is 1/10,000 to 20,000 births [7]. A male predominance has been noted in France [8, 9]. The family history can reveal consanguinity and/or a family history of PCD in siblings [10]. Which corroborates the case of our patient. The symptomatology is polymorphic and mainly concerns the pulmonary, ear, nose and throat (ENT) and genital areas. ENT manifestations are non-specific and often present during early childhood. They are classically caused by chronic mucous purulent rhinorrhea, often obstructive. The pulmonary symptoms are almost constant but not very specific and are characterized by a chronic wet cough, sharp during exacerbation with auscultation rich in bronchial rales and crackles [10, 11]. Here the patient presented several elements in favor of DCP. Chest CT remains essential for the diagnosis of DDB. They are present in almost all cases of PCD in adulthood and predominate at the pulmonary bases [12]. This is the case of our patient. An ultra-structural ciliary study using electron microscopy makes it possible to confirm the diagnosis of PCD as well as the measurement of nasal nitrogen oxide (NO) flow. This measurement shows a reduction in NO produced at the nasal-sinus level [2]. These examinations are not carried out on our patient by default of the technical platform. Rheumatoid arthritis (RA) is a systemic autoimmune disease. The most common circumstance of discovery corresponds to polyarthralgia of the large and small joints [13]. The patient presented with inflammatory polyarthralgia. Pulmonary manifestations are the most common in rheumatoid

arthritis. They are of diverse expression on the scannographic level, notably pleurisy, diffuse interstitial pneumonia and mediastinal lymphadenopathy [14]. In our case, the patient presented with pulmonary fibrosis and mediastinal lymphadenopathy. Remy-jardin and al showed, through a series of chest CT scans, that intrathoracic lymphadenopathy is present in nine patients among 84 with RA [15]. Martinez and al reported the case of a patient suffering from RA for several years in whom chest CT revealed diffuse interstitial lung disease with mediastinal lymphadenopathy [16]. The main bacteria found in adults in bronchiectasis patients are *Haemophilus influenzae, Staphyloccocus aureus, Streptococcus pneumoniae, Pseudomonas aeruginosa* and *mycobacteria* [17, 18]. In our case, we isolated *Candida albicans* after several courses of antibiotics.

Pulmonary infection has been described as possible triggering factor for RA by promoting exposure to a set of bacterial antigenic stimulations, some of which are likely to cause joint disease in genetically predisposed subjects [11]. The hypothesis according to which the chronic bacterial infection present in bronchiectasis patients is at the origin of the autoimmunity process linked to rheumatoid arthritis was raised by Quirke and al. According to the same hypothesis, anti-cyclic citrullinated peptide (anti CCP) antibodies were higher in DDB associated with RA compared to DDB alone (88% VS 48%, p=0.001) and in patients with RA. without pulmonary disease [19]. Cole *et al*., also showed that predisposed individuals could develop a severe inflammatory reaction caused by lung infection [20].

Bronchial drainage is at the center of respiratory care [21]. Antibiotic therapy is proposed during clinical exacerbation or deterioration of respiratory function tests (EFR) by favoring a broad spectrum product (Amoxicillin combined with clavulanic acid, Cephalosporin) then adapted according to the results of the antibiogram. Macrolides at anti-inflammatory doses have shown their clinical and functional effectiveness [2]. ENT management is based on antibiotic therapy during exacerbations combined with basic treatment adapted to the sinus pathology. Topical corticosteroids may be useful in reducing mucosal inflammation [2]. It happens, despite adequate therapeutic management, that the deterioration of respiratory function is inevitable and is complicated by chronic respiratory failure [22]. This is the case of our patient.

CONCLUSION

Primary ciliary dyskinesia is a rare pathology whose symptoms begin early in childhood. The ENT, pulmonary and genital areas are particularly affected. Confirmatory diagnosis remains difficult in resource-limited countries. Treatment is essentially symptomatic. Rheumatoid arthritis can be complicated by extra-articular manifestations, including pulmonary damage, pulmonary fibrosis and mediastinal lymphadenopathy. Primary ciliary dyskinesia associated with pulmonary involvement in rheumatoid arthritis increases the risk of developing respiratory failure. Management must be multidisciplinary in a hospital environment with regular follow-up.

Conflicts of Interest: The authors declare no conflict of interest in relation to this work.

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