Case report

First report of subcutaneous abscess caused by *Porphyromonas gingivalis*

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**A B S T R A C T**

Approximately 90% of skin infections are thought to be attributable to *Staphylococcus aureus* and *Streptococcus pyogenes*, along with some anaerobic bacteria such as *Bacteroides* and *Prevotella* species, which are considered significant causative agents in post-operative skin infections especially in diabetics. Species from the anaerobic *Porphyromonas* genus are known to cause oral infections, but rarely cause infection of the skin. In this case report, we describe a subcutaneous abscess caused by *Porphyromonas gingivalis* in a 67-year-old man who had started chemotherapy for lung cancer (cT3N3M0 stage III B) three days prior to consulting a dermatologist. On clinical examination, a fist-sized mass with a hot sensation was observed in the left temporal region of the face, and treatment with cefazolin was commenced at 6 g/day. After three days, the mass was drained via skin incision and pus culture was performed, which revealed infection with *P. gingivalis*. The patient was successfully treated with abscess drainage and antibiotics therapy. We suggest that in tandem with immunosuppression, *P. gingivalis* could be a cause of skin infections.

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**Introduction**

*Porphyromonas gingivalis* was previously known as *Bacteroides gingivalis*, and renamed *P. gingivalis* after numerous rounds of taxonomic reclassification. *P. gingivalis* is a gram-negative anaerobic bacterium, said to be frequently detected in dental plaque [2]. While skin infections caused by *Bacteroides* and *Prevotella* from the same taxonomic class, play a significant role in post-operative infections, infections caused by *Porphyromonas* are considered rare. Skin abscesses have known involvement with aerobic and anaerobic bacteria, including *Streptococcus anginosus*, *Streptococcus pyogenes*, and *Staphylococcus aureus*, all of which are common causes of skin infections [1,3]. However, *Porphyromonas* species are more commonly associated with oral infections [2].

In this case study, we describe the onset and treatment of a skin abscess caused by *P. gingivalis* in a 67-year-old man who was undergoing chemotherapy for lung cancer. Drainage of the abscess via skin incision and treatment with antibiotics resulted in satisfactory resolution.

**Case Report**

A 67-year-old man attended the Dermatology Department at JR Tokyo General Hospital with swelling to the left side of his head. He had commenced chemotherapy (weekly Paclitaxel [80 mg/m²] + Carboplatin [300 mg/m²], the 1st line regimen used for lung cancer) for lung cancer cT3N3M0 stage III B three days prior to his consultation with Dermatology. Clinical examination revealed a fist-sized mass with a hot sensation to the left temporal region of the face. Initial laboratory workup on the day of presentation showed an elevated serum C-reactive protein level of 416 nmol/L. The patient was diagnosed with a skin infection and started on cefazolin at 6 g/day, but his symptoms did not improve. Therefore drainage via skin incision was performed three days later, and the exudate was collected and submitted for laboratory culture. Cefazolin at 6 g/day was continued, along with treatment of the wound, and *P. gingivalis* was detected from the pus culture. Sensitivity of the bacteria to various antibiotics is shown in Table 1. The patient’s symptoms improved within one month, and chemotherapy was resumed.

**Discussion**

This patient experienced a skin abscess caused by *P. gingivalis*. While this is a common cause of oral infections, it is thought to
Table 1

Antibacterial sensitivity test report of *P. gingivalis* cultured from exudate collected from the patient’s lesion.

| Drug            | MIC * | Interpretation |
|-----------------|-------|----------------|
| Amoxicillin     | ≤0.06 | S²             |
| Piperacillin    | ≤0.03 | S              |
| Cefazolin       | ≤0.12 | S              |
| Gentamycin      | ≤0.12 | S              |
| Arbekacin       | 1     | R³             |
| Clarithromycin  | ≤0.12 | S              |
| Clindamycin     | >4    | R              |
| Minocycline     | 0.5   | S              |
| Fosfomycin      | ≤4    | S              |
| Vancomycin      | ≤1    | NA⁴           |
| Levofloxacin    | >8    | R              |

¹ MIC: minimum inhibitory concentration; ²S: sensitive; ³R: resistant; ⁴NA: not assessed.

Infect the skin and other systems only rarely [2]. Due to undergoing treatment for lung cancer, the patient was considered immunocompromised [4]. Unfortunately, as the exudate culture was submitted after administration of cefazolin, it is not known whether other causative bacteria could have been involved. However, formation of the abscess and detection of cefazolin-sensitive *P. gingivalis* only, with no other pathogens, suggests that *P. gingivalis* was the likely cause. Additionally, the patient uses dentures, which may be a contributing factor for *P. gingivalis* activity.

There has been suggestion of *P. gingivalis* involvement in oral cancer [5], but its association with lung cancer has not been reported and remains unknown. No skin infection or skin abscess due to *P. gingivalis* is reported within the PubMed search range, and this case is considered to be the first of skin abscess due to *Porphyromonas gingivalis*.

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Declarations of Competing Interest

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Informed consent

We obtained written signed consent from the patient to publish his clinical details.

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