

## Epidemiological, clinical and paraclinical aspects of Pott's disease at Brazzaville University Hospital

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### Abstract

**Objective:** Describe the epidemiological, clinical and paraclinical aspects of Pott's disease at the University Hospital Center of Brazzaville.

**Patients and methods:** This was a descriptive, cross-sectional study with retrospective collection carried out in the Rheumatology department of Brazzaville University Hospital from January 1, 2013 to June 31, 2017, i.e. 4 years and 6 months. The diagnosis of Pott's disease was based on anamnestic, clinical and paraclinical arguments.

**Results:** The hospital frequency of Pott's disease was 6.4%. Men predominated (56.4%) with a sex ratio of 1.3. The average age was 46 +/- 16 years (range: 20-80 years). The average time to diagnosis was 6.6 ± 5 months (range: 1-26 months). Alcoholism was the most common cause in 56 cases (50.9%). Spinal syndrome was present in 109 cases (99.1%). All patients had a standard spine x-ray performed. Computed tomography was performed in 28 patients (25.5%), magnetic resonance imaging in 23 patients (20.9%). The most common morphological aspect was spondylodiscitis in 76 cases (69.1%) associating disc pinching (60%), erosion (40%), and demineralization (19.1%). Atypical forms were found in 34 cases (30.9%), dominated by the appearance of spondylitis in 21 cases (61.8%).

**Conclusion:** Pott's disease is a common pathology in developing countries, spondylodiscitis remains the most common morphological form.

**Keywords:** Pott's disease; Epidemiology; Clinical; Paraclinical; University Hospital; Brazzaville

### 1. Introduction

Tuberculous spondylodiscitis, also called Pott's disease, is an infection characterized by the presence and development of Koch's bacillus in the intervertebral disc and adjacent vertebral bodies [1]. It is a re-emerging condition throughout the world and in Africa where it constitutes a real public health problem [2]. It is estimated that approximately one third of the world's population is infected with Mycobacterium tuberculosis [2]. Indeed, the World Health Organization (WHO) in 2015 estimated the number of new cases per year at 10.4 million, of which 1.8 million died [2]. More than 95% of deaths occurred in developing countries. In addition, the advent of HIV/AIDS, added to the unfavorable socio-economic conditions of populations, increases their vulnerability to this disease on our continent [3, 3, 5]. In Africa, tuberculosis regularly has osteoarticular locations including the disco-vertebral location or Pott's disease which represents 35-55% [6, 7, 8, 9]. Pott's disease can have variable clinical expressions, ranging from simple spinal pain to

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serious forms which can combine severe neurological disorders and significant spinal deformations which can jeopardize the functional and/or vital prognosis [10, 11, 12]. The hospital frequency of Pott's disease in Congo is 6.63% [12]. This frequency, combined with its potential seriousness, requires mastery of diagnostic means and imaging remains irreplaceable to establish the diagnosis of this condition [13, 14]. The aim of our study was to describe the epidemiological, clinical and paraclinical aspects of Pott's disease at the Brazzaville University Hospital.

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## 2. Material and methods

This is a descriptive, cross-sectional study conducted from January 1, 2013 to June 30, 2017, i.e. four years and six months (4 years and 6 months) in the Rheumatology department of the University Hospital Center of Brazzaville. We collected the medical files of patients followed for Pott's disease. The diagnosis of Pott's disease was retained on the basis of epidemiological, clinical and paraclinical arguments in the absence of spinal disc biopsy.

-Anamnestic data; we looked for the notion of promiscuity, the notion of tuberculosis contagion, the history of pleuropulmonary or lymph node tuberculosis, the low socio-economic level and the presence of signs of tuberculin impregnation made of an alteration of the general condition, an evening fever or nocturnal, profuse nocturnal sweats. Clinically, the diagnosis of Pott's disease was considered in patients presenting chronic low back or lumbosciatic pain with a mechanical then mixed and finally inflammatory onset), a lumbar or lumboradicular spinal syndrome with gibbosity and/or multidirectional stiffness, the presence or absence of a lower limb deficit syndrome.

Paraclinical data, by the presence of a biological inflammatory syndrome characterized by an acceleration of the sedimentation rate (normal less than 20 mm in the first hour), the increase in C-reactive protein (normal less than 6 mg/l), leukocytosis with polymorphonuclear neutrophils (normal between 4000 and 10,000 white blood cells per cubic millimeter and 1800-7000 polynuclear neutrophils per cubic millimeter) and thrombocytosis (normal 150,000 and 400,000 cells per cubic millimeter). Isolation of Koch bacillus in sputum or gastric samples, puncture of a cold abscess.

Radiologically, the existence of signs of tuberculous spondylodiscitis characterized by global disc narrowing, demineralization of adjacent vertebral endplates, erosions or mirror geodes, paravertebral spindle;

- On MRI by the presence of a hyposignal in T1, a hypersignal in STIR or T1 sequence after injection of gadolinium, the hypersignal in T2 of the disc and adjacent plates with abscess of the paravertebral soft parts and in the space epidural, prevertebral and retropharyngeal.
- -On Computed Tomography (CT), the existence of diffuse disc pinching, demineralization of the vertebral endplates, erosion and mirror geodes, erosion of a vertebral angle, vertebral osteolysis, vertebral fracture and perivertebral or epidural abscess
- -Ultrasound reveals cold abscesses in the psoas muscle.

Therapeutically and progressively, healing under anti-tuberculosis treatment.

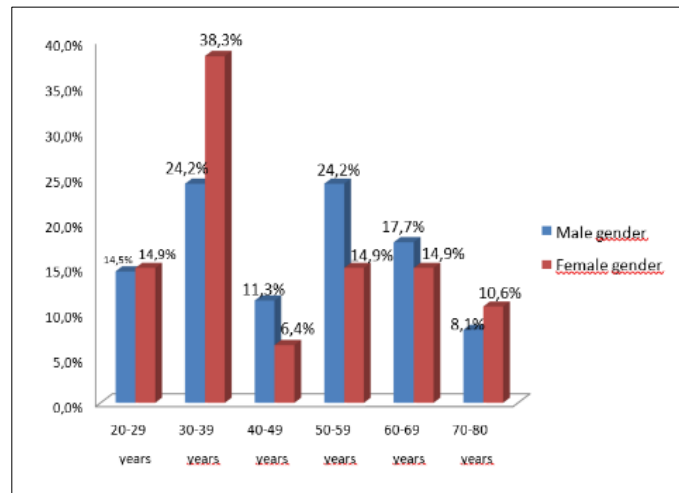
110 documented cases of Pott's disease form the basis of this study. We excluded infectious spondylodiscitis with a common germ; pure inflammatory spondylodiscitis; a medical record that does not include any imaging or poor quality imaging. Epi INFO 7 and Microsoft Excel version 10 software were used to enter and analyze the results. Quantitative variables were expressed as mean  $\pm$  standard deviation and qualitative variables as number (n) or percentage (%).

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## 3. Results

During the study period, we collected 1896 files of patients hospitalized in the Rheumatology department of CHU-B, 110 of which were for Pott's disease, i.e. a hospital frequency of 6.4%. The male gender represented 62 cases (56.4%) and 48 females represented 48 cases (43.6%), i.e. a sex ratio of 1.3. The average age was 46  $\pm$  16 years [20-80 years]. The age group between 30 and 39 was the most represented (figure 1). Clinically, the average time to diagnosis was 6.6 months  $\pm$  5 months with extremes of 1 and 26 months. The clinical manifestations were dominated by spinal syndrome in Spinal syndrome in 109 cases (99.1%), followed by tuberculin impregnation syndrome in 75 cases (68.2%) and Radicular syndrome in 68 cases (61.8%). There was active tuberculosis in 18 cases (16.4%), located at the pleuropulmonary level in 15 cases (13.6%), lymph node and cerebral each in 1 case (0.9%). The risk factors found were alcoholism in 56 cases (50.9%), tuberculosis infection was found in 50 patients (45.5%), previous tuberculosis in 10 cases (9.1%). HIV was the most common comorbidity found in 16 cases (21.4%) followed by diabetes mellitus in 11 (10.0%), liver failure and cancer each in one case (0.9%). Paraclinically and biologically, the blood count was abnormal in 105 patients (%), revealing hyperleucytosis greater than 10,000 elements per mm<sup>3</sup> in 56 cases (%), leukopenia less than 4000 elements per mm<sup>3</sup> in 49 cases (%); inflammatory anemia in 78 cases and lymphocytosis in 64 cases (58.2%).

Measured in 101 cases (91.8%), the sedimentation rate was accelerated in 97 cases (96.0%), C Reactive protein was performed in 106 cases (96.4%), it was positive in Performed in 100 cases (94.3%). AFB testing was positive in six cases. In terms of imaging, standard radiography was the most prescribed imaging in 110 cases (100%). CT scan in 28 cases (25.5%). Magnetic resonance imaging in 23 cases (20.9%). Ultrasound of soft tissues in 24 cases (21.8%). The location in the lumbar spine was the most common in 53 cases (48.2%), followed by the dorsal spine in 29 cases (26.4%) (table 1). Spondylodiscitis was the dominant radiographic appearance in 76 (69.1%). It was characterized by disc pinching (figure 2) in 66 cases (60%), disc disappearance in 10 cases (9.1%), erosion or mirror geode in 44 cases (40%), demineralization in 21 cases (19.1%) (Figure 2) and bodily destruction or osteolysis in 5 cases (4.5%) and vertebral fracture in 6 cases (5.4%). The soft tissue lesion found was a paravertebral spindle in 28 cases (25.4%). Performed in 15 patients, the image of spondylodiscitis on CT scan was characterized by pinching disc lesions in 12 cases. The vertebral lesion was erosion and mirror geodes in 6 cases (21.4%), demineralization of the vertebral endplates in 4 cases (14.2%), bodily destruction or osteolysis in 2 cases (7.1 %) and vertebral fracture in 3 cases (10.7%). Epiduritis was revealed in 10 cases (35.7%). Soft tissue involvement was characterized by a psoas abscess and prevertebral abscess respectively in 8 cases (28.6%) and 2 cases (7.1%). The appearance of spondylodiscitis on magnetic resonance imaging was presented in 9 patients by disc narrowing which was characterized by a T1 hyposignal and a T2 hypersignal. Vertebral damage was characterized by erosion in 4 cases (17.4%), vertebral fracture and bodily destruction respectively in 3 (13.1) and 2 cases (8.7%). soft tissue involvement presented as a psoas abscess in 6 cases (26.1%), a prevertebral abscess in 4 cases (17.4%) and a retropharyngeal abscess in 1 case (4.3%). Apart from the classic form of Pott's disease, we highlighted unusual or atypical forms, which presented in the form of spondylitis in 21 cases (19.1%), involvement of the posterior arch in 9. cases (8.2%) and suboccipital involvement in 4 cases (3.6%). The neurological complication was the most observed. It manifested itself as paraplegia in 54 cases (49.1%) and quadriplegia in 2 cases (1.8%). The rheumatological complication mainly an abscess. It was located at the paravertebral level in 25 cases (22.7%), epidural in 9 cases (8.1%), prevertebral and retropharyngeal respectively in 6 cases (5.4%) and 1 case (0.9%).

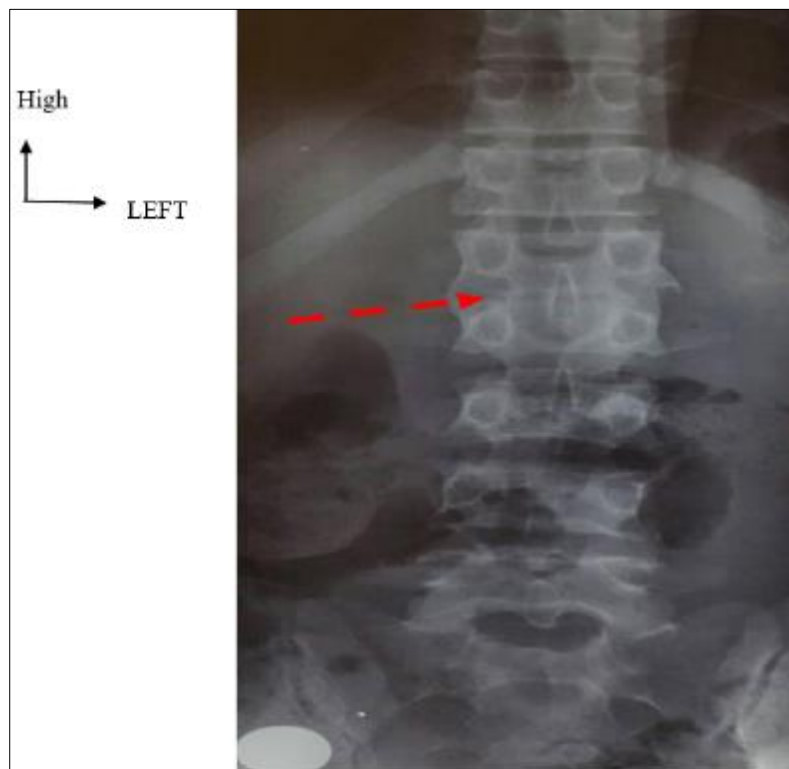


**Figure 1** Distribution of patients age group

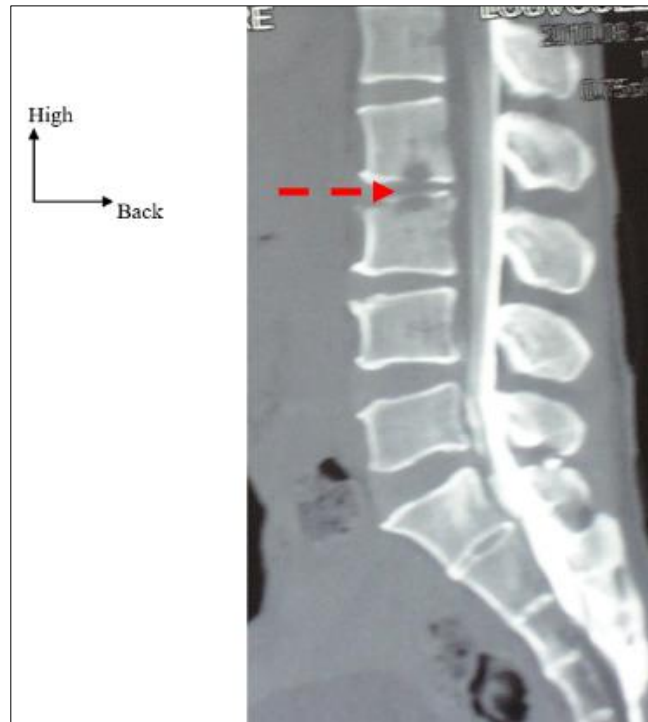
**Table 1** Distribution of patients according to radiological site

	N(110)	%
<b>Cervical</b>		
C2-C3	3	2.7
C1-C2	1	0.9
<b>Dorsal</b>		
D11-D12	8	7.3
D4-D5	5	4.5
D7-D8	5	4.5

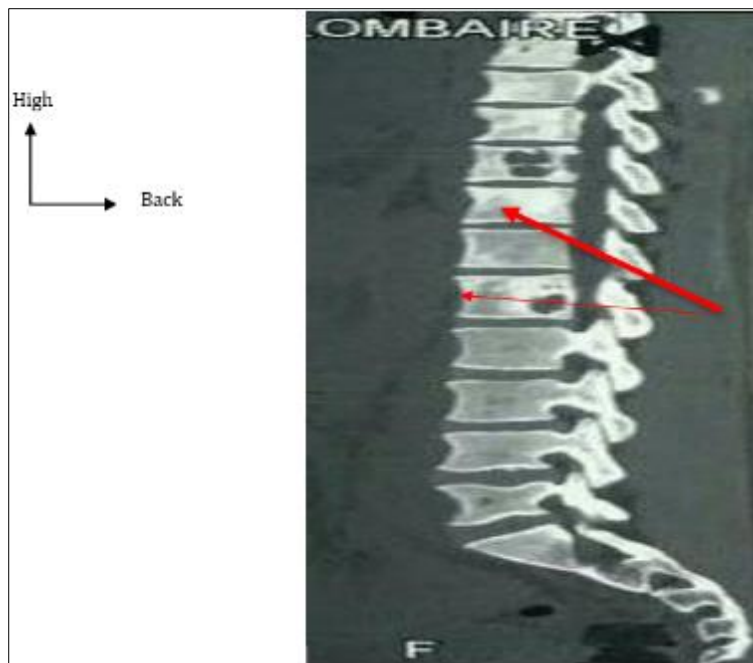
D9-D10	4	3.6
D5-D6	3	2.7
D3-D4	2	1.8
D6-D7	2	1.8
<b>lumbar</b>		
L3-L4	20	18.2
L2-L3	16	14.5
L4-L5	9	8.2
L1-L2	8	7.3
<b>hinges</b>		
T12-L1	11	10
L5-S1	9	8.3
C7-D1	4	3.7



**Figure 2** Frontal x-ray of the lumbar spine, showing diffuse disc narrowing L1- L2 and demineralization (red arrow) during Pott's disease



**Figure 3** Scan of the lumbar spine in sagittal section bone window showing, mirror geodes L2-L3 (red arrow) during a tuberculous spondylodiscitis



**Figure 4** CT scan of the lumbar spine, sagittal section, bone window showing spondylitis (red arrows) in stages during Pott's disease

#### 4. Discussion

The hospital frequency of Pott's disease (6.4%) is stable in our country, in comparison with the study by Ntsiba H et al [12] who reported in their series a hospital frequency of 6.63%. Our result is close to that of Camara P et al [15] in

Senegal in 2006 who reported a hospital frequency of 6.8%, however it differs from those of the series by Gbané-Koné M et al [16] in 2015 in Ivory Coast, by Kayembe JM et al [6] in 2009 in the Democratic Republic of Congo, by Millogo M et al [17] in 2002 in Burkina Faso who report a respective hospital frequency of 10.95%; 3.7% and 0.56%. This difference in frequency is explained by the short period and the small sample size of our study compared to the series by Gbané-Koné M et al [16], but also by the fact that these studies were not carried out in specialized Rheumatology departments. The average age was  $46 \pm 16$  years with extremes of 20 to 80 years and the most represented age group was 30 to 39 years with 30% of cases. Eti E et al [18] in 2010 in Ivory Coast, Kayembe JM et al [6] in Democratic Republic of Congo and Hajji K in 2008 [19] in Morocco report a respective average age of 42.4 years  $\pm$  15, 4 years ; 48 years and 46.2 years identical to ours. This group also corresponds to the age group in working life where men are most exposed to bad behavior such as alcohol and drug addiction. This is also the age group most affected by HIV, which is a known risk factor for tuberculosis and particularly Pott's disease in Africa [2, 5]. Our study found a male predominance (56.4% with a sex ratio of 1.30). This male predominance is classically found in the literature and in various studies. Thus, Toloba Y et al [20] in 2011 in Mali reported a male predominance (57.3%); the same is true for Gbané-Koné M et al [16] in 2015 in Ivory Coast (53.63%) and Hajji K [19] in 2008 in Morocco (53.1%). The time between the appearance of the first symptoms and the establishment of a positive diagnosis of Pott's disease varies greatly depending on the series. As a general rule it is long, this is the case in our study (6.6 months  $\pm$  5 months). Similarly, Zayet et al [21] in 2017 in Tunisia, Boubbou M et al [22] in 2016 in Morocco, Hajji K [19] in 2008 in Morocco report a long diagnostic time of 6, 7 and 6.43 months respectively. . Diagnostic delay is a frequent situation in the African context [12,13]. However, the non-specific and torpid slowly evolving clinical symptoms, the use of traditional treatments, the poor referral of patients as well as the poor care pathway largely justify the diagnostic delay in our context. Clinically, the symptoms are not very specific and are identical to the clinical expression of spinal tuberculosis in general [11, 23, 24, 25]. The clinical picture of Pott's disease is summarized as a spinal syndrome consisting of spinal pain, multidirectional stiffness and the presence of gibbosity, thus constituting the major symptom of the disease in 90% of cases [11]. It may or may not be associated with an infectious syndrome which is most often moderate and sometimes with neurological complications which make Pott's disease so serious, which can lead to death from sepsis and decubitus complications [26, 27, 28]. In our series, spinal syndrome was indicative of Pott's disease in 99.1% of cases. This observation is superimposable to that of the series by Fedoul B et al [11] in 2011 in Morocco and Gbané-Koné M et al [16] in 2015 in Ivory Coast, which respectively reported 98.7% and 100% cases. On the biological level, few effective investigations have been able to be carried out due to the insufficiency of the technical platform. In fact, Koch's bacillus was never detected in our study. Biology does not provide specific arguments. However, the negativity of the IDR, the absence of the inflammatory syndrome and AFB in the samples do not exclude the diagnosis [29]. Rapid diagnosis of tuberculosis by detection of mycobacterial deoxyribonucleic acid by Polymerase Chain Reaction (PCR) is not yet accessible in most developing countries [30]. Spinal disc biopsy is not systematically performed in underdeveloped countries. The diagnosis of spinal tuberculosis is based on presumptive, anamnestic, clinical, biological, imaging arguments and the response to specific treatment conducted for at least 12 months. The contribution of imaging to our country undoubtedly constitutes one of the pillars of the diagnosis of Pott's disease. In our series, all patients had a standard spine radiograph. As for cross-sectional imaging (CT and MRI), it was only performed in 25.5% and 20.9% of patients. Soft tissue ultrasound was performed in 21.8% of cases. In Morocco and Ivory Coast, in the series by Boubbou M et al [24] in 2016 and Gbané-Koné M et al [25] in 2015, cross-sectional imaging is replacing standard radiography in terms of achievement. Indeed, according to international recommendations, cross-sectional imaging should be the first-line examination in cases of spinal tuberculosis. However, in Congo, the low percentage of cross-sectional imaging can be explained on the one hand by the low socio-economic level of our population [31], on the other hand by the fact that it constituted in certain cases of second-line examinations, carried out in the event of diagnostic doubt on standard radiography or complications, but also by the fact that patients consulted late on average five to six months after the start of the disease with already formed lesions. standard radiography. At this time the indication for cross-sectional imaging was no longer useful for diagnosis. In our series the main site of spinal tuberculosis was the lumbar segment in almost half of the cases (48.2%), followed by the dorsal segment in almost a quarter of the cases (26.4%). The L3-L4 floor was the most affected, followed by D11-D12. This observation is unanimously found in several studies including those of Wibaux C et al [32] in 2010 in France, Kayembe JM et al [6] in the Democratic Republic of Congo, Hajji K [19] in 2008 in Morocco and Ntsiba H et al [12] in 2004 in Congo, who reported a lumbar predominance in 50.6%; 57.85%; 62.5% and 45.8% of cases. This predominance would be due to the biomechanics which are more important at the lumbar level with this being the most mobile segment [33]. In our series, spondylodiscitis was the most common anatomo-radiological form. This could be explained by the way the infectious process spreads. Indeed, Pott's disease, like any spinal infection, begins first with a spinal lesion after hematogenous colonization then spread to the disc, all with an insidious evolution of the disease [19, 34]. Several radiological lesions were identified during our study. Thus, on standard radiography, we found disc narrowing (60%), vertebral erosions (40%) and paravertebral spindle (25.4%) as the predominant lesions. These lesions were less frequent on cross-sectional imaging due to the low number of patients who performed these examinations. However, cross-sectional imaging (CT and MRI) revealed epidural and soft tissue damage. Zayet S et al [21] in 2017 and Boubbou M et al [24] in 2012 in Morocco, found the same radiological lesions in their series, although

in different proportions. Atypical forms are widely described by several authors and are the prerogative of tuberculous spondylodiscitis, while common germs are not responsible for atypical forms [27,34]. In our series, 34 patients presented with an unusual form. In Congo and Africa, the presence of unusual forms is linked to numerous multifactorial causes including the long diagnostic delay, poverty, obscurantism and ignorance [13,25]. The predominant unusual form was spondylitis (one in five cases), as reported by Gbané-Koné M et al [25] in 2015 in Ivory Coast in a series of 496 cases (6%) and Boubbou M et al [25] al [24] in 2012 in Morocco in a series of 38 cases (15.8%). This could be explained on the one hand by the fact that anatomically, tuberculous lesions always predominate at the level of the anterior arc of the vertebrae [34]. On the other hand, BK being a bacteria with a very long development, the lesions develop and are limited only to the level of the vertebra at the time of diagnosis, thus explaining the image of pure spondylitis which is sometimes the mode of diagnosis. . Our results agree with those of the series by Hajji K [19] in 2008 in Morocco, and by Gbané-Koné M et al [25] in 2015 in Ivory Coast, which reported a predominance of damage limited to two vertebrae in 72.8% and 61.54% of cases. Lourbes - Lacroix F et al [34] in 2004 in France made the same observation (63.6%). Most often, Pott's disease affects two or more vertebrae contiguously [35]. Multi-vertebral and disc involvement would be a particularity of subjects living in sub-Saharan Africa. It seems to be related to the long diagnostic delay but also to the existence of a debilitating environment (alcoholism, HIV infection, diabetes, drug addiction) [14]. In the literature, the association of an extravertebral location during Pott's disease is found in 20-30% of cases, so their presence helps guide the diagnosis [36]. In our study, 18 patients (16.4%) presented with damage associated with Pott's disease. This concerned the lung with 15 cases out of 110 (13.6%). Identical locations associated with Pott's disease are reported by other authors. Thus, Koné CH [29] in 2007 in Mali, Ntsiba H et al [12] in 2004 in Congo, Bekono CC [36] in 2002 in Mali reported a predominance of pulmonary involvement of 12.1%, 26.4 % and 15.6%. This predominance of pulmonary involvement is due to the fact that the lung constitutes the main entry point for tuberculosis. In our series, paraplegia was the most common complication. It was present in 54 cases (49.1%) and constituted the main reason for consultation and hospitalization. El Khattabi W et al [38] in 2012 in Morocco, Koné CH [29] in 2007 in Mali, Ntsiba H et al [13] in 2004 in Congo, reported a predominance of complications such as paraplegia in 18.8%, 45.5%, 45.4% of cases. This predominance of paraplegia with this high frequency is due to spinal cord compression or epidural damage [39, 40, 41, 42] which would be linked to a long diagnostic delay with significant bone, vertebral and soft tissue lesions.

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## 5. Conclusion

Tuberculous spondylodiscitis or Pott's disease is a common pathology in developing countries. It is the prerogative of young adults in tropical environments, favored by alcoholism, HIV infection, precariousness, a promiscuous environment and unfavorable socio-economic conditions. The symptoms are insidious at first. It results in a late consultation and consequently in often severe orthopedic and neurological complications. The damage predominates at the lumbar and dorsal level. Apart from unusual or atypical forms, spondylodiscitis is the most common morphological form. They lead us to emphasize the role of prevention through anti-tuberculosis vaccination, the improvement of socio-economic conditions, the prevention of HIV and the fight against alcoholism, particularly among young people in our country.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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## References

- [1] Meddeb N, Rammeh N, Chahed M, Sahli H, Elleuch M, Cheour E et al. Current aspects of Pott's disease in Tunisia. About a series of 29 cases. Bull Soc Pathol Exot 2002; 95(4): 269-71.
- [2] World Health Organization. Global tuberculosis control 2016: Epidemiology, Strategy, and Financing. Geneva 2014: who/htm/tb/2016; 162p.
- [3] Harries AD, Zachariah R, Lawn DS, Santos-Filho ET. The HIV-association tuberculosis epidemic-when we will act. Lancet 2010; 375: 1905-19.
- [4] Boulahbal F, Chaulet P. Tuberculosis in Africa: epidemiology and control measures. Med too 2004; 64(3): 224-8.

- [5] Harmouche H, Ammouri W. HIV-Tuberculosis coinfection. *Rev Med Internal* 2009; 309:273-6.
- [6] Kayembe JM, Tshiasuma P, Mupepe D. Tuberculous spondylodiscitis at university clinics in Kinshasa: some observations. *Ann Afr Med* 2009; 3(1): 377-81.
- [7] Richter C, Ndosi B, Mwammu AS., Mbwambo RK. Extrapulmonary tuberculosis, a simple diagnosis? A retrospective study at Dar es Salaam, Tanzania. *Trop Geogr Med* 1991; 43:375-8.
- [8] Tidjani O, Tatagan K, Assimadi K, Amedome A. Extra-thoracic locations of tuberculosis in Togolese children at Lomé University Hospital. *Larc Médical* 1986; 6:191-4.
- [9] Elhj Teo, Peh WCG. Imaging of tuberculosis of the spine. *Singapore Med J* 2004; 45(9): 439-45.
- [10] Cotten A, Fllipo RM, Drouat. Vertebral tuberculosis: study of clinical and radiological aspects from a series of 82 cases. *J. Radiol* 1996; 77:419-26.
- [11] Fedoul B, Chakour K, El Faiz Chaoui M. Pott's disease: about 82 cases. *Pan African Medical Journal* 2011; 8(22): 1-8.
- [12] Ntsiba H, Makosso E, Moyikoua A. Pott's disease in the Congolese rheumatological environment. Analysis of a series of 140 cases. *J Afr Imag Méd* 2004; 7(1): 456-61.
- [13] Bandzouzi-Ndamba B, Mouanga A, Bileckot R, Koubemba CG, Adjien C, Avodé G. Tuberculous spondylodiscitis (Pott's disease) at Brazzaville University Hospital: Diagnostic difficulties and presumptive treatment. *Benin Medical* 2007; 37:66-70.
- [14] Mabilia Babela JR, Makosso E, Nzingoula S, Senga P. Radiological aspects of Pott's disease in children. About 92 cases. *Bull Soc Pathol Exot* 2005; 98(1): 14-7.
- [15] Camara P, Margery J, Ba-Fall K, Diop A, Lefevre N, Chevalier B et al. Pott's disease in adults at the Principal Hospital of Dakar. *Rev PneumolCclin* 2006; 62:258-9.
- [16] Gbané-Koné M, Ouattara B, Diomandé M, Sessou V, Kaboré F, Djoko KF et al. Contribution of computed tomography in the diagnosis of spinal tuberculosis in 496 cases in Abidjan. *Pan African Medical Journal* 2015; 20:201-6.
- [17] Millogo M, Ki-Zerbo GA, Bamouni A, Sawadogo AB, Lankoandé D. Pott's disease: about 32 observations at the national hospital center of Bobo-Dioulasso (Burkina-Faso). *Méd Afr Noire* 2002; 49(3): 142-5.
- [18] Eti E, Daboiko JC, Brou KF, Ouali B, Ouattara B, Kouakou NM. Vertebral tuberculosis. Our experience based on a study of 147 cases in the rheumatology department of Cocody University Hospital (Abidjan, Ivory Coast). *Med Afr Noire* 2010; 57(5): 288-92.
- [19] Hajji K. Cross-sectional imaging of tuberculous spondylodiscitis in 81 cases and review of the literature. Doctoral thesis in Medicine. Marrakech; 2008, n°90: 115p.
- [20] Toloba Y, Diallo S, Maiga Y, Sissoko BF, Ouattara K, Soumaré D. Vertebral tuberculosis (Pott's disease): Clinical, radiological and progressive epidemiological aspects at Point G University Hospital. *Mali Médical* 2011; 26(2): 8-11.
- [21] Zayet S, Berriche A, Ammari L, Abdelmalek R, Fakher K, Kilani Bet al. Radiological aspects of Pott's disease in Tunisia. *J Infect* 2016; 72(1): 125-6.
- [22] Boubbou M, Houssaini-Squalli N, Tizniti S. Contribution of MRI in tuberculous spondylodiscitis. *Maghreb Review of Neurosciences* 2012; 5:1-8.
- [23] Maftah M, Lmejjati M, Mansouri A, El Abbadi N, Bellakhdar F. Mal de pott about 320 cases. *Medicine of the Maghreb* 2001; (90): 19-22.
- [24] Boubbou M, Houssaini-Squalli N, Tizniti S. Contribution of MRI in tuberculous spondylodiscitis. *Maghreb Review of Neurosciences* 2012; 5:1-8.
- [25] Gbané- Koné M, Ouali B, Coulibaly AK, Diomandé M, Yao JC, Eti E, Kouakou NM. Cervical involvement in Pott's disease: Epidemiological-clinical and radiological aspects of 26 cases in Abidjan. *Mali Medical* 2015; 30(2): 15-8.
- [26] Badreddine K, Ammari L, Tiouri H, Kanoun F, Gouboutini. Bacterial to pyogenic or tuberculous spondylodiscitis? *Ann Med Int* 2001; 152(4): 236-41.
- [27] Boussel I, Marchand B, Bilineau N, Pariset C, Hermeir M, Picaud G, Emin M. Imaging of osteoarticular tuberculosis. *J Radiol* 2002; 83:1025-34.



- [28] Lezar S, Moubachir N, Siwane A, Adil A, Moujtahid M, Kadiri R. Radiological aspects of osteoarticular tuberculosis. *Medicine of the Maghreb* 2006; 114:120-3.
- [29] Koné CH. Study of the epidemiological-clinical aspects of tuberculous spondylodiscitis (or Pott's disease): about 33 cases at the Point G University Hospital. Doctoral thesis in Medicine, Bamako; 2007, no. 938: 79p.
- [30] Ndri'Oka D, N'dri-Youboue MA, Varlet G, Haidara A, Bazeze V. Spinal tuberculosis: Epidemiological and diagnostic aspects (about 25 clinical observations in Ivory Coast). *Cah Health* 2004; 14(2): 81-4.
- [31] Ministry of Planning, National Development Plan in the Republic of Congo, [www.nationalplanningcycles.org](http://www.nationalplanningcycles.org), November 2017.
- [32] Wibaux C, Moafo-Tiatsop M, Andrei I, Biver E, Cotten A, Cortet B et al. Evolution of the incidence and management of spinal tuberculosis within a French university Rheumatology department from 1966 to 2010. *Rev Rhum* 2013; 50:286-9.
- [33] Garg RK, Somvanshi DS. Spinal tuberculosis: A review. *Journal of Spinal Cord Medicine* 2011; 34(5): 440-54.
- [34] Loubes-Lacroix F, Gozlan A, Cognard C, Manelfe C. Diagnostic imaging of infectious spondylodiscitis. *EMC-Radiology* 2004; 1:295-315.
- [35] Lee TC, Yang LC, Huang HY, Liang CL. Transpedicular instrumentation as an adjunct in the treatment of thoracolumbar and lumbar spine tuberculosis with early stage bone destruction. *J Neurosurg Spine* 1999; 91(2): 163-9.
- [36] Bekono CC. Radiological aspects of tuberculous spondylodiscitis or Pott's disease in Bamako. Doctoral thesis in Medicine. Bamako; 2002. n°876: 58p.
- [37] Akhaddar A, Gazzaz M, Jiddne M, El hassani MR, Chakir N, El Khamlichi A et al. Tuberculous osteitis of the posterior vertebral arch: A case report. *J Radiol* 2001; 82:257-60.
- [38] El Khattabi W, Aichane A, Moussali N, Riah A, Berrada Z, AfifbH et al. Pott's disease (about 16 cases). *Revue de Pneumologie Clinique* 2012; 68:275-81.
- [39] Diomande M, Ouali B, Ouattara B, Eti E, N'Zué Kouakou M. Tuberculosis of the posterior vertebral arch: about a case observed at the Cocody University Hospital in Abidjan. *Rev Mar Rum* 2015; 32:53-5.
- [40] Mulleman D, Mammou S, Griffoul I, Avimadjé A, Goupille P, Valat JP. Characteristics of patients followed for spinal tuberculosis in a rheumatology department of the University Hospital in France. *Rev Rum* 2006; 73(7): 716-20.
- [41] Andrianarimanitra HU, Rajaonarison NLH, Randrianalison ML, Ahmad A. Significant radiological lesions in pauci-symptomatic spondylodiscitis. *Pan Afr Méd J* 2014; 18:282-7.
- [42] Bosmans S. "Early" or atypical infectious spondylodiscitis: diagnosis by MRI. End of specialization thesis in radiology, Brussels; 2007: n°402: 33p.