Revista Argentina de Microbiología xxx (xxxx) xxx–xxx

REVISTA ARGENTINA DE MICROBIOLOGÍA

www.elsevier.es/ram

BRIEF REPORT

Clinical management of *Lancefieldella parvula* bacteremia: A case study and review of the literature

Cynthia Wenglinski[a], **Delphine Martiny**[b,c], **Michael Watchi**[a], **Fabio Silvio Taccone**[a], **Charles-Hervé Vacheron**[a,d,e,*]

[a] *Department of Intensive Care, Hopital Universitaire de Bruxelles (HUB), Route de Lennik 808, 1070 Brussels, Belgium*
[b] *Department of Microbiology, Laboratoire Hospitalier Universitaire de Bruxelles-Universitair Laboratorium Brussel (LHUB-ULB), Université Libre de Bruxelles (ULB), 1000 Brussels, Belgium*
[c] *Faculty of Medicine and Pharmacy, University of Mons (UMONS), 7000 Mons, Belgium*
[d] *Département d'Anesthésie Réanimation Centre Hospitalier Lyon Sud, Hospices Civils de Lyon, Lyon, France*
[e] *CIRI-Centre International de Recherche en Infectiologie (Team PHE3ID), Univ Lyon, Université Claude Bernard Lyon 1, Inserm, U1111, CNRS, UMR5308, ENS Lyon, 46 Allée d'Italie, Lyon 69007, France*

Received 3 March 2025; accepted 16 June 2025

KEYWORDS
Lancefieldella parvula;
Bacteremia;
Anaerobes

Abstract This report presented the case of a 55-year-old patient who was admitted to the intensive care unit following a ruptured bronchial arteriovenous malformation (AVM). The patient, with no significant medical history, experienced massive hemoptysis leading to cardiac arrest. After successful resuscitation and embolization of the AVM, the patient developed fever and acute respiratory distress syndrome, requiring deep sedation, muscle paralysis, and prone positioning. Blood culture sampled on the day of admission tested positive for *Lancefieldella parvula* on day 4. The patient received targeted antimicrobial therapy, resulting in a favorable hemodynamic and respiratory outcome. No source of the bacteremia was found. We reported the general management of this rare cause of bacteremia and provided a review of the existing literature.

PALABRAS CLAVE
Lancefieldella parvula;
Bacteriemia;
Anaerobios

Manejo clínico de la bacteriemia por *Lancefieldella parvula*: un estudio de caso y revisión de la literatura

Resumen Este informe de caso se refiere a un paciente de 55 años que ingresó en la unidad de cuidados intensivos a causa de una malformación arteriovenosa bronquial (MAB) rota. El paciente, sin antecedentes médicos significativos, experimentó una hemoptisis masiva que

* Corresponding author.
E-mail address: Charles-Herve.vacheron@chu-lyon.fr (C.-H. Vacheron).

https://doi.org/10.1016/j.ram.2025.06.004

Please cite this article as: C. Wenglinski, D. Martiny, M. Watchi et al., Clinical management of *Lancefieldella parvula* bacteremia: A case study and review of the literature, Revista Argentina de Microbiología, https://doi.org/10.1016/j.ram.2025.06.004

condujo a un paro cardíaco. Después de una reanimación exitosa y la embolización de la MAB, el paciente desarrolló fiebre y síndrome de dificultad respiratoria aguda, lo que requirió sedación profunda, parálisis muscular y posicionamiento prono. El cultivo de sangre tomado el día de la admisión dio positivo para *Lancefieldella parvula* en el día 4. El paciente recibió terapia antimicrobiana dirigida, con resultado hemodinámico y respiratorio favorable. No se encontró ninguna fuente de la bacteriemia. Informamos sobre el manejo general de esta rara causa de bacteriemia y revisamos la literatura existente.

Lancefieldella parvula is a Gram-positive anaerobic coccobacillus (GPAC) primarily found in the human oral microbiota. This pathogen is commonly associated with conditions such as halitosis and odontogenic infections; however, it has rarely been documented as a causative agent of bloodstream infections[5,6]. Despite its low prevalence, *L. parvula* has been implicated in few cases of bacteremia, occasionally with an unidentified source of infection[2,10].

Here, we reported a case of a 55-year-old male patient, admitted to the intensive care unit (ICU) following a ruptured bronchial arteriovenous malformation (AVM). The patient had no significant medical history and was not on chronic medication. He initially presented with massive hemoptysis, which rapidly progressed to cardiac arrest. The return of spontaneous circulation (ROSC) was achieved after 8 min of resuscitation and administration of 4 mg of epinephrine. He was subsequently intubated, sedated, and transferred to the ICU, where successful embolization of the AVM was performed.

Upon admission, the patient was febrile (core temperature 38.5 °C), prompting the collection of bronchoalveolar lavage (BAL) fluid and four sets of blood cultures, along with the initiation of empirical antimicrobial therapy with amoxicillin–clavulanic acid (2 g q8h IV). Despite initial stabilization, he developed acute respiratory distress syndrome (ARDS), requiring deep sedation, neuromuscular blockade and prone positioning to reduce the risk of ventilation-induced lung injury and improve oxygenation. By the third day of hospitalization, his clinical condition further deteriorated, prompting a second BAL and an escalation of antimicrobial therapy to piperacillin–tazobactam (4.0/0.5 g q6h IV). One anaerobic blood culture bottle collected at admission flagged positive after two days (Bactec F lytic anaerobic, Becton Dickinson, Franklin Lakes, NJ, USA). While the aerobic blood culture proved negative, its inoculation onto Schaedler agar (Becton Dickinson) incubated at 35 ± 2 °C under anaerobic conditions showed small colonies after an additional 48 h. The colonies were identified as *L. parvula* using MALDI-TOF MS analysis with a high degree of confidence (Bruker Daltonics GmbH, Bremen, Germany). A comprehensive computed tomography (CT) scan was performed to identify a potential source of infection, particularly in the head and neck regions, but no definitive focus was found.

The antimicrobial susceptibility of the strain was determined using the disk diffusion method performed on Schaedler agar incubated for 48 h at 37 °C under anaerobic conditions and interpreted using available EUCAST clinical breakpoints for *Clostridium perfringens*. The strain demonstrated susceptibility to amoxicillin–clavulanate (30 mm), metronidazole (19 mm), meropenem (35 mm) and resistance to clindamycin (18 mm). These results were confirmed using gradient strips (e-Test, bioMérieux, Marcy l'étoile, France), interpreted in accordance with the EUCAST guidance document for cases in which breakpoints are not specified in the table: susceptibility to penicillin (MIC = 0.032 mg/l), amoxicillin–clavulanate (MIC = 0.016 mg/l), meropenem (0.004 mg/l) and metronidazole (0.25 mg/l), and resistance to clindamycin (MIC = 4 mg/l).

Targeted antimicrobial therapy was administered with a 7-day course of appropriate antibiotics. Repeated blood cultures showed clearance of the bacteremia. The patient's hemodynamic and respiratory status gradually improved, allowing for the discontinuation of vasopressors and a stepwise reduction of sedation and respiratory support. He was successfully extubated on day 16 and discharged from the ICU on the 17th day in stable condition.

We presented a case of bacteremia caused by *L. parvula*. Historically classified as *Streptococcus parvulus* and later as *Atopobium parvulum*, its taxonomy has since been revised, and it is now recognized as part of the *Lancefieldella* genus[3,11]. The complete genome of *L. parvula* was first sequenced by Copeland et al. in 2009[4].

GPAC are major constituents of the anaerobic microbiota and are generally considered opportunistic pathogens[6]. *L. parvula* has been identified as part of the normal oral flora in healthy individuals and has been associated with conditions such as halitosis and odontogenic infections, including those related to dental implants[8,9]. Additionally, it has been detected in the microbiota of the endometrium, uterine cervix, and intestinal tract, and has been implicated in localized infections such as abdominal abscesses[1,7,8]. Despite its presence in various microbiomes, *L. parvula* remains an exceptionally rare pathogen. In a study conducted over a 10-year period at a 721-bed university-affiliated teaching hospital in Belgium, only one isolate of *L. parvula* was identified among 437 anaerobic pathogens[5].

The isolation of *L. parvula* in blood cultures is exceptionally rare. Among the various GPAC known to cause

bacteremia, *L. parvula* accounts for less than 5% of cases[12]. To our knowledge, apart from cohort studies, there have been only a few detailed reports of *L. parvula* bacteremia. Cobo et al. described a case of bacteremia caused by *L. parvula* in a 72-year-old male with cancer who suffered a urinary bladder rupture; the organism was susceptible to all tested antibiotics, including penicillin, piperacillin–tazobactam, clindamycin, meropenem, and metronidazole, and the patient ultimately survived his hospitalization[3]. As was the case in our study, the origin of the infection remains unidentified, and transient bacteremia could not be excluded.

Additionally, Townsend et al. documented a case of *L. parvula* bacteremia in a 25-year-old patient with a septic intravascular thrombus. The bacteremia was polymicrobial, also involving *Actinomyces odontolyticus* and *Fusobacterium* species. Despite the severity of the infection, the patient had a favorable outcome following appropriate antimicrobial treatment[10].

Regarding antibiotic susceptibility, *L. parvula* generally exhibits low resistance to commonly used antimicrobial agents. The primary resistance pattern observed corresponds to clindamycin resistance, which has been reported in approximately 40% of cases[12]. Some concerns have been raised regarding potential resistance to metronidazole, based on similarities with *Atopobium* spp.; however, to date, metronidazole resistance does not appear to be a significant clinical issue in *Lancefieldella* infections[2].

In conclusion, this case highlights the rare occurrence of *L. parvula* bacteremia in a critically ill patient, emphasizing the importance of considering uncommon anaerobic pathogens in bloodstream infections, particularly when no clear infectious source is identified. Despite the rarity of this pathogen, appropriate antimicrobial therapy based on susceptibility testing led to a favorable clinical outcome, underscoring the need for early recognition and targeted treatment strategies in similar cases.

Ethical approval

The patient provided his written consent for the publication of this case report.

Funding

None declared.

Conflicts of interest

None declared.

Data availability

Not applicable.

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