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Identification of Facklamia hominis in a Case of *Stercoral Peritonitis: A Case Report and Review of the Literature*

Younes Ait Tamlihat1*, Jérémie Violette2, Julien Labrousse2, Delphine Bregeaud1, Jean François Vincent1

[1]Intensive care unit hospital center of Saintonge, 11 boulevard Ambroise Paré, Saintes, France

[2]Laboratoire interhospitalier – Groupement de Coopération Sanitaire de Saintonge, 11 boulevard Ambroise Paré, Saintes, France.

*Corresponding author: Younes Ait Tamlihat, Intensive care unit hospital center of Saintonge, 11 boulevard Ambroise Paré, Saintes, France. y.ait-tamlihat@ch-saintonge.fr

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Abstract

Facklamia hominis is a Gram-positive, optional anaerobic bacterium that is currently emerging through improved microbiological identification techniques. It has been isolated in various liquids and body tissues. Its peritoneal location has never been reported to our knowledge. The first case of *F. hominis* peritonitis associated with other aero-anaerobic bacteria is described here. In this observation, the sub-mesocolic location and the polymicrobial character of the samples do not allow to establish a specific pathogenicity of *F. hominis*. Its isolation could be explained by an contiguous infection from the female genital tract, the usual host of the bacteria, and recent hysterectomy. Further publications will be needed to better determine virulence factors and pathogenicity of this bacterium in humans.

Keywords: *Facklamia hominis;* Human infection; Peritonitis; Review of the literature

Introduction

Facklamia hominis has rarely been reported as causing infection in humans. Thanks to improved knowledge and better microbiology diagnostic test methods, several cases of infection by this bacterium have recently been reported in the literature. It has not yet been reported in peritoneal fluid. We report a case of septic shock secondary to stercoral peritonitis involving multiple bacteria with identification of *F. hominis.*

Case Presentation

The case involved a 57-year-old woman, nulligravida, with a history of high blood pressure, severe obesity (BMI of 39 kg/m2) and who had had a right salpingo-oophorectomy over 30 years ago via Pfannenstiel laparotomy. Due to the compressive symptoms of a multiply myomatous uterus, the patient received planned laparotomy surgery for a total hysterectomy with left salpingo-oophorectomy (revision of previous scar). The procedure was made difficult due to the presence of many adhesions, predominantly cecal and sigmoid. Operative follow-up was marked on Day 3 by anemia requiring transfusion of 2 packed red blood cells and hyperthermia of 42°C with no infectious point of origin or state of shock. Probabilistic antibiotic therapy with amoxicillin-clavulanic acid combination was started. 48 hours later, (postoperative Day 5), the patient remained febrile at 40°C with increased biological inflammatory syndrome. Antibiotic therapy was expanded with piperacillin-tazobactam and gentamicin. An abdominal pelvic CT scan completed the same day found a pelvic collection of fluid of 95 mm in length. The patient was taken back to the operating block on Day 6 for exploratory laparoscopy transformed to laparotomy, enabling evacuation of an abscessed hematoma of 850 ml, the bacteriological culture of which enabled identification of two wild bacterial strains: *Escherichia coli* and *Klebsiella pneumoniae*. Six days later, Day 12 after the hysterectomy, under antibiotic treatment with piperacillin-tazobactam, the patient exhibited a clinical picture of septic shock with intense abdominal pains combined with pneumoperitonitis confirmed by abdominal pelvic CT scan. Further surgery via laparotomy with colostomy and suturing of the rectal stump (Hartmann type) with peritoneal lavage was performed urgently due to stercoral peritonitis caused by sigmoid perforation. Vascular refilling with five liters of crystalloid fluids completed during the operation due to poor hemodynamic condition then justified introduction of noradrenaline at 0.5 µg/kg/min. The patient was then transferred to Intensive Care.

The outcome was rapidly favorable, enabling withdrawal of noradrenaline and extubation on Day 2. The bacteriological peritoneal sample culture taken during the operation enabled several germs to be identified: *E. coli*, *K. pneumoniae*, *Bacteroides*

fragilis, *Enterococcus faecalis*, and multiple colonies of *F. hominis*. The antibiotic therapy was adapted again to cefotaxime, metronidazole and amoxicillin according to the results of antibiotic susceptibility tests. Due to recurrence of fever and increase of the biological inflammatory syndrome, a third surgical procedure was required on Day 4 (equivalent to Day 16 after the hysterectomy) for surgical drainage of fluid collections revealed on CT imaging. The previously mentioned microorganisms were found again in the new sample taken during the operation. For both peritoneal samples, bacterial identification was performed by matrix-assisted laser desorption/ionization time-of flight mass spectrometry (MALDI-TOF). Colonies of *F. hominis* were identified with 99.9% certainty (Vitek MS V3.0, bioMerieux, France).

The clinical outcome was generally favorable under antibiotic therapy. The duration of the stay was, however, extended (24 days of hospitalization, equivalent to Day 36 after hysterectomy) due to splitting of the Pfannenstiel scar requiring revision of dressings in the operating block, as well as treatment of the wound with negative pressure VAC (Vacuum Assisted Closure).

Discussion and Review

The first description of the genus *Facklamia* type by Collins et al [1] was in 1997 thanks to DNA sequence coding for 16S RNA. Six serotypes were identified from the strains isolated from the human samples taken from the vagina, urine, blood and from the abscess.

Facklamia species are Gram-positive facultative anaerobic cocci which are difficult to identify precisely using traditional biochemistry tests. The colonies are alpha hemolytic and catalase negative in 5% sheep blood agar and resemble those of oropharyngeal *Streptococci*. *Facklamia* species can be distinguished from other Gram-positive catalase negative cocci by their production of Pyrrolidonyl Arylamidase (PYR), Leucine aminopeptidase (LAP) and their capacity to grow in media containing 6.5% sodium chloride, while this type of enzymatic activity is usually negative for *streptococci* [2,3]. The difficulty of identifying *Facklamia* species and the *F. hominis* species probably leads to underestimating the prevalence of infections in humans.

Six species of *Facklamia* have been reported to date: *F. sourekii* has been reported in necrotizing gangrene, *F. languida* and *F. ignava* have been found in several cases of septicemia, *F. miroungae* and *F. tabacinasalis* have never been reported as a human pathogen. Several cases of *F. hominis* infection have been reported in the literature: chorioamnionitis, endocarditis, prosthetic joint infection, meningitis, scapular abscess, cystitis, balanoposthitis, superinfected epidermal inclusion cyst [4-12]. In most cases reported, bacterial identification is performed using the Vitek 2 system (bioMerieux France), DNA sequence coding for 16S RNA or mass spectrometry (MALDI-TOF) (Table 1). Use of MALDI-TOF is a reliable means of diagnosing for *F. hominis* species subject to use of a recent database (Version R07.01 of the Vitek2 system and Version 3.0 of Vitek MS bioMerieux or version 6.0.0.0 of MALDI Biotyper Bruker Daltonics) [12].

The female reproductive system is considered the usual host of *F. hominis*. However, two recent cases of infection of the male reproductive system have been reported: the first case was sepsis secondary to cystitis following transurethral resection of the prostate in a 75-year-old man [10] and the second case revealed balanoposthitis in a 9-year-old boy [11].

Infection by *F. hominis* may be local or in conjunction with genital-urinary infections. It may also occur by hematogenous spread (bacteremia, endocarditis, meningitis). In the case of prosthetic joint infections, scapular abscess and superinfected epidermal inclusion cyst, direct contamination from a cutaneous reservoir may be suspected [7,9,12]. In our case, the hysterectomy was complicated by a peritoneal hematoma with probable gastrointestinal contamination (peritonitis) as evidenced by the identification of two enterobacteria (*E. coli* and *K. pneumoniae*). *F. hominis* was identified secondarily during the second and third surgical revisions. The pathogenic power of *F. hominis* was difficult to evaluate within the polymicrobial context (commensal gut flora). The proximity of the female reproductive system and the recent hysterectomy are probably responsible for the peritoneal contamination. In the abdomen, another species of *Facklamia* (*F. languida*) was isolated in the gallbladder. To our knowledge, *F. hominis* has never been isolated or identified in an intra-abdominal infection.

Signs of polymicrobial samples containing *F. hominis* were also found in the case of meningitis where the cerebrospinal fluid culture returned positive for *Streptococcus pneumoniae* and *F. hominis*. The blood culture profile identified only *Streptococcus pneumoniae* [8].

All cases of *F. hominis* infection recorded in the literature were community-acquired in immunocompetent patients, except the case of superinfected epidermal inclusion cyst in a patient carrying the hepatitis B virus [12]. It seems to us that F. hominis could behave like opportunistic bacteria, exploiting major changes in its environment or host deficiency.

The outcome of *F. hominis* infections is generally favorable under adapted antibiotic therapy. The bacterium is often sensitive to ampicillin and third-generation cephalosporins (Table 1). It must be remembered that certain strains have increased resistance profiles, particularly during systemic infections, as in one case of endocarditis complicated by multiple cerebrovascular accidents following septic emboli where *F. hominis* exhibited resistance to penicillin [6]. Resistance has been reported for *F. ignava* and *F. languida* with elevated minimum inhibitory concentrations (MIC) for cefotaxime, erythromycin, clindamycin and trimethoprim-sulfamethoxazole and low MIC for levofloxacin and vancomycin [13].

Year of publication/ reference	Country	Age	Sex	Infection	Bacteremia	Co-infection	Identification method	Adapted antibiotic therapy	Evolution
2005 [4]	United Kingdom	NA	F	Chorioamnionitis	Yes	No	NA	Ampicillin	
								Metronidazole	Favorable
2010 [5]	United Kingdom	NA	NA	Endocarditis + cardio-embolic stroke	Yes	No	NA	Vancomycin	
								Gentamicin	Death
2012 [6]	India	35	M	Endocarditis	Yes	No	Vitek2 system	Ceftriaxone 6 W	
								Gentamicin 4 W	Favorable
2014 [7]	Spain	81	F	Prosthetic joint	No	No	Vitek2 system +	Ceftriaxone 6 W	
							16S rRNA	then	Favorable
								Amoxicillin 6 W	
2015 [8]	United States	41	F	Meningitis	Yes	Streptococcus pneumoniae	Vitek2 system	Ceftriaxone 14 D	Favorable
2016 [9]	France	40	F	Scapula abscess	No	No	MALDI-TOF	Pristinamycine	
							(score 1.77)		Favorable
2019 [10]	United States	75	M	cystitis	Yes	No	NA	Ampicillin-sulbactam	
								Vancomycin	Favorable
2019 [11]	Spain	9	M	Balanopostitis	No	No	MALDI –TOF	Amoxicillin + clavulanic acid 5 D	Favorable
							(score 2.5)		
2019 [12]	Korea	67	M	epidermal	No	No	Vitek2 system	Amoxicillin + clavulanic acid 7 D	Favorable
				cyst			MALDI –TOF (score 2.024)		
							16S rRNA		

D: day; MALDI-TOF: matrix-assisted laser desorption/ionization time-of-flight mass spectrometry; NA: data not available; W: week.

Table 1: characteristics of *F. hominis* infections.

In our case, the antibiotic susceptibility test was conducted using the agar diffusion method in conformance with the recommendations of the French Microbiology Society (CA-SFM 2019 V02) and the interpretations were extrapolated from the non-hemolytic non-*pneumococcal streptococci*. Our patient's strain was sensitive to amoxicillin (MIC of 0.250 mg/l), cefotaxime (MIC of 0.500 mg/l), as well as to levofloxacin, cotrimoxazole, teicoplanin and pristinamycin. However, there was resistance to all macrolides and to clindamycin.

Conclusion

The *F. hominis* species is rarely identified in humans, but may be responsible for invasive infections or co-infections. The pathogenicity of this species has not been fully established. Other

publications will perhaps enable clarification of the virulence factors of this bacterium.

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Conflict of Interest

All authors: No reported conflicts

Authors contributions

AY drafted the manuscript. VJ, LJ, BD and VJF carried out the critical analysis of article. VJ and LJ performed laboratory analysis. All authors read and approved the final manuscript.

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