



## Case illustrated

**Moraxella catarrhalis bacteremic pneumonia**Hiroki Anezaki<sup>a,b</sup>, Norohiko Terada<sup>a,\*</sup>, Takahisa Kawamura<sup>c</sup>, Hanako Kurai<sup>a</sup><sup>a</sup> Division of Infectious Diseases, Shizuoka Cancer Center Hospital, Suntou-gun, Shizuoka, Japan<sup>b</sup> Department of Internal Medicine, Shizuoka Prefectural Hospital Organization, Shizuoka City, Shizuoka, Japan<sup>c</sup> Division of Thoracic Oncology, Shizuoka Cancer Center Hospital, Suntou-gun, Shizuoka, Japan

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## ABSTRACT

An 81-year-old man with lung cancer with bone metastases, interstitial pneumonia, and emphysema, was hospitalized for pain control. He developed fever and chills during hospitalization. Physical examination revealed a fever of 39.1 °C, but there were no findings on history or physical examination to suggest the source of the infection. Gram-negative cocci were detected in the blood culture (Fig. 1) and in a Gram stained sputum smear (Figs. 3 and 4). *Neisseria meningitidis* and *Neisseria gonorrhoeae* were ruled out based on history and an absence of suggestive symptoms. The cause of his fever was diagnosed as *Moraxella catarrhalis* bacteremic pneumonia based on the blood culture and the sputum smear results, and he was treated with intravenous ceftriaxone. This case illustrates the importance of Gram staining of sputum and blood culture. *Moraxella catarrhalis* should be considered in the differential diagnosis when gram-negative cocci are detected in the blood and the sputum.

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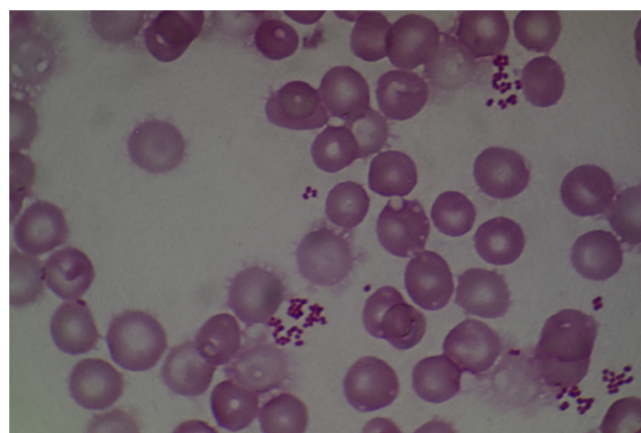
An 81-year-old man exhibiting lung cancer with bone metastases, interstitial pneumonia, and chronic obstructive pulmonary disease (COPD) was hospitalized for pain control. He developed fever and chills on the 18<sup>th</sup> day of hospitalization. Physical examination revealed fever of 39.1 °C; however, physical examination and study of medical history revealed no suggestions on the source of infection. Initial laboratory test results revealed neutrophilic leukocytosis white cell count: 10,150 cells/μL, neutrophils 7,270 cells/μL and elevated C-reactive protein levels 7.69 mg/L. The following day, gram-negative cocci were detected in the blood culture (Fig. 1); the patient still had fever, but the chills disappeared.

After the blood culture result was reported, we performed another clinical examination. This examination revealed blood pressure of 120/70 mmHg, pulse of 80/min (regular), respiratory rate of 12/min with O<sub>2</sub> saturation of 95 % in room air, and body temperature of 37.1 °C.

Physical examination revealed a pan-inspiratory crackle on the left back and late-inspiratory crackle on both backs, but there were

no other findings to suggest the source of bacteremia. Chest X-ray failed to identify any obvious new infiltrates compared to before those seen before symptom onset (Fig. 2).

During an interview, the patient complained of occasional sputum expectoration; we therefore performed Gram staining of a sputum smear.



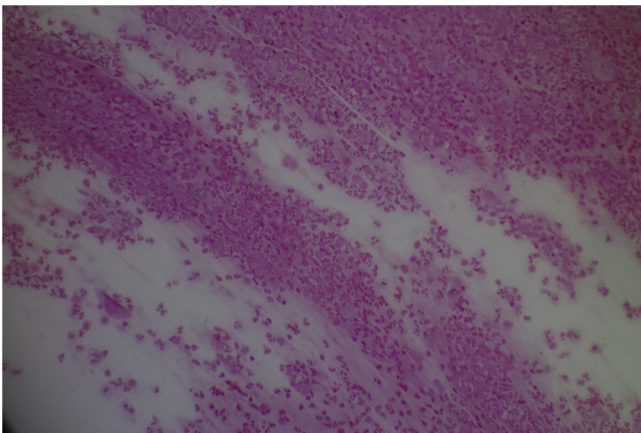
**Fig. 1.** Gram staining of blood culture showing gram-negative cocci magnification ×1,000.

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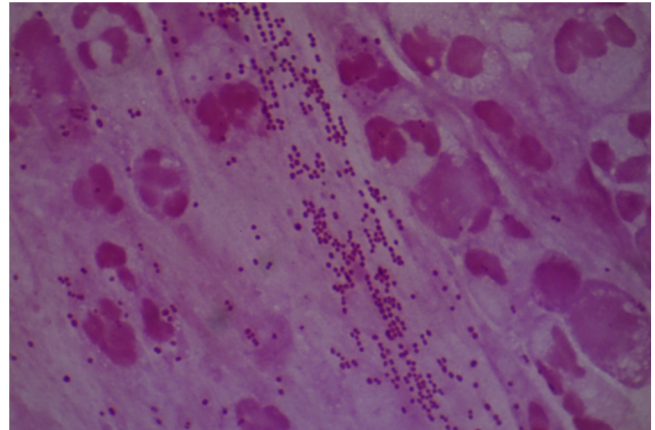


**Fig. 2.** Chest X-ray during fever: No change from previous radiographic findings.



**Fig. 3.** Gram staining of a sputum smear showing gram-negative cocci (magnification  $\times 100$ ).

The sputum smear revealed gram-negative cocci (Figs. 3 and 4). We considered *Neisseria meningitidis*, *N. gonorrhoeae*, and *Acinetobacter* spp. because gram-negative cocci were found in the blood culture but ruled these out based on the absence of a suggestive case history or clinical features. We made a final diagnosis of *Moraxella catarrhalis* bacteremic pneumonia based on blood culture and sputum smear results, combined with the patient's



**Fig. 4.** Gram staining of a sputum smear showing gram-negative cocci magnification  $\times 1,000$ .

history of chronic lung disease, and treated him with intravenous ceftriaxone. Finally, bacteria detected in the blood and sputum cultures were identified as *Moraxella catarrhalis* using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry. Although *M. catarrhalis* seldom causes invasive infection, it has been reported in patients with immunosuppression or respiratory disease [1,2], which is consistent with our patient's background. The prevalence of respiratory diseases such as COPD are likely to increase because of population aging; thus, the incidence of *M. catarrhalis* pneumonia may increase [3]. The recommended treatment for *M. catarrhalis* infection is ampicillin/sulbactam or ceftriaxone owing to the increase in beta-lactamase-producing bacteria [1].

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### CRedit authorship contribution statement

**Hiroki Anezaki:** Writing - original draft. **Norohiko Terada:** Writing - review & editing, Supervision. **Takahisa Kawamura:** Supervision. **Hanako Kurai:** Supervision.

### Declaration of Competing Interest

None.

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