ORIGINAL ARTICLE

Transoral Oropharyngeal Resection Classification: Proposal of the SCORL Working Group

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Oropharyngeal cancer; Base of tongue; Tonsil; Palate; Oropharynx; Transoral laser microsurgery; Transoral robotic surgery; Endoscopy-assisted transoral approach; Minimally invasive surgery

Abstract
Introduction and goals: There has been a very significant increase in the use of minimally invasive surgery has in the last decade. In order to provide a common language after transoral surgery of the oropharynx, a system for classifying resections has been created in this area, regardless of the instrumentation used.
Methods: From the Oncology Working Group of the Catalan Society of Otorhinolaryngology, a proposal for classification based on a topographical division of the different areas of the oropharynx is presented, as also based on the invasion of the related structures according to the anatomical routes of extension of these tumours.
Results: The classification starts using the letter D or I, according to laterality either right (D) or left (I). The number of the resected area is then placed. This numbering defines the zones beginning at the cranial level where area I would be the soft palate, lateral area II in the tonsillar area, area III in the tongue base, area IV in the glossoepiglottic folds, epiglottis and pharyngoepiglottic folds, area V posterior oropharyngeal wall and VI the retromolar trigone. The suffix p is added if the resection deeply affects the submucosal plane of the compromised area. The different proposed areas would, in theory, have different functional implications.
Conclusion: Proposal for a system of classification by area to define different types of transoral surgery of the oropharynx, and enable as sharing of results and helps in teaching this type of technique.
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Introduction

The treatment of head and neck carcinomas has changed greatly over the last three decades. The introduction of organ preservation protocols, initially in the larynx, in the 1990s led to a change in the paradigm of treatment of these tumours. This event helped towards to introduction of radiotherapy treatment in locations such as the oropharynx, where treatment had previously consisted of resective surgery using transcervical and transmandibular approaches which resulted in major functional impairment.

Radiotherapy was introduced as standard treatment to prevent morbidity, despite no clinical trials existing to compare treatment options. With the advance of these treatments, at the beginning of 2000, radiotherapy associated with chemotherapy was introduced as the first treatment for advanced oropharyngeal tumours, based on different meta-analysis which showed an increased in survival with this therapy.

These treatments present major acute and chronic toxicity which leads to major impairment in the quality of life of these patients.

During the last few years increase in the incidence of oropharynx carcinoma caused by the human papilloma virus has led to a change in both the prognosis of this pathology and the patient profile of those suffering from it, which is increasingly younger. This fact, together with the technological advance and introduction of new surgical techniques under transoral approaches, has led to a change of paradigm in the treatment of these tumours. These new surgical techniques facilitate good functioning with oncological outcomes which are similar to previous treatments.

At present, the treatment of choice of early stage cases (I and II) is based on surgical resection of the tumour through transoral approach or radical radiotherapy treatment, with multimodal treatments being reserved for advanced tumour stages.

There are different options for undertaking transoral surgery, either through approaches helped by endoscopy or with microscopy. These have greatly expanded over the last few years, and have become a key element in the treatment of oropharyngeal carcinoma.

We therefore believe it is important to try to establish a classification of the different possible methods of resection via transoral means, aimed at showing these techniques and also being able to interpret and compare results from the different institutions.

Aim of Classification

The aim of this proposal is to provide a common language for transoral resections of oropharyngeal carcinomas. Topographic organisation is proposed to differentiate between resection areas according to the possible anatomical extension of these tumours.
Classification Proposal

Classification begins by naming the right (D) or left side (L) side. If the tumour has spread to both sides of the oropharynx the letters DI or LI will be attached with the first letter corresponding to the side which is most greatly affected.

Immediately after this, the number corresponding to the area affected by the mucosa resection is assigned and finally the suffix P (profound) is added if the resection affects the submucosal plane of the compromised area.

Area I: soft palate with no muscles.
Ip: resection area I with involvement of muscular plane: upper part of the palatoglossus muscle and the palatopharyngeal muscle, soft palate elevation and tensor muscle, uvula muscles, pterygoid muscles.

Area II: tonsils and anterior and posterior pillars.
Iip: resection which involves the muscles of area II: palatoglossus, palatopharynx, constrictor muscle, buccopharyngeal fascia and parapharyngeal space.

Area III: base of the tongue with no involvement of the intrinsic muscles.
IIIp: resection which affects the intrinsic muscles and/or extrinsic muscles at the base of the tongue.

Area IV: glossoepiglottic folds, epiglottis, pharyngoepiglottic folds.
IVp: resection which involves the pre-epiglottic space.

Area V: posterior oropharyngeal wall.
VIP: resection which involves the constrictor muscle and/or pre-vertebral space.

Area VI: retromolar trigone, free margin of the tongue, base of the mouth.
VIP: involvement of the pterygoid muscles.

The following figures summarise this classification: (Figs. 1 and 2).

Discussion

Since the FDA’s approval of robotic surgery in oncology of the head and neck in 2009, this type of approach has greatly expanded, also leading to the growth of other techniques for transoral surgery in this area.

This has triggered the need for an understanding of the anatomy of upper airway aerodigestive tract from inside out, which the head and neck surgeon originally understood to be the inverse.\cite{19,20}

The main aim of all these techniques consists in reducing morbidity,\cite{21} whilst maintaining oncological outcomes. There are many series in the literature which show comparable oncological outcomes of this type of surgical techniques to non surgical ones of this type of lesions, which would mainly be radiotherapy and/or chemo-radiotherapy.\cite{22,22-28}

To obtain satisfactory results, the most important step consists in selecting patients who may undergo this type of resection\cite{29} with obtainment of safe tumour free margins. These techniques allow for the removal of different anatomical parts of the oropharynx and of its structures close to the mouth, based on the use of endoscopies, surgical microscopes and cutting and coagulation tools. This involves a wide range of possible techniques, depending on tumour spread routes.

For this reason we believe that it is important that a common language is acquired to mark resections which involve the tumours of this area, and also to carry out comparative studies regarding this type of surgery and their findings as a tool for treatment.

Furthermore, due to the innovation which these surgical approaches provide, there is now major interest in learning about these techniques. The availability of a classification categorising the type of resections to be made also would help to organise the learning of them.

Two classifications of surgical oropharyngeal defects have been described, both of which aim to predict the need for reconstruction after resection surgery. The most standard is...
that of Urken\textsuperscript{30} based on open surgical techniques, and the most contemporary is that based on transoral techniques.\textsuperscript{31}

We believe that these descriptions do not link up with the previous language, to convey the multiple techniques carried out in this area into a common, easy to understand language which may be used in all cases.

In addition to a common language this classification could also provide a postoperative functional prognosis.

Resection of area I would be likely to produce velopharyngeal insufficiency.

In type Itp resections some type of reconstruction may be necessary to prevent pharyngeal-skin communications, especially in cases with associated cervical emptying in the same surgical intervention.

Area III, IV, and V resections will be those most likely to cause dysphagia and inhalation into the lungs, mainly in IIIp, IVp, and VP resections.

The removal of area VI could lead to postsurgical trismus, principally in those cases where tumour has spread to the pterygoid musculature (VIp).

No reference is made to resection size, because the local stage of the TNM\textsuperscript{32,33} system in oropharynx tumours already refers to this.

Table 1 shows the equivalence of the classification in keeping with the TNM stage, with the standard name and possible theoretical sequelae of the resection of the different areas proposed.

<table>
<thead>
<tr>
<th>Tumours</th>
<th>Proposal</th>
<th>Standard name</th>
<th>Most important sequelae</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 tonsil</td>
<td>II</td>
<td>Extended tonsillotomy</td>
<td>Few</td>
</tr>
<tr>
<td>T2 tonsil palate</td>
<td>I-II-VI p</td>
<td>Lateral oropharyngectomy</td>
<td>Trismus, pharyngocutaneous fistula</td>
</tr>
<tr>
<td>T1-2 uvula-soft palate</td>
<td>I</td>
<td>Partial palatovagotomy</td>
<td>Velopalatal deficiency</td>
</tr>
<tr>
<td>T1 base of tongue</td>
<td>III</td>
<td>Tongue base resection</td>
<td>Few</td>
</tr>
<tr>
<td>T1-2 vallecula</td>
<td>III-IV</td>
<td>Suprathyoid supraglottic extended to tongue base</td>
<td>Dysphagia and microaspirations</td>
</tr>
<tr>
<td>T3 vallecula</td>
<td>IV p</td>
<td>Supraglottic extended to tongue base</td>
<td>Dysphagia and aspirations</td>
</tr>
<tr>
<td>T2-3 lateral wall extended on the inside.</td>
<td>II-III-IV p</td>
<td>Lateral oropharyngectomy extended to hypopharyngectomy</td>
<td>Dysphagia, microaspirations. Pharyngocutaneous fistula</td>
</tr>
</tbody>
</table>

**Conflict of Interests**

The authors have no conflict of interests to declare.

**References**

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