



Case report | Prikaz bolesnika

***Per aspera ad diagnosis* – persistent thigh inflammation caused by a foreign object, masking as *Pantoea agglomerans* infection**

Per aspera ad diagnosis* – perzistentna upala natkoljenice uzrokovana stranim tijelom, prikrivena kao infekcija bakterijom *Pantoea agglomerans

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Summary

Pantoea agglomerans is an environmental Gram-negative bacillus most commonly associated with penetrating plant injuries or nosocomial exposure. We describe a 48-year-old man with persistent thigh swelling and pain, initially attributed to an insect bite and treated with multiple antibiotic regimens, with only transient improvement. Imaging and aspiration revealed chronic inflammation with isolation of *P. agglomerans*, yet targeted antimicrobial therapy failed to achieve clinical resolution of the symptoms. Further imaging identified a retained plant thorn within the muscle, which was surgically removed, resulting in rapid and complete recovery.

Sažetak

Pantoea agglomerans okolišni je gram-negativni bacil koji se najčešće povezuje s penetrantnim ozljedama biljnim materijalom ili bolničkom izloženosti. Prikazujemo slučaj 48-godišnjeg muškarca s perzistirajućim otokom i boli natkoljenice, koji su inicijalno pripisani ubodu insekta te su liječeni višestrukim antibiotskim režimima, uz samo prolazno poboljšanje. Slikovna obrada i aspiracija tvorbe pokazale su kroničnu upalu uz izolaciju bakterije *P. agglomerans*, no ciljano antimikrobno liječenje nije dovelo do kliničke regresije simptoma. Daljnja slikovna dijagnostika identificirala je zaostali biljni trn unutar mišića, koji je kirurški odstranjen, nakon čega je uslijedio brz i potpun oporavak.

Introduction

Pantoea agglomerans is a Gram-negative, facultatively anaerobic, non-spore-forming bacillus of the family *Enterobacteriaceae* commonly found on plants, in soil, and in water^[1,2]. Traditionally regarded as a harmless environmental organism, it has increasingly been recognized as an opportunistic pathogen in humans^[2,3]. Infections usually follow two patterns: community-acquired cases associated with penetrating plant injuries (e.g. thorns, splinters), and nosocomial infections in immunocompromised patients or those with indwelling devices^[2,4,5]. Clinical presentations range from localized abscesses and arthritis to septicemia^[2,3].

We report a case of persistent thigh inflammation initially attributed to an insect bite and later linked to

P. agglomerans, but ultimately caused by a foreign object, i.e. a retained plant thorn.

Patient presentation

A 48-year-old man with a history of allergic asthma presented to the University Hospital for Infectious Diseases in Zagreb in September 2024. He complained of four weeks of painful swelling and stiffness of the right thigh, impairing his gait, with no history of fever. He initially attributed the symptoms to an insect bite acquired during a recent outdoor activity.

Before referral to our Clinic, the patient had already undergone multiple outpatient evaluations, including surgical assessment, and received multiple courses of antibiotics including azithromycin, co-amoxiclav and

metronidazole with only transient improvement followed by relapse of swelling and stiffness. Due to initial suspicion of a local allergic reaction, he was also treated with systemic corticosteroids and antihistamines, without sustained clinical improvement.

At presentation to our Clinic, physical examination revealed an oval area of induration measuring approximately 4 cm in diameter on the anterior part of his right mid-thigh (Figure 1), with no associated lymphadenopathy.



FIGURE 1. CLINICAL APPEARANCE OF THE THIGH SHOWING ONLY A SMALL ERYTHEMATOUS PUNCTATE MARK AT THE SITE OF ENTRY
SLIKA 1. KLINIČKI PRIKAZ NATKOLJENICE S DISKRETNIM ERITEMATOZNIM UBODNIM MJESTOM KOJE ODGOVARA MJESTU ULASKA STRANOG TIJELA

Only a small punctate erythematous mark was visible on the induration. Laboratory findings were largely normal, with CRP mildly elevated at 10.5 mg/L and leukocytes within the normal range. Ultrasound initially demonstrated soft tissue oedema without abscess. Follow-up ultrasound performed two weeks later showed a $6 \times 7 \times 2$ cm oedematous area with a dense central focus measuring 8×7 mm, with no foreign body present. Based on the clinical and ultrasound findings, oral cephalexin (1000 mg q8h) was prescribed until follow-up, when aspiration of the tissue content was planned.

On subsequent follow-up, pain persisted and gait continued to worsen despite therapy with cephalexin. Fine needle aspiration was performed, and subsequent cytology demonstrated chronic inflammation. PCR testing of the aspirate excluded *Staphylococcus aureus*, *Streptococcus pyogenes*, and *Streptococcus agalactiae*, while bacteriological culture yielded a pure isolate of

Pantoea agglomerans, identified using Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS), which was susceptible to all tested antimicrobials (ampicillin, amoxicillin, co-amoxiclav, cefuroxime, ceftriaxone, gentamicin, ciprofloxacin, trimethoprim/sulfamethoxazole), several of which the patient had already received.

At the subsequent follow-up visit, swelling had partially subsided with cephalexin treatment, however the range of motion of the right knee joint remained limited. Cephalexin was discontinued, and further radiological evaluation with CT scan was planned. Contrast-enhanced CT showed a multilocular subcutaneous and intramuscular inflammatory collection involving the vastus lateralis muscle ($66 \times 33 \times 35$ mm) (Figure 2).

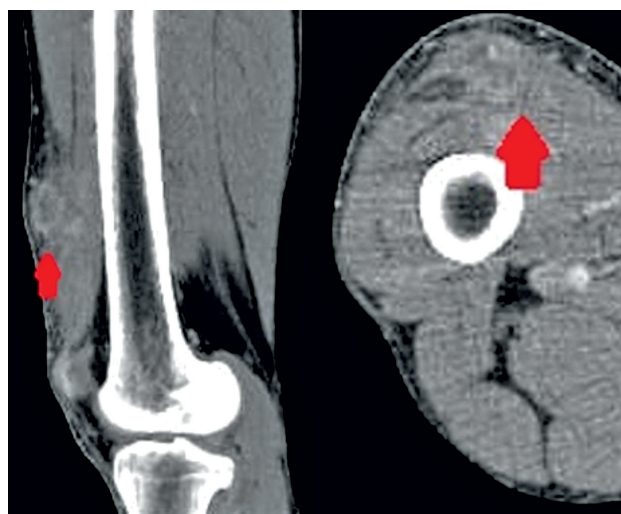


FIGURE 2. CONTRAST-ENHANCED CT OF THE THIGH DEMONSTRATING A MULTILOCULAR SUBCUTANEOUS AND INTRAMUSCULAR INFLAMMATORY COLLECTION INVOLVING THE VASTUS LATERALIS MUSCLE ($66 \times 33 \times 35$ MM), INDICATED BY RED ARROWS, SHOWN IN SAGITTAL AND AXIAL SECTIONS
SLIKA 2. PRIKAZ NATKOLJENICE CT-OM S KONTRASTNIM SREDSTVOM POKAZUJE MULTILOKULARNU SUPKUTANU I INTRAMUSKULARNU UPALNU KOLEKCIJU U PODRUČJU MIŠIĆA VASTUS LATERALIS ($66 \times 33 \times 35$ MM), OZNAČENU CRVENIM STRELICAMA, NA SAGITALNIM I AKSIJALNIM PRESJECIMA

As the persistence of symptoms was interpreted as treatment failure, antimicrobial therapy was continued with trimethoprim/sulfamethoxazole (800/160 mg, q12h) in accordance with the aspirate culture susceptibility testing. In addition, the patient was referred for surgical evaluation due to CT findings suggestive of a localized inflammatory collection. Based on these findings, surgical exploration was performed, but no pus or foreign material was identified.

Due to persisting symptoms, the patient was referred to a plastic surgeon for reassessment. Following partial reduction of swelling during the latest antibiotic treatment, repeat ultrasound revealed a needle-shaped structure within the muscle. Surgical extraction under local anaesthesia retrieved a 3 cm-long black plant thorn (Figure 3).

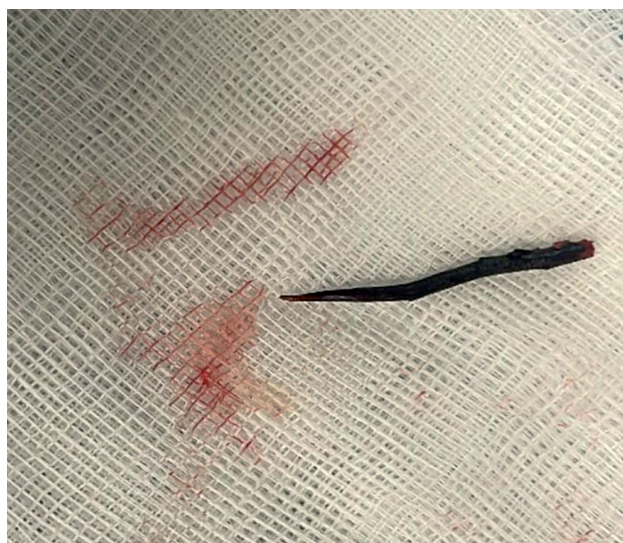


FIGURE 3. SURGICALLY EXTRACTED A 3 CM-LONG PLANT THORN, THE UNDERLYING CAUSE OF PERSISTENT INFLAMMATION

SLIKA 3. KIRURŠKI ODSTRANJEN BILJNI TRN DULJINE 3 CM, KOJI JE BIO UZROK PERZISTENTNE UPALE

After thorn removal, trimethoprim/sulfamethoxazole was discontinued, and the patient promptly recovered. Swelling resolved completely and his gait normalized. At follow-up, the patient recalled that the lesion had appeared shortly after brushing against bushes while urinating outdoors, suggesting direct thorn inoculation rather than an insect bite.

Discussion

While frequently isolated from plants and soil, *P. agglomerans* can cause human disease under specific circumstances^[2,3]. In the community, infections most often follow penetrating injuries with contaminated plant material, whereas nosocomial outbreaks have been linked to contaminated intravenous fluids, medications, or medical devices^[4-6].

Reported clinical manifestations include wound infections, septic arthritis, osteomyelitis, pneumonia, bacteraemia, and sepsis^[2,3,7]. Most isolates remain broadly susceptible to aminoglycosides, fluoroquinolones, cephalosporins, and trimethoprim/sulfamethoxazole, although resistant strains have been described^[3,5].

The initial clinical presentation raised several differential diagnostic considerations, including cellulitis, soft tissue abscess, allergic reaction following an insect bite, and a retained foreign body. The absence of systemic signs of infection, the limited response to antimicrobial therapy, and persistence of localized inflammation despite isolation of *P. agglomerans* from the aspirate prompted further diagnostic evaluation. Ultimately, a retained plant thorn was identified as the underlying cause which acted as a persistent driver of inflammation.

Similar cases have been reported in the literature. In a large paediatric series, Cruz et al. concluded that *P. agglomerans* infections frequently follow penetrating trauma with plant material, with delayed presentation of bone and joint infections weeks after the initial penetration of the skin^[3]. Individual case reports further support this claim, particularly in septic arthritis following thorn injuries^[8]. In a retrospective study, Vaiman et al. similarly described patients with prolonged, treatment-refractory post-traumatic inflammation in whom retained plant-derived foreign bodies infected with *P. agglomerans* were identified. Removal of the foreign material resulted in rapid clinical resolution within a few days in all patients^[9]. This pattern closely mirrors our case and emphasizes that mechanical factors, rather than active infection alone, may sustain inflammation.

The presented case highlights that the isolation of an unexpected pathogen served not only as microbiological evidence of infection but also as an important diagnostic clue. Because *P. agglomerans* is strongly associated with penetrating plant injuries, its isolation raised suspicion of a retained plant-derived foreign body due to only transient improvement with targeted antimicrobial therapy. The microbiological finding of *P. agglomerans*, interpreted together with the clinical course, ultimately led to repeat imaging and identification of the retained plant thorn. Definitive management therefore required removal of the foreign material rather than continuation or escalation of antimicrobial therapy. These findings also emphasize that persistent or recurrent soft tissue inflammation with minimal systemic features should prompt consideration of a retained foreign body. Furthermore, small plant thorns, as in our case, may evade early detection on ultrasonography or CT, particularly in the presence of surrounding oedema and depending on their depth and proximity to bone^[10-11, 14-15]. High-resolution ultrasonography is considered the imaging modality of choice for the detection of radiolucent plant-derived foreign bodies, and has been reported to identify thorns as small as 0.5 mm^[10-13]. It has demonstrated

excellent diagnostic performance, with reported sensitivity and specificity of up to 94% and 99%, respectively^[13]. Nevertheless, false-negative examinations may still occur, particularly with very small foreign bodies or when surrounding inflammatory changes, depth, or proximity to bone reduce imaging sensitivity^[10, 12, 14-15]. Importantly, repeat imaging after partial resolution of inflammation may improve diagnostic yield^[12,14].

In conclusion, this case emphasizes that persistent soft tissue inflammation despite appropriate antimicrobial therapy should prompt evaluation for an underlying source, including retained foreign material. Isolation of an unusual pathogen such as *P. agglomerans* should raise suspicion of plant-related inoculation, and definitive management requires recognition and removal of the underlying cause rather than antimicrobial therapy alone.

Conflict of Interest:

The authors have no conflict of interest to declare. Written informed consent for publication of this case report and accompanying images was obtained from the patient.

REFERENCES

- [1] Walterson AM, Stavrinides J. *Pantoea*: insights into a highly versatile and diverse genus within the Enterobacteriaceae. FEMS Microbiol Rev. 2015;39(6):968–84.
- [2] Dutkiewicz J, Mackiewicz B, Lemieszek MK, Golec M, Milanowski J. *Pantoea agglomerans*: a mysterious bacterium of evil and good. Ann Agric Environ Med. 2016;23(2):197–205.
- [3] Cruz AT, Cazacu AC, Allen CH. *Pantoea agglomerans*, a plant pathogen causing human disease. J Clin Microbiol. 2007; 45(6):1989–92.
- [4] Cheng A, Liu CY, Tsai HY, Hsu MS, Yang CJ, Huang YT, et al. Bacteremia caused by *Pantoea agglomerans* at a medical center in Taiwan, 2000–2010. J Microbiol Immunol Infect. 2013;46(3):187–94.
- [5] Yablon BR, Dantes R, Tsai V, Lim R, Moulton-Meissner H, Arduino M, et al. Outbreak of *Pantoea agglomerans* bloodstream infections at an oncology clinic—Illinois, 2012–2013. Infect Control Hosp Epidemiol. 2016;37(12):1420–5.
- [6] Matsaniotis NS, Syriopoulou VPh, Theodoridou MCh, Tzane-tou KG, Mostrou GI. Enterobacter sepsis due to contaminated intravenous fluids. Infect Control. 1984;5(10):471–7.
- [7] Flores Popoca EO, Miranda García M, Romero-Figueroa S, Mendoza Medellín A, Sandoval Trujillo H, Silva Rojas HV, et al. *Pantoea agglomerans* in immunodeficient patients with different respiratory symptoms. ScientificWorldJournal. 2012; 2012:156827.
- [8] Koester MC, Stannard JP, Cook JG. Septic arthritis caused by *Pantoea agglomerans* following a thorn injury. J Orthop Case Rep. 2020;10(2):54–7.
- [9] Vaiman M, Abuita R, Lazarovich T, Lotan G. *Pantoea agglomerans* as an indicator of a foreign body of plant origin in cases of wound infection. J Wound Care. 2013;22(4):182–5.
- [10] Bray PW, Mahoney JL, Campbell JP. Sensitivity and specificity of ultrasound in the diagnosis of foreign bodies in the hand. J Hand Surg Am. 1995;20(4):661–6.
- [11] Failla JM, van Holsbeeck M, Vanderschueren G. Detection of a 0.5-mm-thick thorn using ultrasound: a case report. J Hand Surg Am. 1995;20(3):456–7.
- [12] Crawford R, Matheson AB. Clinical value of ultrasonography in the detection and removal of radiolucent foreign bodies. Injury. 1989;20(6):341–3.
- [13] Saboo SS, Soni SS, Adhane V, Khandelwal A. High-resolution sonography is effective in the detection of soft-tissue foreign bodies. J Ultrasound Med. 2009;28(12):1631–7.
- [14] Mizel MS, Steinmetz ND, Trepman E. Detection of wooden foreign bodies in muscle tissue: experimental comparison of computed tomography, magnetic resonance imaging, and ultrasonography. Foot Ankle Int. 1994;15(8):437–43.
- [15] Said HG, El-Sharkawi MM, El-Sayed A, Ahmed AF. Multidetector computed tomography for thorn (wooden) foreign bodies of the knee. Knee Surg Sports Traumatol Arthrosc. 2011; 19(9):1569–72.