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Case report

Retropharyngeal abscess due to *Staphylococcus aureus* complicated by bilateral neck and intraabdominal abscesses in an immunocompetent infant

Takuma Ohnishi[a,*], Satoshi Sato[a], Satoshi Asanuma[b], Sho Ikeda[c], Eisuke Suganuma[a]

[a] Division of Infectious Diseases and Immunology, Saitama Children's Medical Center, 1-2 Shintoshin, Chuou-ku, Saitama-shi, Saitama, 330-8777, Japan
[b] Division of Otorhinolaryngology, Saitama Children's Medical Center, 1-2 Shintoshin, Chuou-ku, Saitama-shi, Saitama, 330-8777, Japan
[c] Department of Pediatrics, Soka Municipal Hospital, Saitama, 2-21-1 Soka, Soka-shi, Saitama, 340-8560, Japan

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ABSTRACT

Retropharyngeal abscess is a serious condition, with potentially high morbidity and mortality if not detected early. The patient, a previously healthy 10-month-old girl, was admitted due to retropharyngeal and bilateral cervical lymph node abscesses. The neck abscesses recurred, despite surgical drainage and treatment with intravenous ampicillin-sulbactam. Methicillin-susceptible *Staphylococcus aureus* was identified from the abscess culture. A mesenteric abscess was also found during treatment. Intravenous ampicillin-sulbactam was switched to intravenous cephazolin and metronidazole, and the patient was successfully treated without further surgical intervention. No recurrence was observed throughout the 1-year follow-up period. Immune function testing, especially neutrophil function, did not reveal any abnormality. Neck abscesses can spread to the deep or shallow neck spaces directly or through the lymph node chains, even in immunocompetent hosts. Clinicians should consider deep neck infection in patients with cervical lymph node abscess, even if they present without the typical signs and symptoms of retropharyngeal abscess.

Introduction

Retropharyngeal abscess is a serious condition, which can potentially lead to high morbidity and mortality if not detected early [1]. The potential complications include airway obstruction, internal jugular vein thrombosis, mycotic aneurysm, aspiration pneumonia, mediastinitis, and sepsis [2]. Herein, we report a case of retropharyngeal abscess due to *Staphylococcus aureus* infection complicated by bilateral cervical lymph nodes and mesenteric abscesses in an immunocompetent infant.

Case

A previously healthy 10-month-old girl presented to a clinic for fever and bilateral neck swelling. She appeared healthy, and had a good appetite, no difficulty in swallowing or breathing, and normal vocal sounds. An initial diagnosis of viral or bacterial cervical lymphadenopathy was formulated. Although she was treated with the oral administration of cefcapene-pivoxil for 3 days, followed by oral amoxicillin for another 3 days, her neck swelling gradually worsened over a period of 2 weeks and she was taken to another hospital for further evaluation. Contrast-enhanced computed tomography (CT) revealed a retropharyngeal abscess and bilateral cervical abscesses (Fig. 1A and B). Intravenous meropenem and clindamycin were administered, and fine needle aspiration was performed for the neck abscesses. Methicillin-susceptible *Staphylococcus aureus* (MSSA) was identified on the abscess cultures. Although fine needle aspiration was performed repeatedly, her neck abscesses increased in size and she was transferred to our hospital for further surgical treatment.

The patient's temperature was 39.2℃ upon presenting to our hospital. Physical examination revealed palpable, elastic, soft, and tender masses on both sides of the neck, with erythematous, warm skin. No abnormalities were observed in the pharynx or tonsils. The results of laboratory tests, including a complete blood count and blood chemistry, were within normal limits, except for the elevation in the white blood cell count [14,910/μL (61.0 % neutrophils)] and serum C-reactive protein (CRP; 23.62 mg/dL) levels. Ultrasonography revealed the presence of bilateral neck abscesses. No intraabdominal abscesses, lymphadenitis, or ascites were found. Two sets of blood cultures were negative for pathogens.

* Corresponding author.
E-mail address: prince1999and7@hotmail.com (T. Ohnishi).

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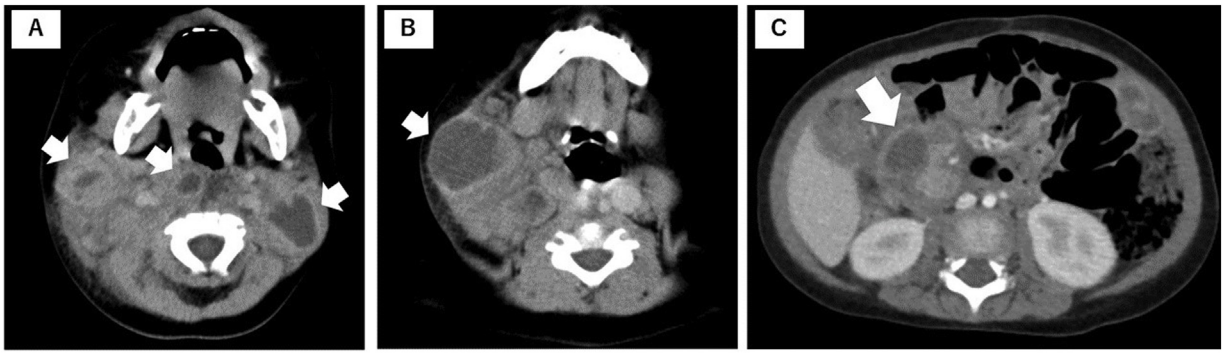

Fig. 1. Contrasted computed tomography showing retropharyngeal and bilateral neck abscesses on admission (A, B). Contrasted computed tomography showing intra-abdominal abscess during treatment (C). White arrows point to abscesses.

Incision and drainage of the retropharyngeal and right neck abscesses were performed on the day of admission. MSSA was cultured from the retropharyngeal abscess. The antimicrobial susceptibility testing was performed using the microdilution method (Clinical and Laboratory Standards Institute. Performance Standards for Antimicrobial Susceptibility Testing; 29th edition, M100-S27. 2019). The minimum inhibitory concentration (MIC) (mg/L) and interpretation (using *S. aureus* breakpoints) results were as follows: ampicillin >8 (R), sulbactam/ampicillin ≤8/4 (S), cefazolin ≤2 (S). Antibiotic therapy was switched to intravenous ampicillin-sulbactam. Nevertheless, her neck abscesses required repeated drainage. On postoperative day 28, she became febrile, and the CRP levels were elevated again. Abdominal ultrasonography showed a 3-cm abscess in the mesenteric lymph node, which was further confirmed on a whole-body contrast enhanced CT scan (Fig. 1C). No other abscesses were found. The antibiotic regimen was changed to cefazolin plus metronidazole. Thereafter, both the neck and abdominal abscesses diminished gradually. The patient completed an additional 4 weeks of antibiotic therapy (Fig. 2), and no recurrence was observed over the 1-year follow-up period. The patient's immune function was tested and found to be normal.

Discussion

This case report described the development of multiple abscesses in the neck and abdominal spaces due to *S. aureus* infection in an immunocompetent infant, who was successfully treated with antibiotic therapy supported by surgical drainage of the neck abscesses. Fever and neck swelling were the sole symptoms during her initial clinic and follow-up visits; she had none of the other symptoms of retropharyngeal abscess such as poor oral intake, torticollis, odynophagia, and drooling, which is why retropharyngeal abscess was not suspected prior to the acquisition of the CT scan. We suspected two possible routes of infection for the neck abscesses in our patient. One hypothesis is that she initially had cervical lymphadenitis caused by *S. aureus*, which progressed to bilateral cervical lymph node abscesses at the same time as the retropharyngeal abscesses. The other hypothesis is that the retropharyngeal abscess occurred first, with the infection subsequently spreading through the lymphatic chains from the retropharyngeal to the bilateral upper deep cervical nodes, progressing to abscess formation. Because the retropharyngeal lymph nodes drain into the upper deep cervical nodes [3], 79 %–83 % of children with retropharyngeal abscesses have cervical lymphadenopathy [1].

This case involved complicated persistent abscesses despite repeated drainage. The abscesses were difficult to drain and clean fully since they were bilateral and multiloculated. In such cases, a single incision and drainage may not be adequate [4]. Although the appropriate timing of surgical drainage remains controversial, drainage within 24 h of presentation is recommended for patients with a retropharyngeal abscess [5].

We did not find an intraabdominal abscess in the patient when she was transferred to our hospital. However, a mesenteric lymph node abscess was discovered during antibiotic treatment. Although blood cultures revealed no pathogens, the patient might

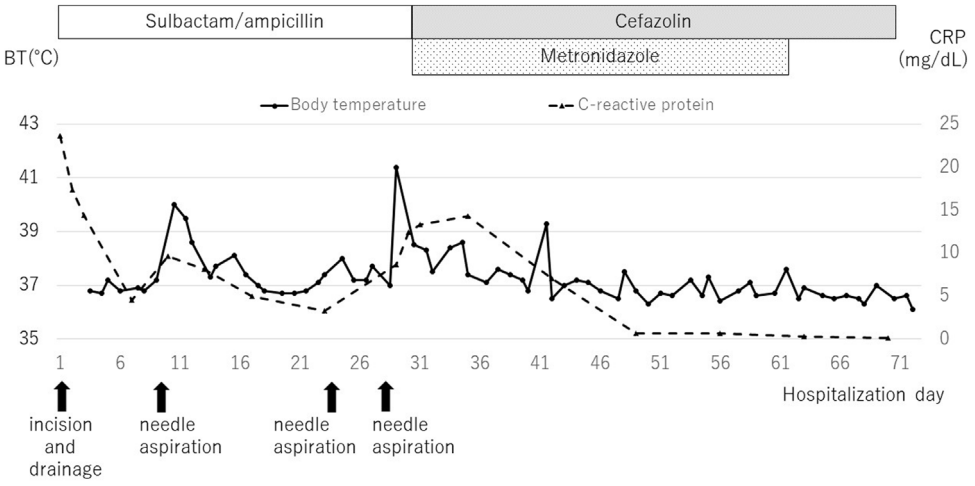

Fig. 2. Clinical course after admission.

have had transient bacteremia during the recurrences of the abscess, trapping the bacteria in a mesenteric lymph node, which led to abscess formation.

Her neck abscess recurred repeatedly even during ampicillin/sulbactam treatment, and finally metastasized to the mesenteric lymph nodes. After switching the antibiotic regimen to cefazolin plus metronidazole, the abscess decreased without recurrence and additional drainage. MSSA was isolated from her neck abscess and its minimal inhibitory concentration assays showed susceptibility to both ampicillin/sulbactam and cefazolin. Cefazolin is the most effective choice for treating MSSA [6] because antistreptococcal penicillins are not available in Japan. We suspect that cefazolin was more effective than ampicillin/sulbactam for treating her abscesses.

In conclusion, this case of a patient with a retropharyngeal abscess complicated with bilateral cervical lymph nodes and mesenteric abscesses due to *S. aureus* in an immunocompetent infant was treated with antibiotics and surgical drainage of the neck abscesses. Neck abscesses can extend to the deep or shallow neck spaces directly or through the lymph nodes chains, even in immunocompetent hosts. Clinicians should consider deep neck infection in patients with cervical lymph node abscess, even if they present without the typical signs and symptoms of retropharyngeal abscess.

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Ethical approval

A written informed consent was obtained from patient's guardian. All investigations in this case report were approved by the Institutional Review Board of Saitama Children's Medical Center.

Authors' contributions

T.O. carried out patient care and wrote the manuscript; S.S., S.A., S.I. and E.S. carried

out patient care and reviewed the manuscript. All authors read and approved the final manuscript. Written informed consent was obtained from the parents of a patient.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article to disclose.

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