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ORIGINAL ARTICLE

# Salvage surgery after radiotherapy for oropharyngeal cancer. Treatment complications and oncological results

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## KEYWORDS

Squamous cell carcinoma;  
Oropharynx;  
Radiotherapy;  
Salvage surgery

## Summary

**Aims:** Surgery is the only available curative treatment option following failure of radiation therapy for oropharyngeal cancer. This study was designed to analyse the postoperative morbidity and survival rate in patients undergoing salvage surgery.

**Material and methods:** Single-centre retrospective study in a tertiary referral centre.

**Results:** One hundred and five patients were included, with tumour recurrence in 72 cases, and disease progression in 33 cases, despite radiotherapy. Seventy-seven tumours were located in the tonsillar fossa or glossotonsillar sulcus. Ninety-four tumours were classified as rT2-T3 and 83 were classified as rN0. Segmental mandibulectomy was performed in 77 cases. Cervical lymph node dissection was performed in 96 cases. Pharyngeal reconstruction was performed with a myocutaneous flap in 90 cases. Forty-one local complications were observed, including 12 orocutaneous fistulae and/or neck abscesses, associated with carotid artery rupture in three cases. Twenty patients experienced general complications. The mean decannulation and feeding times were 20 and 30 days, respectively. The 5-year disease-free survival was 21%. On univariate analysis, survival was poorer in patients with disease progression ( $P=0.01$ ); survival was also correlated with tumour site ( $P=0.02$ ), rT status ( $P=0.03$ ), rN ( $P=0.048$ ), and quality of resection ( $P=0.04$ ). On multivariate analysis, tumour size ( $P=0.03$ ) and the interval between the end of radiotherapy and surgery ( $P=0.02$ ) were the two main prognostic factors for survival.

**Conclusion:** The results of this study confirm the high local complication rate of salvage surgery for oropharyngeal cancer and the poor overall survival.

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## Introduction

Radiotherapy and surgery are the two reference treatments for oropharyngeal cancer. Surgery is the only curative treatment option available after failure or recurrence after radiotherapy [1]. Surgery of the lateral oropharynx has evolved considerably since the transmandibular pharyngectomy described and developed in the 1950s by Dargent [2]. This technique is still used in the salvage setting but has undergone a number of technical improvements:

- preservation of the mandible, resulting in better functional and cosmetic results [3];
- use of myocutaneous pedicle flaps [4].

Despite these improvements, surgery after radiotherapy is associated with two main difficulties:

- delayed healing responsible for local complications;
- local disease control which determines patient survival.

This study was designed to analyse the postoperative morbidity and survival of patients operated for oropharyngeal cancer after radiotherapy.

## Material and methods

This single-centre retrospective study (1980–2005) was conducted in a tertiary referral centre. Inclusion criteria were:

- presence of biopsy-confirmed recurrence of oropharyngeal cancer (invasive squamous cell carcinoma), with no synchronous tumours or metastases;
- treatment by mandibulectomy with systematic frozen section histological examination.

The rTN classification and staging were performed according to the UICC 2002 classification [5]. All patients had been initially treated for oropharyngeal cancer by curative doses of radiotherapy; patients previously treated by radiotherapy for a primary cancer with a metachronous tumour situated in the oropharynx were excluded. Ordinal variables were compared by Fisher's exact test. Survival estimates were calculated by the Kaplan-Meier method and survivals were compared by a Log-rank test; multivariate analysis was performed according to the Cox model (Statview 5.1).

## Results

One hundred and five patients (93 men and 12 women, with a mean age of 59 years) were included in this study. Fifty-five had been operated before 1995. Seventy-three patients had been initially treated in another centre and the initial cTNM classification was available for only 30 (41%) of them. Sixty (57%) patients had not stopped smoking and/or drinking. Eighteen patients had grade 2 arterial disease of the lower limbs, 15 had type II diabetes, and 12 were treated for chronic obstructive pulmonary disease (COPD).

The mean radiation dose delivered to the tumour was 70 Grays with 58 Grays delivered to the first draining lymph

**Table 1** rTN classification.

rN	rT				Total
	0	1	2	3	
1	8	1	1	—	10 (9.5%)
2	35	4	—	1	40 (38%)
3	39	10	5	—	54 (51.5%)
4	1	—	—	—	1 (1%)
Total	83 (79%)	15 (14.5%)	6 (5.5%)	1 (1%)	105

nodes. Thirty-three (32%) patients presented disease progression and 72 (68%) presented recurrence with a mean interval between radiotherapy and recurrence of 22 months.

Tumour sites were:

- tonsillar fossa, 48 cases;
- glossotonsillar sulcus, 29 cases;
- base of tongue, 20 cases;
- retromolar trigone and/or intermaxillary commissure, 8 cases.

The tumour was ulcerated and/or invasive in 84 cases. The rTN classification is shown in Table 1. Ninety-four tumours were classified as rT2-T3. No lymphadenectomy were detected clinically and/or radiologically in 83 cases. There were eight stage I, 35 stage II, 54 stage III and eight stage IV tumours.

Segmental mandibulectomy was performed in 77 (74%) patients and marginal mandibulectomy was performed in 28 patients. Unilateral lymph node dissection was performed in 96 (95%) patients with radical neck dissection in 73 cases and modified radical neck dissection in 23 cases. No lymph node dissection was performed in nine patients who had all undergone dissection as part of the initial treatment, prior to radiotherapy. In 80 cases (86%), pharyngeal reconstruction was performed with a pectoralis major or latissimus dorsi myocutaneous flap (MCF). A temporofrontal flap was used in 10 patients operated before 1983. The pharynx was closed by direct suture in five cases (5%) due to minimal loss of substance associated with a small tumour recurrence (rT1). Eight (7.5%) patients received adjuvant therapy according to the protocol proposed by Wong et al. [6] with a combination of 5-fluorouracil and hydroxyurea alternating with radiotherapy sessions for four to six cycles.

## Postoperative course

The mean hospital stay (excluding postoperative deaths) was 40 days. The mean decannulation time was 20 days. Seven patients could not be weaned of their tracheotomy and were excluded from calculation of the mean decannulation time. The mean time to resumption of satisfactory oral feeding (1,500 kcal/24 hours – removal of the nasogastric tube) was 30 days. Three patients required a transient feeding gastrostomy (for an average of 3 months); four patients required permanent gastrostomy due to major swallowing disorders. These seven patients were excluded from calculation of the

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