Case report

Cololaryngostomy procedure in caustic esophageal burns

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Abstract

The study presented herein was undertaken to report an original case of cololaryngostomy operation in caustic esophageal burns. Cololaryngostomy application to a chronic caustic esophageal burn case is reported with a detailed literature review of the topic. For the first time in the world, the larynx was used for the integrity of the gastrointestinal system by applying a cololaryngostomy procedure as it was found to be the only intact and reliable tissue in the operation. The patient started to gain weight in a 3-month period. Oral nutrition and speech were also achieved. Caustic injury to the upper aerodigestive system with scarring of the pharynx, hypopharynx and esophagus is an important reconstructive problem. In reconstruction, the aim should be the supplementation of both oral nutrition and speech.

Keywords: Caustic esophageal burns; Larynx; Colon interposition; Cololaryngostomy

1. Introduction

Caustic injury to the upper aerodigestive system with scarring of the pharynx, hypopharynx and esophagus is a challenging reconstructive problem [1]. Throughout this century, ingenious surgeons have created various functioning substitutes for the esophagus [1,2]. In reconstruction, the aim is not only to create a new esophagus, but also to supply well-functioning oral nutrition and speech. These operations are technically demanding, and the associated morbidity is high [3]. There is still no agreement as to which is the 'best' operation.

We have considered these issues in the treatment of our case when reviewing the early postoperative results. In our case, for the first time in the world, the larynx was used for the integrity of the gastrointestinal system by applying a cololaryngostomy procedure as it was found to be the only intact and reliable tissue in the operation.

2. Case report

A 21-year-old female was referred with a history of hydrochloric acid ingestion 1 year ago in a suicide attempt. She had undergone an emergency operation of tracheostomy + gastrectomy + tube jejunostomy in another university clinic. Her complaints were excessive weight loss, aphonla and a decrease in her quality of life. The physical examination revealed only some cervical microlymphadenopathies, other than her tracheostomy. All of her laboratory findings were within normal ranges. In examination of the oral cavity, the epiglottis and hypopharyngeal and laryngeal tissues were seen to be stuck together completely; there was no opening. The pharyngeal and laryngeal tissues were not differentiated from each other. To see the cord vocalis was impossible with laryngoscopy. The cord vocalis and subglottis could be seen through tracheostomy by looking upwards, but their movement could not be evaluated. As a result, the function of n. laryngeus recurrens was not known.

As a first attempt, a cervical exploration was carried out to discover if the esophagus could be reached and how the interior side of the larynx was. The esophagus was absent and, instead, there was fibrotic tissue. The interior side of the larynx (glottis) was in relatively good condition, but the supraglottic area was stuck to the surrounding tissues. The hypopharynx was also absent. The definitive operation was delayed for a period of time to observe if the patient had any tendency to a second suicidal attempt. As it is impossible to create both a new esophagus and a new pharynx by making the larynx functional; the patient was asked to choose one. She had to choose either speaking, by reconstructing the larynx without touching the jejunostomy, or oral nourishment, by making the larynx a part of the alimentary tract. The patient preferred oral nourishment.
Under these circumstances, she underwent laparotomy. First of all, esophageal replacement by a retrosternal aniso-peristaltic left colic segment was supplied. Between the transverse colon and the proximal side of the sigmoid colon, an end-to-side colocolostomy with a two-layer anastomosis technique (in the first layer, absorbable, and in the second layer, non-absorbable suture materials were used) was performed; and between the distal end of the colonic flap and the duodenum, an end-to-side coloduodenostomy procedure with a one-layer anastomosis technique (non-absorbable suture material was used) was performed. Then, in the cervical region, the larynx was found by lateral laryngopharyngotomy through the adhesions in the laryngopharynx; the adhesions in the supraglottic area were resected and a stent, 1.5 cm in diameter and 4 cm in length, was placed for a 2-month period. The vocal cords were left in their normal region. The lower end of the larynx (the subglottic area) was anastomosed to the colon using an end-to-end pattern with a single-layer anastomosis technique (absorbable suture material was used). The upper side (the supraglottic area) was opened to the oropharynx. As a result, the larynx began to take over the functions of the hypopharynx. In the operation, the tracheostomy and the tube jejunostomy were not touched. The patient was discharged on the 9th day postoperatively as no complications developed during this period. Several weeks after the operation, a Provax speaking prosthesis was placed for ease of speech. In the second month after the operation, the stent was removed and the patient started to eat orally. In her postoperative passage graphy, the laryngocolostomy integrity was shown (Fig. 1). Then, the tube jejunostomy was taken out and the orifice spontaneously closed.

At present (2 years after the operation), the patient can speak easily. Sometimes the inlet of the larynx becomes stenotic by the formation of strictures. In these situations, generally occurring in 2-month periods, we dilate these strictures using a CO₂ laser. In her last passage graphy,
taken 2 years after the operation, the laryngocolostomotic anastomosis was shown not to have any stenosis (Fig. 2). At the moment, the patient is able to take solid foods comfortably. Her psychiatric consultations are continuing.

3. Discussion

Replacement of the esophagus with a segment of colon was attempted as early as 1911. Kelling (of Germany) succeeded in bringing transverse colon under the skin to the anterior chest. The patient died of obstructing cancer of the esophagus before anastomosis was performed with the cervical esophagus [1]. In 1921, Lundblad (of Sweden) used an isoperistaltic segment of transverse colon in a 3-year-old child with a lye stricture. The patient lived and swallowed normally until he died in an automobile accident 37 years later [1]. The use of colonic segments became more popular during the 1950s, with antibiotics and safer anesthetic techniques. Initially, the colon was used in adults with cancer [2].

In 1957, Sherman and Waterston summarized previously reported operations and described two methods of reconstruction that remain popular today, with various modifications [3]. Waterston initiated the use of an isoperistaltic segment of transverse colon, brought up through the diaphragm and left hemithorax, with anastomosis of the distal end to the stump of esophagus in the chest. The same report describes substernal interposition of the right colon with a gastric anastomosis. The liberal blood supply of the stomach makes it the most reliable organ for use in the intrathoracic replacement of the esophagus. For short segment replacement of the cervical esophagus, a free autograft of small intestine may be used; arterial and venous anastomoses are accomplished by conventional microvascular techniques [4].

Severe caustic burns involving the pharynx complicate reconstruction of the esophagus. The only case in the literature resembling our case is reported by Ogura and colleagues. Ogura et al. described an extensive two-stage procedure in which the substernal right colon was anastomosed to the pyriform sinus [5]. Later, the epiglottis was freed up, and scar tissue was excised. The defect was then covered with a split-thickness skin graft. However, in our case, the pharynx was completely disturbed. Cysts were described inlaying an inverted U-shaped piece of colon into the pharynx in these patients [6].

In our case, for the first time in the world, left colon was anastomosed to the larynx as it was found to be the only intact and reliable tissue in the operation. This cololaryngostomy procedure supplied the integrity of the gastrointestinal system. Now the patient is able to feed orally. After the application of a Provax prosthesis, she can also speak very well.

Technical complications and morbidity continue to be reported in studies of large series of patients who underwent colon interposition. Waterson et al. updated their experience with isoperistaltic left colon placed through the left hemithorax [7]. The incidence of mortality was reduced to one death among 40 cases, but complications included leaks at cervical and thoracic anastomoses, late strictures and an instance of total loss of transplant.

Raffensperger et al. reviewed the course of 59 children who had bypass of their entire esophagus, with a follow-up period ranging from 1.5 to 37 years [1]. Three patients required reoperation because of adhesive intestinal obstruction. In one child, obstruction developed when the redundant ileum herniated through a defect in the pleura. The first patient in this series had dysphagia 14 years after her operation. A partial obstruction just distal to the cervical anastomosis was relieved by resection of a portion of the manubrium at the thoracic inlet. Forty of the 57 surviving patients who had complete bypass of the esophagus have nearly normal eating and swallowing habits. Four of them have mild dysphagia with specific foods such as chicken or meat. Thirteen others have had food ‘caught’ occasionally, in some as often as once a week. The symptoms are relieved by drinking liquids. One child required esophagoscopy 5 years after surgery to remove a hot dog impacted at the neck anastomosis site. Hendren and Hendren also reported on 32 children who had complete or partial replacement with an isoperistaltic segment of transverse and descending colon brought through the left hemithorax [8]. In six, previous procedures had failed. There were only two small proximal anastomotic leaks; there were no strictures, and no ischemic necrosis of the segment was evident.

Other long-term complications of colonic interposition include episodic diarrhea and unexplained massive gastrointestinal hemorrhage [9]. However, ulceration is uncommon in the acid-resistant colonic mucosa. Carcinoma has been reported in some cases of colon interpositions [10]. These observations emphasize the importance of long-term follow-up. Growth retardation after total colonic bypass has been a concern of many investigators [9,10]. Delay in establishing feeding may result in long-term swallowing difficulties and food aversion.

In our case, the patient started to gain weight in a 3-month period. Preoperative excess weight loss was seen to be compensated. There was no complication of the operation. The only problem we confronted was stenosis of the inlet of larynx by the formation of strictures; this occurs in 2-month periods. In these situations, we dilate these strictures using a laser. As for the laryngocolostomotic anastomosis, it works perfectly.

References


