

Laryngotracheal separation under local anaesthesia for intractable salivary aspiration: cricoidectomy with fibrin glue support

MICHIHIKO SONE, M.D., TSUTOMU NAKASHIMA, M.D., NORIYUKI YANAGITA, M.D.

Abstract

Chronic salivary aspiration can cause life-threatening pneumonia in a patient whose laryngeal function is completely lost. We report a patient who had laryngotracheal separation with cricoidectomy under local anaesthesia. The simplicity and reliability of the procedure were improved by using fibrin glue and the outcome was most satisfactory.

Key words: Aspiration; Saliva; Cricoid cartilage; Trachea; Surgery; Fibrin tissue adhesive

Introduction

The management of intractable aspiration varies depending on the severity of laryngeal dysfunction. Individual evaluation is necessary, with assessment of the severity of neurological deficits, the extent of aspiration, and the mental state (Butcher, 1982). Various operations have been performed to treat intractable aspiration, including supraglottic closure (Habal and Murray, 1972), glottic closure (Montgomery, 1975; Sasaki *et al.*, 1980), tracheo-oesophageal diversion (Lindeman, 1975; Krespi *et al.*, 1984), and laryngotracheal separation without cricoidectomy (Lindeman *et al.*, 1976; Baron and Dedo, 1980). These operations were developed to allow reversal when the laryngeal dysfunction improved. When the recovery of laryngeal function is considered unlikely, laryngectomy is another choice (Hawthorne *et al.*, 1987). However, even laryngectomy is associated with a high incidence of pharyngeal fistula (Krespi *et al.*, 1985).

Recently, Eisele *et al.* (1995) proposed subperichondrial cricoidectomy as an alternative to laryngectomy with a high success rate and low morbidity. In this paper, we report a successful case of subperichondrial cricoidectomy performed under local anaesthesia using fibrin glue.

Case report

A 69-year-old man was referred from a private hospital to the Department of Otorhinolaryngology of Nagoya University Hospital with an eighteen-month history of tracheostomy and nasogastric feeding after emergency surgery for cerebellar haemorrhage. He had been on a respirator since the operation when a tracheostomy was performed. Limb function was restricted and he could not move independently. He wanted the ability to handle oral intake, even if the procedure sacrificed phonation. CT scans of the head revealed multiple cerebral and brainstem infarcts accompanied by post-operative changes of the cerebellum, and stenosis of the bilateral internal carotid arteries with calcification. The chest X-ray film showed

diffuse aspiration bronchiolitis and *Pseudomonas aeruginosa* was cultured from his sputum.

Because his poor condition made general anaesthesia impossible, laryngotracheal separation with cricoidectomy under local anaesthesia was planned. The tracheostomy tube was replaced by a shortened endotracheal tube and a vertical incision was made just above it. The cricoid cartilage was exposed (Figure 1) and its arch was removed with preservation of the intracricoid mucosa. Then the intracricoid mucosa was totally separated from the lamina of the cricoid cartilage. In this case, a tracheotomy already existed just below the first tracheal ring. The separated



FIG. 1

Dislocation of the cricoid cartilage (arrow) is revealed after the vertical skin incision is made. A shortened endotracheal tube is inserted.

From the Department of Otorhinolaryngology, Nagoya University School of Medicine, Nagoya, Japan.
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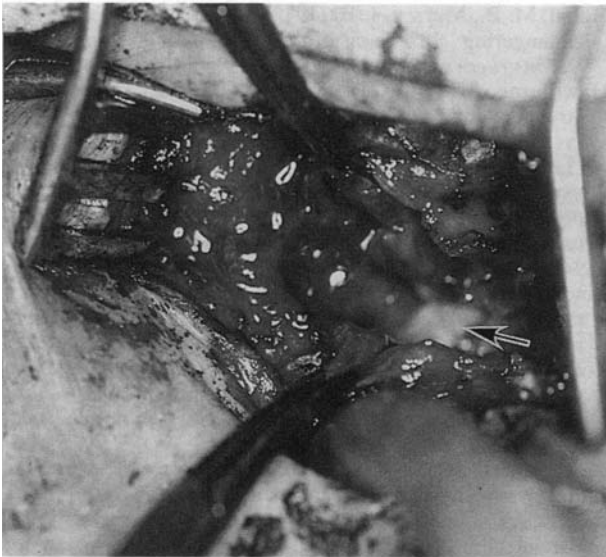


FIG. 2

The completely separated intracricoid mucosa is transected. The lamina of the cricoid cartilage (arrow) is seen behind the mucosa.

mucosa was transected horizontally at the level of the cricoid cartilage (Figure 2) and both edges were closed sagittally with absorbable sutures (Figure 3). Strap muscles and fibrin glue were used to reinforce the closures and a suction drain was placed for two days post-operatively. On the 12th post-operative day, a swallowing study with contrast medium revealed no fistula and little pooling in the subglottic pouch (Figure 4). The patient could subsequently handle an oral intake, although a nasogastric tube was still needed.

Discussion

Various surgical procedures have been developed to prevent intractable aspiration in patients who have lost

their laryngeal function. However, the success of such operations is influenced by the pre-operative condition of the patient. Eibling *et al.* (1995) reported post-operative fistulas in over one third of their patients after laryngotracheal separation. They stated that prior tracheostomy made tension-free mucosal closure difficult and that fistulas still occurred even when muscle flaps were used. When the patient's condition is so poor that general anaesthesia is contra-indicated, the rate of post-operative complications such as a tracheocutaneous fistula could increase and such problems could be fatal. In such a patient, the simplicity and reliability of the procedure is most important. Some procedures can be performed under local anaesthesia (Baron and Dedo, 1980; Eisele *et al.*, 1995; Eibling *et al.*, 1995). Pooling of secretions in the larynx and subglottic pouch poses no problem after laryngotracheal separation (Lindeman *et al.*, 1976; Baron and Dedo, 1980). However, Eisele *et al.* (1989) have reported a tracheocutaneous fistula arising from the subglottic pouch in patients who had prior tracheostomy. In our patient, tracheostomy had already been performed and sputum culture revealed *Pseudomonas aeruginosa* infection. In addition, his nutritional status was poor, so the risk of a post-operative fistula was considered to be high.

Laryngotracheal separation at the level of the cricoid cartilage can provide a small pouch and abundant tension-free mucosa for closure. We could not obtain enough mucosa for horizontal suturing as described by Eisele *et al.* (1995) because of the cricoid cartilage dislocation and mucosal fibrosclerotic change following the patient's previous high tracheostomy. In our procedure, the transected edges were sagittally sutured as tightly as possible, and were reinforced with the strap muscles and fibrin glue. When this procedure is planned, pre-operative CT scanning should be done to confirm the existence of a normal cricoid cartilage. One advantage of operating under local anaesthesia is that the sutured layers can be checked during the procedure to determine whether the normal swallowing pressure is tolerated. The proximal edge of the transected portion should be completely closed. If there is insufficient mucosa for closure after

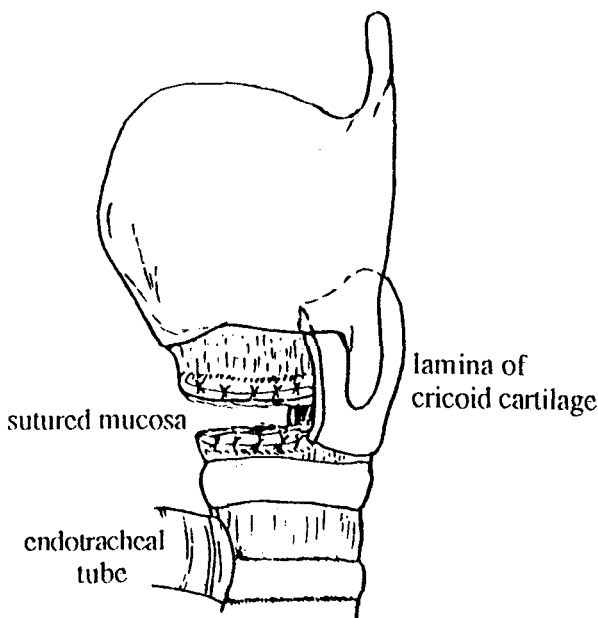


FIG. 3

Lateral view of the procedure. The arch of the cricoid cartilage is removed and both edges of the transected mucosa are sutured sagittally.

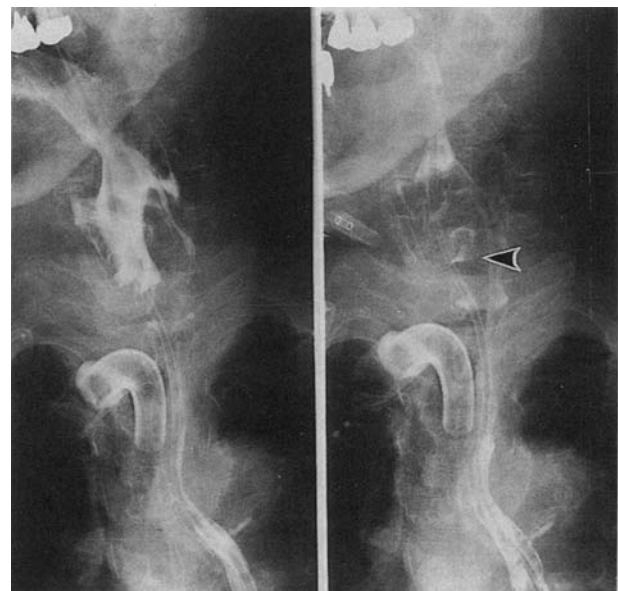


FIG. 4

Post-operative swallowing study with contrast medium. (Left) In the initial stage, the medium flows into the larynx. (Right) In the next stage, it flows out smoothly and into the oesophagus. Pooling in the subglottic pouch (arrow head) is very slight.

intracricoid transection, it should be performed at a lower level. Complete closure of the distal edge is not necessarily needed. The strap muscles and fibrin glue can be useful to reinforce both edges.

Eisele *et al.* (1995) mentioned that a disadvantage of subperichondreal cricoideotomy is the need for a tracheostomy tube due to lack of a tracheostoma. However, when a prior tracheostomy exists, the fashioning of a tracheostoma may increase the risk of post-operative complications. We wanted to reduce surgical intervention to the minimum in this patient. The patient and his family were greatly satisfied with the result of the operation. The outcome encourages us to treat severely debilitated patients with intractable salivary aspiration.

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Address for correspondence:

Michihiko Sone, M.D.,
Department of Otorhinolaryngology,
Nagoya University School of Medicine,
65 Tsurumai-cho,
Showa-ku,
Nagoya, 466,
Japan.

Fax: 81-52-741-1678