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CASE REPORT

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Repeated postoperative laryngeal obstruction due to bilateral cricoarytenoid joint involvement in rheumatoid arthritis

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Abstract A 61-year-old woman with a 40-year history of severe rheumatoid arthritis developed postoperative laryngeal obstruction twice; the first episode occurred just after surgery for cervical myelopathy and the second episode occurred 3 weeks after surgery when physiotherapy activity increased. A flexible laryngeal endoscopy demonstrated that abduction of the bilateral vocal cords was severely disturbed at the paramedian position, suggesting a diagnosis of cricoarytenoid arthritis. Early administration of corticosteroids was successful.

Key words Cricoarytenoid (CA) joint · Laryngeal obstruction · Postoperative · Rheumatoid arthritis

Introduction

The cricoarytenoid (CA) joints, although small, play important roles not only in phonation but also in normal full respiration. Involvement of these joints in patients with rheumatoid arthritis has been clearly demonstrated in otolaryngology.[1,2] In the orthopedic field, however, much less attention has been paid to this subject. Here we report a case of bilateral CA joint ankylosis and vocal cord abductor disturbance, resulting in repeated postoperative laryngeal obstruction.

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Case report

A 61-year-old woman with a 40-year history of rheumatoid arthritis was admitted with complaints of myelopathic symptoms below the Th1 level that had become exacerbated by a fall. She had received prednisolone (5 mg/day), bucillamine (100 mg/day), and methotrexate (6 mg/week). The C-reactive protein concentration was 1.0 mg/dl and the erythrocyte sedimentation rate was 27 mm/h. Steinbrocker stage and class was IV and 4, respectively. Radiographs and magnetic resonance imaging of the cervical spine showed the subaxial subluxation at the C7–Th1 level and spinal cord compression at that level. She did not complain of hoarseness, swallowing disturbance, or inspiratory stridor. She had no respiratory complications. Arterial blood gas examination was within normal limits.

The first episode

Decompressive laminectomy of C7 and Th1, spinal fusion from C6 to Th3 using pedicle screws of the Olerud system, and auto bone graft were performed, following the preoperative administration of hydrocortisone (100 mg). Fiberoptic endotracheal intubation for general anesthesia was finally successful but quite difficult due to the insufficient space at the glottis. Surgery was successfully performed; however, dyspnea and strong inspiratory stridor developed immediately after extubation. We considered that airway obstruction was caused by pre-existing stenosis at the glottic level and additional edema of the vocal cord and larynx caused by mechanical stimulation due to endotracheal intubation. Both chest radiography and postmyelogram computed tomography (CT) of the cervical spine showed airway obstruction at the level of the vocal cords (Fig. 1). After oxygen inhalation, saline nebulization, and intravenous administration of hydrocortisone (100 mg), dyspnea improved. Laryngeal endoscopic examination demonstrated bilateral ankylosis of the arthritic cricoarytenoid joint and severe abductor disturbance of vocal

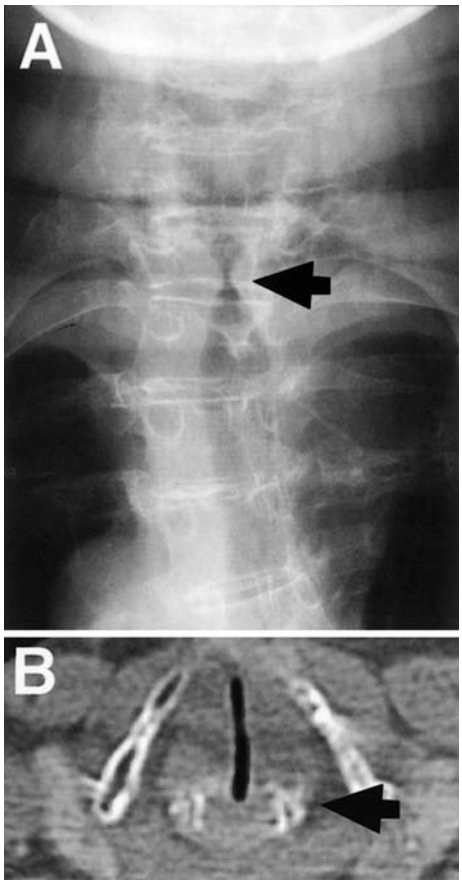

Fig. 1. **A** Chest radiograph showing abductor disturbance of the vocal cords during quiet respiration (*arrow*). **B** Axial view of computed tomogram at the level of larynx during quiet respiration, showing that the cricoarytenoid joints are thicker than normal and at the paramedian position (*arrow*)

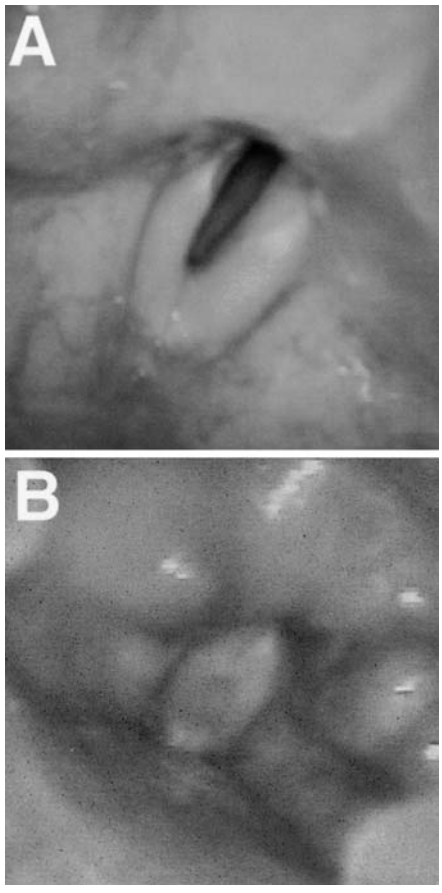

Fig. 2. Laryngoscopic view of the vocal cord at inspiratory phase (**A**) and phonation phase (**B**). Note that the vocal cord is edematous and fixed at the paramedian position during the inspiratory phase

cords at the paramedian position (Fig. 2), confirming the findings on chest X-ray and CT scan.

The second episode

After the first attack, the patient did not complain of dyspnea or inspiratory stridor, and postoperative physiotherapy progressed up to full ambulation with the recovery of her myelopathic symptoms. However, on postoperative day 21 she complained again of dyspnea similar to that during the first episode. Although saline nebulization was started without delay, dyspnea did not improve. In consultation with an otolaryngologist, nebulization with 0.015% betamethasone sodium phosphate was performed, resulting in a dramatic improvement of dyspnea. After betamethasone nebulization for 10 days, respiratory distress and dyspnea disappeared. Although the physiotherapy course was slow, she was finally able to walk without assistance. Four years postoperatively, she remains free of dyspnea.

Discussion

Since the report by Mackenzie in 1894,[3] several lines of evidence have demonstrated the involvement of CA joints in rheumatoid arthritis,[2,4] which might be seen in up to 25%–35% of rheumatoid arthritis patients.[1,5] Although this involvement is a well-known concept in otolaryngology, obstruction of the airways is a rarely seen complication of rheumatoid arthritis.[6,7] An interesting feature of the case reported here is the repeated postoperative laryngeal obstruction that occurred just after extubation and 3 weeks postoperatively when the physiotherapy program had progressed to ambulation. The first episode was caused by preexisting stenosis at the glottic level due to bilateral ankylosis of CA joints, and the additional edema of vocal cord and larynx caused by mechanical stimulation due to endotracheal intubation. The cervical spine surgery in a prone position also might have been one of the causes for this episode. The second episode was presumably caused by reduced ventilation through the narrow space at the vocal cord level at the paramedian position. The ventilation volume might have been insufficient for the increased activity associated

with the progression of postoperative physiotherapy. However, we cannot deny the possibility that acute inflammation due to a common cold might have caused further reduction of the glottic space. In rheumatoid arthritis patients, orthopedic surgeons should bear in mind the possibility of cricoarytenoid arthritis-induced laryngeal obstruction. Although Kamanli et al. reported the effectiveness of steroid injections around cricoarytenoid joints,[7] steroid nebulization was also quite effective. Postoperative physiotherapy should progress slowly and carefully.

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