Official journal of the Spanish Society of Chemotherapy

Letter to the Editor

Revista Española de Quimioterapia
doi:10.37201/req/050.2024

Lucía Iglesias-Linares[1]
Ana Román-de-la-Torre[2]
María Aguilera-Franco[2]
Alberto Puertas-Prieto[1,3]
María José Medina-Pascual[4]
José Gutiérrez-Fernández[2,3,5]

Threat of preterm labor and preterm birth in the presence of *Lachnoanaerobaculum gingivalis*

[1]Servicio de Obstetricia y Ginecología, Hospital Universitario Virgen de las Nieves. Granada, España.
[2]Servicio de Microbiología, Hospital Universitario Virgen de las Nieves. Granada, España.
[3]Instituto de Investigación Biosanitaria Granada. Ibs. Granada.
[4]Laboratorio de Referencia e Investigación en Taxonomía. Centro Nacional de Microbiología (Instituto de Salud Carlos III)
[5]Departamento de Microbiología, Facultad de Medicina y Programa de Doctorado en Medicina Clínica y Salud Pública, Universidad de Granada.

Article history
Received: 16 May 2024; Revision Requested: 8 July 2024; Revision Received: 6 August 2024;
Accepted: 4 September 2024; Published: 30 September 2024

Sir,

Bacteria of the *Lachnoanaerobaculum* genus are obligate Gram-positive, spore-forming, filamentous bacilli that may appear Gram-negative due to their easy decolorization [1]. The genus contains four species, *L. orale*, *L. saburreum*, *L. umeaense*, and *L. gingivalis*, found in the oral cavity, saliva, and small intestine of humans. Their presence has been associated with gingival disease and bacteremia in patients with hematological malignancies [1-5]. We present the first report of an association between this genus and an episode of chorioamnionitis. We examine the clinical, diagnostic, and therapeutic data and other factors that may elucidate the pathogenesis.

A 25-year-old woman with no medical history was referred to our Regional Hospital at 29+1 weeks of gestation for the diagnosis of threatened preterm labor. She was asymptomatic at arrival, and her vital signs were within normal ranges. She reported low-intensity uterine contractions and exhibited a shortened cervical length of 6 mm. In the emergency department, premature membrane rupture was ruled out, vagino-rectal swabs were taken to detect *Streptococcus agalactiae*, and vaginal discharge and urine samples were gathered for routine microbiological cultures. Analytic findings included leukocytosis (13,000/µL; normal range: 3,500-10,500/µL), neutrophilia (86%; 42-77%), and C-reactive protein (CRP) level of 28.4 mg/L (0.1-5 mg/L). Treatment commenced with intravenous tocolysis and the administration of corticosteroids for lung maturation. The patient remained clinically stable, but an increase in CRP levels was observed.

Intravenous antibiotic prophylaxis was initiated with clindamycin (900 mg/8 h) and gentamicin (240 mg/24 h), due to a penicillin allergy. Amniocentesis revealed the presence of elongated, slender Gram-negative bacilli (Figure 1) with reduced glucose (8 mg/dL) and elevated interleukin 6 (160,834 pg/mL) levels, prompting the clinical diagnosis of chorioamnionitis. Polymerase chain reaction (PCR) analysis of the amniotic fluid was positive for *Ureaplasma urealyticum*. Tocolytic treatment was discontinued, and magnesium sulfate infusion was initiated for fetal neuroprotection, followed by labor induction.

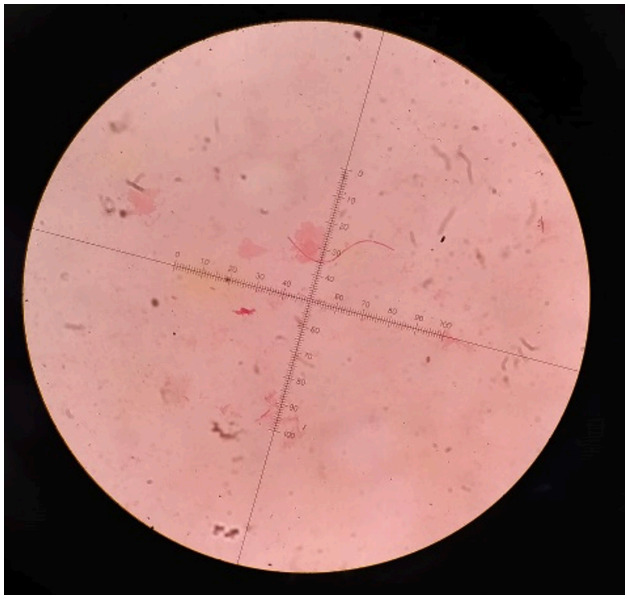

Figure 1 | **Gram staining of *Lachnoanaerobaculum gingivalis***

After eight hours of induction, she delivered a 1,350 g female infant with an Apgar score of 6 at one minute and 9 at five minutes, umbilical artery pH of 7.35, and venous pH of 7.37. The antibiotic treatment was continued for 24 h postpartum.

L. orale colonies alone were isolated within the first 48 h of anaerobic incubation on sheep blood agar plates (Bi-

Correspondence:
Lucía Iglesias Linares
Servicio de Obstetricia y Ginecología, Hospital Universitario Virgen de las Nieves. Granada, España.
E-mail: iglesiaslinaresl@gmail.com

Table 1 **Antibiotic susceptibility of *Lachnoanaerobaculum gingivalis* according to the E-test.**

Antibiotics	MIC (mg/L)	Clinical category
Ampicillin	<0.016	Susceptible
Piperacillin-tazobactam	<0.016	Susceptible
Cefotaxime	0.12	Susceptible
Imipenem	0.008	Susceptible
Clindamycin	24	Resistant
Tetracycline	8	Intermediate
Metronidazole	0.125	Susceptible

oMerieux, France), presenting as gray, shiny, spread-out, non-hemolytic colonies with soft consistency and irregular edges. The colonies were identified (score 2.103) as *L. orale* by MALDI-TOF spectrometry (Bruker Biotyper, Germany) and were then genetically identified as *L. gingivalis* at the National Center of Microbiology (Majadahonda, Madrid, Spain) by 16S rRNA gene sequencing, following a previously described protocol and using E781 and U1115 as primers [6,7] and the Applied Biosystems 3730xl DNA Analyzer for sequencing. A sequence of 1331pb was obtained and compared with strain sequences in the GenBank data bank (https://blast.ncbi.nlm.nih.gov/Blast.cgi), observing 99.2% identity with L. gingivalis (ChDC B114), described in a previous study [8]

Antimicrobial susceptibility testing was performed using gradient strips (Liofilchem, Italy) according to 2023 CLSI criteria for anaerobic Gram-negative bacilli (CMI value in mg/L) on Brucella blood agar supplemented with hemin (5 µg/mL), vitamin K1 (1 µg/mL), and laked sheep blood (5% v/v) (Becton Dickinson, BD, Franklin Lakes, NJ, USA) anaerobically cultured at 36 °C±1 °C for 48 h. Table 1 exhibits the results.

L. gingivalis is rarely isolated in clinical samples [4] due to its easy decolorization in Gram staining and the resulting mis-assignment to other Gram-negative bacilli in this rapid test. Its correct identification is also hampered by current Maldi-TOF databases, with frequent confusion between *L. orale* and *L. gingivalis*.

Acute or subacute chorioamnionitis is defined by placental membrane inflammation of infectious origin. It has been proposed that microorganisms can gain access to the amniotic cavity by four routes: *via* ascent from the lower genital tract, hematogenous spread, invasive procedures, and/or seeding from the peritoneal cavity [9].

Bacteria involved in periodontal disease can reach the amniotic cavity, depending on patient-related and/or microorganism-related factors [10,11]. *L. gingivalis* was isolated from amniotic fluid in the present patient; however, its significance appears to be limited given that the therapy was not effective, as shown by the antibiogram.

Membrane rupture is not a prerequisite for the entry of microorganisms into the amniotic cavity. Bacteria can penetrate intact membranes and cause subclinical infections that are often undetected when the amniotic fluid is not analyzed.

L. gingivalis is more frequently detected in saliva and dental plaque and is associated with the development of gingival diseases [5]; hence, the oral cavity is a probable source of the infection in the present patient. *Lachnoanaerobaculum* has also been isolated from blood, causing bacteremia in patients under chemotherapy for acute myeloid leukemia [2-4].

The absence of data on this bacterium in amniotic fluid can be attributed to the lack of comprehensive microbiological studies in these patients, explained by the subacute progression of the infection, with no evident symptoms of acute chorioamnionitis.

The antibiogram indicated *in vitro* activity against ampicillin, piperacillin/tazobactam, cefotaxime, imipenem, and metronidazole and resistance to clindamycin. Despite this resistance, the patient remained stable and showed a favorable clinical progression, suggesting that the infection was successfully resolved by the completion of gestation.

In conclusion, this is the first reported case of the isolation from amniotic fluid of *L. gingivalis*, a potential cause of intrauterine infection and threatened preterm birth.

FUNDING

None to declare

CONFLICT OF INTEREST

Authors declare no conflict of interest

REFERENCES

1. Hedberg M, Moore E, Svensson-Stadler L, Hörstedt P, Baranov V, Hernell O, et al. *Lachnoanaerobaculum* gen. nov., a new genus in the Lachnospiraceae: characterization of *Lachnoanaerobaculum umeaense* gen. nov., sp. nov., isolated from the human small intestine, and *Lachnoanaerobaculum orale* sp. nov., isolated from saliva, and reclassification of *Eubacterium saburreum* (Prevot 1966) Holdeman and Moore 1970 as *Lachnoanaerobaculum saburreum* comb. nov. Int J Syst Evol Microbiol. 2012;62(11):2685-2690. doi: 10.1099/ijs.0.033613-0.
2. Sabrie N, Halani S, Maguire F, Aftanas P, Kozak R, Andany N. *Lachnoanaerobaculum orale* bacteremia in a patient with acute myeloid leukemia and stomatitis: An emerging pathogen. IDCases. 2023 Jul;33:e01837. doi: 10.1016/j.idcr.2023.e01837.
3. Ida Y, Okuyama T, Araki K, Sekiguchi K, Watanabe T, Ohnishi H. First description of *Lachnoanaerobaculum orale* as a possible cause of human bacteremia. Anaerobe. 2022;73:102506. doi: 10.1016/j.anaerobe.2021.102506.
4. Okada N, Murakami A, Sato M, Nakamura S, Fujii S, Sogabe K, et al. First reported case of *Lachnoanaerobaculum gingivalis* bacteremia

in an acute myeloid leukemia patient with oral mucositis during high dose chemotherapy. Anaerobe. 2022 Aug;76:102610. doi: 10.1016/j.anaerobe.2022.102610.

5. Lim YK, Park SN, Jo E, Shin JH, Chan YH, Shin Y, et al. *Lachnoanaerobaculum gingivalis* sp. nov., Isolated from Human Subgingival Dental Plaque of a Gingivitis Lesion. Curr Microbiol. 2019;76(10):1147-1151. doi: 10.1007/s00284-019-01747-z.
6. Baker GC, Smith JJ, Cowan DA. Review and re-analysis of domain-specific 16S primers. J Microbiol Methods 2003;55: 541–555. doi: 10.1016/j.mimet.2003.08.009.
7. Weisburg WG, Barns SM, Pelletier DA, Lane DJ. 16S ribosomal DNA amplification for phylogenetic study. J Bacteriol 1991; 173:697-703. doi: 10.1128/jb.173.2.697-703.199
8. Lim YK, Park SN, Jo E, Shin JH, Chang YH, Shin Y, et al. *Lachnoanaerobaculum gingivalis* sp. nov., isolated from human subgingival dental plaque of a gingivitis lesion. Curr Microbiol 2019; 76:1147-1151. doi: 10.1007/s00284-019-01747-z.
9. Conde-Agudelo A, Romero R, Jung EJ, Garcia-Sánchez ÁJ. Management of clinical chorioamnionitis: an evidence-based approach. Am J Obstet Gynecol. 2020 Dec;223(6):848-869. doi: 10.1016/j.ajog.2020.09.044.
10. Cardona-Benavides I, Puertas-Prieto A, Pinilla-Martín FJ, Navarro-Marí JM, Gutiérrez-Fernández J. *Alloscardovia omnicolens* emerging presence in premature rupture of membranes. New Microbiol. 2019 Oct;42(4):237-239.
11. Hidalgo-Chicharro A, Abad-Torreblanca R, Navarro-Marí JM, Gutiérrez-Fernández J. 32-week premature rupture of membranes caused by oropharyngeal microbiota. JMM Case Rep. 2017 Oct 12;4(10):e005121. doi: 10.1099/jmmcr.0.005121.