Spondylodiscitis due to *Haemophilus parainfluenzae*: A Case Report

Espondilodiscitis por Haemophilus parainfluenzae: *Un reporte de caso*

Ratko Yurac[1] Macarena Santorcuato[1] Guisela Quinteros[2] Juan J. Zamorano[1] Bartolomé Marré[1]

[1] Department of Orthopedic Surgery, Clínica Alemana de Santiago-Universidad del Desarrollo, Santiago, Región Metropolitana, Chile
[2] Department of Orthopedic Surgery-Spine Surgery, Hospital Regional de Talca, Talca, Región del Maule, Chile

Address for correspondence Ratko Yurac Barrientos, MD, Clínica Alemana de Santiago, Avenida Vitacura 5.951, Santiago, Región Metropolitana, Chile (e-mail: ryurac@gmail.com).

Rev Chil Ortop Traumatol 2022;63(2):e139–e144.

Abstract

Introduction *Haemophilus parainfluenzae* (HP) is a gram-negative coccobacillus and an opportunistic pathogen. It is rarely associated with spinal- and musculoskeletal-site infections, and very little reported in the literature.

Case Presentation An otherwise healthy, 45-year-old woman who presented with a two-week history of progressive low back pain, fever, coryza and nasal congestion, was found to have intervertebral discitis caused by HP, confirmed by two positive blood cultures and progressive lumbar spine magnetic resonance imaging (MRI) findings. The MRI findings were atypical, consisting of a psoas abscess and small anterior epidural and intraspinal fluid collections associated with spondylodiscitis. The initial diagnosis was delayed because the initial MRI failed to reveal findings suggestive of an infectious process. The treatment consisted of a long course of intravenous followed by oral antibiotics, ultimately yielding a good clinical response.

Discussion and Conclusion *Haemophilus parainfluenzae* is a very rare pathogen in spondylodiscitis. Nonetheless, it should be considered, especially in patients presenting with low back pain and fever and/or gram bacteremia. The initial work-up should include contrast-enhanced MRI of the spine. Although rare, spondylodiscitis and a psoas abscess can present concomitantly. Prolonged antibiotics are the mainstay of treatment.

Keywords
- Haemophilus parainfluenzae
- low back pain
- spondylodiscitis
- magnetic resonance imaging
- psoas abscess

Resumen

Introducción *Haemophilus parainfluenzae* (HP) es un cocobacilo gran negativo y un patógeno oportunista. Rara vez se asocia a infecciones vertebrales o musculoesqueléticas, y está muy poco reportado en la literatura.

received
September 20, 2020
accepted after revision
May 18, 2022

DOI https://doi.org/10.1055/s-0042-1753550.
ISSN 0716-4548.

Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

Presentación del caso Una mujer de 45 años, sana, que presentaba un historial de dos semanas de lumbalgia progresiva, fiebre, coriza y congestión nasal, y que tenía discitis intervertebral causada por HP, confirmada por dos hemocultivos positivos y hallazgos progresivos de resonancia magnética (RM) de columna lumbar. Los hallazgos de la RM fueron atípicos, y consistían en un absceso del psoas y pequeñas colecciones de líquido epidural anterior asociadas con espondilodiscitis. El diagnóstico inicial se retrasó debido a que la RM inicial no reveló hallazgos que sugirieran un proceso infeccioso. El tratamiento consistió en un ciclo prolongado de administración intravenosa seguida de antibióticos orales, lo que finalmente produjo una buena respuesta clínica.

Discusión y conclusión El HP es un patógeno muy raro en la espondilodiscitis. No obstante, debe tenerse en cuenta, especialmente en pacientes que presentan lumbalgia y fiebre y/o bacteriemia por microorganismos gram negativo. El estudio inicial debe incluir una RM de la columna con contraste. Aunque es poco común, la espondilodiscitis y un absceso del psoas pueden presentarse concomitantemente. Los antibióticos prolongados son el pilar del tratamiento.

Palabras clave
- Haemophilus parainfluenzae
- lumbalgia
- espondilodiscitis
- resonancia magnética
- absceso del psoas

Introduction

Haemophilus parainfluenzae (HP) is a gram-negative coccobacillus that is part of the native flora of the mouth, as well as the respiratory, digestive, and urogenital tracts.[1] From these sites, it can access the bloodstream, causing bacteremia, thereby becoming an opportunistic pathogen responsible for infections like meningitis, laryngitis, endocarditis, pneumonia, and liver abscesses. It is rarely associated with musculoskeletal site infections, but previous reports[2] have been published documenting infections involving the hip, clavicle, acromioclavicular joint, knee, ankle, and spine. We herein present a rare case of spondylodiscitis due to HP. To our knowledge, only four other similar cases have been previously reported in the literature.[1,3–5]

Case Presentation

The presentation of the case was authorized by the patient. An otherwise healthy 45-year-old woman presented to the emergency room (ER) with a 2-week history of progressive low back pain, aggravated 24 hours prior to admission and associated with general discomfort, fever up to 38°C, coryza, and nasal congestion. She had no history of trauma, nor any other red flags. Upon physical examination, she had pain in the lower lumbar area that increased with generalized spinal palpation. She had no radiating pain or neurological deficits, and had a negative kidney percussion test.

In the ER, she had persistent severe pain despite receiving an intravenous dose of an analgesic, so she was admitted to the hospital for pain management and diagnostic work-up. Among the tests requested upon admission, an increased C-reactive protein (CRP) level was detected, along with a normal urinalysis and negative urine and blood cultures . A normal abdominal and pelvic computed tomography (CT) scan ruled out other infectious foci.

The patient was further studied with lumbar spine magnetic resonance imaging (MRI) (►**Figure 1**), which revealed lytic spondylolisthesis at the L5-S1 level, combined with right foraminal stenosis and potential L5 root impingement

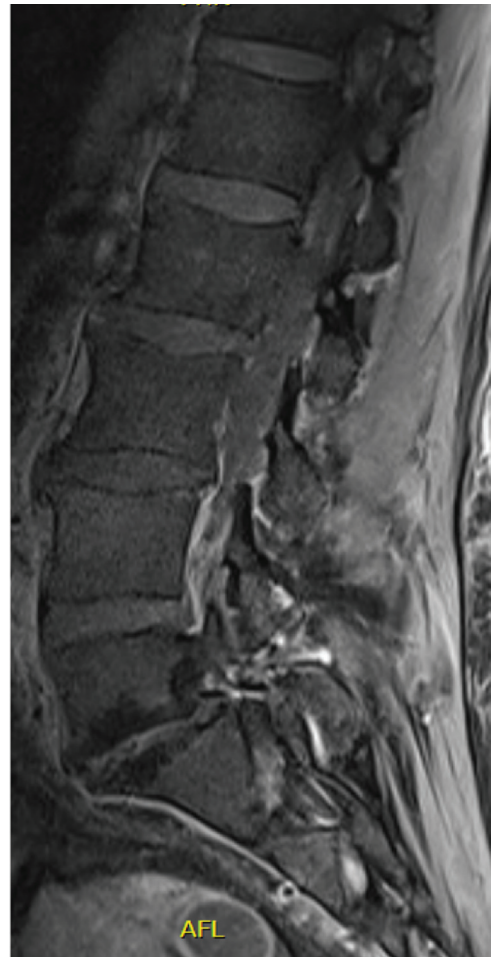

Fig. 1 Initial lumbar spine magnetic resonance imaging (MRI).

(inconsistent with her symptoms). No findings suggestive of an infectious process were identified on the initial MRI.

During her hospitalization, a significant increase in the levels of CRP (from 3.81 mg/dL to 17.4 mg/dL and to 26 mg/dL; normal value: < 0.5 mg/dL)) was noted, together with the detection of bacilliforms (77%) on the complete blood count (CBC). Hence, the patient was pan-cultured again and empiric intravenous antibiotic therapy (IV ATB) with ceftriaxone was started. Two blood cultures returned positive for HP.

Over the next several days, the patient's inflammatory markers progressively normalized, and she became afebrile. However, she continued to have refractory lumbosacral pain. Consequently, further imaging studies were requested, including a transesophageal ultrasound (which was negative for vegetations), and contrast-enhanced MRI of her lumbosacral spine, which revealed a fluid collection in the left psoas muscle, a small anterior epidural fluid collection at the L4-L5 level, and signs suggestive of a right hydrosalpinx associated with free fluid (possible pyosalpinx).

Due to these MRI findings, the patient was presumed to have HP bacteremia, compromising her uterine adnexa and perivertebral soft tissues, so metronidazole was added to her IV ATB regimen for a full 21 days of combined (ceftriaxone + metronidazole) treatment.

Given her positive clinical course and progressive reduction in pain, after we consulted the Infectious Disease Service, we discharged the patient home with instructions to complete the oral ATB treatment with cefuroxime for three to six more weeks. However, five days after discharge, she returned to the ER with recurrent severe low back pain, now radiating into her right buttock, without neurological impairment. The laboratory exams also revealed a slight increase in the levels of CRP (from 1.60 mg/dL to 2.93 mg/dL) and erythrocyte sedimentation rate (ESR; from < 20 mm/hour to 32 mm/hour).

The patient was readmitted for pain management and further work-up, including repeat lumbar spine MRI (►**Figure 2**), which revealed a smaller fluid collection in the left psoas, but also signal abnormality in the L3-L4 disc, in continuity with the aforementioned collections, and edema of the adjacent vertebral bodies. These findings were considered most compatible with spondylodiscitis.

Given this increase in inflammatory markers, the patient's worsened clinical condition, and the new MRI findings, transpedicular biopsies of the L3-L4 disc and bone L4 of the vertebral body were performed for further histological analysis and cultures (►**Figure 3**), with antibiotics suspended until after the procedure. Even though the patient had two previous positive blood cultures for HP, we decided on a spine biopsy because the patient had had a worsening of her symptoms despite a suitable antibiotic therapy for HP (ceftriaxone + metronidazole initially, followed by cefuroxime).

The universal PCR returned negative for bacterial DNA, and all tissue and liquid cultures (six in total) of the disc and bone were negative. Histology of the bone and

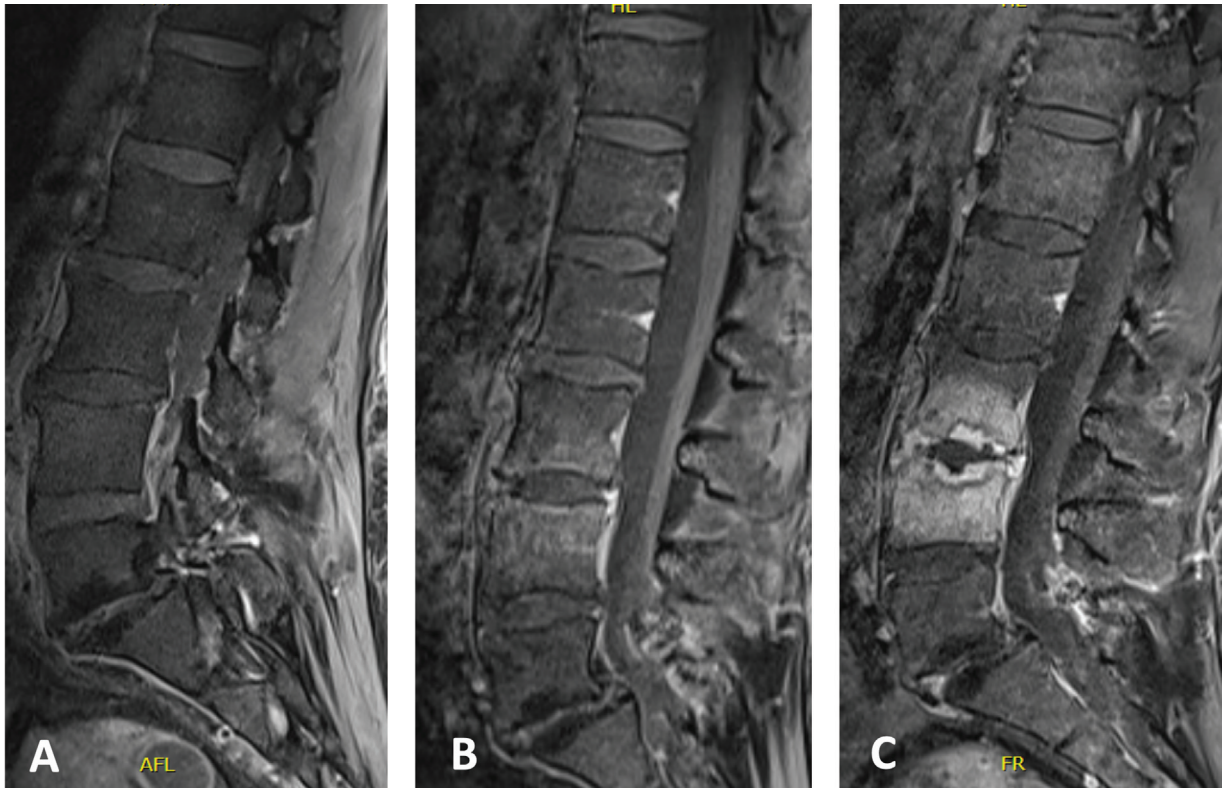

Fig. 2 Progression of MRI findings in the compromised vertebral platforms; (**A**) initial lumbar spine MRI; (B) lumbar spine MRI 7 days after the initial one; (**C**) lumbar spine MRI 30 days after the initial one.

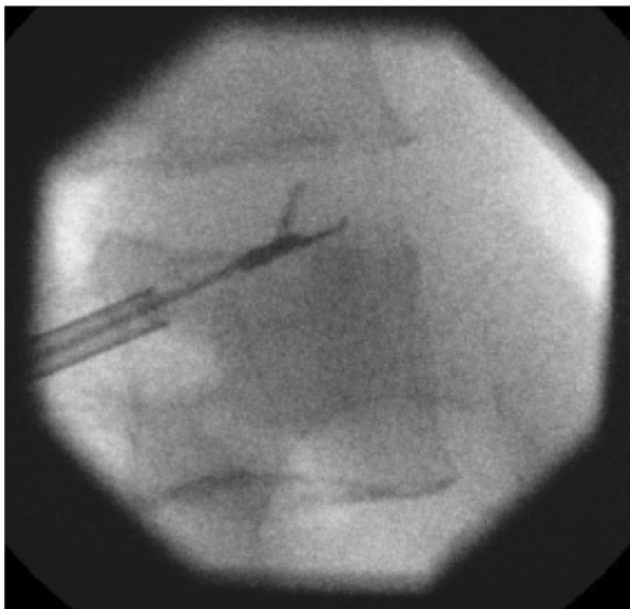

Fig. 3 Transpedicular L3-L4 disc biopsy.

fibrocartilaginous tissue was compatible with chronic osteomyelitis without recognizing microorganisms. A diagnosis of spondylodiscitis due to HP was confirmed, and IV ATB treatment with ceftriaxone was prescribed for six weeks, followed by another six weeks of oral ATB treatment with ciprofloxacin. A rehabilitation program with physiotherapy and a lumbar brace were also initiated.

The evolution of the patient's clinical course included complete remission of pain, and no other complications during subsequent follow-up visits (> ►**Figure 4**). The latest available imaging exam is a lumbar spine CT scan obtained three months after her initial admission (►**Figure 5**). At 12 months of follow-up, the patient has remained asymptomatic, and is working without limitations in her activities of daily living.

Discussion

Spondylodiscitis due to HP was first described in 1987 by Olk et al.[3] Since then, only three other cases have been reported in the literature.[1,4,5]

Although HP is part of the native flora, and generally only has a pathogenic role in immunosuppressed patients,[6] almost all of the reported cases of musculoskeletal infections occurred in immunocompetent subjects,[2] just like our patient. The only risk factor she had was her overweight, with a body mass index of 31,8, kg/m^2, which falls in the obesity category.

It is noteworthy that all of the previously-reported cases of spinal infections due to HP[1,3–5] had been submitted to an invasive procedure within the previous three months (two cases submitted to an upper endoscopy, one, to a dental procedure, and one, to a nasal septoplasty).[2]

In patients presenting with low back pain and fever and/or bacteremia (especially gram-positive), spondylodiscitis should always be ruled out via an appropriate work-up.[7] Contrast-enhanced MRI remains the gold standard for the radiographic documentation of this condition, with 96% sensitivity and 94% specificity.[8]

That said, MRI has limitations, especially when the initial changes are atypical. In our patient, the initial level of clinical suspicion for spondylodiscitis was low, despite an MRI being performed to evaluate the low back pain with fever. The initial images then were not suggestive of infection; consequently, infection was deemed unlikely, and the patient received a suboptimal initial management. It should be noted that no contrast was used during the initial MRI.

It also should be noted that this patient had a psoas abscess and a small anterior epidural intraspinal collection associated with spondylodiscitis, which again is an atypical presentation. Abscesses of the psoas muscle, a very uncommon condition, mostly tend to be primary;[9] and, when secondary

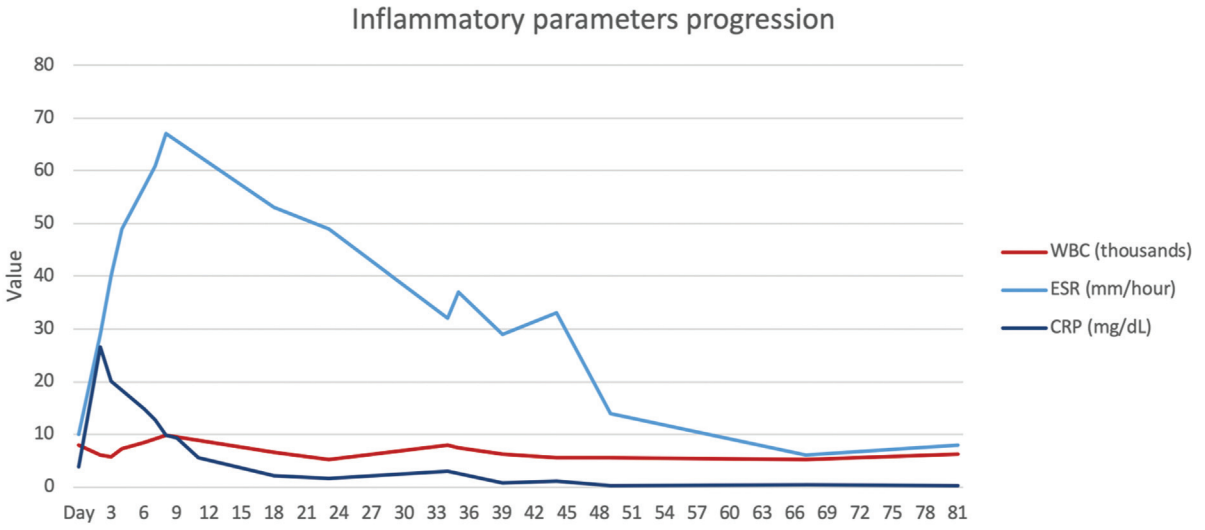

Fig. 4 Progression of the inflammatory parameters over time. Day 1 corresponds to the blood tests performed upon admission on the first day. Abbreviations: CRP, C-reactive protein ESR, erythrocyte sedimentation rate WBC, white-blood-cell count.

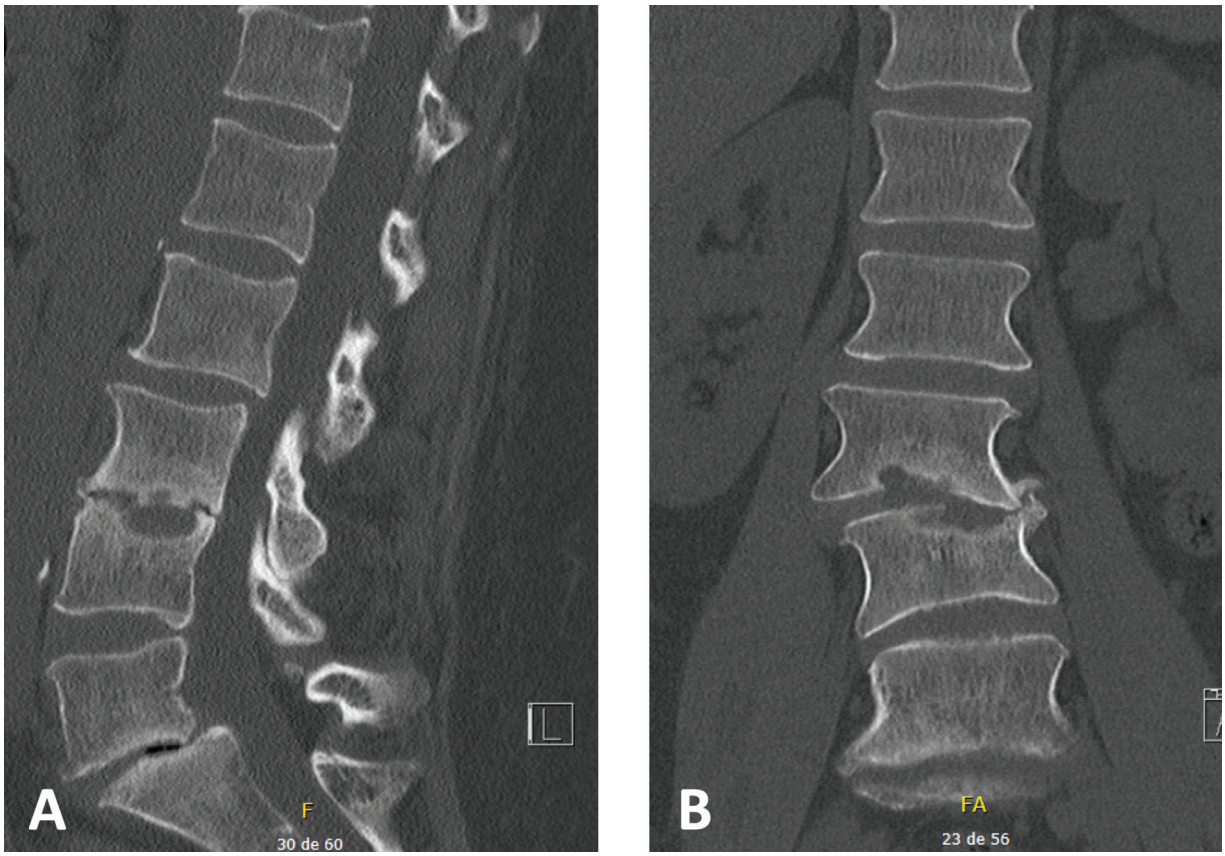

Fig. 5 Computed tomography scan of the lumbar spine three months after the first hospitalization; (**A**) sagittal view; (**B**) coronal view.

(distinguished from an iliopsoas abscess), most are due to spondylodiscitis of the lumbar spine.[10]

Although the association between spondylodiscitis and a psoas abscess is infrequent, three of the four previously-reported cases of HP spondylodiscitis[3–5] were associated with a bilateral psoas abscess, in addition to an epidural abscess; and one only had an epidural abscess. However, further studies are needed to determine whether any true association exists between this atypical presentation of back pain and the etiology of the spondylodiscitis.

All of that said, when facing a persistent unexplained low back pain and particularly in the setting of a bacteriemia with inconclusive initial images, follow-up imaging with contrast MRI may be necessary in order to rule out an atypical presentation of spondylodiscitis.

Finally, we must keep in mind that the cornerstone of the treatment for spondylodiscitis is antibiotics, including a minimum of four to six weeks of intravenous administration, and not less than three months of antibiotics overall.[7]

Conclusions

Haemophilus parainfluenzae is a very rare pathogen in spondylodiscitis. Nonetheless, in patients with persistent low back pain associated with fever of unclear origin, it must be considered. Though usually a benign organism, HP bacteremia can cause serious osteoarticular compromise.

The initial work-up should include contrast-enhanced MRI of the affected spine segment, which may initially reveal few to no abnormalities. Follow-up imaging may be necessary to arrive at an accurate and timely diagnosis.

Prolonged antibiotic management is the mainstay of treatment.

Funding

The authors declare that they have received no funding for the performance of the present study.

References

1 Kohr BS, Liaw SJ, Liao HC, Yang CC, Lee MH. Bone and Joint Infections Caused by Haemophilus parainfluenzae. Infect Dis Clin Pract 2007;15(03):206–208
2 O'Neil CR, Wilson E, Missaghi B. Bone and Joint Infections due to Haemophilus parainfluenzae: Case Report and Review of the Literature. Can J Infect Dis Med Microbiol 2016;2016:4503025. Doi: 10.1155/2016/4503025
3 Olk DG, Hamill RJ, Proctor RA. Haemophilus parainfluenzae vertebral osteomyelitis. Am J Med Sci 1987;294(02):114–116. Doi: 10.1097/00000441-198708000-00011
4 Auten GM, Levy CS, Smith MA. Haemophilus parainfluenzae as a rare cause of epidural abscess: case report and review. Rev Infect Dis 1991;13(04):609–612. Doi: 10.1093/clinics/13.4.609
5 Beauvais C, Berenbaum F, Spentchian M, Prier A, Kaplan G. Early diagnosis of vertebral osteomyelitis due to a rare pathogen: Haemophilus parainfluenzae. J Rheumatol 1992;19(03): 491–493

6 Oill PA, Chow AW, Guze LB. Adult bacteremic Haemophilus parainfluenzae infections. Seven reports of cases and a review of the literature. Arch Intern Med 1979;139(09):985–988. Doi: 10.1001/archinte.139.9.985

7 Berbari EF, Kanj SS, Kowalski TJ, et al; Infectious Diseases Society of America. 2015 Infectious Diseases Society of America (IDSA) Clinical Practice Guidelines for the Diagnosis and Treatment of Native Vertebral Osteomyelitis in Adults. Clin Infect Dis 2015;61 (06):e26–e46. Doi: 10.1093/cid/civ482

8 Modic MT, Feiglin DH, Piraino DW, et al. Vertebral osteomyelitis: assessment using MR. Radiology 1985;157(01):157–166. Doi: 10.1148/radiology.157.1.3875878

9 Desandre AR, Cottone FJ, Evers ML. Iliopsoas abscess: etiology, diagnosis, and treatment. Am Surg 1995;61(12):1087–1091

10 López VN, Ramos JM, Meseguer V, et al; GTI-SEMI Group. Microbiology and outcome of iliopsoas abscess in 124 patients. Medicine (Baltimore) 2009;88(02):120–130. Doi: 10.1097/MD.0b013e318 19d2748

