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Letter to the Editor

Severe cervical abscess due to PVL-positive ST6562 MRSA-IVa, a presumptive variant of ST8-IVa USA300 clone in northern Japan

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Dear Editor,

USA300, a pandemic methicillin-resistant *Staphylococcus aureus* (MRSA) clone mostly predominating in the US, is characterized by genotypes SCC*mec*-IVa/ST8/*spa*-t008 and production of Panton-Valentine leukocidin (PVL), carrying arginine-catabolic mobile genetic element (ACME) [1]. Recently, genetic variants of the USA300 clone have been reported worldwide. As one of the variants, PVL-positive MRSA-IVa genotyped as ST6562, a single-locus variant of ST8, has been identified exclusively in Japan [2–4], while rarely detected. Here we report a case of severe cervical abscess caused by ST6562 MRSA.

A 2-year-old girl, who was otherwise healthy, presented to our hospital with a fever on day 1. Although the physical findings were unremarkable, the patient was admitted to the hospital for observation after a one-minute seizure following the visit. On admission, the patient had a fever of 39.3 °C, pulse of 165/min, respiratory rate of 30/min, and percutaneous oxygen saturation of 99%. Her past medical history is unremarkable and her immunizations are up to date. She had no history of atopic dermatitis, and there was no evidence of a *Staphylococcus aureus* infection, such as contagious impetigo, in the surrounding community. Her laboratory examination showed an elevated white blood cell count of 13,400/μL and a *C*-reactive protein (CRP) level of 2.03 mg/dL. There were no abnormalities in liver function, renal function or electrolyte levels.

Fever persisted after hospitalization, and left cervical swelling with tenderness and good mobility was observed the next day. Cervical ultrasound revealed a lymph node enlargement of 35 × 22 mm, and pyogenic lymphadenitis was diagnosed. Antibiotic treatment with cefazolin (50 mg/kg/day) was started, and the fever gradually resolved. Although the degree of lymphadenopathy remained unchanged, the patient's general condition was good, so switched to amoxicillin (33 mg/kg/day) and she was discharged on day 6.

After discharge from the hospital, she again developed a fever of 40 °C and attended to our hospital on day 8. The cervical swelling increased and was accompanied by skin redness (Fig. 1(a)). Her laboratory examination showed that the white blood cell count was 16,000/μL and the CRP was 6.60 mg/dL, indicating a worsening of the disease. Cervical ultrasound showed a liquefaction in the enlarged lymph node (sized 35 × 27 mm) and forming an abscess (Fig. 1(b)). Therefore, the treatment was changed from amoxicillin to cefazolin (100 mg/kg/day) and abscess puncture was performed. The pus culture was taken; on day 12, an MRSA was isolated from the culture, accordingly cefazolin was replaced with vancomycin (83 mg/kg/day). On day 13, vancomycin-induced red man syndrome occurred and the trough level was low, so switched to clindamycin (37.5 mg/kg/day). The fever resolved on day 15 and the patient was switched to sulfamethoxazole/trimethoprlim (50/10 mg/kg/day) based on the drug susceptibility testing. On day 18, the lesion was found to be self-destructing, and incision and drainage were performed. A culture of the pus was submitted and confirmed to be negative. Since then, she had no fever and cervical lymphadenopathy was no longer identified from day 20. She was discharged on day 22 and the antimicrobial therapy was completed on day 27. In the convalescent phase, serum immunoglobulin, complement, and neutrophil superoxide production were normal. Therefore, immunodeficiency was not detected.

The MRSA isolate from the abscess (HK-YI-22) had SCC*mec*-IVa and was genotyped as ST6562/*agr*-I/*spa*-t20855/*coa*-IIIa. A *spa*-type t20855 was newly identified for this isolate, having repeat profile of 11–19-12-21-34-24-34-34-22-25, which is closely related to that of t008 (11-19-12-21-17-34-24-34-22-25). This isolate harbored PVL genes belonging to haplotype R1 on bacteriophage Φsa2usa, while lacked ACME and most of enterotoxin (-like) genes (Table S1). Despite being resistant to penicillins, cephems, erythromycin, and levofloxacin, having resistance genes *msrA* and *aph(3')-IIIa*, and mutations in *gyrA/grlA*, the isolate HK-YI-22 was susceptible to anti-MRSA drugs including vancomycin (Table S2). These characteristics are almost identical to those of only an ST6562-MRSA-IVa isolate reported from osteomyelitis/pulmonary embolism in Japan [4], with difference in *spa*-type and presence of antimicrobial resistance genes. In contrast, absence of ACME in these MRSA clinical isolates were distinct from the USA300 clone. Recently, we identified an ST8-MRSA-IVa strain which has almost identical genome to that of USA300 strain TCH1516, while lacking ACME [5]. Therefore,

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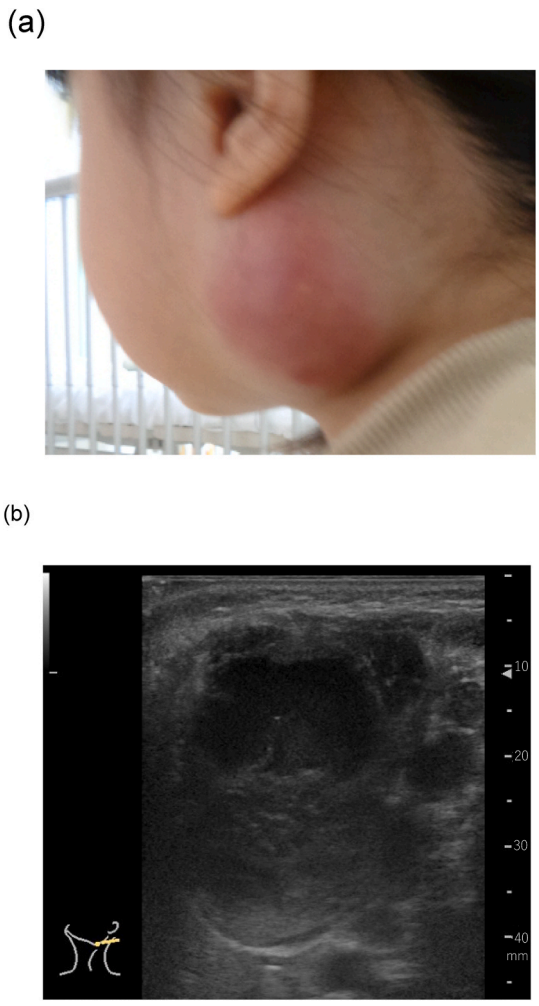

Fig. 1. Cervical abscess of the patient (a) and its image from ultrasound scan (b) showing liquefaction (upper hypoechoic region) in the enlarged lymph node (35 × 27 mm).

ACME-negative variant of the USA300 clone, including the present ST6562 MRSA, is suggested to occur and spread in northern Japan. It may be necessary to keep a close watch on the USA300 variant as a cause of severe infections.

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CRediT authorship contribution statement

Katsumasa Kudo: Writing – original draft, Resources, Investigation, Formal analysis, Conceptualization. **Takahiro Noda:** Resources. **Yuta Sasaoka:** Resources. **Atsuo Togashi:** Supervision, Conceptualization. **Meiji Soe Aung:** Methodology, Investigation, Formal analysis. **Yoshiyuki Sakai:** Supervision, Resources. **Takeshi Tsugawa:** Supervision, Conceptualization. **Nobumichi Kobayashi:** Writing – review & editing, Writing – original draft, Supervision, Investigation.

Declaration of competing interest

The authors declare no competing of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.nmni.2024.101230.

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Katsumasa Kudo, Takahiro Noda, Yuta Sasaoka
Department of Pediatrics, Hakodate Municipal Hospital, Hakodate, Hokkaido, Japan

Atsuo Togashi
Department of Pediatrics, Sapporo Medical University School of Medicine, Sapporo, Hokkaido, Japan

Meiji Soe Aung
Department of Hygiene, Sapporo Medical University School of Medicine, Sapporo, Hokkaido, Japan

Yoshiyuki Sakai
Department of Pediatrics, Hakodate Municipal Hospital, Hakodate, Hokkaido, Japan

Takeshi Tsugawa
Department of Pediatrics, Sapporo Medical University School of Medicine, Sapporo, Hokkaido, Japan

Nobumichi Kobayashi*
Department of Hygiene, Sapporo Medical University School of Medicine, Sapporo, Hokkaido, Japan

* Corresponding author. Department of Hygiene, Sapporo Medical University School of Medicine, S-1 W-17, Chuo-ku, Sapporo, 060-8556, Japan.
E-mail address: nkobayas@sapmed.ac.jp (N. Kobayashi).