ACCESS MICROBIOLOGY
an open research platform

MICROBIOLOGY SOCIETY
OPEN DATA OPEN ACCESS

Review Tool reports

UNDERSTANDING AND CONTEXTUALIZING THE REPORTS

Readers of these automated manuscript Review Tool reports are encouraged to use them to support them in performing their own assessment and 'health check' on a preprint prior to it completing peer review.

However, these should only be used as a guide, read within the overall context of the article itself, and should never replace full peer review. Please ensure you read the article fully alongside these and familiarize yourself with the tools and how they work, using the links provided below.

SCISCORE® REPORTS: MDAR CHECKLIST FOR AUTHORS AND SCISCORE CORE REPORT

SciScore® (https://sciscore.com) scans the methodology section of an article for important scientific rigour criteria and key biological resources and highlights if these are accessible or have problems associated. The Materials, Design, Analysis, and Reporting (MDAR) report and Core report generated from this are included here for transparency and can be cited independently using the DOI below.

- Information on the MDAR report: https://sciscore.com/reports/MDAR-Report.php
- Information on the Core report: https://sciscore.com/reports/Core-Report.php

How to cite the SciScore reports for this article:

Ben Lahlou Y, Dokponou YCH, Malihy Z, Benaissa E, Maleb A, *et al*. SciScore reports for: Clinical Value of Procalcitonin as a Biomarker for Detecting a Primary Tuberculous Spinal Infection: Case Report and Review of the Literature.. *Access Microbiology*. 2024. https://doi.org/10.1099/acmi.0.000788.v1.1

ITHENTICATE® REPORT

iThenticate® (https://www.ithenticate.com) checks the submitted article against an extensive database of articles from the internet and scholarly publications and highlights where similar sentences or phrases have been used previously, including in the author's own published work. Each individual match is given a percentage score based on how much it overlaps with the previously existing work, and an overall similarity score is given. The report generated from this are included here for transparency and can be cited independently using the DOI below.

- FAQs: https://www.ithenticate.com/products/faqs
- Help pages: https://help.turnitin.com/ithenticate/ithenticate-user/ithenticate-user.htm#TheSimilarityReport

How to cite the iThenticate report for this article:

Ben Lahlou Y, Dokponou YCH, Malihy Z, Benaissa E, Maleb A, *et al*. iThenticate report for: Clinical Value of Procalcitonin as a Biomarker for Detecting a Primary Tuberculous Spinal Infection: Case Report and Review of the Literature.. *Access Microbiology*. 2024. https://doi.org/10.1099/acmi.0.000788.v1.2

Document Identifier: **2435_65ae4e4e325839.41608480**

SciScore Report

Below you will find your SciScore report containing three tables. Your score is calculated based on adherence to scientific rigor criteria (Table 1) and identification of key biological resources (Table 2). Table 3 contains statistical tests and oligonucleotides but is not scored. If SciScore makes any mistakes, please contact us to help us learn and improve.

Table 1: Rigor Adherence Table

Ethics
not required.
Inclusion and Exclusion Criteria
not required.
Attrition
No data were reused or generated in this study.
Sex as a biological variable
not required.
Subject Demographics
Age: not required.
Weight: not required.
Randomization
not detected.
Blinding
not detected.
Power Analysis
not detected.
Replication
not required.

Table 2: Key Resources Table

Your Sentences	REAGENT or RESOURCE	SOURCE	IDENTIFIER

SciScore is an automated tool that is designed to assist expert reviewers by finding and presenting formulaic information scattered throughout a paper in a standard, easy to digest format. ***SciScore is not a substitute for expert review.*** SciScore also checks for the presence and correctness of several unique identifiers, including RRIDs (research resource identifiers) in the manuscript, detects sentences that appear to be missing RRIDs, and can even suggest RRIDs under certain circumstances. **All RRID suggestions should be verified;** only the author can know whether the suggestions are correct.

For a full description of scored criteria and tips for improving your score, please see https://www.scicrunch.com/sciscorereport-faq

Materials Design Analysis Reporting (MDAR) Checklist for Authors

The MDAR framework establishes a minimum set of requirements in transparent reporting applicable to studies in the life sciences (see Statement of Task: doi:10.31222/osf.oio/9sm4x.). The MDAR checklist is a tool for authors, editors and others seeking to adopt the MDAR framework for transparent reporting in manuscripts and other outputs. Please refer to the MDAR Elaboration Document for additional context for the MDAR framework.

Materials

Antibodies	Yes (indicate where provided: page no/section/legend)	n/a
For commercial reagents, provide supplier name, catalogue number and RRID, if available	No antibodes detected. Please add identifiers for all resources where possible	

Cell Materials	Yes (indicate where provided: page no/section/legend)	n/a
Cell lines: Provide species information, strain. Provide accession number in repository OR supplier name, catalog number, clone number, OR RRID	No cell lines detected Please add identifiers for all resources where possible	
Primary cultures: Provide species, strain, sex of origin, genetic modification status.	Not currently checked by SciScore	

Experimental Animals	Yes (indicate where provided: page no/section/legend)	n/a
Laboratory animals: Provide species, strain, sex, age, genetic modification status. Provide accession number in repository OR supplier name, catalog number, clone number, OR RRID	No organisms detected Please add identifiers for all resources where possible	
Animal observed in or captured from the field: Provide species, sex and age where possible	Not currently checked by SciScore	
Model organisms: Provide Accession number in repository (where relevant) OR RRID	See laboratory animals section for information.	

Plants and microbes	Yes (indicate where provided: page no/section/legend)	n/a
Plants: provide species and strain, unique accession number if available, and source (including location for collected wild specimens)	Not currently checked by SciScore	
Microbes: provide species and strain, unique accession number if available, and source	Not currently checked by SciScore	

Human research participants	Yes (indicate where provided: page no/section/legend)	n/a
Identify authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	Not detected.	
Provide statement confirming informed consent obtained from study participants.	Not detected.	
Report on age and sex for all study participants.	**Age:**not required. **Sex:**not required.	

Design

Study protocol	Yes (indicate where provided: page no/section/legend)	n/a
For clinical trials, provide the trial registration number OR cite DOI in manuscript.	Not detected.	

Laboratory protocol	Yes (indicate where provided: page no/section/legend)	n/a
Provide DOI or other citation details if detailed step-by-step protocols are available.	Not detected.	

Experimental study design (statistics details)	Yes (indicate where provided: page no/section/legend)	n/a
State whether and how the following have been done, or if they were not carried out		
Sample size determination	not detected.	
Randomization	not detected.	
Blinding	not detected.	
inclusion/exclusion criteria	not required.	

Sample definition and in-laboratory replication	Yes (indicate where provided: page no/section/legend)	n/a
State number of times the experiment was replicated in laboratory	Not detected.	
Define whether data describe technical or biological replicates	Not detected.	

Ethics	Yes (indicate where provided: page no/section/legend)	n/a
Studies involving human participants: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	Not detected.	
Studies involving experimental animals: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	Not detected.	
Studies involving specimen and field samples: State if relevant permits obtained, provide details of authority approving study; if none were required, explain why.	Not detected.	

Dual Use Research of Concern (DURC)	Yes (indicate where provided: page no/section/legend)	n/a
If study is subject to dual use research of concern, state the authority granting approval and reference number for the regulatory approval	Not currently checked by SciScore	

Analysis

Attrition	Yes (indicate where provided: page no/section/legend)	n/a
State if sample or data point from the analysis is excluded, and whether the criteria for exclusion were determined and specified in advance.	No data were reused or generated in this study.	

Statistics	Yes (indicate where provided: page no/section/legend)	n/a
Describe statistical tests used and justify choice of tests.	Not detected.	

Data availability	Yes (indicate where provided: page no/section/legend)	n/a
State whether newly created datasets are available, including protocols for access or restriction on access.	Not detected.	
If data are publicly available, provide accession number in repository or DOI or URL.	Not detected.	
If publicly available data are reused, provide accession number in repository or DOI or URL, where possible.	Not detected.	

Code availability	Yes (indicate where provided: page no/section/legend)	n/a
For all newly generated code and software essential for replicating the main findings of the study:		
State whether the code or software is available.	Not detected.	
If code is publicly available, provide accession number in repository, or DOI or URL.	Not detected.	

Analysis

Adherence to community standards	Yes (indicate where provided: page no/section/legend)	n/a
MDAR framework recommends adoption of discipline-specific guidelines, established and endorsed through community initiatives. Journals have their own policy about requiring specific guidelines and recommendations to complement MDAR.		
State if relevant guidelines (eg., ICMJE, MIBBI, ARRIVE) have been followed, and whether a checklist (eg., CONSORT, PRISMA, ARRIVE) is provided with the manuscript.	Not currently checked by SciScore	

ACMI-D-23-00250.pdf

By Yassine Ben Lahlou

WORD COUNT	1995	TIME SUBMITTED	22-JAN-2024 11:14AM
		PAPER ID	106333858

Access Microbiology

Clinical Value of Procalcitonin as a Biomarker for Detecting a Primary Tuberculous Spinal Infection: Case Report and Review of the Literature.

--Manuscript Draft--

Clinical Value of Procalcitonin as a Biomarker for Detecting a Primary Tuberculous Spinal Infection: Case Report and Review of the Literature

Yassine Ben Lahlou[1], Yao Christian Hugues Dokponou[2], Zakaria Malihy[1] ,Elmostapha Benaissa[1], Adil Maleb[3], Mostafa Elouennass[1], Mariama Chadli[1]

[1] Department of Bacteriology, Mohammed V Military Teaching Hospital, Mohammed V University of Pharmacy and Medicine of Rabat-Morocco.

[2] Department of Neurosurgery, Mohammed V Military Teaching Hospital, Mohammed V University of Pharmacy and Medicine of Rabat-Morocco.

[3] Department of Microbiology, Mohammed VI University Hospital/Faculty of Medicine and Pharmacy (University Mohammed the first), Oujda, Morocco.

***Corresponding author**: Dr. Yassine Ben Lahlou, MD, Ass. Professor of Clinical Biology, benlahlouyassine@gmail.com, Tél: +212613580693

ABSTRACT:

Procalcitonin is a biomarker, potentially useful in the diagnosis of sepsis and severe bacterial infections. Few studies have examined the usefulness of this biological marker in the diagnosis of tuberculous spondylodiscitis.

We report the case of a 37-year-old woman with an unremarkable medical history who was newly diagnosed with tuberculous spondylodiscitis while the procalcitonin test was negative. This case confirms the hypothesis that procalcitonin is not a useful parameter to support the diagnosis of primary tuberculous spondylodiscitis.

KEYWORDS: Procalcitonin biomarker, spinal infection, tuberculosis.

INTRODUCTION:

Spinal infections are diagnosed through physical examination, laboratory tests, and radiological analysis. Commonly used inflammatory biomarkers in laboratories include white blood cell count, C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR). Procalcitonin (PCT) has recently been used to differentiate between bacterial and nonbacterial infections. Infections should be recognized as quickly as possible for physiological and clinical reasons. Through the early detection of damaged tissue, therapeutic and preventive measures can be initiated earlier [1-3].

A useful marker for diagnosing bacterial infection is PCT, a prohormone for calcitonin. After infection, PCT secretion begins 4 hours later and peaks after 8 hours, whereas CRP secretion begins 4-6 hours later and peaks only 36 hours later. Serum PCT levels are still useful for clinical purposes and are currently used for four common purposes. To determine the likelihood of death in critically ill patients with sepsis. Second, PCT values were used to guide patients receiving empirical antibiotic therapy for sepsis, pneumonia, and bronchitis. Third, PCT value, along with other conventional biomarkers, can help assess the effectiveness of empirical antibacterial therapy for the patient. The fourth and most practical application is to use sequential PCT values to assess when antibacterial therapy is no longer necessary [4-6].

This biomarker has attracted great interest in recent years, particularly in the differential diagnosis between bacterial and viral infections. Nevertheless, few studies have examined the utility of this biological marker in the diagnosis of infectious spondylodiscitis, particularly tuberculous spondylodiscitis.

We report a case of tuberculous spondylodiscitis in a 37-year-old woman with negative procalcitonin.

CASE PRESENTATION:

Patient information: A 37-year-old woman with no medical history presented with progressive upper back pain for six months. She reported progressive dorsalgia that became resistant to standard pain medications, followed by rapid fatigue of the lower limbs and intermittent claudication complicated by bladder and bowel dysfunction on admission. She denied any trauma or other triggering events.

Clinical findings: On physical examination, the patient was fully conscious, had no fever, and was both respiratory and hemodynamically stable. There was D4 level hypoesthesia and normal muscle tone with a Medical Research Council (MRC) muscle strength scale of 3/5 in both lower limbs. The reflexes of the right lower extremity were reduced with right-sided Babinsky. Mild abdominal distension with pollakiuria was noted.

Diagnostic assessment: Magnetic resonance imaging showed spinal cord compression at the D3-D4 level with epidural collection. The initial laboratory evaluation revealed WB 10.4G/1; CRP 138.7 mg l−1; PCT 0.04 ng/ml. ECG and Chest X-Ray were unremarkable. Analysis of sputum using molecular methods (GenXpert MTB/RIF®) and classical methods (direct examination and culture on Löwenstein-Jensen solid media) yielded negative results.

Therapeutic intervention: The patient underwent decompressive surgery, which included a laminectomy of D4 and osteosynthesis of D2-D5. A molecular test using real-time PCR (GeneXpert MTB/RIF®) performed on the surgical specimen revealed the presence of Mycobacterium tuberculosis complex (MTBC) without detecting rifampicin resistance. Anatomopathological examination of the surgical specimen confirmed the diagnosis by revealing a caseating necrotizing epithelioid and giant cell granuloma.

Follow-up and outcome: After detection of MTBC, treatment included antitubercular therapy according to the national protocol. The treatment was successful and led to resolution of the inflammatory syndrome. CRP normalized 8 weeks after the initiation of treatment.

DISCUSSION:

Tuberculosis is a significant public health problem worldwide. According to the World Health Organization (WHO), more than 10 million people develop an active tuberculosis infection (2). This disease is the third most common cause of death from infectious diseases worldwide. The frequency of tuberculous spondylodiscitis among all infectious spondylodiscitis varies considerably depending on the endemic status. It ranges from 20–40% in France, Spain or Sweden (3–5) to over 70% in North African countries (6). The dorsolumbar spine is more commonly affected (more than 95% of cases), as was the case in our patient, who had compression between D3 and D4 (7). The diagnosis of tuberculous spondylodiscitis is based on clinical, radiological and biological arguments. The gold standard for diagnosing tuberculosis is either isolating the bacterium through conventional culture or detecting its specific nucleic acid sequence using molecular testing. In our case, the diagnosis was confirmed using the real-time PCR technique, which, with its specificity and sensitivity as well as its rapid results, has revolutionized diagnostics and allows timely treatment of this chronic disease. Therefore, it serves as a valuable tool in an endemic country like ours (8). As for the laboratory results, our patient had a negative PCT and a positive CRP. Several studies have concluded that PCT is a potentially useful biomarker for identifying traumatic spinal cord lesions (9,10). However, many other studies suggest that PCT is not helpful in diagnosing tuberculosis spondylodiscitis (1). This last statement is confirmed in our case. On the other hand, Jeong et al. showed that high PCT serum levels were observed, particularly in associated systemic infections (9). Yoon et al. observed that the serum level of PCT is lower in tuberculous spondylodiscitis compared to pyogenic spondylodiscitis (11).

According to the recommendations of the French Society of Infectious Diseases, the investigation of an inflammatory syndrome using CRP measurement should be the first

biological test carried out. On the contrary, PCT is not a useful marker for the diagnosis of spondylodiscitis (12).

PCT is a precursor of calcitonin, a hypocalcemic peptide hormone secreted by C cells of the thyroid. This protein is encoded by the CALC-I gene. Under normal conditions, PCT undergoes intracellular maturation and is then secreted as calcitonin. This means that PCT is not released as a prohormone and its measurement is negative. However, in some pathological situations (sepsis, severe bacterial infections), the expression of the CALC-I gene is enhanced in other tissues, leading to PCT synthesis in other organs such as liver, lungs, kidneys, intestines, adipose tissue, etc not by leukocytes [13,14]. This atypical expression in unusual cell types is not followed by the maturation step that normally converts the prohormone into active calcitonin. Thus, it is the PCT that is excreted into the bloodstream. Initial treatment of tuberculous spondylodiscitis includes antitubercular drugs, starting with two-month quadritherapy based on rifampicin-isoniazid-pyrazinamide-ethambutol, followed by seven-month bitherapy with rifampicin-isoniazid. The patient was treated with the same regimen and showed significant clinical and biological improvement.

Conclusion

PCT measurement remains challenging, time-consuming, and costly. Therefore, in this clinical scenario, there is a need for optimization and the need for simultaneous measurement of CRP. Therefore, it is advisable to prioritize CRP and control PCT measurement based on the criteria described previously.

Declarations

Ethics approval and consent to participate: Informed consent was obtained from the patient before the submission of this article. Also, this article respects both the Consensus-based Clinical Case Reporting Guideline and the Recommendations for the Conducting, Reporting, Editing, and Publication of Scholarly Work in Medical Journals.

Consent for publication: Informed consent was obtained from the patient to publish his case

Availability of data and material: No data were reused or generated in this study.

Competing interests: The authors declare that they have no competing interests

Funding: No funding was received for this research

Authors' contributions: **YBL:** Conceptualization, writing draft, reviewing and editing, visualization, supervision, validation, methodology. **YCHD:** Writing, review & editing, **ZM:** Writing, review & editing, **EM:** Writing, review & editing. **AD:** Writing & editing, **ME**, **MC:** Supervision, Validation, & review.

Acknowledgments: N/A

References:

1. Dubost JJ, Lopez J, Pereira B, Couderc M, Tournadre A, Soubrier M. Serum procalcitonin measurement is not a useful biomarker in the detection of primary infectious spondylodiscitis. Joint Bone Spine. juill 2017;84(4):503‑4.

2. Ministry Of Health, Department of Epidemiology and Disease Control. National Guidelines for The Management of Tuberculosis in Children and Adolescents. 2020.

3. Marie Beronius BB Rune Andersson, null. Vertebral Osteomyelitis in Goteborg, Sweden: A Retrospective Study of Patients During 1990-95. Scandinavian Journal of Infectious Diseases. 1 janv 2001;33(7):527‑32.

4. Colmenero J, Jimenez-Mejias M, Sanchez-Lora F, Reguera J, Palomino-Nicas J, Martos F, et al. Pyogenic, tuberculous, and brucellar vertebral osteomyelitis: a descriptive and comparative study of 219 cases. Ann Rheum Dis. déc 1997;56(12):709‑15.

5. Belzunegui J, Intxausti JJ, De Dios JR, Del Val N, Rodríguez Valverde V, González C, et al. Haematogenous vertebral osteomyelitis in the elderly. Clin Rheumatol. 2000;19(5):344‑7.

6. Ben Taarit C, Turki S, Ben Maiz H. [Infectious spondylitis. Study of a series of 151 cases]. Acta Orthop Belg. oct 2002;68(4):381□7.

7. Larget-Piet B, Martigny J. [Bacterial spondylodiscitis. Etiology, diagnosis, development, prognosis, treatment]. Rev Prat. 1 avr 1995;45(7):915□20.

8. Liu P, Liu Y, Wang Y, Hao S, Qin Y. Assessing the diagnostic accuracy of the Xpert MTB/RIF assay in detecting epididymal tuberculosis. Eur J Clin Microbiol Infect Dis. avr 2022;41(4):615□20.

9. Jeong DK, Lee HW, Kwon YM. Clinical Value of Procalcitonin in Patients with Spinal Infection. J Korean Neurosurg Soc. sept 2015;58(3):271□5.

10. Gilbert DN. Use of Plasma Procalcitonin Levels as an Adjunct to Clinical Microbiology. J Clin Microbiol. juill 2010;48(7):2325□9.

11. Yoon YK, Jo YM, Kwon HH, Yoon HJ, Lee EJ, Park SY, et al. Differential diagnosis between tuberculous spondylodiscitis and pyogenic spontaneous spondylodiscitis: a multicenter descriptive and comparative study. The Spine Journal. août 2015;15(8):1764□71.

12. French Infectious Diseases Society. [Primary infectious spondylitis, and following intradiscal procedure, without prothesis. Recommendations]. Med Mal Infect. sept 2007;37(9):573□83.

ACMI-D-23-00250.pdf

ORIGINALITY REPORT

26%
SIMILARITY INDEX

PRIMARY SOURCES

1	www.opastpublishers.com Internet	140 words — 9%
2	www.phidias.us Internet	35 words — 2%
3	doaj.org Internet	33 words — 2%
4	jac.oxfordjournals.org Internet	33 words — 2%
5	Hyuck Lee. "Procalcitonin as a biomarker of infectious diseases", The Korean Journal of Internal Medicine, 2013 Crossref	24 words — 1%
6	www.austinpublishinggroup.com Internet	23 words — 1%
7	www.science.gov Internet	23 words — 1%
8	www.researchsquare.com Internet	21 words — 1%
9	ejns.springeropen.com Internet	20 words — 1%

10	jsurgmed.com Internet	17 words — 1%
11	kjnt.org Internet	14 words — 1%
12	sciendo.com Internet	14 words — 1%
13	www.lsmuni.lt Internet	10 words — 1%
14	Advanced Techniques in Diagnostic Microbiology, 2013. Crossref	9 words — 1%
15	R Klocke. "Arterial stiffness and central blood pressure, as determined by pulse wave analysis, in rheumatoid arthritis", Annals of the Rheumatic Diseases, 2003 Crossref	8 words — < 1%
16	"Imaging of Spinal Infection", Springer Science and Business Media LLC, 2021 Crossref	7 words — < 1%

EXCLUDE QUOTES	OFF	EXCLUDE SOURCES	OFF
EXCLUDE BIBLIOGRAPHY	ON	EXCLUDE MATCHES	OFF