



## Case study

## Capnocytophaga sputigena: An unusual cause of community-acquired pneumonia

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## ABSTRACT

*Capnocytophaga sputigena* is an unusual cause of community-acquired pneumonia. A 22-year-old woman presented an amoxicillin-resistant pneumonia. Sputum examination detected *C. sputigena* from 3 specimens with a significant bacterial load. The strain produced beta lactamase. Evolution was favorable after introduction of amoxicillin-clavulanate acid. Physicians might be aware of the presence of this unusual bacterium in cases of community-acquired pneumonia.

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## Introduction

*Capnocytophaga sputigena* is a capnophilic gram-negative fusiform bacillus belonging to the family Flavobacteriaceae. This bacterium was first described in 1979 and belongs to the normal flora of the subgingival throat [1]. There is no national or international epidemiological surveillance of this bacterium. As for pulmonary infections, they still seem very little described. Here, we report a case of pneumonia with *C. sputigena*.

## Clinical case

In July 2018, a 22-year-old woman with a severe obesity, for which she underwent sleeve gastrectomy, was hospitalized in our infectious diseases unit, in the IHU Méditerranée Infection, Marseille, France. For 2 weeks she had rhinorrhoea associated with fever without improvement under symptomatic treatment. Subsequently, symptoms worsened with dyspnoea, coughing, fever and purulent sputum. Amoxicillin was introduced as acute community pneumonia was suspected. After 8 days of antibiotic therapy, the symptoms persisted and led the patient to consult again in the emergency department.

Clinically, she presented cough with sputum associated with crackles at the two pulmonary bases. The rest of the clinical exam was normal. Chest radiograph showed a focal infection of

the left lower lung lobe associated with diffuse interstitial syndrome (Fig. 1). Standard blood test analysis found moderate inflammatory syndrome with CRP at 45 mg/L without hyperleucocytosis or any other abnormality. On the microbiological level, *Legionella pneumophila* and *Streptococcus pneumoniae* urinary antigens were negative. We decided to empirically change antibiotic therapy for levofloxacin in this atypical pneumonia resistant to amoxicillin.

Three semi-quantitative cultures of sputum specimen were performed, for which *C. sputigena* was found predominant. The isolate identified by MALDI-TOF MS grew at 10<sup>7</sup>CFU/mL in all specimens. Antibiotic susceptibility testing was performed according to the EUCAST recommendations using *Haemophilus* spp. breakpoints and evinced a resistance to amoxicillin and a susceptibility to amoxicillin-clavulanic acid.

According to these results, amoxicillin-clavulanic acid was introduced. In parallel, this atypical case of pneumonia due to *C. sputigena* was documented. The patient entirely recovered after 7 days of treatment.

## Discussion

*C. sputigena* is rarely implicated in pulmonary infection, most of the described cases related its implication in bacteraemia or amniotic infections [2]. To the best of our knowledge, only five other cases of *C. sputigena* pulmonary infection have been described (Table 1). Infection can occur in immunocompetent hosts, and Lo et al. reported the case of a bilateral pneumonia with pleural effusion in an 84-year-old man. *C. sputigena* was detected on blood cultures [3]. Li et al. presented a case of a 68-year-old

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**Table 1**  
Cases report of *C. sputigena* pulmonary infections previously reported.

Cases report	Sex	Age	Past medical history	Immuno-suppression	Clinical presentation	Positive culture on Detection by	Treatment	Death
Atmani S, et al. <i>Arch Pediatr.</i> 2008	F	12	None	No	Febrile pleural effusion	Pleural fluid 16S RNA sequencing	Amoxicillin Rifampicin	No
Li A, et al. <i>J Clin Microbiol.</i> 2013	M	64	Hypertensive intracranial hemorrhage vascular dementia, parotid pleomorphic adenoma	No	Pleural empyema with unfavorable evolution (treated since one month)	Pleural fluid MALDI-TOF MS (Codetection of <i>P. aeruginosa</i> )	Amoxicillin Ciprofloxacin	No
Lo SH1, et al. <i>J Microbiol Immunol Infect.</i> 2017	M	84	Stroke, diaphetic seizure, high blood pressure, type 2 diabetic mellitus, benign prostatic hypertrophy, gastric cancer	Gastric cancer Diabetic mellitus	Relapsing bilateral pneumonia with pleural effusion	Blood culture MALDI-TOF MS 16S RNA sequencing	Piperacillin tazobactam	No
Migiyama Y, et al. <i>J Infect Chemother.</i> 2018	M	67	Prostatic cancer	Lung cancer	Lung abscess seven days after fibroscopy for pulmonary mass exploration	Lung abscess fluid MALDI-TOF MS	Meropenem	No
Our case	F	22	Severe obesity, sleeve gastrectomy	No	Pneumonia	Sputum MALDI-TOF MS	Amoxicillin Clavulanic acid	No



**Fig. 1.** Chest radiograph highlighting a pneumonia.

immunocompetent man with persistent pleural effusion for whom *C. sputigena* was detected on a pleural drain [4]. *C. sputigena* has also been involved in a respiratory infection following care; a 67-year-old old man, who underwent fibroscopy for exploration of a suspicious pulmonary mass, presented fever 7 days after the procedure, and a lung abscess was diagnosed. *C. sputigena* was isolated from the latter and histological analysis detected a lung cancer [5]. Furthermore, *C. sputigena* was involved in a lung abscess in a 39-year-old immunocompromised host suffering from a neuroendocrine tumor. Interestingly, the biochemical testing identified the isolate as *C. ochracea* or *C. sputigena* [6]. Finally, the pediatric population can be affected as Atmani et al. related the case of a 12-year-old girl with pleural effusion involving *C. sputigena* [7].

Our case is the first in which *C. sputigena* is recovered from a sputum specimen. Sputum might be a difficult sample for

interpretation and diagnosis of this infection, as the bacterium is a commensal of the oral flora. However, in our case, *C. sputigena* was detected on three samples and with a significant bacterial load. Moreover, clinical response was correlated with antibiotic susceptibility as the introduction of a beta-lactamase inhibitor improved the clinical course. The bacterium was identified by MALDI-TOF mass spectrometry, which is the technique that has been used in recent case reports [3–5].

Evolution was unfavourable following amoxicillin treatment. *Capnocytophaga* is now often resistant to beta-lactam because of its beta-lactamase production. Adjunction of a beta-lactam inhibitor is recommended when a treatment against *Capnocytophaga* is initiated [8]. As an example, in our lab, since 2013, among the 51 samples found positive for *C. sputigena*, we found that 55% were sensitive to amoxicillin, while 100% were sensitive to amoxicillin-clavulanic acid.

## Conclusion

We present here the first documented case of pneumonia caused by *C. sputigena* after sputum examination, and the second case described in France. The repeated culture of this bacterium from the sputum samples of the same patient should alert microbiologists and infectious disease clinicians, as this bacterium can, in rare occasion, cause pneumonia.

## Conflicts of interest

We have no conflict of interest.

## Funding

We have no funding source.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of

the written consent is available for review by the Editor-in-Chief of this journal on request.

### Author contribution

LG, and SA: data collection, data analysis and writing; MM and GD: data analysis and reviewing the manuscript; JCL: study design; writing.

### Ethical approval

Not applicable.

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