



Patterns of Abscesses of Soft Tissue in Spinal Tuberculosis: Frequency, Topography and Therapeutic Means of 311 Cases Observed in Abidjan (Ivory Coast)

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Authors' contributions

This work was carried out in collaboration between all authors. Authors VST, ESCLK, MGK, AKC and KJMD contributed to the study design, coordination of the project and interpretation of the data. Author ESCLK translated the manuscript in from French to English. Author MD designed the study, wrote the protocol, did the data collection, performed the statistical analysis and wrote the manuscript. Author VST managed the sample size estimation and statistical analysis. Authors BO, EE, JCD and MNK revised the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: The research of soft tissue abscesses in spinal tuberculosis is important and can help in the diagnosis of certainty. These abscesses also have a prognostic and therapeutic interest. The aim of this study is to determine the frequency, topography and the therapeutic means of the abscesses of soft tissue in spinal tuberculosis.

Methodology: This descriptive retrospective study covered 311 cases of patients (167 men and 144 women, age range 4-88 years) with soft tissue abscesses on spinal tuberculosis, detected by

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imaging. The patients have been selected in the rheumatology department of the University Hospital Center of Cocody in Abidjan from January 2003 to December 2013. We were interested to epidemiological, topographical and therapeutic data. Fishers exact test was used to test the significance of association between different variables. Level of significance was set at 0.05.

Results: The prevalence of abscesses was 72.8% that was 311 cases among these 427 records of spinal tuberculosis collected during the study period. The total number of patients was dominated by men (53.6%) and the average age was 43.1 years. Computed tomography scan was the main diagnostic imaging (97.7%). The topography of soft tissue abscesses was: subcutaneous area (1.2%), paraspinal muscles (95.1%), retro-pharyngeal area (10.6%) and epidural area (19.6%). Osteoarticular lesions associated with abscesses were: Spondylodiscitis (96.1%), spondylitis (2.8%) and zygapophyseal arthritis and osteitis (4.5%). The majority of patients had tuberculosis treatment lasting 12 months: 2 months of the combination Rifampicin-Isoniazid-Pyrazinamide-Ethambutol following by 10 months of Rifampicin-isoniazid. The outcome was favorable marked by the resorption of abscesses and the healing of patients.

Conclusion: The soft tissue abscesses are common in spinal tuberculosis in Abidjan. They mostly sit at the paraspinal muscles. Their treatment involves corticosteroid-associated with tuberculosis treatment.

Keywords: Soft tissue abscesses; spinal tuberculosis; osteoarticular tuberculosis; mycobacterium tuberculosis.

1. INTRODUCTION

Soft tissue abscesses in spinal tuberculosis (ST) is the consequence of spinal infection and it is formed from pus, granulations and necrotic debris. Its frequency ranges from 12,5 to 80% in ST depending on the continent [1-5]. These abscesses may put at stake the prognosis for life (by compression of medulla oblongata at the cervical vertebrae) and the functional prognosis (neurological deficit by spinal or nerve root compression at the level of cervical, dorsal or lumbar spine). Its presence may help in the diagnosis of certainty by the demonstration of acid-fast bacilli (AFB) or by the identification of Mycobacterium tuberculosis by polymerase chain reaction (PCR BK). This latter technique is rather specific (92-96%) [1]. It can be an alternative to the diagnosis of certainty in our context, given the difficulty to perform disco-vertebral biopsy and this because of the poor technical platform. Thus the search for soft tissue abscesses becomes important. The objectives of this study were:

- To determine the frequency and topography of abscesses of soft tissue in patients with ST
- To determine the therapeutic means for its management.

2. PATIENTS AND METHODS

2.1 Study Design

We carried out a descriptive retrospective study in the rheumatology department of the University

Hospital of Cocody in Abidjan over a 10-year-period, from January 2003 to December 2013.

2.2 Study Population

All patients in the university hospital center were informed that their records could be used for the realization of a study and they gave their consent. Were included patients in whom soft tissue abscesses were identified on imaging (plain film radiography, ultrasound, computed tomography scan (CT scan), magnetic resonance imaging (MRI), on a presumptive or certainty diagnosis of ST. Records in which the anamnestic, clinical, biological and radiological items, keys for diagnosis were missing, were not included. We accepted the diagnosis of ST on the basis of histological evidence (determination of Koster follicle on the specimen of disco-vertebral biopsy) or on bacteriological evidence (by the presence of AFB in the various biological body fluids or by PCR BK). The presumptive diagnosis of ST was based on the combination of anamnestic arguments (notion of tuberculosis contagion, history of tuberculosis, notion of promiscuity, poverty or insecurity), clinical arguments (stiff spine, rib hump, tuberculous impregnation signs (TIS): Vesperal fever, poor general condition, night sweats, chronic insidious evolution), biological arguments (tuberculin skin test positive or phlyctenular, HIV positive, acceleration of erythrocyte sedimentation rate (ESR) or high C-reactive protein (CRP) radiological arguments (spondylodiscitis, spondylitis, spinal osteitis or osteoarthritis), therapeutic and evolutionary arguments on

tuberculosis treatment (the healing on tuberculosis treatment after 12-18 months). The identification of a soft tissue abscesses was done by plain film radiography of the spine, ultrasound of the soft parts of the spine, CT scan or MRI of the segments of the spine.

2.3 Study Design

A survey form helped to collect:

- Sociodemographic data (age, gender).
- Clinical data (history of tuberculosis, notion of tuberculosis contagion, duration of the evolution of the disease, signs of tuberculous impregnation).
- Biological data (tuberculin skin test, HIV status, ESR and CRP).
- Imaging Data: Radiological lesions observed (spondylitis, spondylodiscitis, zygapophyseal osteitis and arthritis, osteitis of the vertebral posterior arch).
- The topography of abscesses.
- Therapeutic data (corticosteroids, puncture-drainage, surgery, protocol and duration of tuberculosis treatment).

2.4 Statistical Analysis

Fisher's exact test was used to research a association between variables. The test was statistically significant when P was strictly inferior to 0.05. ($P < 0.05$).

3. RESULTS

According to the selection criteria, we selected 427 records of ST out of 550 cases of osteoarticular tuberculosis that is 77.6% of cases. The prevalence of abscesses was 72.8% that is 311 cases among these 427 records of ST recorded during the study period. The total number of patients consisted of 167 men (53.6%) and 144 women (46.4%) that is a sex ratio of 1.1. The average age was 43.1 years (extremes: 4 and 88 years).

Seventy eight patients had a history of tuberculosis (25%). A notion of tuberculosis contagion was revealed in 83 patients (26.6%). The disease developed for more than 3 months in 72.9% of patients and for less than 3 months in 17.1% of patients with an average of 7 months. There were signs of tuberculous impregnation in 77.1% of cases. HIV serology was positive in 44 patients (14.1%).

The CT scan and MRI were performed respectively in 97.7% and 7.5% of cases. Soft

tissue abscesses (Fig. 1) had the following locations: subcutaneous abscess (1.2%), abscess of paraspinal muscles (95.1%) including 90 psoas muscle abscess, retro-pharyngeal abscess (10.6 %) and epidural abscess (19.6%). Osteoarticular lesions associated with abscesses were: Spondylodiscitis (299 cases that is 96.1%), spondylitis (9 cases that is 2.8%) and zygapophyseal osteitis and arthritis (14 cases that is 4.5%). Table 1 shows a correlation between sociodemographic, clinical and paraclinical parameters on the one hand and the presence of abscesses on the other hand. Table 2 shows the topography of abscesses according to the radiological lesions found.



Fig. 1. Lumbar CT scan showing multiple abscesses of paraspinal muscles on a tuberculous spondylodiscitis

The treatment of abscesses was based on corticosteroids (193 cases that is 62.6%), puncture-drainage of abscesses (17 cases that is 5.5%) and surgery (2 cases that is 0.6%). Patients were all put on tuberculosis treatment according to the protocol two months of the combination Rifampicin-isoniazid-pyrazinamide, Ethambutol (RHZE) followed by 10 months of Rifampicin-isoniazid (RH) that is a total of 12 months of treatment in 82.91% of cases. Patients in whom the abscesses persisted at 12 months had 18 months of treatment that is 17.09% of cases (2 months RHZE and 16 months RH). The outcome was favorable marked by the resorption of abscesses on imaging after treatment and cure of patients.

Table 1. Parameters associated with the presence of abscess

Parameters		Abscess (+)	Abscess (-)	P
Gender	Male	167	59	0.66
	Female	144	57	
Tuberculosis history		78	52	0.0001
Tuberculosis contagion		83	29	0.8
TIS		240	72	0.002
Evolution time	≥ 3 months	227	79	0.33
	< 3 months	84	37	
HIV positive		44	18	0.75
Associated lesions	Spondylodiscitis	299	100	0.00061
	spondylitis	9	4	0.75
	Arthritis or zygapophyseal osteitis and arthritis	8	7	0.09

(+): presence of abscess (-): absence of abscess

Table 2. Topography of radiological abscess and lesions found

	Spondylodiscitis	Spondylitis	Arthritis or zygapophyseal osteitis and arthritis
Subcutaneous abscess	4	0	0
Paraspinal abscess	279	9	8
Epidural abscess	58	0	3
Retropharyngeal abscess	32	0	1

4. DISCUSSION

Our high prevalence (72.8%) close to that of Alothman et al. (80%) in Asia was significantly higher than that of Elkhatabi et al. (40%) in the Maghreb, Wibaux et al. (40.7%) in France as well as that of Toloba et al. in sub-Saharan Africa (12.5%) [2-5]. This finding is explained mainly by the delay in the diagnosis of ST. This disease has rather insidious installation or even misleading and is responsible for a delayed diagnosis by 7 months on average in our study. This period was within the range estimated by the literature: 3 to 12 months (average of 10.8 months) [6-9]. Therefore, many patients were hospitalized at the stage of neurological complications: 27,2% in the series of Eti et al. [10]. According to Ferro et al, 80-90% of patients arrive at the hospital with severe lesions: Bone destruction (30%), hump, abscess (50%), fistula (2-6%), paraplegia (23-25%), multifocal locations (4-13%) [11]. In Europe, this significant rate of presence of abscesses found its explanation in the origin of the patients concerned. Indeed, the vast majority of populations affected by ST were immigrant populations from tuberculosis endemic areas [8,12-14].

Our patients were adult subjects as shown in the study of Fedoul et al. (43.1 years) and Dum et al (44,5 years) with an average age of 43.1 years [9,15]. A slight male predominance was noted in our study. On the other hand in Rafiqi et al. [16] females were predominant. Nevertheless neither sex is dominant according to most authors [1,17,18].

These abscess in our study were located most often in the paraspinal muscles especially at the level of psoas muscle as mentioned in most publications on spinal tuberculosis [3,9,19,20-23]. It is about cold abscess in the lumbodorsal region: The favorite area of tuberculous spondylodiscitis [8,19,20,24-27]. We noted in our study two particular locations:

- The retro-pharyngeal abscess (10.6%), which can manifest by otorhinolaryngology signs (dysphonia), gastrointestinal signs (dysphagia, gastroesophageal reflux) and pulmonary signs (dyspnea) with a risk of diagnostic error. They are cause of sudden death by compression of the medulla oblongata.
- The epidural abscess (19.6%), cause of spinal cord compression whose main etiology was tuberculous spondylodiscitis according to Diomandé et al. [28]. This latter lesion was predominant in our study (90.9%), where it was significantly associated with the presence of abscesses (P = 0.00061), as well as a tuberculosis history (P = 0.0001) and tuberculous impregnation signs (P = 0.02). Spondylodiscitis remains the most classic lesion of spinal tuberculosis [26,27]. The zygapophyseal involvement (4.5% of cases) is an unusual location of osteoarticular tuberculosis [29].

Therapeutically, in addition to tuberculosis specific treatment, treatment of abscesses was based, as suggested by many authors, on

puncture-drainage and surgical drainage of abscesses [20,30,31]. Puncture drainage is systematic in case of a large abscess because it can hinder the action of tuberculosis drugs; surgery that is widely and readily practiced elsewhere is limited by its cost still too high in our context because of lack of health insurance and increased poverty. A special feature in our study: the high rate of use of steroids used for anti-oedematous, analgesic and anti-inflammatory purposes with satisfactory results.

5. CONCLUSION

The soft tissue abscesses are common in ST in Abidjan and are present in adult subjects most often male. They usually sit at the paraspinal muscles and psoas muscle mainly was associated with spondylodiscitis. Corticosteroid associated with tuberculosis treatment is the main treatment of abscesses in our context.

CONSENT

In our country (Côte d'Ivoire), all patients who are hospitalized in a University Hospital Center, know that their records will be use for a study, so they agree automatically.

ETHICAL APPROVAL

We have submitted our protocol to the National Ethics Research Committee of Côte d'Ivoire (in French "Comité national d'éthique et de la recherche") with the number or reference which is N/Ref: 121/MSHP/CNER-kbn. The protocol was approved by this committee. The study complied with the principles of the Declaration of Helsinki, 1964.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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