

Is it Necessary to Perform Neck Dissections as a Staged Procedure in Laser Supraglottic Laryngectomy?

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Introduction and objectives: Endoscopic CO₂ laser supraglottic laryngectomy has similar oncological results to the classical open approach. Treatment of the neck is of paramount importance in these tumours and it is usually performed as a staged procedure. The aim of this work is to ascertain if it is safe to perform the neck dissections at the same time as the laser supraglottic laryngectomy.

Methods: Twenty-four patients with supraglottic epidermoid carcinoma, who underwent laser CO₂ supraglottic laryngectomy and bilateral neck dissection, were studied. In 12 patients the neck dissections were performed as a staged procedure (a mean of 15 days after the laryngectomy), and in the remaining 12 they were performed simultaneously. Both groups were comparable in terms of age and the staging of their tumours.

Results: No significant differences were found between the groups in terms of surgical complications ($P=.18$), tracheostomy rates (1 post-operative tracheostomy in each group; $P=.99$), aspiration pneumonia ($P=.48$), and the mean for nasogastric tube feeding ($P=.36$). The mean hospital stay was five days longer in the group with staged neck dissections.

Conclusions: It is a safe procedure to perform neck dissections at the same time as the supraglottic laryngectomy. We did not find any increase in the complications rate and the hospital stay was shorter.

Key words: Supraglottic laryngectomy. CO₂ laser. Neck dissections.

¿Es necesario diferir los vaciamentos cervicales en las laringectomías supraglóticas con láser?

Introducción y objetivos: La laringectomía supraglótica endoscópica con láser CO₂ es una técnica con resultados oncológicos similares que con la técnica convencional. El tratamiento del cuello es esencial en estos tumores, que en general se realiza de forma diferida respecto al tratamiento del tumor primario. El objetivo de este trabajo es analizar si es seguro realizar los vaciamentos cervicales de forma simultánea a la laringectomía supraglótica con láser.

Material y método: Se estudia a 24 pacientes con carcinoma epidermoide supraglótico a los que se realizó una laringectomía supraglótica con láser CO₂ y vaciamento cervical bilateral. En 12 pacientes los vaciamentos fueron de forma diferida a la laringectomía (media de 15 días), y en los otros 12, de forma simultánea. Ambos grupos eran similares en cuanto a la distribución por estadios y la edad de los pacientes.

Resultados: No se encontraron diferencias significativas en cuanto a las complicaciones quirúrgicas ($p = 0,18$), la necesidad de traqueotomías postoperatorias (1 en cada grupo; $p = 0,99$), las neumonías por aspiración ($p = 0,48$), y la media de duración de la alimentación por sonda nasogástrica ($p = 0,36$). La estancia media hospitalaria fue 5 días mayor en el grupo de los vaciamentos diferidos.

Conclusiones: La realización de vaciamentos cervicales en un solo tiempo quirúrgico con la laringectomía supraglótica con láser es un procedimiento seguro, que no aumenta las complicaciones postoperatorias, y permite disminuir la estancia hospitalaria.

Palabras clave: Laringectomía supraglótica. Láser CO₂. Vaciamentos cervicales.

The authors have indicated there is no conflict of interest.

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INTRODUCTION

In 1947, Alonso¹ gave the first description of a horizontal supraglottic laryngectomy. With the modifications introduced by other surgeons, this technique became popular as it had oncological outcomes similar to total laryngectomy, preserving the patient's voice with less morbidity.^{2,3} In 1972, Strong et al⁴ introduced the use of CO₂ laser for the

Clinical and Pathological Characteristics of the Patients Studied^a

<i>Characteristic</i>	<i>Staged Dissection</i>	<i>Simultaneous Dissection</i>
Mean age	60.1 years	61.7 years
T Classification		
T1	3 (25%)	3 (25%)
T2	5 (42%)	5 (42%)
T3	4 (33%)	4 (33%)
N Classification		
N0	6 (50%)	5 (42%)
N1	1 (8%)	1 (8%)
N2	4 (33%)	6 (50%)
N3	1 (8%)	
Stage		
I	2 (17%)	1 (8%)
II	3 (25%)	3 (25%)
III	2 (17%)	2 (17%)
IV	5 (42%)	6 (50%)
Type of dissection		
BFD	11 (92%)	9 (67%)
RD+FD	1 (8%)	3 (33%)

^aBFD indicates bilateral functional dissection; RD+FD, radical dissection plus functional dissection.

endoscopic treatment of laryngeal cancer and Vaughan,⁵ in 1978, performed the first laser resection of a supraglottic carcinoma. Over time, endoscopic supraglottic laryngectomy using CO₂ laser has become an alternative to the transcervical approach as, if free surgical borders can be obtained, the oncological outcomes seem to be comparable with the results obtained with conventional supraglottic laryngectomy.^{6,7} In addition, many papers have attributed functional advantages to transoral surgery when compared to the transcervical approach. The advantages described include the need to perform a smaller number of tracheotomies, the lower incidence of pneumonias due to bronchoaspiration, a shorter period of hospital stay, lower frequency of pharyngeal-cutaneous fistulae, and the faster recovery of swallowing through the mouth.⁸⁻¹³

As for the treatment of choice for the neck, most authors concur in the need to perform prophylactic lymph-node dissections even in stages I and II of the disease, as the likelihood of hidden lymph-node metastases is sufficiently high as for the benefits to outweigh the risks.^{2,14-16} Most authors conduct staged dissections (deferred from 1 to 4 weeks after the laryngectomy) with the aim of minimizing the risk of oedema in the airways and, therefore, the number of tracheotomies.^{9,17,18} Nonetheless, some patients in these series have undergone dissection at the same time as the laser resection and there are no studies assessing the safety of this versus staged dissections.

The goal of this study is to determine the safety of neck dissections performed in the same operation on patients with supraglottic carcinoma undergoing endoscopic resection with CO₂ laser.

MATERIAL AND METHOD

This retrospective study performed on 24 patients with supraglottic carcinomas operated on between 2000 and 2007 by means of transoral supraglottic laryngectomies using CO₂ laser.

Their ages ranged between 44 and 81 years of age, with a mean of 61. All patients were male. The staging of the disease was done using the sixth edition of the TNM system from the International Union Against Cancer: 6 patients (25%) presented tumours classified as T1; 10 (42%) as T2; and 8 (33%) as T3. Table shows the clinical and pathology characteristics of the patients included in our series.

The transoral approach was indicated in the supraglottic tumours at stages T1, T2, and T3 (of the latter, only those so classified due to a limited invasion of the pre-epiglottic space) in which the tumour could only be completely exposed during the diagnostic microsurgery performed prior to the laryngectomy. Those patients who did not meet these criteria underwent a conventional supraglottic laryngectomy or a total laryngectomy, if the vocal cords or laryngeal cartilages were affected. Transoral supraglottic laryngectomy by CO₂ laser was performed following the recommendations of Davis.¹⁹ In selected cases, the minimal intervention performed was an epiglottectomy. No tracheotomy was performed simultaneously with the supraglottic laryngectomy in any case. In 17 (71%) of the 24 patients, a nasogastric food tube was inserted during surgery. In the other 7 patients (all with tumours classified as T1 or T2), it was decided not to place this tube and swallowing by mouth was recovered 24 h after the procedure.

All patients underwent functional or radical bilateral cervical lymph node dissection, depending on the clinical and surgical findings: bilateral functional dissection was performed on 20 patients and the other 4 received radical dissection on one side and functional dissection on the other. When laser supraglottic laryngectomy was introduced to our centre, dissections took place about 15 days after the supraglottic laryngectomy. Since 2005, practically all patients have undergone dissection in the same surgical procedure. Thus, the whole group of patients with dissection at the same time as the laser supraglottic laryngectomy has been operated on in the last 3 years and, for the sake of comparison we have selected a similar group of patients (in terms of age and tumour staging) on whom dissection was staged (Table).

The variables studied in these 2 groups of patients were: surgical complications (abscesses, seromas, bleeding/bruises, lymphorrhages, cutaneous necroses, dehiscences of the surgical wound, subcutaneous emphysemas), incidence of tracheotomies, percentage of decannulations, incidence of pharyngeal-cutaneous fistulae, pneumonias due to bronchoaspiration, time with the nasogastric tube in place, and hospital stay after surgery.

For the comparison of the groups in terms of tumour staging, complications and tracheotomies, the χ^2 test was used. In order to compare the results in terms of age, duration of the nasogastric tube and post-operative stay, Student *t* test was used. A *P* value less than .05 was considered significant.

The statistical studies were performed with the aid of the SPSS 12.0 software programme.

RESULTS

As can be noted in Table, the 2 groups of patients are comparable in the characteristics of the primary tumour ($P=.99$) and very similar in terms of the lymph-node metastases ($P=.68$), tumour staging ($P=.93$), and mean age ($P=.7$), so the possible differences that we may find between the 2 groups cannot be attributed to these parameters. Nor were there significant differences in the kind of dissection performed ($P=.59$); in fact there was a larger number of radical dissections in the group of patients who were operated on simultaneously (Table).

No patient in either group presented any surgical complications (bleeding, infection, fistula...) in connection with the laser supraglottic laryngectomy. As for the neck dissections, only 1 patient in the group which underwent dissection at the same time as the laryngectomy suffered a surgical complication (cervical seroma), whereas in the other group with staged dissection, 1 presented a bruise and the other a seroma, without significant differences ($P=.18$).

It was necessary to perform a tracheotomy in the post-operative phase, due to oedema of the airways leading to dyspnoea, in 1 patient from each group ($P=.99$). In the case of the patient in the staged dissection group, the tracheotomy had to be performed after the supraglottic laryngectomy, without the dissections having taken place. Both patients could be decannulated afterwards.

Two patients in the staged dissection group presented pneumonia in the post-operative phase following laser laryngectomy, whereas this complication did not occur in any patient in the group of those undergoing dissection simultaneously ($P=.48$).

Four patients in the simultaneous dissection group and 3 in the staged dissection group did not require the placement of a nasogastric tube and began swallowing by mouth 24 h after surgery. In the other patients, the probe placed during surgery could be removed in all cases and every one could be fed by mouth; the patients in the simultaneous dissection group used the tube for an average of 11.6 days (median, 8 days), whereas the patients in the staged dissection group wore it for an average of 28.6 days (median, 10 days) ($P=.36$).

The mean duration of the patients' stay following simultaneous dissections was 15 days, versus 20 days for the patients with staged dissection (adding together the stays for the laryngectomy and the dissections) ($P=.2$).

DISCUSSION

In supraglottic tumours in which it is possible to obtain adequate exposure by means of direct laryngoscopy, with disease-free edges, the oncological outcomes of transoral supraglottic laryngectomy with CO₂ laser are comparable with those obtained by means of conventional transcervical supraglottic laryngectomy and, by extension, comparable

to those of a total laryngectomy.⁷ Previous studies have attributed functional advantages to the transoral approach with respect to the transcervical one. The advantages described include the need to perform a smaller number of tracheotomies, the lower incidence of pneumonias due to bronchoaspiration, a shorter period of hospital stay, lower frequency of pharyngeal-cutaneous fistulae and the faster recovery of swallowing through the mouth.¹⁰⁻¹³

Nonetheless, the approach to the primary tumour only represents a part of the problem in these tumours, as the treatment of the neck is crucial in view of the high rate of lymph-node metastases they present (between 25% and 50% of clinically negative cases).^{14,15} Due to this high prevalence of metastasis, most authors recommend performing cervical dissection even in cases at clinical stages I and II on diagnosis.¹⁶ In addition, lymph-node metastases are the most important prognostic factor in supraglottic cancer.²⁰⁻²² It is currently widely accepted that neck treatment is justified if the risk of lymph-node metastases exceeds 15%.²³ The performance of bilateral dissection allows elimination of sub-clinical disease at the same time as it provides prognostic information and allows the most sensible use of complementary radiation therapy. In clinically negative cases, it is possible to apply a functional dissection (and some authors even advocate selective dissection of areas II-IV), with scant morbidity.^{24,25} In addition, the performance of bilateral dissections has been shown to reduce the incidence of cervical relapses.¹⁶ Nonetheless, in the case of lateral tumours (those not crossing the midline) without clinical metastases, the performance of only a one-sided functional dissection might be warranted.²⁶

Despite the evidence, many of the series of laser supraglottic laryngectomies published do not perform cervical dissections on all patients. More often than not it is performed separately after the laryngectomy, although it was performed simultaneously on some patients, without any pre-defined criterion.^{8,9,17,18} Thus, we have not found in the literature any study assessing the safety of performing dissections at the same time as the supraglottic laryngectomy, or justifying the need to perform that at a later date.

At our hospital, as a general rule, all patients with supraglottic carcinoma undergo bilateral dissection. When we started the endoscopic approach to these tumours using CO₂ laser, the dissections were performed at a later date (about 15 days after the supraglottic laryngectomy) in order to avoid tracheotomies due to post-operative oedema. For the last 3 years, however, after confirming that the oedema produced in the airways after performing the dissections was not, in general, particularly large, we decided to start performing the dissections simultaneously with the supraglottic laryngectomy in order to avoid the need for a second operation.

Since we had 2 similar groups of patients in terms of their age and the characteristics of their tumours, we decided to verify whether our decision to perform dissections at the same time as the laryngectomies was correct.

Although the number of patients in each group is relatively small, our results confirm that these dissections can be performed safely at the same time as the supraglottic

laryngectomy with laser. The surgical complications were similar in each group and it was only necessary to perform one tracheotomy in each of them, so the main justification for deferring the performance of the dissection did not arise in our study.

What is more, since only one surgical operation is required, the mean stay is shorter when the dissections are performed simultaneously. On the other hand, the scheduling of a supraglottic laryngectomy with laser and a bilateral dissection for the same time allows the time of the operating theatre to be used better than when the 2 procedures are kept separate, with the final outcome of better control of the total surgery time.

The recovery of swallowing was also favourable in the group with simultaneous dissections, with a shorter duration of the need for nasogastric tube feeding.

But this might well be due to the fact that one of the patients in the staged dissection group took a considerably longer time (150 days) than the other patients to regain the ability to swallow, which distorts the mean (as can be seen, the median values are more similar for both groups).

In conclusion, our results indicate that performing the cervical dissections simultaneously with the laser supraglottic laryngectomy is a safe and advantageous procedure with respect to the staging of the dissections in terms of avoiding a second operation and shortening the stay in hospital.

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