LESSON OF THE MONTH

Fatal postoperative airway obstruction in a patient with rheumatoid arthritis

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Case history

A 55 year old woman had a 10 year history of erosive, seropositive rheumatoid arthritis (RA), when referred for assessment of intractable neck pain. From its onset in 1985 the disease deteriorated quickly and neither gold salts, nor sulphasalazine, methotrexate, cyclophosphamide, or cyclosporin A, with or without combination of non-steroidal anti-inflammatory drugs (NSAIDs) or corticosteroids, prevented major joint deformities. Joint replacement surgery of the right hip and both knees, as well as corrective surgery of hands and feet, were performed in 1992 and 1993 using regional anaesthetic blocks. Neck pain was first reported in 1992 and became intractable later on.

On admission in March 1995 the patient particularly complained about pain localised to the neck and she expressed difficulties in swallowing large pieces of food. Drug treatment included NSAIDs, low dose corticosteroids, paracetamol, a tricyclic antidepressant, and calcium. Physical examination showed widespread joint swelling and secondary osteoarthritis of most peripheral joints including both temporomandibular joints (TMJ) resulting in limited oral aperture capability. Mobility of the cervical spine was severely impaired, however no neurological signs were present. Magnetic resonance imaging of the cervical spine showed significant and deteriorating ventral and subaxial subluxation with vertical impaction of the axis (fig 1). The pain, as well as the difficulties in swallowing, was attributed to these changes and elective surgery was chosen to relieve the pain.

Preoperative fiberoptic exploration of the nasopharynx exposed no abnormalities and subsequent nasal intubation was easily possible. Electrodes for perioperative monitoring of somato-sensory evoked potentials (SSEP) were placed and the patient was then turned into the prone position. Partial reposition using Mayfield extension and subsequently a dorsal occipito-cervical fusion from C0-C5 were performed. The operation lasted three hours and was uneventful. Postoperative radioimaging of the cervical spine showed successful reposition of the cervical spine and correct location of all metal implants (fig 2). All SSEP readings were normal at this stage. Thirty five minutes after surgery had ended the patient was breathing sufficiently and moved

Figure 1 Preoperative magnetic resonance image of the cervical spine.

all four extremities whereupon she was extubated. Acute obstruction of the upper airways was observed only seconds thereafter. She deteriorated quickly and cardiopulmonary resuscitation became necessary. Ventilation by an oral airway tube was impossible and immediate attempts at reintubation failed because of the arthritis associated deformities. Perforation of the cricothyroid membrane with a thick needle was unsuccessful because the needle was dislocated during resuscitation. After ventilation was re-established by minitracheostomy, fiberoptic exploration of the nasopharynx showed massive oedema of the mesopharynx and hypopharynx. During the next two days all vital organs regained normal function except the cerebrum. The patient remained deeply comatose and the electroencephalogram indicated cerebral death. Another airway obstruction occurred when the endotracheal tube was finally removed and breathing was only possible through the minitracheostomy aperture. The patient died three days later. At

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Figure 2 Postoperative magnetic resonance image of the surgical spine.

postmortem examination the fatal pharyngeal oedema was no longer present.

Discussion

The cause of this fatal soft tissue swelling remains unclear. The patient had no known allergies. A local overreaction to the surgical procedure cannot be excluded although because of the posterior access this does not seem very likely. Postoperative respiratory problems are seen in up to 20% of patients but usually include chest infection or atelectasis rather than acute occlusion of the airways.¹ However, episodes of upper airway obstruction have previously been described in patients with arthritis of the TMJ, especially when laying supine,² and in two patients with cricoarytenoid arthritis.³

Cricothyroid arthritis in RA patients is far more common than anticipated and is difficult to recognise. While clinical studies found involvement of the cricoarytenoid joints in about 30% of patients with RA,^{4,5} necropsy examinations disclosed much higher numbers.⁶ Symptoms suggestive of previous laryngeal inflammation include sore throat, hoarseness, breathlessness, nocturnal cough, throat pain,

choking or gagging, 'tension or fullness' in the throat, tenderness over the larynx, chronic cough, and disability to sing, but only sore throats and difficulty during inspiration seem to predict abnormalities seen on indirect laryngoscopy.⁵ Problems occur when the cricoarytenoid joints become inflamed and immobilised with the vocal cords adducted to the midline. Inspiratory stridor, non-responsive 'asthma', intermittent respiratory difficulty with cyanosis, sudden collapse, shock, and coma have all been described.⁷⁻⁹ In our patient intubation may have caused mechanical trauma to the already critical laryngeal region resulting in acute airway obstruction and death.

The lesson

- RA patients in need of intubation should carefully be assessed for cricoarytenoid arthritis and TMJ arthritis preoperatively.
- Indirect laryngoscopy is the appropriate method to screen for cricoarytenoid arthritis and should be performed preoperatively if symptoms suggestive of previous laryngeal inflammation are present, notably sore throats and difficulties during inspiration.
- Prophylactic minitracheostomy needs to be considered in those patients showing evidence of cricoarytenoid arthritis and laryngeal inflammation as well as advanced TMJ destruction.

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