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Patterns of lymph node metastasis of parotid cancer

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ABSTRACT

Objective: To define the incidence and pattern of spread of lymph node metastasis from parotid cancers and to clarify the risk factors and appropriate extent of neck dissection (ND) for individual patient with parotid cancer.

Methods: A total of 72 patients with parotid gland cancer treated by surgery between 1994 and 2013 were analyzed retrospectively by reference to medical records. In line with our protocol, patients with clinically positive lymph nodes and/or cT3/T4 disease were generally selected to undergo ND.

Results: Pathological examinations revealed mucoepidermoid carcinoma in 23 patients, carcinoma ex pleomorphic adenoma in 11, adenoid cystic carcinoma in 9, salivary duct carcinoma in 9, acinic cell carcinoma in 8, squamous cell carcinoma in 5, adenocarcinoma NOS in 4, epithelial myoepithelial carcinoma in 2, and basal cell carcinoma in 1. Thirty-three patients underwent neck dissection: modified radical ND (MRND) in 13, and elective ND (END) in 20. Postoperative RT (PORT) was performed in 33 patients.

Among 13 cN+ patients, 10 were pN+ and lymph node metastasis was distributed mainly in levels I, II, III and V. Among 59 cN− patients, clinical T1, T2, T3 and T4 classifications accounted for 10, 24, 10 and 15 patients, respectively. The incidence of occult lymph node metastasis was 22%. Occult lymph node metastasis was mostly seen in the intraparotid, levels I and II of patients with cT4 disease. Among the ND group, 12 necks were pathologically negative for cancer (pN0). Relapse of neck lymph node metastasis occurred only in two patients treated by MRND with pathologically positive lymph nodes (pN+). These patients developed local and distant metastasis within 1 year after neck lymph node recurrence, and subsequently died of the cancer.

pN+ was found in 19/30 high grade (63%), 1/10 intermediate grade (10%), and 3/32 low grade (9.4%).

Among 33 patients who received PORT, only 1 patient relapsed neck lymph node.

Conclusion: For patients with clinically positive lymph nodes, ipsilateral modified radical neck dissection (levels I–V) is recommended. Elective neck dissection is strongly recommended for patients with T3N0 or T4N0 disease, and the extent of ND should include at least level I/II. PORT for patients with high-risk features may improve the outcome of good neck control.

1. Introduction

Salivary gland cancers represent about 6% of all head and neck malignant neoplasms, comprising 23 pathological types with differing biological behavior. Between 64 and 80% of all salivary gland neoplasms are at the parotid gland with a 15–32% of malignancy [1].

Complete resection followed by postoperative radiation is the mainstay of treatment for patients with high-risk features (advanced clinical T classification, pathological high grade, or a positive or close surgical margin) to reduce the likelihood of local and neck lymph node relapse.

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Metastasis to cervical lymph nodes has been reported as a major prognostic factor in patients with parotid cancers [2]. High-grade tumor, extraparotid extension, a tumor size ≧4 cm and facial nerve involvement are associated with nodal disease [3]. In patients who present with clinically positive neck disease, total neck dissection is warranted [4]. Among patients with clinically negative neck disease, there have been reported 20–48% with occult metastasis [5,6]. The indications for and the extent of neck dissection (ND) for clinically N− patients are not well defined due to the low incidence of this cancer. The aim of the present study was to clarify the risk factors of lymph node metastasis and identify the appropriate extent of ND in individual patients with parotid cancers.

2. Materials and methods

2.1. Patients

The medical records of 74 patients who had radical resection of histologically proven carcinomas of the parotid gland between April 1994 and December 2013 were reviewed retrospectively. The median observation period was 37.5 months, ranging from 3 to 208 months. One patient who had undergone neck dissection previously for laryngeal cancer and another patient with lung metastasis before surgical treatment were excluded from this analysis. Table 1 outlines the clinical and disease characteristics of the remaining 72 patients. The median age was 59 years (range, 5–84 years). The pathological grade was classified into three groups – high, intermediate, and low – in accordance with the Japanese clinical practice guidelines of head and neck cancer 2013 [7]. The most common pathological type was mucoepidermoid carcinoma (23), followed by carcinoma ex pleomorphic adenoma (11), adenoid cystic carcinoma (9), salivary duct carcinoma (9), acinic cell carcinoma (8), squamous cell carcinoma (5), adenocarcinoma NOS (4), epithelial myoepithelial carcinoma (2) and basal cell carcinoma (1). Stage evaluation consisted of history, physical examination, chest X-ray, and imaging of the primary and metastatic site using MRI, CT, PET, and/or Ga scintigraphy. Tumors of the parotid glands were staged retrospectively in accordance with the 6th AJCC TNM staging system [8]. The T classification was: T1 14% (10 patients), T2 35% (25 patients), T3 19% (14 patients), and T4 32% (23 patients). The N classification was: N0 82% (59 patients), N1 4% (3 patients), and N2b 14% (10 patients). This study was approved by the Institutional Review Board of Kobe University Graduate School of Medicine before the collection of patient information.

Table 1
Clinical and disease characteristics of the 72 patients.

Characteristic	Total patients (%)
Gender	
Male	42 (58)
Female	30 (42)
Age (y)	
<60	38 (53)
>60	34 (47)
Facial Palsy	
Yes	21 (29)
No	51 (71)
Clinical T classification	
T1	10 (14)
T2	25 (35)
T3	14 (19)
T4	23 (32)
Clinical N classification	
N0	59 (82)
N1	3 (4)
N2a	0
N2b	10 (14)
N2c	0
N3	0
Clinical stage	
I	10 (14)
II	24 (33)
III	10 (14)
IV	28 (39)
Histology	
Mucoepidermoid	23 (32)
Low grade	17
Intermediate grade	2
High grade	4
Carcinoma ex pleomorphic adenoma	11 (15)
Low grade	4
High grade	7
Adenoid cystic	9 (12.5)
Intermediate grade	8
High grade	1
Salivary duct	9 (12.5)
Acinic cell	8 (11)
Squamous cell	5 (7)
NOS	4 (6)
Epithelial myoepithelial cell	2 (3)
Basal cell	1 (1)

2.2. Treatment of the primary tumor

All patients were treated with curative intent. Extent of resection was dependent on the location and extent of the tumor, and involvement of the facial nerves. Thirty-one (43%) patients had positive or close surgical margins and 31 (43%) had sufficient margins. In the remaining 10 patients (14%), the margin status could not be confirmed from the patient records.

In principal, we performed modified radical neck dissection (MRND) for clinically positive neck (cN+) patients and elective neck dissection (END) for cT3N0/T4N0 patients. ND was performed in 33 patients including 13 cN+ patients, 16 cT3N0/T4N0 patients and 4 early-stage patients with high-grade cancers (Fig. 1). In 33 patients with stage IV disease, positive/close surgical margin, or histologically high-grade cancer, postoperative RT (PORT) were administered with a daily dose of 2.0 Gy 5 days per week for a total of 50–70 Gy.

2.3. Statistical analysis

Statistical evaluation correlating the risk factors of occult metastasis was performed using the chi-square test (R software (ver 3.0.2 2013 the R foundation for statistical computing)). Overall survival rate and disease specific survival rate were

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