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ORIGINAL ARTICLE

Fistula following total laryngectomy. Retrospective study and bibliographical review

Luis D. Sarra,* Juan C. Rodríguez, Mariela García Valea, Julio Bitar, and Alejandro da Silva

Sección de Cirugía de Cabeza y Cuello, Servicio de Otorrinolaringología, Hospital Municipal Dr. Diego E. Thompson, General San Martín, Buenos Aires, Argentina

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Abstract
Background: The pharyngocutaneous fistulae is troublesome and the most common complication following total laryngectomy. Our objetive was to determine the incidence of pharingocutaneous fistulae after the total laryngectomy in our serie and to make review of the medical literature.
Methods: We made a retrospective study of a serie of 81 consecutive cases of laryngeal carcinoma treated between 1995 and 2008 in our section. Total laryngectomy was performed in 29 cases and 52 patients treated with organ preservation approach, were excluded. In 14 cases, the procedure was combined with radical neck dissection, pharyngeal resection or myocutanenous flaps. Nasogastric tube for feeding in the postoperative period was used in all patients and surgical gastrostomy was performed in 5 cases.
Results: Our incidence of fistulas when total laryngectomy was the alone procedure is 20% and 34.5% when simultaneous surgical proceedings were associated. Spontaneous closure was noted in 80% of the cases and the mean hospitalization time was 23 days.
Conclusions: Most of the fistulas can be managed with conservative treatment. Pectoralis major myocutanenous flap is appropriate when conservative treatment has failed. In small fistulas, nasogastric, or gastrostomy tube for feeding can be successfully managed in the ambulatory follow-up. The cost-benefit relation must be better analyzed.

*Corresponding author.
E-mail address: lsarra@intramed.net.ar (L.D. Sarra).

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PALABRAS CLAVE
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Fístula tras laringectomía total. Estudio retrospectivo y revisión bibliográfica

Resumen
Introducción y objetivos: La fístula faringocutánea es la complicación más frecuente de la cirugía del cáncer de laringe y hay escasa literatura sobre el tema. Nuestro objetivo es analizar la experiencia de más de una década en un hospital zonal y realizar una revisión bibliográfica.
Métodos: Entre los años 1995 y 2008, se diagnosticó a 81 pacientes con cáncer de laringe. Se excluyó a 52 pacientes que ingresaron a protocolos de quimiorradioterapia o fueron tratados con cirugía conservadora. Se practicó laringectomía total como tratamiento primario a 29 pacientes. En 14 casos se asoció faringectomía parcial o total, vaciamientos de cuello o colgajos. Utilizamos alimentación por sonda nasogástrica en todos los casos, como mínimo, durante 8 días.
Resultados: Cuando la laringectomía total fue el único tratamiento, la incidencia de fístulas alcanzó el 20%, mientras que cuando se asociaron otros procedimientos, la incidencia fue del 34,5%. El tiempo de internación promedio de los pacientes fistulizados fue de 23 días. Cerraron espontáneamente el 80% de las fístulas y debimos reintervenir a 2 pacientes. Se realizó gastrostomía en 5 oportunidades y alimentación enteral domiciliaria en 8 pacientes.
Conclusiones: Nuestra frecuencia de fístulas es similar a la publicada y coincidimos en que el tratamiento inicial debe ser conservador. Cuando es necesario reoperar, preferimos el colgajo miocutáneo de pectoral mayor. En pacientes seleccionados, la alimentación enteral domiciliaria reduce el tiempo de internación y mejora la calidad de vida. Queda pendiente el análisis del impacto de esta complicación en los costos de salud.

Introduction

In the face of the development of laryngeal preservation protocols, total laryngectomy for cancer has been relegated to bulky tumours or as salvage surgery in recurrences or in patients with poor response to chemotherapy.[1]

Pharyngocutaneous fistulae are the most common and at the same time, the most problematic complication in the immediate postoperative period of a total laryngectomy.[1-6] Dehiscence of the pharyngeal suture line occurs in 10%-30% of composite resections of the crossing of the airway and the digestive tract and in 8%-22% of total laryngectomies.[3] Weingrad and Spiro reported a 4% of total laryngectomy fistulae in endolarynx tumours, a figure which reached 37% when tumours invaded the hypopharynx.[6]

The local conditions of the tumour, the general and nutritional condition of the patient and previous treatments are risk factors extensively treated in the literature.[2,3,5-10] Pre-operative radiation therapy is the main local risk factor.[1,2,8,9] The incidence of fistulae in previously irradiated patients is 2.6 times higher than in the rest.[8] While 70%-80% of these fistulae closed spontaneously in a variable time, in some cases they constituted true therapeutic challenges and required a multidisciplinary effort by institutions.[1-3,11] In general, they are not a serious complication but they do delay oral feeding and prolong hospital stay. These facts have an impact on patients' return to work and social life as well as on the cost to the health system. A Canadian paper estimated the cost required to treat fistulae after laryngectomy at a single reference care centre for head and neck oncology in Toronto at $400 000 per annum.[11]

Methods

Between 1995 and 2008, 81 patients with laryngeal cancer were treated at the Head and Neck Surgery Department of the Hospital Diego Thompson. We excluded 52 patients who underwent conservative surgery or were included under organ preservation protocols. In the remaining 29, surgery was performed with curative intent, consisting of total laryngectomy as a single procedure or combined with resections of the pharynx, dissection of the neck, and reconstructions through flaps. The surgical team was the same in all cases and the synthesis technique used involved closure on an extramucosal plane with separate stitches of 000 calibre polyglactin 910 and a muscular reinforcement plane of the same material in those operations where primary pharyngeal closure took place. We prefer a T-suture although we have made it linear when this could be done without tension.

In all cases, a K 108 or K 10 nasogastric tube was put in place; drip was begun with a 5% dextrose solution after 24 h and enteral feeding 48 h post-surgery.

We analyzed: frequency of fistulae, tumour size, extent of resection, resection margins, type of reconstruction, concomitant diseases, prior radiation therapy and chemotherapy, treatment carried out, and its outcome.

Results

We retrospectively studied a series of 29 cancer patients subjected to total laryngectomy. The patients in the series ranged from 44 to 72 years of age. In the distribution by gender, 93.1% of patients were male (27 cases). In all

Table 1 Treatment and results

Primary treatment	Cases	Fistulae	Insufficient margin	Spontaneous closure	Reintervention
Total laryngectomy (TL)	15	3	—	3	—
Total laryngectomy + radical neck dissection	16	2	—	2	—
TL + partial pharyngectomy + radical neck dissection	4	2	1	2	2
TL + partial pharyngectomy + radical neck dissection + chest flap	4	3	1	1	—

Table 2 Presence of fistulae in total laryngectomy

Author	Year	Fistulae, %
Weingrad-Spiro[6]	1991	4
Murdoch et al[9]	1998	59
Martínez et al[4]	1998	20
Parikh et al[11]	1998	22
Redaelli et al[20]	1999	16
Volling et al[5]	1999	12
Virtaniemi et al[13]	2001	15
Ferbeyre Binelfa et al[7]	2001	65
Grau et al[8,*]	2003	19
Smith et al[10]	2003	22.9
Rubino et al[1]	2005	55

*100% salvage surgery.

patients the histology was moderately or well differentiated squamous cell carcinoma. In the TNM classification, tumour size corresponded to stage T3 in 11 patients and stage T4 in the other 18. By stages, 11 cases were stage III and 18 stage IV. At the time of diagnosis, 14 patients presented regional involvement requiring radical neck dissection (48.3% of cases). All of the patients (100%) were smokers of more than 15 cigarettes per day for over 20 years and in 86.2% of cases, smoking was associated with chronic alcoholism. With regard to concomitant disease, 3 patients in the series were type 2 diabetics and 15 of them reported a weight loss of more than 5 kg in the 3 months prior to the consultation. Patients included in chemoradiation therapy protocols for laryngeal preservation were referred to centres of greater complexity, so we do not have experience with salvage surgery in recurrences.

The details of the primary treatment, frequency of fistulae, spontaneous closure, reinterventions, and study of the resection margins are summarized in Table 1.

Post-operative fistulae occurred in 10 patients, a number representing 34.5% of the global series and in 3 of the 15 total laryngectomies when this was the only procedure (20%).

The spontaneous closure of fistulae, with local care and enteral feeding, occurred in 80% of cases (8 patients). This is compared through a literature review with statistics from other authors (Table 2).

The length of the mean hospital stay for fistulized patients was 23 days with a range of 5-58 days of hospitalization. The mean time for spontaneous closure of fistulae in patients subjected to a "wait and see" approach was 27 days; out-patient monitoring and domiciliary enteral feeding were carried out in 8 patients with low debit fistulae.

In 5 cases in which long-term enteral feeding was planned due to the development of the fistula, surgical gastrostomy was performed. We had to reintervene 2 patients due to fistulae which did not close spontaneously. A reconstruction with pectoralis major myocutaneous flap was performed in both cases. In one of these, with a high flow fistula and skin flap necrosis, temporary placement of an intraluminal device was required in a preliminary procedure prior to the final intervention.

In 2 cases of prolonged fistulization, the margins were found to be insufficient in the resection specimen. There was 1 death in the immediate post-operative period following 1 of the re-operations due to septic complications in a patient in poor general condition (mortality was 3.44%).

Discussion and conclusions

Our incidence of 34.5% post-operative fistulae in combined resections and 20% in total laryngectomies as the only procedure is similar to the rest of the series seen in the literature review, with the exception of 2 Cuban papers and 1 from Argentina which reported a fistula frequency in excess of 55%, high levels in comparison with the rest of the cases reported.[1,7,9]

There is agreement that the initial management of fistulae should be conservative, as they close spontaneously in most cases.[1-3,6,12] In our series, 80% of patients evolved favourably with local care and tube feeding, a figure which coincides with the published data. In 8 cases we performed, with good results, enteral feeding at home and ambulatory monitoring until restoration of oral intake, which reduced hospitalization time and was evaluated by patients as an improvement in their quality of life.

With the exception of some authors who propose early oral feeding, the trend is towards the use of a nasogastric or nasoenteral tube during the first 7 to 14 days after surgery.[1,5,13-19] We leave it in place for a week unless there is dehiscence, and before starting a soft diet, we carry out a radiological study of pharyngeal-oesophageal transit by means of a water-soluble contrast or a test with methylene blue administered orally.

When enteral nutrition has to continue for more than 3 weeks or after re-operation, we prefer to feed the patient through a gastrostomy to avoid the complications of prolonged nasogastric intubation.

There is no total consensus on the factors that predispose towards dehiscence of the pharyngorrhaphy. Local factors such as tumour size, extended resections, tumour persistence, preoperative tracheostomy, radical neck dissection and, above all, prior radiotherapy, are mentioned in the literature.[1-3,7,8,12,13] Systemic factors identified are diabetes, anaemia, malnutrition, and liver conditions.[2,8,11,13,14]

Techniques and synthetic materials used do not vary largely in the series reviewed, except in some works which report an experience with the use of mechanical linear suture for pharyngorrhaphy based on experience in surgery of Zenker's diverticulum and a communication on the local use of growth factors in fistulae.[4,14,15]

We make use of the pectoralis major myocutaneous flap in reinterventions or the primary procedure when the pharyngeal closure shows tension. A paper published in 2003 proposed the systematic use of this flap in the reconstruction of all total laryngectomies and presents a comparison of 2 similar series of patients with a dramatic decrease in the frequency of post-operative fistulae.[10]

Finally, an important aspect of this complication is the impact on the cost of its treatment in different health systems. Protocols have been presented in an attempt to limit the cost of treatment of these fistulae.[11,16] However, when analyzing the economic issue it is important not to overlook the quality of life given to patients with cancer of the head and neck, taking into account that, in terms of survival, there have been no significant progresses in recent times.[17,18,20]

Conflict of interests

The authors have indicated there is no conflict of interest.

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