

Mycoplasma hominis bloodstream infection following transfemoral cannulation for extracorporeal life support: a case report

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Case Report

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Abstract

Background

Mycoplasma hominis (*M. hominis*) is a common commensal of the urogenital tract frequently associated with localized infections; however, hematogenous dissemination is uncommon, and cases secondary to indwelling central venous catheters are exceedingly rare. Here, we report a case of *M. hominis* bloodstream infection following transfemoral cannulation for extracorporeal life support, including an intra-aortic balloon pump (IABP) and continuous renal replacement therapy (CRRT).

Case Presentation:

A 68-year-old male patient underwent coronary stent implantation for acute myocardial infarction at Haining People's Hospital on July 25, 2025. Postoperatively, he developed heart failure and cardiogenic shock, necessitating IABP support. Although, his cardiac function and hemodynamics improved, and the patient's IABP was weaned on Day 8. However, the patient subsequently developed recurrent dyspnea, along with increasing body temperature and C-reactive protein (CRP) levels. CRRT was therefore initiated to maintain fluid balance and metabolic homeostasis and to remove inflammatory mediators. Despite this, the patient continued to experience fever with persistently elevated inflammatory markers. On Day 13, blood cultures, urine cultures, and catheter tip cultures were obtained. Hemodynamic deterioration occurred on Day 15, prompting veno-arterial extracorporeal membrane oxygenation (VA-ECMO) support. Dynamic monitoring revealed a rising trend in troponin I levels, and repeated coronary angiography demonstrated occlusion of the coronary stent, which was managed with balloon dilatation. The patient was then transferred to the First Affiliated Hospital of Zhejiang University for further management. On Day 16, the microbiology laboratory at Haining People's Hospital reported that the blood cultures yielded *M. hominis*; this finding was communicated to the receiving hospital. Subsequent anti-infective therapy with omadacycline was administered. After undergoing left ventricular assist device (LVAD) implantation, the patient ultimately improved and was discharged in stable condition.

Conclusions

In terms of femoral catheter-related infections adjacent to the urogenital tract, uncommon atypical pathogens such as *M. hominis* warrant consideration in addition to routine bacterial etiologies.

Background

While *M. hominis* is increasingly recognized as a pathogen capable of causing extraurogenital infections—such as bloodstream infection, surgical site infection, and infection secondary to trauma (particularly pelvic fractures in proximity to the urogenital tract) [1–3]—to our knowledge, no cases of catheter-related bloodstream infection attributed to this organism have been previously reported. Herein, we present a

case of *M. hominis* bacteremia following transfemoral cannulation for extracorporeal life support (IABP and CRRT), which serves as a reminder to clinicians that uncommon pathogens should be considered in the differential diagnosis of catheter-related infections, especially those arising from vascular access in the inguinal region.

Case Presentation

A 68-year-old male patient presented to the emergency department of Haining People's Hospital at 19:16 on July 25, 2025, with a chief complaint of chest pain for 1 hour. On arrival, his blood pressure was 61/40 mmHg. Electrocardiography revealed third-degree atrioventricular block, with mild ST-segment elevation in leads I and aVR and ST-segment depression in leads V₂-V₄. His troponin I concentration was 0.157 ng/mL. Acute myocardial infarction complicated by cardiogenic shock was suspected. Emergency coronary angiography revealed no significant stenosis in the left main coronary artery, diffuse mid-to-distal left anterior descending artery disease with 50–80% stenosis, total occlusion of the proximal circumflex artery, and spasm of the right coronary artery with 30% proximal stenosis. One stent was successfully implanted in the culprit circumflex artery lesion (Fig. 1). Following the procedure, the patient was urgently transferred to the emergency intensive care unit for monitoring. At that time, his blood pressure was maintained at approximately 120/45 mmHg with a norepinephrine infusion at 0.56 µg/kg/min. Bedside echocardiography demonstrated regional wall motion abnormalities of the left ventricle and reduced left ventricular systolic function, with an ejection fraction (EF) of 44% measured by biplane Simpson's method. IABP was inserted via percutaneous puncture of the right femoral artery for 1:1 counterpulsation support using a 40-cc balloon catheter inserted to a depth of 61 cm through an 8-Fr sheath. Mechanical ventilation was initiated. The glycoprotein IIb/IIIa inhibitor tirofiban was administered intravenously at 0.1 µg/kg/min for 24 hours, followed by oral aspirin (100 mg) once daily and ticagrelor (90 mg) twice daily. Systemic anticoagulation was maintained with continuous heparin infusion, with the activated partial thromboplastin time targeted at approximately 60 seconds. Chest computed tomography revealed inflammatory exudates in the right lower lobe, suggestive of aspiration pneumonia. Empirical antibiotic therapy with 3 g of cefoperazone-sulbactam every 12 hours was initiated. After 7 days of the above treatment, the norepinephrine infusion rate was reduced to 0.17 µg/kg/min, and repeat echocardiography revealed an EF of 55%, indicating improvement in cardiac function. The IABP was weaned on Day 8. On Day 9, the patient successfully passed a spontaneous breathing trial and was extubated, transitioning to high-flow nasal cannula oxygen therapy (FiO₂40%, flow rate 50 L/min), with pulse oxygen saturation maintained at approximately 95%.

However, on Day 10, the patient developed tachypnea (approximately 30 breaths/min), with a decrease in oxygen saturation to 85%. Acute left-sided heart failure was suspected, and the patient was intubated and placed on mechanical ventilation. At this time, the patient had a low-grade fever with a peak temperature of 37.8°C, along with elevated levels of the inflammatory markers CRP (128 mg/L), procalcitonin (PCT) (1.46 ng/mL), and interleukin-6 (IL-6) (11.4 pg/mL). His B-type natriuretic peptide level rose to 2344 pg/mL, and his response to high-dose diuretics (furosemide 120 mg) was poor. The serum creatinine concentration increased to 155 µmol/L. Accordingly, acute kidney injury secondary to

infection and impaired cardiac function was considered. On Day 11, a hemofiltration catheter was placed in the left femoral vein for CRRT to remove inflammatory mediators and manage fluid balance. However, on Day 13, the patient developed recurrent fever, with a maximum temperature of 38.8°C, and laboratory tests revealed a CRP concentration of 161.2 mg/L, a PCT concentration of 13.64 ng/mL, and an IL-6 concentration of 739.7 pg/mL. To identify the source of infection, sputum cultures, blood cultures, urine cultures, and a culture of the right subclavian venous catheter tip were obtained on the same day. Given the patient's history of mechanical ventilation and vascular catheterization, empirical antibiotic therapy was increased to 1 g meropenem every 8 hours plus 0.6 g linezolid every 12 hours to cover both gram-negative and gram-positive organisms. On Day 15, the patient's hemodynamic status deteriorated, with hypotension requiring high-dose norepinephrine at 4.44 µg/kg/min. Echocardiography revealed an EF of approximately 32%, and the repeat troponin I level increased to 9352.4 ng/L. The Sequential Organ Failure Assessment score was 12. The differential diagnosis considered sepsis and worsening cardiac function. Emergency VA-ECMO was initiated. A repeat coronary angiography revealed total occlusion of the proximal segment of the circumflex stent, which was managed with drug-coated balloon dilatation of the circumflex artery. The patient was subsequently transferred to the First Affiliated Hospital of Zhejiang University for further management. On Day 16, pinpoint, needle-like colonies were observed on Columbia blood agar plates at Haining People's Hospital (Fig. 3a). Under high-power microscopy, the colonies exhibited a typical "fried-egg" appearance (Fig. 3b). The organism was identified as *Mycoplasma hominis* by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) using the ZYBIO EX2000 system (Fig. 3c). Both sets of blood cultures (bilateral double bottles) tested positive, while sputum cultures, urine cultures, and catheter tip cultures all yielded negative results. The details of the diagnosis and treatment are shown in Fig. 2.

The referral hospital was notified of the blood culture results and the patient was subsequently treated intravenously with omadacycline at a loading dosage of 200 mg once daily on the first day, followed by 100 mg intravenously once daily. After 26 days of treatment, the infection was controlled. However, due to poor cardiac function, a LVAD was implanted on Day 33. VA-ECMO was weaned off on Day 39, and the patient was discharged in improved condition on Day 78.

Discussion

M. hominis is a conditional pathogenic microorganism that lacks a cell wall, exhibits marked pleomorphism, stains poorly with Gram staining, and commonly colonizes the urogenital tract, where it frequently causes local infections. Previous literature has reported that the colonization rate of genital mycoplasmas ranges from 60% to 80%, with *M. hominis* accounting for approximately 21% to 53% of these cases [4]. This pathogen rarely penetrates the submucosal layer and uncommonly causes infections outside the urogenital system. However, under certain conditions, such as immunocompromised status or invasive procedures, it can occasionally cause infections in the bloodstream, surgical sites, central nervous system, and other locations [1–3]. For instance, Wang et al. and Phuong et al. reported *M. hominis* infections detected in blood cultures from postoperative patients

with intracerebral hemorrhage and from an adult female patient, respectively [2, 5]. To date, catheter-related bloodstream infection (CRBSI) caused by *M. hominis* has not been reported in the literature.

M. hominis infection may present with either localized urogenital symptoms or systemic bloodstream infection manifestations. Urogenital tract symptoms are often nonspecific and may include frequent urination, urgency, dysuria, and increased vaginal discharge. In contrast, bloodstream infection typically presents with systemic symptoms such as fever, fatigue, and chills, along with laboratory findings of elevated white blood cell count, neutrophil count, and CRP levels [6]. Overall, however, these findings are not significantly different from those of other bacterial infections. Conventionally, culturing for Mycoplasma is demanding and time-consuming. On agar media, typical colonies of *M. hominis* may exhibit a “fried-egg” appearance [4]; however, in most cases, colony growth is slow and small, making identification difficult. MALDI-TOF MS, which generates characteristic mass spectra by analyzing the molecular weights of ribosomal proteins and other microbial components, followed by database comparison, facilitates rapid and accurate identification of Mycoplasma species [7]. Serological methods such as immunofluorescence assays and enzyme immunoassays, as well as PCR, are also commonly used for *M. hominis* detection. In addition, many reports have demonstrated that next-generation sequencing (NGS) enables accurate identification of this pathogen, allowing for early diagnosis and treatment [8, 9].

In this case, the patient developed a fever and elevated inflammatory markers developed after undergoing sequential femoral artery catheterization for IABP and femoral vein catheterization for CRRT. Blood cultures and mass spectrometry confirmed *M. hominis* infection. However, sputum cultures, urine cultures, and cultures from the tip of the right subclavian venous catheter, collected during the same period, all returned negative results. However, as mentioned earlier, *M. hominis* colonized the urogenital tract at a certain rate, and our extracorporeal life support catheterization sites were adjacent to the urogenital tract. Therefore, despite negative urine cultures under the same conditions, we inferred that this was a case of catheter-related bloodstream infection caused by *M. hominis*, which likely originating from femoral vessel catheterization in proximity to the urogenital tract. These findings further confirm, from a mechanistic perspective, that *M. hominis* can enter the bloodstream and cause systemic infection, particularly in immunocompromised patients or during f invasive procedures [10].

CRBSI is among the most common and life-threatening complications of arteriovenous catheterization for extracorporeal life support modalities such as blood purification and IABP [11]. This case suggests that atypical pathogens such as *M. hominis*, may also be causative agents of CRBSI. Literature indicates that the predominant pathogens of CRBSI are *Staphylococcus aureus* and gram-negative bacteria [12]; therefore, when CRBSI is caused by *M. hominis*, commonly used antibiotics such as β -lactams are typically ineffective. As a result, when patients fail to respond to conventional antimicrobial therapy, further etiological investigations should be conducted using culture, mass spectrometry, NGS, and other detection methods. Moreover, during femoral vascular procedures, stricter adherence to aseptic techniques and enhanced screening for atypical pathogens, such as Mycoplasma, are warranted.

M. hominis lacks a cell wall, which makes it intrinsically resistant to many commonly used antibiotics, such as β -lactams. In contrast, it is generally more susceptible to fluoroquinolones, macrolides, and tetracyclines [13]. However, resistance to tetracyclines and fluoroquinolones has been increasing in recent years [4, 6]. Novel tetracyclines, such as doxycycline and omadacycline, offer new therapeutic options for drug-resistant atypical pathogens [14–16]. Waites et al. [14] performed in vitro susceptibility testing on 10 genital Mycoplasma isolates and compared multiple antibiotics, including tetracycline, doxycycline, levofloxacin, azithromycin, and omadacycline, and reported omadacycline to be the most effective agent. Despite this, omadacycline has relatively low blood concentrations, which makes it less commonly used for bloodstream infections. However, Shoen et al. [15] demonstrated that omadacycline exhibited minimum inhibitory concentrations (MICs) of 0.06–0.25 $\mu\text{g/mL}$ against atypical pathogens, including *M. hominis*, in vitro. In the study by Flarakos et al. [16], a single oral dose of 300 mg omadacycline achieved a plasma C_{max} of $563 \pm 79.5 \text{ ng/mL}$. Clearly, the peak plasma concentration of omadacycline exceeds its MIC, suggesting that it still has therapeutic value for bloodstream infections. Therefore, in the present case, taking into account the patient's poor gastrointestinal function and suboptimal response to oral doxycycline (as the referral hospital had no injectable doxycycline formulation available), omadacycline was selected and achieved favorable clinical efficacy.

In the present case, it was also observed that in-stent thrombosis of the coronary artery occurred following *M. hominis* bloodstream infection, despite concurrent antiplatelet therapy with aspirin and ticagrelor and systemic anticoagulation with heparin. Previous reports have indicated that infections caused by Mycoplasma species, including *M. hominis* and *Mycoplasma pneumoniae*, are prone to thrombotic events at multiple sites, such as cerebral infarction [17, 18]. The underlying mechanisms of these events remain unclear but may include the following (1) infection-induced endothelial dysfunction triggering fibrin formation, platelet adhesion, and aggregation; (2) local vasculitis and thrombotic vascular occlusion mediated by cytokines and chemokines (IL-6, IL-8, IL-18, and tumor necrosis factor- α (TNF- α)); (3) reduced microvascular flow and hypercoagulable states during septic shock, promoting thrombosis; and (4) interactions between the coagulation pathway and the complement cascade induced by Mycoplasma infection [17]. These possibilities warrant further investigation. This case also highlights the need for vigilance regarding thrombotic complications when abnormalities in D-dimer levels, coagulation function, or other relevant parameters are observed in the context of such infections.

In summary, we report for the first time that *M. hominis*, as a pathogenic microorganism, has the potential to cause CRBSIs, which may lead to sepsis and thrombotic events. When an infection occurs after femoral arteriovenous catheterization and does not respond to conventional empirical antimicrobial therapy, increased vigilance for this pathogen is warranted. This case also highlights the importance of reinforcing aseptic techniques and enhancing pathogen screening during invasive femoral vascular procedures.

Abbreviations

M. Hominis *Mycoplasma hominis*

IABP intra-aortic balloon pump

CRRT continuous renal replacement therapy

CRP C-reactive protein

VA-ECMO veno-arterial extracorporeal membrane oxygenation

LVAD left ventricular assist device

EF ejection fraction

PCT procalcitonin

IL-6 interleukin-6

MALDI-TOF MS matrix-assisted laser desorption/ionization time-of-flight mass spectrometry

CRBSI catheter-related bloodstream infection

NGS next-generation sequencing

MIC minimum inhibitory concentrations

TNF- α tumor necrosis factor- α

Declarations

Ethics approval and consent to participate

The study was approved by the Ethics Committees of the Haining People's Hospital, and it was carried out in compliance with the Declaration of Helsinki ' s principles. Written informed consent was obtained from patient or their guardian.

Consent for publication

Written informed consent was obtained from the patient's family for publication of this case report and accompanying images.

Availability of data and materials

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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No funding was received for this study.

Author contributions

ZYY is responsible for collecting medical records and writing papers;LL is responsible for literature search and organization;ZY is responsible for collecting medical record data and processing images and tables;DJS is responsible for data interpretation and formal analysis;WQH is responsible for literature screening and guiding paper writing.

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Figures

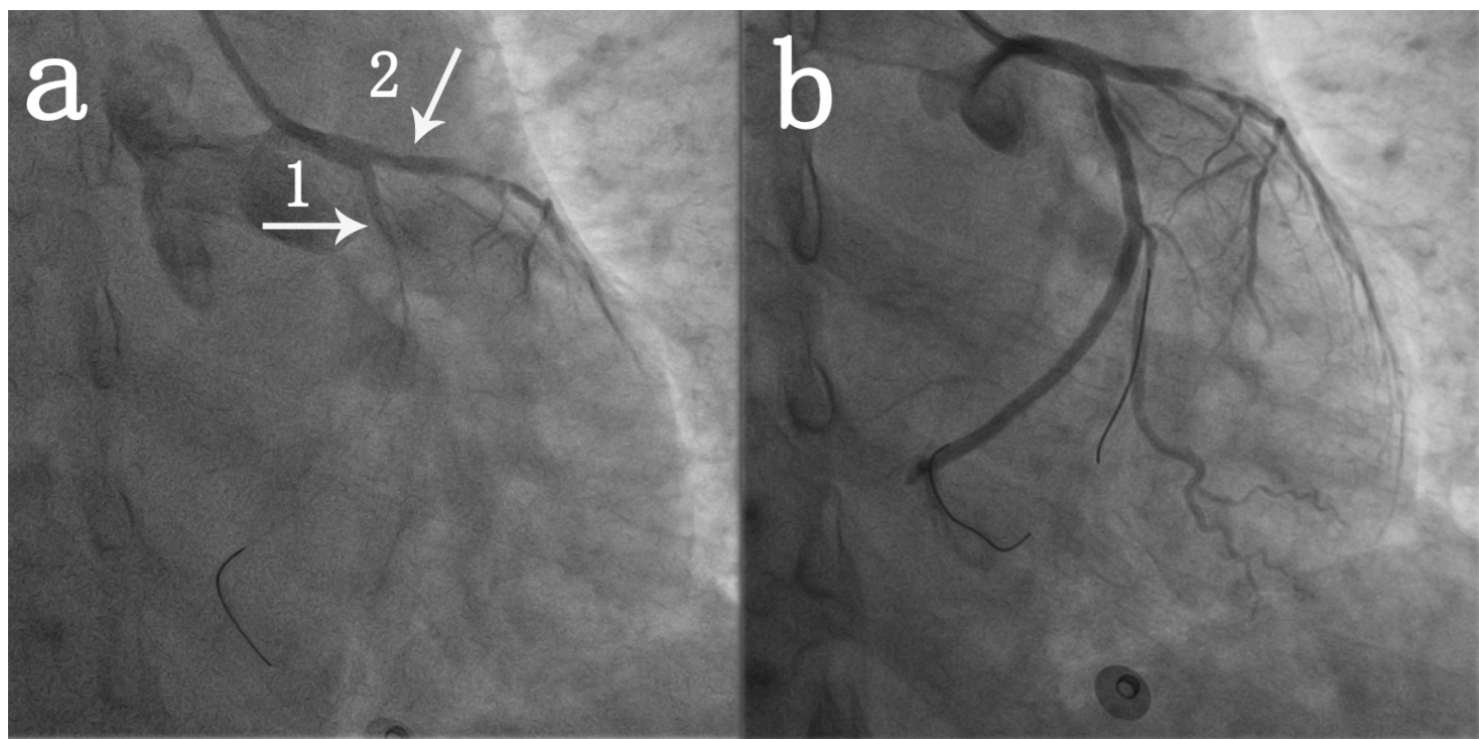


Figure 1

Coronary angiography (July 25, 2025). (a) Pre-stenting and (b) Post-stenting . The left main coronary artery showed no significant stenosis. The mid-to-distal left anterior descending artery exhibited diffuse disease with stenosis ranging from 50–80%. The proximal circumflex artery was completely occluded. The right coronary artery showed spasm with 30% proximal stenosis. A stent was implanted in the circumflex artery lesion. Arrow 1: the circumflex artery, Arrow 2: the left anterior descending artery.

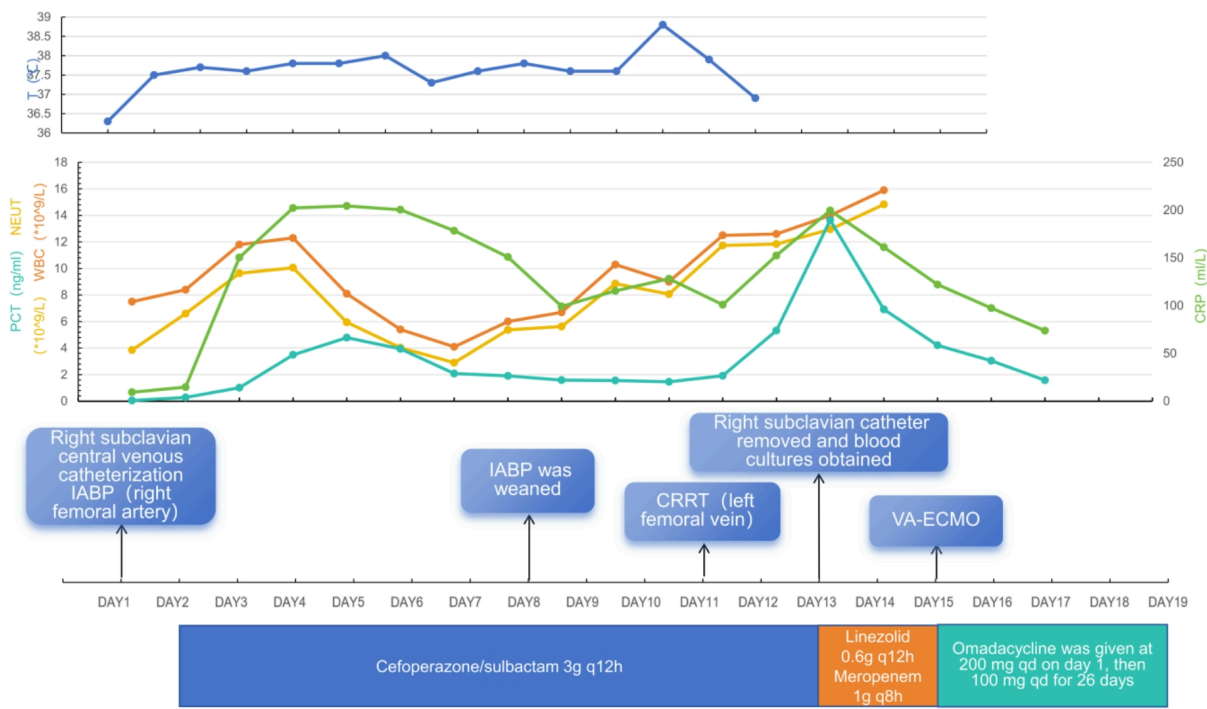


Figure 2

Trends in body temperature and inflammatory markers, along with the timeline of catheterization and antibiotic therapy. WBC White blood cell; NEUT Neutrophil; CRP C-reactive protein; PCT procalcitonin; T Temperature)

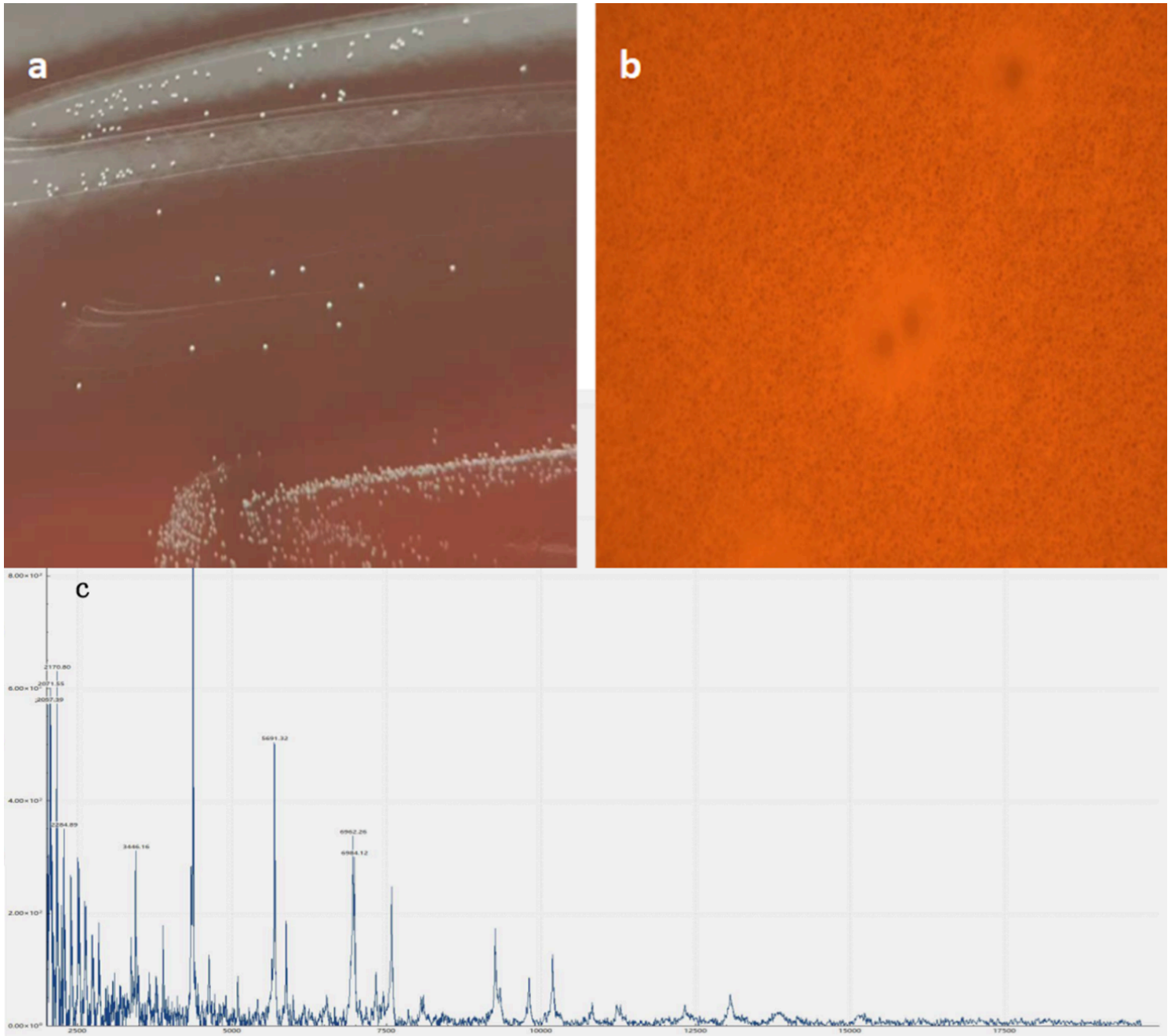


Figure 3

Culture and identification of *M. hominis*. The organism was cultured on Columbia blood agar at 35 °C in a 5% CO₂ atmosphere. (a) Pinpoint colonies were observed under low-power microscopy (10×10). (b) A typical “fried-egg” appearance was noted under high-power microscopy (40×10). (c) The mass spectrum profile of *M. hominis* was obtained using the ZYBIO EX2000 MALDI–TOF MS system.