LARYNGEAL AND TRACHEAL STENOSIS

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Case 1. Master R.K., 7 Years

This child was bitten by a dog on 10 October 1959, when one fang perforated the right ala of his thyroid cartilage. When first seen on 3 November 1959, mirror examination of the larynx showed marked reduction in the size of the glottic airway by a mass which replaced the anterior one-half of the right vocal fold (cord) and extended to the subglottic region. Spicules of the thyroid cartilage were visible in this mass, which prevented apposition of the vocal folds on attempted phonation. The posterior half of the right vocal fold was oedematous and immobile. The left vocal fold was slightly oedematous and showed slight mobility.

Operation was carried out on 12 November 1959—laryngofissure and tracheostomy; excision of the scar tissue and fragments of cartilage; preservation of the laryngeal mucosa and the insertion of a Vitallium plate, 1 mm. thick (Fig. 1, A), which was anchored with gauge 28, soft Austenal wire to a suitable frame (Fig. 1, B), on the neck.

The Vitallium plate was removed on 22 December 1959 and fortnightly dilatations were carried out, under general anaesthesia, using Jackson triangular dilators, until June 1960. The laryngeal appearances and the glottic airway improved progressively and granulations had to be removed on only two occasions. From June until December 1960, monthly dilatations were continued using up to size 38 Jackson bougies. During the latter period the smallest tracheotomy tube was used and was kept completely occluded, except at night; and it was finally removed in 1960. Up to the present time the laryngeal condition has remained satisfactory, though mobility of the right vocal fold has not returned. His voice is hoarse, but he leads a normal life.

Case 2. Mrs. F.D.W., 49 Years

This patient suffered multiple severe injuries in a motor car accident on 17 April 1965, including a direct hit on the larynx. Immediate tracheostomy was performed. The patient was first seen by us on 18 May 1965 when it was found that the tracheostomy had been allowed to close and the patient showed considerable stridor. Mirror examination of the larynx showed unusual prominence of both ventricular bands and oedema of the aryepiglottic folds. In the region of the vocal folds was an ovoid of scar tissue which extended subglottically and allowed an airway of about the size of a lead pencil. At that time there was no obvious infective process in the larynx.

After consultation with the senior plastic surgeon we were considering the performance of a plastic procedure on somewhat similar lines to that recently reported by Montgomery[1] for the correction of an upper cervical defect of the trachea. However, on 16 June 1965, redness and swelling of the skin, with early fluctuation, appeared in the midline in the region of the lower border of the thyroid cartilage and this was accompanied by an increase in the laryngeal obstruction. On 17 June 1965 the following procedure was carried out under general anaesthesia: laryngoscopy and the introduction of a Negus bronchoscope (child's size) to ensure a moderate airway; then tracheostomy, the bronchoscope being left *in situ*; then

opening of the laryngeal abscess including the removal of a small sequestrum of thyroid cartilage from the abscess cavity. Finally, a solid acrylic mould (Fig. 2 A), triangular in cross-section, was introduced into the larynx per os, after removing the bronchoscope, and anchored to a suitable external splint by means of 28 gauge, soft Austenal wire.

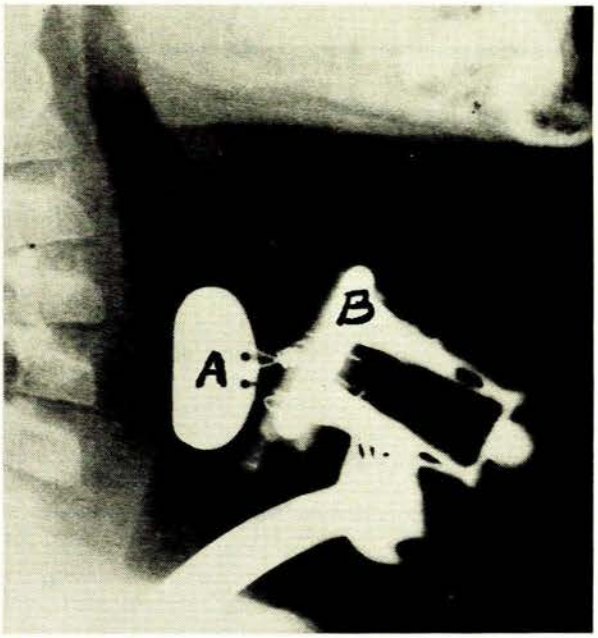

Fig. 1. See text.

The postoperative progress has been satisfactory and, on 25 June 1965, the acrylic mould was changed to a larger one, thin ovoid in cross-section. As the patient's progress continued to be satisfactory, a hollow, shaped Portex tube was introduced on 27 July 1965 (Fig. 2 B). We hope that it will be possible to retain the present mould in position for an extended period of time.

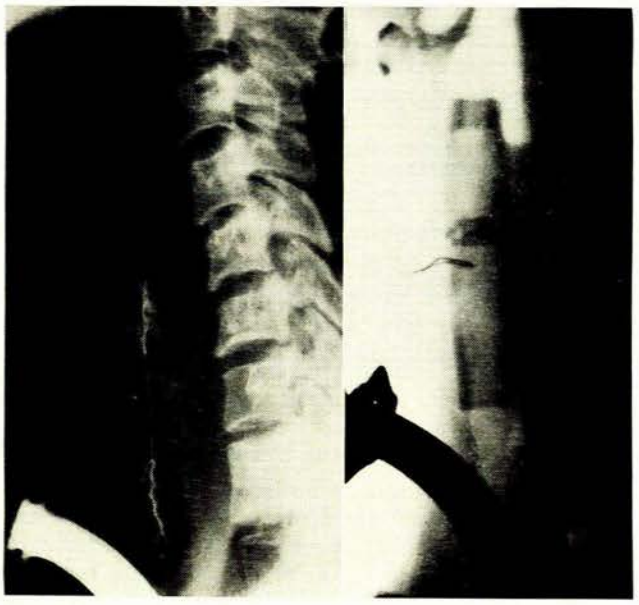

Fig. 2 A. See text. *Fig. 2 B.* See text

Case 3. Mr. S.L., 63 Years

On 6 March 1964 the patient received multiple injuries in a motor car accident, including a direct hit on his larynx and trachea. On 7 March 1964 tracheostomy was performed. After about 14 days this was allowed to close. The patient was first examined by us on 28 May 1964, when mirror examination of his larynx showed a marked subglottic stenosis in the cricoid region, confirmed by a tomograph taken the same day. On 4 June 1964 the larynx and trachea were exposed by a midline vertical incision and a tracheostomy tube was inserted at its distal end. The anterior aspect of the cricoid and first ring of trachea had been fractured and the fragments were displaced posteriorly, causing a reduction of the airway to about one-half of its normal size. Just distal to this the tracheal lumen widened for about 1 inch and then narrowed again, owing to the presence of a partial band of fibrous tissue involving, for the most part, the posterior tracheal wall. Distal to the latter stenosis the posterior tracheal wall bulged forward for about 1 inch. A shaped Portex tube was introduced into the larynx and trachea and extended from the subglottic region to the tracheostomy tube, to which it was anchored with no. 2 silk.

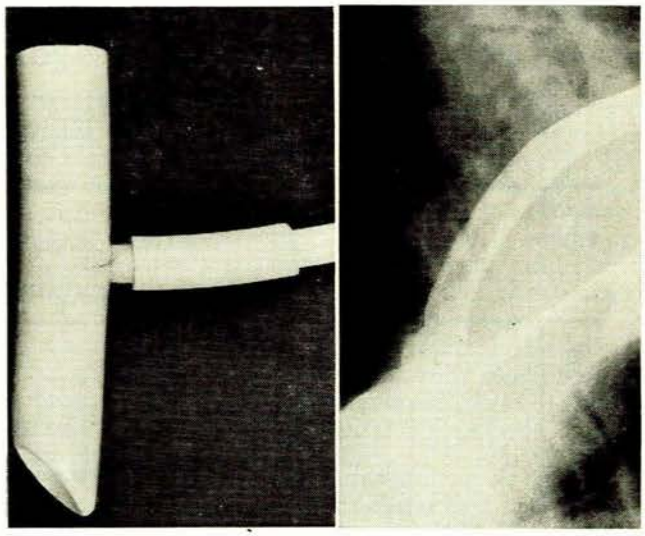

Fig. 3 A. See text. *Fig. 3 B.* See text.

On 25 June 1964 the Portex tube and the tracheostomy tube were changed to the type of Portex tube shown in Fig. 3 A. The latter tube was satisfactory and remained *in situ* until 27 August 1964, when it was thought that both areas of stenosis may have been cured, and it was removed. The region of the cricoid fracture has remained very satisfactory with no return of stenosis; but the tracheal stenosis recurred within a week of the removal of the tube and we had to resort to a tracheostomy tube once more. From then until July 1965 a modified Tucker tube has been worn by the patient with a valved inner tube. The patient was anxious to eliminate the tracheostomy tube and so, on 25 June 1965, we reintroduced a longer Portex tube. This was not satisfactory and the patient had some stridor. On 30 June 1965 we replaced it with a still longer Portex tube (Fig. 3 B) and, up to 31 July 1965 the latter tube has been satisfactory and we hope to leave it *in situ* for a considerable time. The small lateral extension of these tubes fixes them in the trachea, allows a little antero-posterior mobility and facilitates a return to the tracheostomy tube if necessary. The Portex tubes have remained remarkably clean and free from inspissated secretions; and, so far, have not given rise to macroscopic changes in the tracheal mucosa.

I wish to thank the Department of Surgery for the photographs.

1. Montgomery, W. W. (1964): Ann. Otol. (St. Louis), 73, 5.

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