Case report

Case Study on Tabetic Arthropathy: Exploring the Connection Between Neurological Disorders and Joint Damage

ABSTRACT

AIMS: Our aim is to describe the clinical, biological and radiological characteristics of Tabetic Arthropathy (TA) and to demonstrate that this pathology is still relevant in our context, illustrated by two case reports.

CASE 1: A 68-year-old man, with no particular pathological history, presented painless swelling of left knee lasting for 1 year. Physical examination showed positive patella tap, painless mobilization with limited flexion ataxia, negative Romberg's test and positive Argyll Robertson pupils. Syphilitic serology was positive in blood and in joint fluid and doubtful in cerebrospinal fluid. Knee X-ray showed massive joint destruction with osteolysis and condensation of tibial plateau.

CASE 2: A 54-year-old man, followed since 2010 for neuro-syphilis with tabetic arthropathy of the two hips, presented for a large painless left knee that started two months before. Physical examination showed a positive patella tap, painless mobilization with limited flexion, tabetic gait, preserved DTR with positive Romberg's test. Syphilitic serology was positive in blood, and in joint fluid. Knee X-ray showed a Genu Valgum with advanced Patellofemoral arthritis and a reconstruction image at the upper edge of the patella.

Their treatment was based on penicillin G.

DISCUSSION: TA a rare complication of neuro-syphilis, has become exceptional due to early syphilis treatment. It is characterized by its usual indolence and the importance of bone deformities. Positive syphilitic serology in joint fluid, blood and/or CSF is essential for diagnosis. Penicillin G is the cornerstone of currently available therapies. Orthopedic treatments are suggested according to the importance of destruction. TA remains difficult to manage due to the severity of the disability, hence the importance of early diagnosis.

CONCLUSION: Prevention through early detection and treatment of syphilis is necessary because of therapeutic difficulties and complications of this joint form.

Keywords: Tabetic arthropathy, syphilis, serological diagnosis, penicillin G

INTRODUCITON

Syphilis is a sexually transmitted infection caused by Treponema pallidum, in the absence of treatment neurosyphilis can be seen at various stages of the disease. According to WHO, Neurosyphilis accounts for 56%-70% of all visceral syphilis and is a complication in 5%-10% of cases of untreated syphilis. (1)

Tabetic Arthropathy (TA), is a rare complication of neuro-syphilis. Indeed, it is a chronic condition characterized by articular lesions of nervous origin, the knee being the joint frequently affected (2)

It is a consequence of a loss of painful and proprioceptive innervation, responsible for major destruction of joints that are continually subjected to the traumas of everyday life. It has become exceptional thanks to the early treatment of syphilis with penicillin. It complicates about 10% of tabes.(3)

At this stage of the syphilitic disease there is no lasting acquired immunity, reinfection is possible even after treatment and the persistence of anti-treponemal antibodies does not confer protective immunity (4,5).

Our aim is to describe the clinical, biological and radiological characteristics of Tabetic Arthropathy (TA) and to demonstrate that this pathology is still relevant in our context, illustrated by two case reports.

PRESENTATION OF CASES

Case 1: A 68-year-old man, with no particular pathological history, presented painless swelling of left knees lasting for 1 year, causing lameness in a context of apyrexia.

Physical examination showed a large swelling of the left knee without inflammatory signs, positive patella tap, painless mobilization with limited flexion. The neurological examination found ataxia and diminished deep tendon reflexes (DTR), negative Romberg's test and positive Argyll Robertson pupils. Syphilitic serology was positive in blood and in joint fluid and doubtful in cerebrospinal fluid (CSF) **(Table I).**

Table I. Laboratory Data of the Patient "case 1".

	TPHA*	VDRL*
Blood	Positive : 2560	Negative
Joint fluid	Positive : 320	Negative
CSF	Doubtful	Negative

TPHA (Treponema Pallidum Hemagglutinations Assay)*

VDRL (Venereal Disease Research Laboratory)*

Knee X-ray showed massive joint destruction with osteolysis and condensation of tibial plateau. Depression of the internal tibial plateau with detachment of multiple bone fragments and adjacent osteochondrosis with genu valgum (Figure 1). The diagnosis of TA was retained, and the patient was put on penicillin G, 20 million units a day for two weeks, with slight clinical improvement after 10 days. Traumatologists have indicated a left orthosis and scheduled surgery after antibiotic therapy.

Fig. 1. Destruction of the left knee joint

Case 2: A 54-year-old man, followed since 2010 for neuro-syphilis with tabetic arthropathy of the two hips having received seven cures of penicillin G. He consulted for a large painless left knee that started two months before.

The physical examination revealed a large swelling of the left knee without inflammatory signs a positive patella tap, painless mobilization with a limited flexion of 30 ° with a 5 ° flexion leading to tabetic gait. The neurological examination found ataxia, preserved DTR with positive Romberg's test. Syphilitic serology was positive in blood, and in joint fluid **(Table II).**

Table II. Laboratory Data of the Patient "case 2".

	TPHA	VDRL
Blood	Positive : 1/81920	Positive : 1/8
Joint fluid	Positive : 1/40960	Negative

Knee X-ray showed a Genu Valgum with tibiofemoral and patellofemoral joint narrowing and a reconstruction image at the upper edge of the patella and the medial border of the tibiofemoral joint, with projection of some osteochondromas **(Figure 2).**

The diagnosis of TA was retained, and the treatment was based on penicillin G, 24 million units a day for 21 days.

Fig. 2. Left tibiofemoral osteoarthritis with reconstruction

DISCUSSION

Syphilis is a sexually transmitted infection caused by Treponema pallidum, a bacterium of the spirochete family, very fine, with a Gram-negative cell wall, which cannot be cultivated. Its diagnosis is based on the positive results of the tests: TPHA and VDRL tests. In the absence of treatment neurosyphilis can be seen at various stages of the disease. Indeed, meningeal involvement is frequent but often remains silent, it is only symptomatic in 5-10% of cases, either in the context of early neurological syphilis, or late syphilis with tabes (6).

At this stage of the syphilitic disease there is no lasting acquired immunity, reinfection is possible even after treatment and the persistence of anti-treponemal antibodies does not confer protective immunity (4,5).

Tabetic arthropathy (TA) is a chronic degenerative condition secondary to a loss of painful and proprioceptive sensory innervation, which leads to significant joint destruction (7) (8). It is present in 10% of cases of tabes, generally 10 to 20 years after its first signs (2) (9). This serious condition has become exceptional thanks to early treatment with penicillin (10).The initial description of tabetic arthropathies came from Charcot in 1868 (11,12), completed by Kroenig from 1884 and clarified by the anatomical studies of Abadie in 1900 (2). Then Alajouanine and Thurel specify the radiological aspects in 1934 (11,12),The male predominance is noted in the literature with an average age of 60 years (10) which agrees with our cases.

Tabetic arthropathy is characterized **clinically** by the striking contrast between the extent of joint deformities and indolence (2,13)Its mode of onset can be abrupt during an improper movement or subacute over few days, with a sensation of cracking and a buckling of the legs (14).

Topographically, all the joints can be affected with a clear predominance for the lower limb (2). There are also polyarticular and bilateral forms (7).The knee joint is the most frequently affected followed by the ankles, hips and shoulders (15). Our two patients had knee involvement.

The **pathogenesis** of these arthropathies is based on two theories that have been raised by several authors (7):

- A mechanical theory due to joint anesthesia removing all protection from the joint, which will be exposed to repeated trauma. Tabetic arthropathy would be then, a post-traumatic osteoarthritis (15).
- A trophic theory related to lesions of the sympathetic system which disturb osteoarticular trophicity by a vasculosympathetic mechanism with osteoclastic hyper-resorption explaining spontaneous fractures (16).

The **radiological** aspect often shows demineralization lesions, osteophytes, lines of intra-articular fractures and more or less clear compression of the epiphyses, in particular at the level of the tibial plateaus (2,3,14). At an advanced stage, there are signs of a characteristic association of destructive and constructive lesions which define the atrophic and hypertrophic forms (7).

In the absence of a context of syphilitic disease, the association of painless joint deformity and radiological images of joint destruction with or without neurological signs should suggest the diagnosis of tabetic arthropathy (7,15).

However, the demonstration of positive syphilitic serology in joint fluid, blood and/or CSF is essential to retain the diagnosis (9). In our patients, syphilitic serology was positive in blood and joint fluid.

Serological tests for the diagnosis of syphilis include nontreponemal tests and treponemal tests. Non-treponemal tests (VDRL, RPR) are rapid, simple and inexpensive, but have limited sensitivity to primary syphilis and late latent syphilis (17) (18).

- Treponemal tests include Treponema pallidum hemagglutination test, Treponema pallidum particle agglutination test, and FTA-ABS test.
- Treponemal tests correlate poorly with disease activity, and they are used primarily to confirm a positive non-treponemal test. However, they can be used for the diagnosis of late syphilis despite a negative non-treponemal test (17) (18).

Care should be taken when interpreting the results as the sensitivity and specificity are different depending on the type of test and the stages of syphilis (19).

Penicillin G is the cornerstone of therapies currently available. Its main purpose is to sterilize infectious lesions and stabilize joint damage.The dose varies from 20 to 30 million units per day for three weeks, the number of cures is variable: 2 to 4 cycles depending on the clinical, biological and evolutionary data of the disease (2,8,14,15). In case of penicillin allergy, cyclins (mainly doxycycline) can be used) (7) (3). Our two cases received penicillin G.

Local treatment including joint lavage, local corticosteroid therapy or synoviorthesis can be proposed in case of significant effusion (15). At the same time, orthopedic treatment is often indicated, but remains disappointing so far (16).

Reducing joint instability with immobilization and non-weight bearing is of paramount importance in protecting against even minor trauma that can worsen the impairment (15) (3). The indication for **prosthetic arthroplasty** is limited by the extent of the destruction, the local condition and the risk of loosening. **Arthrodesis** is often indicated in the most altered forms of TA with a deformed and unstable joint (15).

Arthrodesis was indicated in case 1, but was not performed due to lack of financial means.

CONCLUSION:

Tabetic arthropathy is currently a rare condition that is often overlooked, occurring during the evolution of tabes in 10% of cases. Arthropathy due to untreated syphilitic infection is not only a disease of historical interest, but in our context still relevant today.

We should have the reflex to evoke this diagnosis in front of any patient presenting a rapid articular destruction without apparent causes, especially if there is a contrast between the extent of joint destruction and clinical indolence.

Early consideration and confirmation of the diagnosis using serological tests, can allow timely administration of appropriate interventions such as penicillin therapy and no weight bearing.

Above all, the best treatment requires early and effective treatment of syphilis, without forgetting the important role of the prevention of syphilis as a sexually transmitted disease.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

REFERENCES:

1. Yahyaoui M, Serragui S, Regragui W, Errguig L, Mouti O, Benomar A, et al. [Epidemiological and clinical aspects of neurosyphilis in Morocco]. EMHJ - East Mediterr Health J 11 3 470-477 2005 [Internet]. 2005 [cité 1 avr 2023]; Disponible sur: https://apps.who.int/iris/handle/10665/116968
2. Zouhair K, Akhdari N, El Ouazzani T, Lazrak S, Lakhdar H. Tabetic arthropathy: "a forgotten disease". Annals of Dermatology and Venereology. 2004 Aug;131(8‑9):787‑9.
3. Rafai MA, Oumari S, Boulaajaj FZ, Gynerane M, Moutawakkil BE, Slassi I. Severe tabetic arthropathy revealing neurosyphilis. NPG Neurology - Psychiatry - Geriatrics. 2010 Oct;10(59):225‑8.
4. Musher DM, Schell RF. The Immunology of Syphilis. Hosp Pract. déc 1975;10(12):45‑50.
5. Hanff PA, Fehniger TE, Miller JN, Lovett MA. Humoral immune response in human syphilis to polypeptides of Treponema pallidum. J Immunol. 1 sept 1982;129(3):1287‑91.
6. Leroux M, Pasquet A, Baclet V, Alcaraz I, Melliez H, Cheret A. Syphilis neurologique révélée par un tableau évocateur d'artérite temporale et de pseudopolyarthrite rhizomélique. Ann Dermatol Vénéréologie. 2013;140(10):619‑22.
7. El-Fatimi A, Mkinsi O, Etaouil N, Benyahya E, Janani S, Bennis R. Tabetic arthritis of the knee: About 4 cases. Rheumatology [Internet]. 1997 [cited 2023 Jan 31]; Available at: https://www.semanticscholar.org/paper/Les-arthropathies-tab%C3%A9tiques-du-genou-%3A-A-propos-de-El-Fatimi-Mkinsi/7cbe2404c4cab2f02a6eb7c29bbc5f2718e256dc
8. Hsaini Y, Karouache A, Satte A, Zerhouni A, Bourazza A. Ataxia revealing tabetic arthropathy of the spine. The Medical Press. 2010 Oct;39(10):1109-11.
9. Kim CW, Lee CR. Multifocal neuropathic arthropathy in patient with undiagnosed neurosyphilis: A case report. Int J STD AIDS. juin 2017;28(7):729‑31.
10. GRAUER JL, DREVET JG, ZAGALA A, PHELIP X. Osteoarticular manifestations of syphilis. About two cases. Rheumatology (Aix-Bains). 1985;37(10):321‑6.
11. Rąpała K, Obrębski M. Charcot's Arthropathy of the Hip Joints. J Arthroplasty. août 2007;22(5):771‑4.
12. Charcot J. M. On some arthropathies which seem to depend on a lesion of the brain or the spinal cord. Arch, physiol norm and pathol. 1868;1:161‑78.

13. Hsaini Y, Mounach J, Satté A, Zerhouni A, Qacif H, Mosseddaq R. Arthrotabes: about five cases. The Journal of Internal Medicine. Jun 1, 2007;28:101.

14. Tinni IA, Yaméogo NW, Compaoré V, Savadogo JE, Ouédraogo M, Zabsonré/Tiendrébéogo WJS, et al. Tabetic arthropathy: a condition not to be forgotten. Francophone African Rheumatology. 2020;3(1):24‑9.
15. Allali F, Rahmouni R, Hajjaj-Hassouni N. Tabetic arthropathy. A report of 43 cases. Clin Rheumatol. 25 sept 2006;25(6):858‑60.
16. Biotti D, Fuerea R, Deschamps G, Durupt S. Neurogenic osteoarthropathy of the knee associated with spina bifida: a diagnosis not to be overlooked. The Journal of Internal Medicine. 2009 Nov 1;30(11):985‑7.
17. Ratnam S. The laboratory diagnosis of syphilis. Can J Infect Dis Med Microbiol. 2005;16(1):45‑51.
18. Seña AC, White BL, Sparling PF. Novel Treponema pallidum serologic tests: a paradigm shift in syphilis screening for the 21st century. Clin Infect Dis Off Publ Infect Dis Soc Am. 15 sept 2010;51(6):700‑8.
19. Morshed MG, Singh AE. Recent trends in the serologic diagnosis of syphilis. Clin Vaccine Immunol CVI. févr 2015;22(2):137‑47.