

This is a provisional PDF only. Copyedited and fully formatted version will be made available soon.

**Actinomycosis caused by *Actinomyces odontolyticus*: diagnostic and
therapeutic challenges**

Authors: Monika Pazgan-Simon, Justyna Jachman-Kapułka, Joanna Górka-Dynysiewicz,
Krzysztof Simon

Article type: Clinical image

Received: March 4, 2024.

Revision accepted: March 26, 2024.

Published online: March 28, 2024.

ISSN: 1897-9483

Pol Arch Intern Med.

doi:10.20452/pamw.16717

Copyright by the Author(s), 2024

This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License ([CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)), allowing anyone to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material, including commercial purposes, provided the original work is properly cited.

Actinomycosis caused by *Actinomyces odontolyticus*: diagnostic and therapeutic challenges

Monika Pazgan-Simon¹, Justyna Jachman-Kapułka², Joanna Górka-Dynysiewicz³, Krzysztof Simon⁴

1 First Department of Infectious Diseases, J. Gromkowski Regional Specialist Hospital, Wrocław, Poland

2 Internal Medicine and Geriatric Department J. Gromkowski Regional Specialist Hospital, Wrocław, Poland

3 Department of Pharmaceutical Biochemistry, Wrocław Medical University, Wrocław, Poland

4 Clinical Department of Infectious Diseases and Hepatology, Wrocław Medical University, Wrocław, Poland

Correspondence to: Monika Pazgan-Simon, MD, PhD, First Department of Infectious Diseases, J. Gromkowski Regional Specialist Hospital in Wrocław, ul. Koszarowa 5, 51-149 Wrocław, Poland, phone: +48 71 3261325, email: monikapazgansimon@gmail.com

While gram-negative bacteria of the genus *Actinomyces* were initially described in the 19th century, the species *Actinomyces odontolyticus* was only first described in the 20th century [1]. In humans, these bacteria occur mainly on the mucous membranes of the mouth, digestive tract and female reproductive organs. After tissue continuity is disrupted, bacteremia, sepsis, and endocarditis often develop [2]. The available literature report individual cases of *Actinomyces odontolyticus* causing meningeal or brain abscesses [3-5].

Case report of a 45-year-old male of Algerian nationality. The patient was an information technology specialist by profession and a sportsman – weightlifter – in the past. He has been living in Poland for five years.

In January 2018, the previously healthy patient visited the emergency room with cervical spinal pain (7 / 10) radiating to the upper limbs that had been increasing for two weeks. Physical examination showed negative meningeal signs, laboratory tests showed C-reactive protein (CRP) at 80 mg/L (reference range, 0–5 mg/L) and blood count – WBC at $9 \times 10^3 / \mu\text{L}$, while nuclear magnetic resonance (NMR) revealed a massive hernia of the C3/C4 intervertebral disc. The patient was referred to a neurosurgeon and the hernia was removed (Figure 1A); however, the tissue material was neither tested for the presence of bacteria, nor sent for histopathology tests. The patient returned to the emergency room in September 2018 due to pain recurrence (7 / 10) and fluid leakage from the postoperative wound. The CRP level was 56 mg/L, and the patient underwent surgery again (there is no data available regarding the nature of this treatment). The pain continued and in November 2018, the patient decided to undergo another NMR of the cervical and thoracic spine and was diagnosed with spondylodiscitis in Th8/9 with epidural and paraspinal inflammatory infiltrations (Figure 1B). The CRP level was 123 mg/L. The patient was referred to a neurosurgeon and a biopsy of the Th8/9 intervertebral disc was performed. Bacterial culture resulted in isolation of *Actinomyces odontolyticus*, infection with bacteria of the species *Nocardia* and *Mycobacterium* was ruled out. The patient underwent a dental consultation, and the condition of his teeth was determined to be normal. The patient received oral therapy of amoxicillin with clavulanic acid at a dose of $2 \times 1 \text{ g/ day}$ for 4 weeks, together with $2 \times 500 \text{ mg/ day}$ clindamycin for 4 weeks.

In January 2019 the thoracic spine pain increased again (5 / 10), a follow-up NMR of the thoracic spine with contrast was performed, which showed spondylodiscitis in Th8/9/10/11, an abscess of the antero-left side of the vertebral body in Th10, and

inflammatory infiltration in the pre-spinal tissues in Th8-12 (Figure 1C). The patient was referred to a neurosurgeon once more, but no indications for surgery were identified. Anti-infective treatment was continued. In March 2019, the patient was referred to the Infectious Diseases Clinic and was started on amoxicillin (3×500 mg/day), which he continued for 3 months. In July 2019, due to continuing pain, the patient was hospitalized at the Infectious Diseases Department and CRP levels were 8.3 mg/L. The patient received 6 weeks of intravenous ceftriaxone therapy and continued oral amoxicillin (3×500 mg/day) for the following 5 months, which resulted in the disappearance of subjective symptoms.

In January 2020, the patient visited the emergency room once again, with severe back pain (8 / 10), which made it difficult for him to move around and function normally.

A whole spine contrast-enhanced NMR revealed changes resembling spondylodiscitis at the L4/5 level, with the formation of an abscess inside the spinal canal putting pressure on the nerves, and numerous small abscesses in the back, lumbar muscles, and part of the left iliac muscle (Figure 1D). The patient was again referred to the Infectious Diseases Department. with CRP level at 37 mg/L. Therapy was extended with intravenous ceftriaxone (2×2 g/day) and vancomycin (2×1 g/day). After two weeks, significant clinical improvement was observed: the patient began to walk smoothly without pain. The patient was discharged due to the onset of the COVID-19 pandemic. On an outpatient basis, the patient continued intravenous ceftiraxone, 1×2 g daily for up to 365 days. A control nuclear magnetic resonance examination performed prior to the end of treatment showed that the inflammation had lessened and most of the changes had resolved. No symptom recurrence has been observed to the present day.

Conclusions: 1. *Actinomyces odontolyticus* infection can be iatrogenic and associated with a history of neurosurgical procedure. 2. Infection of the central nervous system (CNS) caused

by the strain of *Actinomyces odontolyticus*, rarely observed in Poland, poses diagnostic difficulties and oral antibiotic therapy is not very effective.

Article information

Funding None.

Conflict of interest None declared.

Open access This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License ([CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)), allowing anyone to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material, including commercial purposes, provided the original work is properly cited.

How to cite Pazgan-Simon M, Jachman-Kapulka J, Górka-Dynysiewicz J, Simon K. Actinomycosis caused by *Actinomyces odontolyticus*: diagnostic and therapeutic challenges. Pol Arch Intern Med. 2024; XX: 16717. doi:10.20452/pamw.16717

References

- 1 Könönen E, Wade WG. Actinomyces and related organisms in human infections. Clin Microbiol Rev. 2015; 28: 419-442.
- 2 Rueda MS, Hefter Y, Stone B, et al. A premature infant with neonatal actinomyces odontolyticus sepsis. J Pediatric Infect Dis Soc. 2021; 10: 533-535.
- 3 Huang Q, Hong Z, Hong Q. Cryptococcal meningoencephalitis with Actinomyces odontolyticus sepsis: a case report and literature review. BMC Infect Dis. 2023; 23: 434.
- 4 Jain H, Singh G, Eranki A. Actinomyces odontolyticus causing meningitis and cervical abscess. Proc (Bayl Univ Med Cent). 2021; 34: 492-493.
- 5 Yesilbas O, Yozgat CY, Nizam OG, et al. Life-threatening multiple brain abscesses secondary to Actinomyces odontolyticus. Pediatr Int. 2020; 62: 1307-1308.

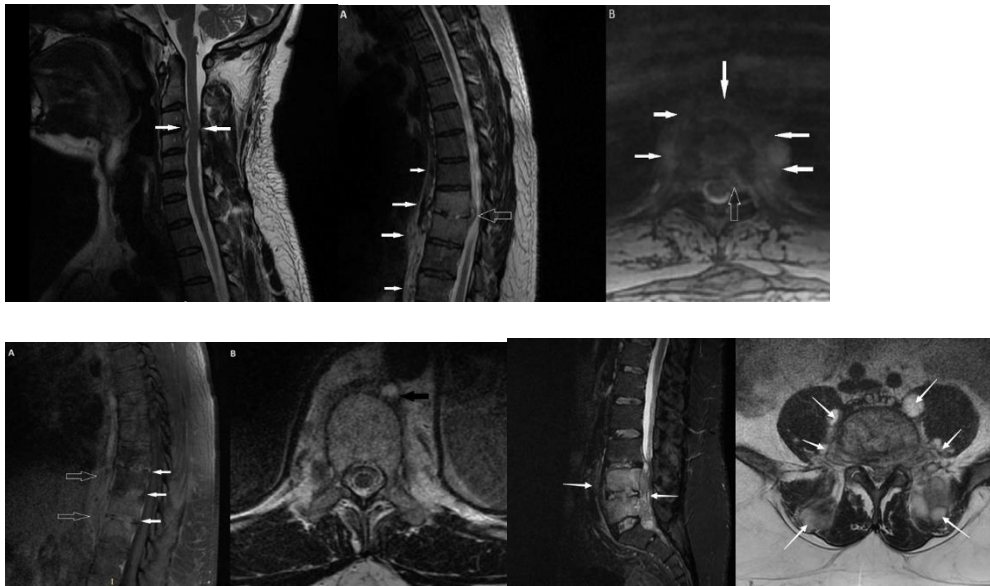


Figure 1 A – T2-weighted FSE sequence MRI of the cervical spine in the sagittal plane.

Large mid-left lateral herniation of the C3/C4 intervertebral disc causing spinal stenosis (sagittal dimension: 5 mm), compressing the dural sac, spinal cord, and left spinal nerve root;

B – T2-weighted FSE sequence MRI of the thoracic spine in the sagittal plane and 2D

MERGE sequence in the transverse plane. Spondylodiscitis with infiltration of inflammatory epidural changes with left-lateral modeling of the spinal cord present at the Th8/9

intervertebral disc. Massive infiltrative inflammatory lesions in soft tissues present

paraspinally, 90 mm long and 15 mm wide (white arrows); **C** – T1-weighted FSE sequence

MRI of the thoracic spine, contrast-enhanced (with gadolinium), in the sagittal plane and T2-

weighted FSE sequence MRI in the transverse plane. Spondylodiscitis with post-contrast

enhancement of the Th10 and Th11 discs and vertebrae and infiltration on the ventral side of the spinal canal, without compression of the spinal cord present at three intervertebral discs:

Th8/9, Th9/10 and Th10/11. A paraspinal inflammatory infiltration in soft tissues, 86 mm

long and 17 mm wide. Abscess in the antero-left side of the Th10 shaft; **D** – T2-weighted

STIR sequence MRI of the lumbosacral spine in the sagittal plane and T2-weighted FSE

sequence MRI in the transverse plane. Spondylodiscitis with an abscess in the spinal canal,

infiltrating the nerve roots. Numerous abscesses in the dorsal and lumbar muscles