

# "Conditional" neck dissection in management of laryngeal carcinoma

## Lo svuotamento laterocervicale "condizionato" nel trattamento del carcinoma laringeo

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### Key words

Laryngeal cancer • Elective neck dissection • Occult lymph-node metastasis • N0 cases

### Parole chiave

Carcinoma laringeo • Svuotamento linfonodale laterocervicale elettivo • Metastasi linfonodali occulte • Casi N0

### Summary

It is well known that malignant laryngeal tumours can extend from their site of origin into tributary lymph nodes, depending on their location and size. Management protocols almost always include concomitant surgical treatment of both the tumour and cervical nodes. When palpable lymph nodes are present, dissection is mandatory but there is no general agreement on the option of choice in clinically N0 patients. Elective neck dissection, following the current indications, is necessary in most cases of N0 laryngeal cancer, but the number of bilateral dissections may be limited. In tumours of only one hemilarynx or extending slightly beyond it, metastatic involvement is more likely to be on the same side as the lesion although there is no absolute certainty that it will be. In these cases, and especially in supraglottic tumours, occult metastatic spread may also penetrate into the contralateral lymph nodes of the neck. The present report deals with the results of a surgical strategy to limit bilateral elective dissection, based on the following criteria. In supraglottic tumours of only one hemilarynx or extending slightly beyond it, the presence of ipsilateral node metastases is highly predictive of a concomitant involvement of the contralateral nodes. In these supraglottic tumours, only in cases with post-operative serial positive histology of the uni-ipsilateral dissected cervical lymph nodes, has contralateral elective neck dissection ("conditional dissection") been performed. "Conditional dissections" led to a reduction of approximately 70% of elective bilateral neck dissections.

### Riassunto

È noto che i tumori laringei possono estendersi dal loro sito di origine nei linfonodi tributari a seconda della loro sede ed estensione. I protocolli di trattamento quasi sempre includono un approccio chirurgico concomitante sia del tumore che dei linfonodi cervicali. Quando sono presenti linfonodi palpabili la dissezione del collo è obbligatoria, ma non c'è alcun accordo generale sull'opzione di scelta nei pazienti clinicamente N0. La dissezione del collo elettiva, seguendo le indicazioni correnti, è necessaria nella maggior parte dei casi di cancro laringeo N0, ma il numero di dissezioni bilaterali può essere limitato. Nei casi di tumore interessante una sola emilaringe o estendendosi leggermente oltre essa, la metastasi è più probabile che avvenga dallo stesso lato della lesione, benché non ci sia alcuna certezza indiscutibile che sarà esclusivamente così. In questi casi, infatti, può verificarsi una diffusione metastatica occulta nei linfonodi controlaterali, anche se con minor frequenza. In questo lavoro presentiamo i risultati di una strategia chirurgica finalizzata a limitare gli svuotamenti elettivi bilaterali, basata sui seguenti criteri. Nei tumori sopraglottici estesi ad una sola emilaringe o di poco oltre la linea mediana, la presenza di metastasi linfonodali laterocervicali è estremamente predittiva di un coinvolgimento concomitante dei linfonodi controlaterali. In questi tumori sopraglottici, solo in caso di esame istologico positivo post-operatorio dei linfonodi cervicali uni-ipsilaterali asportati, abbiamo eseguito in maniera differita uno svuotamento laterocervicale controlaterale elettivo ("svuotamento condizionato"). La strategia dello svuotamento condizionato ha comportato una riduzione, di circa il 70% di svuotamenti bilaterali laterocervicali di principio.

### Introduction

It is well known that malignant laryngeal tumours can extend from their site of origin into tributary lymph nodes depending on their location and size. Management protocols almost always include concomitant surgical treatment of both the tumour and nodes since neck metastases are an important cause

of failure after resection of the tumour alone. With the introduction of radical neck dissection<sup>1</sup> at the beginning of the 20<sup>th</sup> century, the cancer-related mortality of these cases decreased while the post-operative morbidity increased due to the extension of surgical resection required. In laryngeal cancers with similar surgical indications, functional neck dissection, as described by Suárez and Bocca<sup>2,3</sup>, considerably re-

duced the post-operative morbidity while ensuring radical tumour resection<sup>4,5</sup>. When palpable lymph nodes are present dissection is mandatory but there is no general agreement on the option of choice in clinically N0 patients.

The numerous clinical and statistical studies on the correlations between tumour site and lymph node station involvement<sup>6-12</sup> and the better knowledge of the immune function of lymph nodes have resulted in a re-examination of the treatment modalities for the N0 neck leading to different approaches<sup>7,13</sup>. Selective dissections stem from the division of the lymph node group into levels based on the surgical anatomy of the neck and entail removal of only some levels of the greater incidence of node metastases depending on the tumour site<sup>14-17</sup>. This technique ensures a radical approach to the tumour similar to the classical methods while further reducing the surgical damage<sup>18</sup>.

Although selective neck dissections provide an acceptable compromise between the need to radically remove the tumour and limiting functional damage<sup>19</sup>, they are elective procedures which are just as effective as the Suarez-Bocca technique in cases with occult metastases. However, they are excessive and unnecessary in many patients (70-90%) who do not develop node metastases of the neck if left untreated<sup>20,21</sup>.

Laryngeal lymphatic drainage occurs via the side chains of the neck bilaterally, thus in patients with central tumours or cancers involving both sides of the larynx, bilateral neck dissection is necessary<sup>22</sup>. In tumours of only one hemi-larynx or extending slightly beyond it, metastatic involvement is more likely to be on the same side as the lesion although there is no absolute certainty that this will occur. In these cases, and especially in supraglottic tumours, occult metastatic spread may be found within the contralateral lymph nodes of the neck<sup>23</sup>, although this occurs much less frequently than on the same side as the tumour<sup>24</sup>. The likelihood of contralateral node involvement suggests that an elective bilateral dissection should always be performed, although this considerably increases the number of unnecessary elective dissections<sup>25,26</sup>.

It is, therefore, useful to quantify the risk of bilateral metastatic involvement in N0 tumours, partially or completely confined to one hemi-larynx, in order to identify the conditions in which bilateral dissections are warranted.

A previous study<sup>24</sup> retrospectively examined 117 patients with tumours, exclusively or predominantly, located in the vestibule or glottis of a hemi-larynx who had undergone total or supraglottic laryngectomy and only ipsilateral neck dissection. The aim was to quantify the incidence of contralateral metastatic node involvement based on the occurrence of adenopathies during follow-up. The investigation also

aimed to define the predictive factors to evaluate the risk for patients who received only ipsilateral neck dissection.

Appearance of a contralateral adenopathy, during the follow-up period, was evaluated considering the criteria generally used to grade the metastatic potential of a tumour, namely according to cancer site and extension, and the finding of metastatic node involvement on the same side as the lesion. In the cases of supraglottic cancer, presence of ipsilateral adenopathy amounted to 25.9%, while contralateral node involvements, appearing at a later stage after tumour surgery, were found in 12% of all the cases and, specifically, in 15.3% of patients with supraglottic cancer and only in one case of glottic cancer. In terms of tumour extension, contralateral metastatic node involvement was seen in slightly more than 10% of the T2 and T3 cases and in 25% of the T4 tumours. Based on the ipsilateral clinical N (clinical node involvement on the same side as the lesion) contralateral metastases were found in 8.7% of the N0 cases and in 16.3% of the N1 cases.

Appearance of contralateral metastatic adenopathies was also evaluated considering lymph node histology after ipsilateral neck dissection. Only one patient with a glottic tumour presented contralateral metastases and had no ipsilateral involvement. In the supraglottic cancers, contralateral metastases were found in 31.8% of the cases that were histologically N+ after dissection and in 9.5% of the patients presenting no metastatic node involvement. In the N0 cases with supraglottic cancer, contralateral metastases appeared in 33% of the patients with positive lymph nodes after their first dissection and in 7.7% of the patients with negative lymph nodes after their first dissection.

From the results of this study it may be concluded that:

- the presence of ipsilateral node metastases is highly predictive of a concomitant involvement of the contralateral nodes only in supraglottic tumours. In these tumours, the incidence of contralateral metastases exceeds 30% in clinically N0 patients with positive ipsilateral lymph nodes;
- in the lateral glottic tumours, unilateral neck dissection is a plausible option whereas vestibular tumours with ipsilateral node metastases, the option is bilateral neck dissections.

## Materials and Methods

On the basis of the results reported and the relative considerations made, elective neck dissection is necessary in N0 laryngeal cancers with lateral lesions or lesions that are larger on one side, following the current indications, but the number of bilateral dissections may be limited.

**Table I.** Ipsilateral dissections.

	pN0 (N-) Cases	pN1 (N+) Cases	Total	%
T2	42 (84%)	8 (16%)	50	47
T3	34 (64%)	19 (36%)	53	50
T4	1 (33%)	2 (67%)	3	3
Total	77 (73%)	29 (27%)	106	100

The present report refers to a surgical strategy based on the following criteria:

- selection of supraglottic laryngeal carcinomas, mainly lateral tumours in a hemilarynx, that were surgically indicated for supraglottic or total laryngectomy and presenting with clinically N0 necks;
- concomitant surgical treatment of the tumour and lymph nodes with functional, uni- and ipsilateral elective neck dissection;
- post-operative serial histology of the dissected lymph nodes and contralateral elective neck dissection in cases with positive histology (“conditional neck dissection”);
- adjuvant radiotherapy if N+;
- five-year follow-up.

This protocol was used to manage a series of 106 patients with lateral, clinically N0 supraglottic laryngeal carcinoma, who had undergone total or supraglottic laryngectomy and functional unilateral neck dissection on the same side as the tumour.

At the post-operative histological examination of the dissected nodes, 77 patients had negative lymph nodes (77/106, 73%) and 29 had positive lymph nodes (29/106, 27%) (Table I).

**Table II.** Conditional dissection in 20 cases.

	Cases	pN1 (N+) upon second dissection	%
T2	5	3	60
T3	14	6	43
T4	1	0	0
Total	20	9	45

**Table III.** Neck node metastases.

	Cases
Cases with ipsilateral metastasis	29/106
Histological contralateral metastasis	9/20
Delayed-onset clinical metastasis	4/77
Total contralateral metastases	13/106

In accordance with the protocol, the 77 node-negative patients did not receive a contralateral neck dissection. During follow-up, contralateral metastatic adenopathies appeared in 4 of these cases (5%), 3 of which were T2 and one T3.

Elective contralateral neck dissection was planned and performed in only 20 out of the 29 positive patients. Post-operative histological examination of the dissected nodes showed that 9 (45%) had lymph node involvement (Tables II, III).

Of the remaining 9 patients who did not undergo elective contralateral neck dissection, 4 refused further surgical treatment, 1 patient could not be operated upon on account of cancer-related causes and 4 due to non-cancer-related causes.

## Discussion and Conclusions

Treatment of clinically N0 necks in non T1 laryngeal cancers is still an unresolved issue since elective neck dissection is effective in cases with occult metastases (pN+) but unnecessary in (pN-) individuals. From another standpoint, a “wait and see” attitude not only lessens the curability of delayed-onset adenopathies but entails anxiety for patients and challenges for the physicians during follow-up due to the extra clinical, laboratory and imaging procedures and the time needed for them.

In order to reduce the number of unnecessary, especially bilateral, dissections, a middle course may be to identify patients with the lowest risk for bilateral occult node metastases in whom avoiding neck dissection, at least on one side, is warranted. The first clinical hallmark to seek in these patients is a clearly lateral tumour and the second – based on our investigations – is ipsilateral node involvement. The likelihood of contralateral node involvement, in these conditions, exceeds 30% and warrants postponing neck dissection on the other side of the neck until histological examination of the ipsilateral lymph nodes has been performed.

This was the policy followed in our series.

Of the 212 bilateral elective dissections that could have been planned in 106 patients, we avoided 77 un-

necessary dissections (36%); delayed-onset adenopathies occurred only in 4 N-cancers after ipsilateral dissection (5% of the 77 cases).

In conclusion, these data provide further evidence that elective neck dissection is an essential part of surgical management protocols for laryngeal carcinoma.

They further support limiting the use of bilateral dissections since "conditional" dissections led to a reduction of approximately 70% of the bilateral dissections and of the contralateral cervical delayed metastatic adenopathies (9/13 cases), known to have a less favourable prognosis.

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