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Retrospective study of selective neck dissection versus radical neck dissection as salvage therapy for patients with recurrent nasopharyngeal squamous cell carcinoma

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ABSTRACT

Purpose: While salvage surgery has been shown to improve the survival of patients with recurrent nasopharyngeal carcinoma, it is not known whether selective neck dissection has a beneficial or harmful effect on the survival of patients compared with modified neck dissection. The present study was aimed to compare the outcomes among patients receiving either selective neck dissection or modified neck dissection as salvage therapy for recurrent nasopharyngeal carcinoma.

Patients and methods: In the present retrospective study, a total of 67 patients with recurrent nasopharyngeal squamous cell carcinoma were included. 23 patients received selective neck dissection and 44 patients received modified neck dissection. The clinical parameters and Kaplan–Meier 1-, 3-, 5-year overall survivals were compared for the two groups.

Results: The clinical parameters were comparable between the two groups. The 1-, 3-, 5-year survivals were 91.3%, 62.0% and 55.1% respectively for selective neck dissection and 93.1%, 82.5% and 77.9% respectively for modified neck dissection. Patients receiving modified neck dissection had a significant better overall survival than patients receiving selective neck dissection ($\chi^2 = 4.079$, $P = 0.043$).

Conclusion: Although selective neck dissection was associated with fewer complications, it was associated with poor over all survival compared with modified neck dissection. Further prospective, large-scale and long-term study is needed to confirm this conclusion.

1. Introduction

Nasopharyngeal carcinoma (NPC), a rare tumor arising from the epithelium of the nasopharynx, has its highest incidence in the southeastern part of China, Taiwan, and Hong Kong (Tai and Mould, 2001). According to the lately released data, the incidence of NPC is as high as 3.61 (per 100,000) in 2012 in China. NPCs are generally undifferentiated or nonkeratinizing carcinomas and therefore they are sensitive to radiotherapy (Mould and Tai, 2001). The first-choice therapy for NPCs is radiotherapy. For locally relapsed NPC, reirradiation is still effective. However, serious complications decrease patients' quality of life (Leung et al., 2000; Chua et al., 2003). Surgical resection offers an alternative treatment option (Bian et al., 2012; Guo and Guo, 2014). In 1987, Crile reported the results of neck dissection performed on 132 patients with squamous cell carcinoma (SCC) in the head and neck area (Crile, 1987). He emphasized that a block dissection of the regional lymphatics and the primary malignancy was necessary. Block dissection has been standard treatment for almost 70 years. Although satisfactory results are achieved, patients' quality of life is severely affected by shoulder dysfunction. In the sixties of the 20th century, the surgical concepts of modified neck dissections (MND) were proposed. MND preserves muscles, veins, and nerves (Robbins et al., 1991). Recently, several more conservative procedures, defined as "selective neck dissection (SND)", have been introduced in clinical practice. The SND involves excision of select lymph node groups/levels, leaving others routinely removed in MND. SND has been divided

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into supraomohyoid neck dissection (levels I, II, and III), anterolateral or jugular neck dissection (levels II, III and IV), posterolateral neck dissection (levels II, III, IV, V and suboccipital nodes), and central compartment dissection (level VI) (Patel and Shah, 2005). Their rationale is based on findings that tumors arising in different areas of the head and neck region tend to give rise to nodal metastases in different levels of the neck. For example, nodal metastases from laryngeal cancers are often found at levels II–IV, those from malignancies in the floor of the mouth, at levels I–III. Only these nodes, defined "at risk", on a statistical basis, are removed in SND. Patients' quality of life is higher following SND (Chepeha et al., 2002).

However, to our knowledge, no clinical study aiming to compare the efficacy between SND and MND in patients with recurrent NPC as salvage therapy has been published. At our hospital, selection of either SND or MND is mostly a preference of the surgeons. The present study was aimed to compare the efficacy of the two surgical treatments in terms of overall survival.

2. Material and methods

2.1. Patients

We reviewed the medical records of all patients with recurrent NPC who underwent salvage surgery at the Fuzhou General Hospital, China between 1989 and 2009 and performed a retrospective study. Patients were followed up at least 5 years after surgery. Patients with distant metastasis at the initial visit were excluded. A total of 67 patients were identified.

2.2. Staging work-up

All patients were pathologically confirmed before treatment. Before the surgical intervention, the staging work-up included a physical examination, laboratory tests, upper gastrointestinal tract endoscopy, flexible bronchoscopy (for upper-third and middle-third tumors), computed tomography (CT) scans from the neck to the upper abdomen, and positron emission tomography/computed tomography (PET/CT).

We analyzed the type of neck dissection and histopathological factors. The disease was staged according to the International Union Against Cancer (UICC) TNM classification (Sobin and Wittekind, 2002). Classification of neck lymph nodes was done according to the neck dissection classification by the American Academy of Otolaryngology Head and Neck Surgery (AA-OHN) (Robbins et al., 2002). Tumor cell differentiation was determined using the World Health Organization (WHO) classification scheme (Pindborg et al., 1997). The study protocol was approved by the Institutional Review Board of Fuzhou General Hospital.

2.3. Pathological examination

All resected tissue and lymph nodes in the surgery were sent for pathological examination, which was carried out according to the 7th edition AJCC TNM staging system (Sobin and Wittekind, 2002).

2.4. Follow-up

Patients were followed at our outpatient department every 3 months for the first 2 years, every 6 months for 2–4 years and then annually. Routine follow-up examinations included chest radiography and CT scan from the neck to the upper abdomen. Endoscopy, radionuclide bone scans and PET/CT scans were carried out as indicated clinically. Overall survival was defined as the time from the date of relapse to death or last known follow-up.

2.5. Statistical analysis

The main outcomes were 5-year disease-specific survival (DSS) according to the type of neck dissection, based on the Kaplan–Meier method and log-rank tests. A Cox's proportional hazard model with univariate and multivariate analysis was used to determine variables related to regional control and the DSS. A chi-square test or Fisher's exact test was used to compare the characteristics of each cohort. Statistical significance was defined as a p value < 0.05.

3. Results

3.1. Survival

A total of 67 patients (47 men, 20 women) were included in the analysis. The mean age was 64.3 years (range, 24–87 years). The median follow-up was 72 months (range, 12–210 months).

Among 67 patients, 23 underwent SND for recurrent NPC and 44 patients underwent MND. The patient characteristics are shown in Table 1. The 3-year regional control rate was 85.1% in patients who had SND and 92.5% in those who had MND ($\chi^2 = 0.055$, $p = 0.815$). The 1-, 3-, 5-year survivals were 91.3%, 62.0% and 55.1% respectively for patients treated with SND and 93.1%, 82.5% and 77.9% respectively for those treated with MND. Patients receiving MND had a significant better overall survival than patients receiving SND ($\chi^2 = 4.079$, $p = 0.043$) (Fig. 1).

Positive nodes were identified histopathologically on the excised specimen in 82.6% (19/23) patients who underwent MND and 84.1% in those who had MND ($p = 0.290$).

Table 1
Characteristics of patients.

Variable	SND ($n = 23$)	MND ($n = 44$)	P value
Age (yr)	45.00 ± 10.34	48.57 ± 10.68	0.194
Gender (m/f)	15/8	32/12	0.524
Tumor differentiation			
Undifferentiated	2	0	
Poorly differentiated	16	31	0.243
Moderately differentiated	5	13	
Recurrent nodal disease			
Yes	12	27	0.469
No	11	17	
Recurrence-free time	20.18 ± 12.85	31.94 ± 25.15	0.116
Residual nodal disease			
Yes	15	24	0.400
No	8	20	
Stage of tumor			
T1	21	39	
T2	2	3	0.700
T3	0	1	
T4	0	1	
N1	15	29	0.994
N2	8	14	
N3	0	1	
Bilateral of cervical lymph nodes			
Yes	19	40	0.403
No	4	4	
Size of lymph node			
0	7	4	0.698
1	0	3	
2	9	28	
3	7	9	
Postoperative radiotherapy			
Yes	7	8	0.253
No	16	36	
Dose (if yes)	67.75 ± 12.15	67.44 ± 8.90	0.919