Upper Cervical Osteomyelitis with Odontoid Process Destruction Treated with a Halo Vest in a Child: A Case Report

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Studies about pediatric pyogenic osteomyelitis have been conducted. However, most reports have only included a limited number of cervical spine cases and data about lumbar spine onset[1)]. The current treatment method for pediatric pyogenic osteomyelitis of the cervical spine, which includes treatment selection for patients who require drainage and the fixation method with the use of a cervical collar or cast or with surgery, is controversial[2,3)]. Herein, we present a child with pyogenic osteomyelitis of the upper cervical spine with destruction at the odontoid process of the axis.

A 6-year-old girl with no significant medical history had flu-like symptoms 2 weeks prior to onset. The symptoms spontaneously improved. Then, she presented with fever (temperature, 37°C-38°C) and severe neck pain without neurological symptoms in the four limbs. The symptoms exacerbated; thus, she sought consultation at a local clinic 1 week after onset. Cervical computed tomography scans revealed a retropharyngeal abscess and osteolysis of the axis. Cervical magnetic resonance imaging revealed intensity changes in the atlas and axis and formation of a retropharyngeal abscess (Fig. 1). Blood testing revealed a white blood cell count of 10.8×10^9/L and a C-reactive protein (CRP) level of 19.6 mg/L, which is indicative of an inflammatory reaction. Meropenem intravenous infusion (120 mg/kg/day) was initiated; subsequently, the CRP level rapidly decreased. However, after 1 week, the patient's neck was rotated to the left side due to continuous pain. Computed tomography revealed osteolysis at the base of the odontoid process of the axis (Fig. 2). The pain could not be controlled with a cervical collar; therefore, a halo vest was used. Fluoroscopic imaging revealed instability at the base of the odontoid process caused by posterior compression of the neck. In the recumbent position, the vertebra of the axis was displaced posterior to the odontoid process. The patient experienced severe neck pain when changing from the sitting position to the recumbent position. By providing support using a stretching band from the rear to the mid-to-lower cervical spine, neck pain during movement was alleviated (Fig. 3). After 1 month, meropenem intravenous infusion was changed to oral cephalexin at a dose of 2,000 mg/day. Bone healing of the axis was confirmed on cervical computed tomography scans performed after 2 months; thus, the halo vest was removed. After 3 months, oral antibiotic therapy was discontinued, and neck pain or recurrence of inflammation was not observed after 2 years (Fig. 4).

The major cause of cervical vertebral osteomyelitis is the spread of a retropharyngeal abscess[4)], which can be treated with surgical drainage and antibiotic therapy[4)]; however, treatment with antibiotics alone has also been reported[5)]. Nonsurgical treatment can be considered in some patients with a small-sized retropharyngeal abscess[2)]. Our patient had a small abscess and showed an improved reaction during the early stage of treatment; therefore, she could be treated with antibiotic therapy alone. As previously indicated, surgical treatment is required in patients with a large abscess owing to serious complications, including airway obstruction[2)], or

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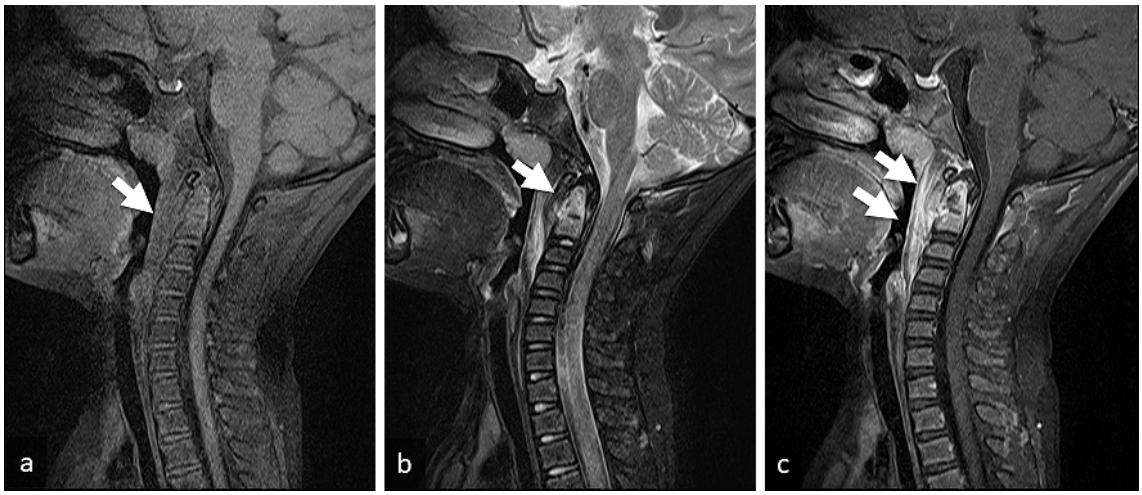

Figure 1. Magnetic resonance imaging findings of the cervical spine. (a) Sagittal T1-weighted image showing retropharyngeal soft-tissue swelling (arrow). (b) Sagittal T2-weighted image showing an edema signal in the odontoid process (arrow). (c) Sagittal contrast-enhanced T1-weighted image showing enhancement in the odontoid process with retropharyngeal soft-tissue swelling (arrows).

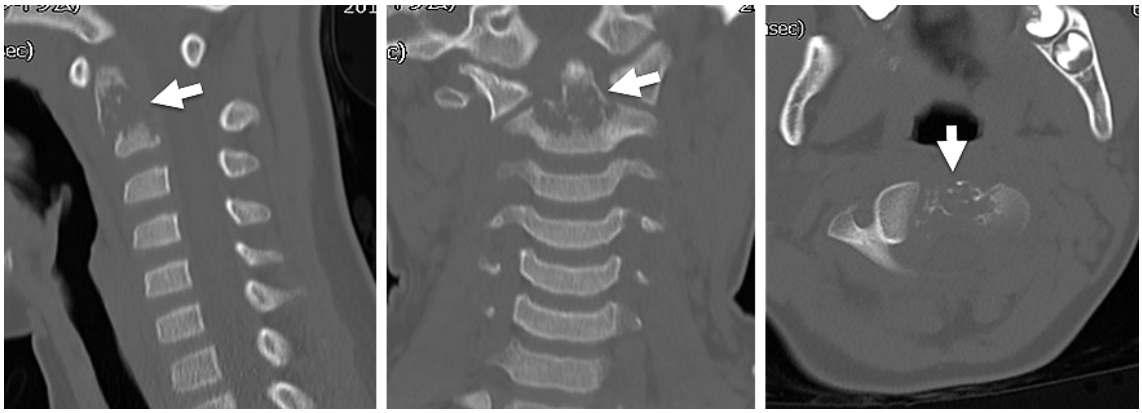

Figure 2. Computed tomography reconstructed images obtained 1 week after the start of treatment showing destructive changes at the base of the odontoid process of the axis (arrow).

Figure 3. Halo vest immobilization with posterior stretching band support (arrows). The band was fixed with bilateral front pillars and was supported from the rear part of the patient's neck.

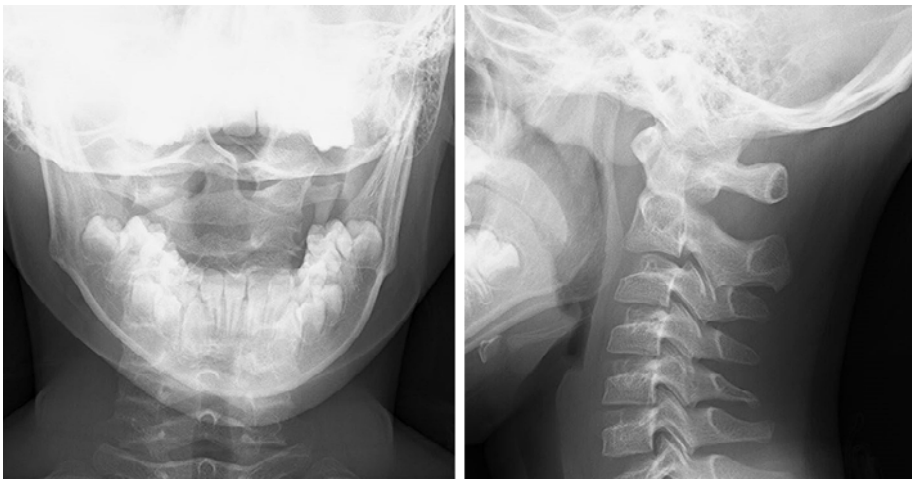

Figure 4. Radiography findings at a 2-year follow-up showing bone healing of the axis.

in those with spinal cord compression with neurological dysfunction[4].

Some reports have described fixation with the use of a cervical collar or cast[2] and others about fixation with surgery[3] because most patients who were included were neonates or infants. The use of a halo vest may be considered in some patients with almost the same age as the patient in our case. Regarding the level of immobilization with a halo vest, a cadaveric radiostereometric analysis has shown that cervical flexion and extension were maintained to a certain degree, whereas lateral bending and rotation were almost entirely limited[6]. A previous study has evaluated the immobilization capability of a halo vest in patients with cervical trauma and found that the ranges of extension and flexion were greater in the upper cervical spine than in the mid-to-lower cervical spine[7]. The greatest motion was observed when changing between the sitting and supine positions[7]. In the present case, instability was observed at the base of the odontoid process of the axis and the atlantoaxial joint even after halo vest fixation. By providing support from the posterior part of the cervical spine, the patient's pain was alleviated. Thus, this approach should be considered a treatment option in similar cases.

Conflicts of Interest: The authors declare that there are no relevant conflicts of interest.

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Informed Consent: Informed consent was obtained from a person legally able to give consent on the patient's behalf.

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