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19 **ABSTRACT**

20 *Sneathia amnii* is an opportunistic pathogen of the female reproductive tract that has been  
21 reported to cause infections during pregnancy and in the post-partum period. Infections  
22 outside the reproductive tract have rarely been described. We report the case of a spondylitis  
23 due to *S. amnii* in a 72-year old woman, successfully treated with a course of antibiotic therapy  
24 for 7 weeks. Growth of this pathogen guided our diagnosis towards a gynecological  
25 pathology; we discovered an endometrium adenocarcinoma. This case emphasizes the need  
26 for adequate incubation of discal biopsies, both using aerobic and anaerobic enrichment broth  
27 and prolonging delay of culture of negative samples.

28

29 **KEYS WORDS :** *Sneathia amnii*; Spondylitis; Endometrium adenocarcinoma; 16S rDNA  
30 sequencing; Case report

31

32

## 33 **1. Introduction**

34 *Sneathia amnii* (formerly *Leptotrichia amnionnii*) is a fastidious anaerobic Gram-negative rod  
35 considered as an opportunistic pathogen of the female reproductive tract. *Sneathia* species  
36 have been associated with bacterial vaginosis and with various obstetric complications  
37 including spontaneous abortions, preterm labor and post-partum bacteremia [1]. Infections  
38 outside the reproductive tract have rarely been described. We report a case of *S. amnii*  
39 spondylitis linked to an endometrium adenocarcinoma and review the literature on this  
40 pathogen.

## 41 **2. Case report**

42 A 72-year old woman with a previous history of heart disease and type 2 diabetes was  
43 admitted to the emergency department for a disabling back pain evolving for one week, not  
44 controlled by morphine. She did not report deterioration of her general condition. On  
45 admission, she presented with fever (38.3°C), lower back and paravertebral pain, without  
46 sepsis nor neurological signs. Laboratory tests showed biological inflammatory syndrome (C-  
47 Reactive Protein at 142 mg/L), hyperleukocytosis (19690/mm<sup>3</sup>), anemia (9,9 g/dL).  
48 Dorsolumbar MRI showed a L3-L4 spondylitis with a small anterior abscess, infiltration of  
49 the psoas and epiduritis. Blood cultures (Bact-Alert3D; BioMérieux, Marcy l'Etoile, France)  
50 remained sterile. Discal biopsies were sampled. An inflammatory tissue with many  
51 neutrophils was described by anatomopathologic analysts. In bacteriology, a Gram-negative  
52 nonmotile bacilli grew in Wilkins-Chalgren anaerobic broth at the third day of incubation  
53 while aerobic broth remained sterile. Subculture was performed on Columbia agar with blood  
54 5% anaerobically incubated at 35°C for 6 days. On blood agar, colonies were flat, crystalline  
55  $\alpha$ -hemolytic, with a diameter of approximately 1 mm. Catalase and oxidase were negative.  
56 On the Gram stain, bacteria appeared as long and short Gram-negative rods (Figure A).  
57 Bacteria were identified as *S. amnii* using MALDI-TOF spectrometry mass (Bruker Daltonics,

58 Wissembourg, France) and 16S rDNA sequencing (377 ABI Prism; PE Applied Biosystems,  
59 Foster City, CA., USA). *In vitro* susceptibility tests performed by disk diffusion method with  
60 an inoculum of 1 McFarland on Brucella agar with vitamin K1 and blood 5%, according to  
61 the procedure and interpretation criteria proposed by the Comité de l'Antibiogramme de la  
62 Société Française de Microbiologie (CA-SFM EUCAST 2019) ([http://www.sfm-](http://www.sfm-microbiologie.org)  
63 [microbiologie.org](http://www.sfm-microbiologie.org)), showed susceptibility to amoxicillin-clavulanic acid, tetracycline,  
64 clindamycin, rifampicin, and metronidazole. New discal biopsies were sampled 4 weeks later.  
65 The same bacteria yielded in 14 days in the anaerobic broth and the subculture in 12 days  
66 more on Columbia agar with 5 % blood. Both vertebral biopsies cultures being positive with  
67 *S. amnii* alone, since gynecological entrance wound was highlighted in the patient, the  
68 contribution of other micro-organisms such as streptococcus and other anaerobic bacteria  
69 remained unclear but plausible and was considered for antimicrobial therapy. The presence of  
70 complications with abscess and epiduritis was also taken into account. Treatment was initiated  
71 with association of intravenous amoxicillin-clavulanic acid and metronidazole for 10 days to  
72 enlarge microbiological spectrum, further replaced by clindamycin plus metronidazole for 6  
73 weeks since psoas abscess and epiduritis had promptly disappeared.  
74 Because of these microbiological findings and given that *S. amnii* is part of the genital tract, a  
75 gynecological examination was performed: a large uterine fibroid was discovered, later  
76 identified as an endometrium adenocarcinoma, with a significant increase of CA125 level (86  
77 U/mL). The patient later revealed that she had metrorrhagia since one year.

78

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### 80        3. Discussion

81    The review of the literature on *S. amnii* related various cases of infections associated with the  
82    female genital tract or delivery : upper genital tract infections, chorioamnionitis, abortion,  
83    stillbirth, postnatal sepsis and neonatal infections such as meningitis [2,3,4,5]. Only few cases  
84    of infections outside the urogenital tract have been described : an urinary tract infection in a  
85    renal transplant [6], a renal abscess occurring 5 weeks after vaginal delivery [7], an arthritis in  
86    a diabetic and hemodialysis man [8], an epidural abscess following hysteroscopy [9] and a  
87    spondylitis in a context of endometrium adenocarcinoma (our case) .

88    To our knowledge, our description is the first of a *S. amnii* spondylitis in a patient with  
89    gynecological cancer. *In vitro*, Harwich et al. pointed out *S. amnii* ability to adhere and its  
90    high cytotoxic potential for cervical epithelial cells [1]. Recent studies evocated increase of  
91    *Sneathia* sp. in vaginal flora of patients with cervical cancer [10-12]. However, these  
92    observations need to be strengthened and may not be transposable to endometrium  
93    adenocarcinoma.

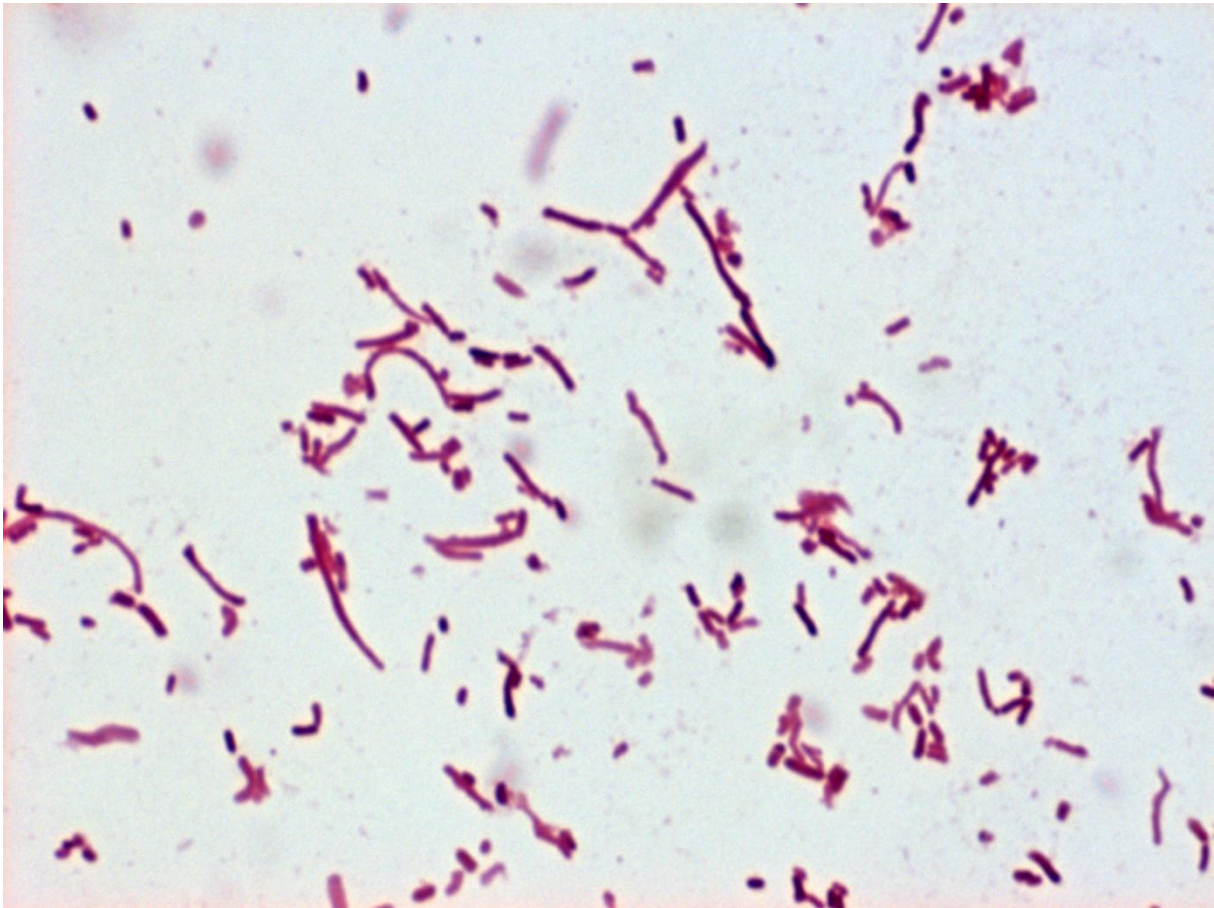
94    Anaerobes are rare causes of spondylitis since they are observed in less than 4% of cases [13,  
95    14]. Indeed, *Staphylococcus aureus* is the predominant pathogen accounting for half of non-  
96    tuberculosis spondylitis, followed by *Enterobacteriaceae*, *Pseudomonas aeruginosa*,  
97    coagulase-negative staphylococci and streptococci [13]. Blood cultures are the first way to  
98    obtain a microbiological diagnosis of spondylitis and were positive in 66.0% out of the 194  
99    documented cases in the serie by Amsilli et al. These authors recommend to perform vertebral  
100    biopsies as a second line technique since they documented 89.4% of cases without positive  
101    blood culture, and particularly, yielded all anaerobes of their serie [14]. In other studies, 39%  
102    of biopsy cultures in suspected cases of spondylitis were negative [13]. In this context,  
103    anaerobes such as *S. amnii* may be underestimated organisms since they are fastidious and  
104    slow-growing bacteria. Some authors thus consider use of broad range PCR as a valuable

105 adjunct to standard cultures for culture-negative vertebral biopsies [13]. To our view, it  
106 mostly emphasizes the need for adequate incubation of these samples, both using aerobic and  
107 anaerobic enrichment broth and prolonging delay of culture of negative samples. Indeed, in  
108 our case, culture of *S. amnii* has been essential for gynecological cancer diagnosis (since it has  
109 led us to perform a gynecological examination), more than for spondylitis treatment (since it  
110 is a very antibiotic-susceptible bacterium).

111

112

113 **FIGURE A**



114

115 **Gram stain of *Sneathia amnii*.** Gram stain from colonies on blood agar, image taken at  
116 magnification 1000x. Presence of long and short Gram-negative rods.

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