

Traumatic Laryngeal Stenosis

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Injury of the larynx is becoming a more frequent problem due to a number of causes such as automobile accidents¹⁾ and industrial accidents which was the cause of injury for the case discussed here.

This paper presents a case of traumatic laryngeal stenosis to emphasize the importance of early adequate treatment and the difficulty of restoration of an adequate lumen in the airway in these injuries.

REPORT OF A CASE

On September 8, 1967, a 37 year-old woman, while working in a lumber yard, fell down, her larynx hitting the edge of a desk. At that time, immediate loss of voice occurred associated with hemoptysis, but laceration on the neck was not present. She was immediately taken to a nearby laryngological clinic and was hospitalized and was found to be cyanotic. Several hours after the accident, she developed marked cervical emphysema, moderate difficulty in breathing and difficulty in swallowing. Intravenous feeding and nasal oxygen inhalation were started. These symptoms slowly improved over a period of 10 days and only a moderate hoarseness remained. After three weeks of hospitalization, her physician noted that the patient was having increased dyspnea in spite of continuous antibiotic therapy and inhalation. About 5 weeks after the accident, on October 13, she was referred to Yamaguchi University Hospital and was hospitalized.

On physical examination the patient was found to be in no acute distress. She spoke in a scarcely audible whisper. Weight 37 kg, body temperature 36.5°C, breathing rate 20 per minute and regular, blood pressure 156/90 mmHg. Her chest was clear to percussion and auscultation. Urinalysis and blood studies were normal. The ears and nose were normal. The oropharyngeal area was entirely normal. Mirror examination of the larynx showed that the right arythenoid fold was displaced anteriorly. The right aryepiglottic fold and the right false cord were hypertrophied. The left true cord appeared normal except on its anterior third where granulation was present. The glottic area was very narrow (Fig. 1).

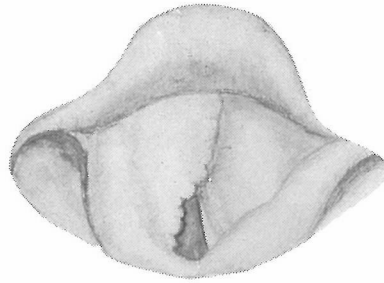


Fig. 1. Indirect laryngoscopic view illustrating dislocation of the right arytenoid and marked hypertrophic ventricular bands.

On palpating the neck the prominence of the thyroid could not be felt.

A lateral view of the Cervical X-ray films showed fragmentation of the thyroid cartilage and narrowing of the subglottic space. These findings were confirmed by a laryngogram (Fig. 2).

One week after admission progress was quite satisfactory. However, cicatricial changes in the anterior commissure, which affected her voice and also her airway, gradually developed. For that reason, open surgery was carried out thirty days after the accident.

First, a low tracheotomy was performed and through this tracheal opening anesthesia with G. O. F. was started. Under this condition a laryngofissure was carried out. An incision was made from the tracheal opening upward to expose the thyroid and cricoid cartilages. The thyroid cartilage was found to be fractured vertically and the fragment displaced inwardly (Fig. 3).

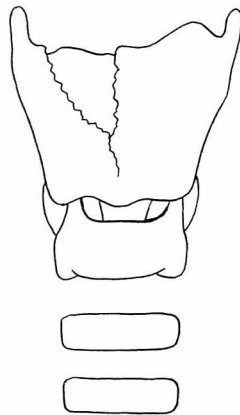


Fig. 3. The fracture of the thyroid cartilage.

The cartilage was mobilized and scar tissue was excised. The mucous membrane and perichondrium were sutured carefully. Postoperatively, she experienced no trouble with swallowing. However, there was no development of an adequate

airway which would permit decannulation following the operation. Because of this, twenty-five days later, on November 14, re-operation with hemilaryngectomy on the right side was performed and once more the scar tissue was excised. At that time, a rubber endotracheal anesthesia tube was fastened and it was placed in the larynx (Fig. 4). The tube was well tolerated with no evidence of granulation tissue or infection. Three days later the tube was removed and the tracheotomy was closed. Following this procedure, her progress was satisfactory, except that her voice remained somewhat hoarse. However, cicatricial changes in the anterior commissure region gradually developed in the next 21 days. Increased hoarseness and beginning dyspnea occurred. Because of this, she was again operated and a new prosthesis was inserted without a skin graft.

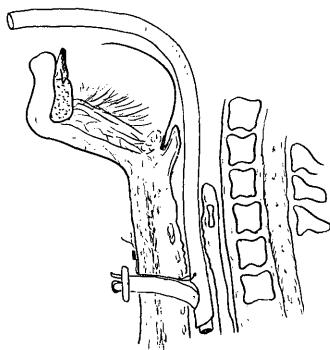


Fig. 4. Sagittal section of the larynx. The rubber endotracheal anesthesia tube in position. Sutures in the lower part of tube are brought out through the tracheotomy opening and fastened to the cheek with an adhesive strip.

On December 14, a vinyl tube 5 cm. in length as an endlaryngeal stent was inserted into the subglottic space through the larynx extending from the supraglottic area above to the tracheotomy below. This stent was anchored above and below with silk. The upper end was fastened to the cheek and the lower one held in position to the cannule. The stent was left in site for a period of about two months. There was no evidence of increased granular change in the larynx during this period. When the tube was removed, it was found that the laryngeal lumen was inadequate.

The patient continues under observation, but no further operative procedures are presently planned.

COMMENT

This is a case of a closed injury of the larynx with fracture of the thyroid cartilage and subsequent cicatricial laryngeal stenosis. The rapid development of

cervical empysema and loss of voice directed her first to the local physician who in turn referred her to the University Medical School Hospital for hospitalization. Initially, tracheotomy was not performed because the possibility of grave laryngeal injury was not considered seriously until after admission to the University Hospital approximately one month after the accident.

The significant problem encountered in laryngeal injuries is late laryngeal stenosis. In the management of these cases, the object is,¹⁾ to restore and maintain an adequate lumen within the larynx and ultimately eliminate the tracheotomy tube,²⁾ if possible, to restore the voice to its normal condition.

The most commonly accepted technique for late laryngeal stenosis is the use of obturators. These are made of various materials such as Tantalum, Polyethylene, Acrylic Silicone rubber or Sponge rubber.⁴⁾⁵⁾ Among these materials, acrylic was chosen as the most suitable material, because it could be more easily molded.⁵⁾

The surgical procedures used in treating laryngeal stenosis have been discussed by many authors.⁶⁾⁷⁾⁸⁾

In this case, surgical technique was quite similar to the technique described by Middleton.²⁾ However, satisfactory results were not obtained in the case described here, because of the development of severe and long term scar tissue in the larynx. Middleton left the splints in place for four to nine months.

The watchword for laryngeal injury is that treatment is the best to be done early to prevent the ultimate development of cicatricial stenosis, as pointed out by Priest et al.³⁾

The lesson to be learned from the case described here is that early exploration of the laryngotracheal area, particularly in a closed injury of this type, is important, and every effort must be made to establish and maintain an airway lumen before scar tissue formation obstructs the airway.

SUMMARY

A case of traumatic laryngeal stenosis is reported. An endotracheal anesthesia tube was used to restore an adequate lumen within the larynx. However, unsatisfactory results were obtained.

Early recognition and appropriate surgical treatment may be required in laryngeal injury.

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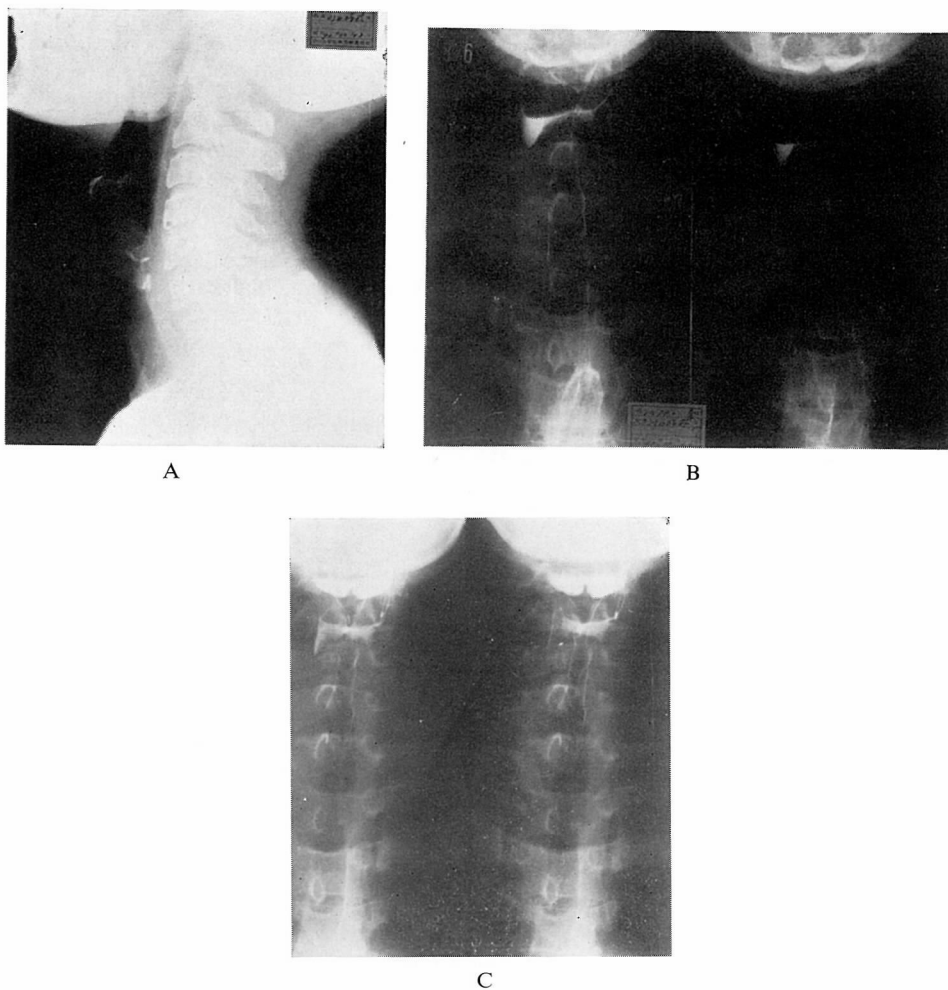


Fig. 2.

- A. Lateral roentgenogram of the larynx. Note fragmentation of the thyroid cartilage and narrowing of the subglottic space.
- B. Preoperative laryngogram in respiration and during phonation. Note marked hypertrophic ventricular bands and the extensive narrowing of the subglottis.
- C. Postoperative laryngogram in respiration and during phonation. Note moderate reconstruction of the glottic lumen in its lateral diameter at one month.