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Unusual Airway Difficulty in the Acromegalic Patient—Indications for Tracheostomy

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Although laryngeal and pharyngeal involvement in acromegalic patients have been recognized since 1896,[1] few references have appeared in the anesthesia literature regarding airway management difficulties in this group of patients.[2–4] The following report describes the anesthetic management of such a patient, who had massive hypertrophy of the pharyngeal soft tissue but a normal larynx.

REPORT OF A CASE

A 31-year-old man was scheduled for transsphenoidal hypophysectomy. Twelve years prior to admission there had been a gradual-onset weight gain, coarsening of facial features, enlargement of hands and feet, and deepening of the voice. The diagnosis of acromegaly had been made, and a course of radiation therapy had reduced the growth hormone level from 500 to 50 ng/ml (normal less than 10). However, continued enlargement of the sella occurred.

On physical examination, the patient had the classic stigmata of advanced acromegaly, including marked prognathism, a thickened tongue and a broad flat thyroid cartilage. Results of endocrine studies were consistent with the diagnosis. All preoperative spirometric indices of pulmonary function were within normal limits; however, fiberoptic laryngoscopy and soft-tissue X-rays and tomograms of the upper airway revealed generalized thickening of all tissues, including nasal turbinates, epiglottis, walls of the hypopharynx, and a broad-based tissue mass protruding from the posterior pharyngeal wall. The vocal cords were normal in appearance and mobility.

Premedication consisted of morphine sulfate (5 mg), droperidol (5 mg), and atropine sulfate (1 mg), im, one hour prior to operation. After preoxygenation, anesthesia was induced with thiopental (4 mg/kg). In spite of considerable difficulty in maintaining a tight mask fit because of abnormal facial contours, it was possible to ventilate the lungs adequately. After administration of succinylcholine, direct laryngoscopy was undertaken. However, the massive hypertrophy of the pharyngeal mucosa prevented visualization of any portion of the larynx with either straight or curved blades. Endotracheal intubation was accomplished by blind insertion of an orotracheal tube. Anesthesia was maintained with halothane, nitrous oxide, and oxygen. After completion of the hypophysectomy, for fear that the trauma of the original tracheal intubation might have further compromised the airway, an elective tracheostomy was performed.

The postoperative course was complicated only by the development of mild diabetes insipidus. On the third postoperative day the patient was able to breathe adequately around the tracheostomy tube, which was removed the following day.

DISCUSSION

Various airway abnormalities associated with acromegaly have been described. Chappell[1] mentioned hypertrophy of the inferior nasal turbinates and lingular glands, thickening of the anterior and posterior pillars, soft palate, uvula, tonsils, tonsillar capsules, epiglottis, arytenoids and ventricular bands, enlargement of the larynx on external examination, and marked narrowing of the glottic opening. Jackson[5] emphasized the frequent asymmetry of the cartilaginous enlargement. Grotting and Pemberton[6] discussed the problem of vocal cord "fixation" and suggested several possible etiologies, including stretching of the recurrent laryngeal nerve(s) or of the cords themselves by laryngeal enlargement, impaired mobility of the cricoarytenoid joints, or compression of the recurrent laryngeal nerves by the thyroid enlargement that frequently accompanies acromegaly.

The clinical significance of these findings varies widely. While the great majority of acromegalic patients are free of symptomatic airway obstruction, Chappell's patient[1] apparently died of acute airway obstruction. There are numerous reported cases of hoarseness and dyspnea on exertion secondary to airway changes of acromegaly.[1,5–8]

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The principal problems posed for the anesthetist by these airway abnormalities are 1) inability to obtain a reasonable mask fit, 2) difficulty in visualization of the larynx,[3,4] 3) difficulty in passing an endotracheal tube due to stenosis of the glottic opening,[2] and 4) postintubation respiratory obstruction.[4]

Preanesthetic evaluation of the acromegalic patient should include obtaining a detailed history, with specific inquiries about the presence or absence of nocturnal dyspnea, loud snoring, and exertional dyspnea or stridor. Physical examination should emphasize a thorough evaluation of the airway. Kitahata[3] recommends radiologic studies of the neck and/or indirect laryngoscopy. When indirect examination is not possible, fiberoptic or direct laryngoscopy during local anesthesia and sedation should be considered. Pulmonary function tests and arterial blood-gas determinations are useful in the evaluation of patients complaining of dyspnea.

On the basis of the preanesthetic evaluation, it is possible to divide acromegalic patients into several categories: 1) those without significant airway involvement, 2) those with hypertrophy of nasal and pharyngeal mucosa but normal vocal cords and glottis, 3) those with glottic abnormalities, including glottic stenosis or vocal-cord paresis, and 4) those with both glottic and soft-tissue abnormalities. Patients in the third and fourth categories should probably undergo tracheostomy either preoperatively or prior to removal of the endotracheal tube. It is in the second category of patients that indications for tracheostomy are the least clear-cut. We feel that the patient whose larynx can be visualized relatively easily can be managed with close observation in the recovery room and intensive care unit. It is suggested, however, that when intubation is unusually difficult, elective tracheostomy be undertaken either preoperatively or prior to extubation.

In this case, massive hypertrophy of the soft tissue obliterated all views of the glottis and the endotracheal tube was passed blindly into the larynx after several attempts. Additional trauma of intubation added an element of edema to the already hypertrophied mucosal folds in the upper airway. It was feared that extubation would be followed by complete supraglottic obstruction. Elective tracheostomy avoided a potential catastrophic airway problem, did nothing to prolong postoperative morbidity, and appears to be a therapeutic modality to be considered in such situations.

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Laryngeal Competence after Tracheal Extubation

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Aspiration of gastric contents is a recognized hazard to postoperative patients whose laryngeal reflexes are inhibited by sedatives or residual effects of general anesthetic agents.[1,2] However, relatively few data have accumulated regarding laryngeal function in postoperative patients who are awake and alert. Gardner[3] reported aspiration of radiopaque dye given orally by ten of 94 alert, ambulatory patients, two to four days postoperatively. Tomlin *et al.*[4] challenged awake patients with dye two hours or more after anesthesia of approximately 60 min duration and found aspiration in nine of 41 patients whose tracheas had been intubated. Using a similar dye test 15 min after

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