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Review

The Role of Elective Neck Dissection during Surgical Salvage for Recurrent Nasopharyngeal Carcinoma

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Background: To study the incidence of microscopic tumour deposit in the neck in patients with recurrent nasopharyngeal carcinoma (NPC) and hence, the role of routine elective neck dissection during nasopharyngectomy.

Methods: Retrospective review of the pathology report of the selective neck dissection specimens in patients with recurrent NPC and clinically N0 status.

Results: Between 2000 and 2012, 38 patients presented with recurrent NPC requiring maxillary swing nasopharyngectomy and free flap reconstruction. The initial T-classification of the tumour was T1, 15.8%; T2, 52.6%; and T3, 31.6%, and the N-classification was N0, 26.3%; N1, 47.4%, N2, 15.8%; and N3, 10.5%. Concurrent chemoradiation was given in 57.9% of the subjects. All patients in the series had complete response after the initial treatment, and the mean time to develop local tumour recurrence was 22.3 months. Among these patients, only 1 (2.6%) demonstrated microscopic tumour metastasis in 1 lymph node removed during selective neck dissection.

Conclusions: Given the low incidence of microscopic tumour metastasis in patients with recurrent NPC and clinically N0 status, routine elective neck dissection may not be indicated. Further large scale investigation is indicated to address the issue.

Keywords: recurrent nasopharyngeal carcinoma; maxillary swing; elective neck dissection; microscopic tumour deposit

Introduction

Nasopharyngeal carcinoma (NPC) differs from other head and neck malignancies in its epidemiology, pathology and treatment outcome[1,2]. It is endemic in southern China and Southeast Asia, affecting 10 to 50 per 100,000 populationsper year[3]. The primary treatment is radiotherapy or chemoradiotherapy depending on the stage of disease on presentation[4-7], whilesurgery is reserved for persistent or recurrent tumours after the combined therapy[8].

JNPC Journal of Nasopharyngeal Carcinoma

NPC has the highest preponderance for regional lymph node metastasis among other head and neck malignancies [9]. As a result, the entire neck is empirically irradiated regardless of the stage of disease on presentation [10-11].While radical neck dissection is often the treatment of choice in regional failures, the need to attend the neck in patients with local tumour recurrence in the nasopharynx is not studied previously. The current investigation will address the role of elective selective neck dissection in locally recurrent NPC.

Patients and Methods

The study was approved by the Institutional Review Board. Between 2000 and 2012, patients with recurrent NPC, who required nasopharyngectomy and free flap coverage of the parapharyngeal space and skull base, were included in the study. Preoperative investigations included nasoendoscopy and biopsy for histological confirmation and determination of Epstein-Barr virus encoded ribonucleic acid (EBER) status, ultrasound examination of bilateral neck and fine needle aspiration of suspicious lymphadenopathy, and contrast magnetic resonance imaging (MRI) of the nasopharynx and the neck to delineate the local extent of disease and the presence of enlarged lymph nodes in the neck. Patients with cytologically proven metastatic disease in the neck would receive salvage neck dissection at the time of nasopharyngectomy, and they were excluded from the study.

All the recruited patients had large recurrent tumour in the nasopharynx with parapharyngeal extension. They had subsequent nasopharyngectomy performed via the maxillary swing approach. The procedure had been described previously [12], with a few modifications over the years [13]. Through a Weber-Ferguson-Longmire incision, osteotomies were made on the anterior wall of maxilla and zygoma and the hard palate. Maxillary tuberosity was separated from the pterygoid plate using a curved osteotome. The maxilla ipsilateral to the tumourwas then swung out to gain access to the tumour.

The nasopharyngeal tumour wasthen resected en-bloc with the pterygoid muscles and the underlying pharyngobasilar fascia to ensure clear margins on the surface of petrosal internal carotid artery. The exposed artery was covered with the free vastus lateralis muscle flap in order to prevent dreaded complications such as carotid blowout. Selective neck dissection, with the removal of ipsilateral level I to III and Va lymph nodes, was performed for all the patients, and suitable recipient vessels were prepared for subsequent microvascular anastomosis. The sternocleidomastoid muscle, the internal jugular vein and the accessory nerve were safeguarded. The maxillary osteocutaneous unit was then returned and the osteotomy sites were fixed with titanium mini plates and screws. A pre-fabricated dental obturator was fitted to ensure accurate dental positioning.

The selective neck dissection specimens were separated into different levels and they were sent separately to the Department of Pathology for histological examination. The specimens were formalin fixed and embedded in paraffin blocks. All the lymph nodes in the selective neck dissection specimens were stained with hematoxylin and eosin (H&E) for each tissue block and subjected to continuous pathological section. In addition, the detection of tumour was enhanced by in situ hybridization of EBER by Novocastra NCL-EBV-K ISH Kit (Novocastra Laboratories Limited, Balliol Business Park West, Benton Lane, Newcastle, UK). The presence of microscopic tumour deposits were noted and recorded.

All data were entered into the Head and Neck database file and analyzed with Statistical package for social sciences version 18.0 (SPSS, Inc., Chicago IL). A *p*-value of 0.05 or less was considered as significant.

Results

During the study period, 38patients were included in the study. Majority (73.7%) of the patients were male. The median age was 52 years (range 24-62 years). The initial T-classification of the tumour on presentation was T1, 15.8%; T2, 52.6%; and T3, 31.6%, and the N-classification was N0, 26.3%; N1, 47.4%, N2, 15.8%; and N3, 10.5%. Concurrent chemoradiation was given in 57.9% of the subjects. All patients in the series had complete res

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ponse after the initial treatment, and the mean time to develop local tumor recurrence was 22.3 months. All the tumors had invaded the parapharyngeal space at the time of recurrence.

Pre-operative tumour biopsy yielded undifferentiated carcinoma in all patients. The mean number of lymph nodes removed during selective neck dissection was 24.8 (range, 18 – 30) per neck. Microscopic tumour deposits were identified in only 1 lymph node removed, which was located in the level II. The rest of the lymph nodes examined were negative for malignancy.

Discussion

The treatment outcome for primary nasopharyngeal carcinoma is improved with the use of intensity-modulated radiotherapy [14] and concurrent chemoradiation[5-7]. When tumour persists or recurs after the initial therapy, surgeryoffers better local tumour control and survival [15-18] as well as less post-treatment morbidities than re-irradiation.

Treatment of recurrent metastatic nodal disease in nasopharyngeal carcinoma requires radical neck dissection [19]. In patients with extensive regional recurrence and extra-capsular spread of cancer cells, extended radical neck dissection with simultaneous insertion of afterloading tubes for early post-operative brachytherapy is effective in improving the treatment outcome [20]. Management of recurrent retropharyngeal lymph node metastasis is more challenging in the diagnosis and treatment, and it can be resected via the maxillary swing approach [21]. The role of prophylactic elective treatment of the neck in patients with locally recurrent NPC, however, is not investigated before. Our previous study on patients with squamous cell carcinoma of the oral cavity showed that selective neck dissection is an effective diagnostic procedure in the staging of N0 neck [22]. It significantly reduces the regional recurrence rate and increases the 5-year disease-free survival [23].The chance of harboring microscopic tumour deposits in the selective neck dissection specimens of cN0 patients of carcinoma of the tongue was 22% [24].

NPC has the highest preponderance for regional lymph node metastasis among other head and neck malignancies. Studies showed that 85% of patients with NPC presented with lymphadenopathy [25], and the most commonly involved regions included retropharyngeal (69%) and level II lymph nodes (70%). The outcome of salvage surgery for recurrent nodal disease after radiotherapy, however, has not been satisfactory. The 5-year overall survival and disease-free survival is reported to be as low as 26.03% and 22.65%, respectively [26]. Therefore, it may be advantageous to better stage the nodal status in at-risk patients who have local tumour recurrence in the nasopharynx, and hopefully, better treatment results can be achieved as observation alone may be dangerous for the irradiated neck. We have previously shown that clinical assessment and fine needle aspiration cytology is insufficient to allow early diagnosis of recurrent nodal metastasis in NPC after irradiation[27]. Therefore, in the current study, we have investigated the incidence of recurrent microscopic nodal metastasis in a group of patients with recurrent NPC who had selective neck dissection performed for the preparation of recipient vessels for microvascular free flap reconstruction after maxillary swing nasopharyngectomy. Our subjects represented a mixed group of patients with various tumour staging before the initial radiotherapy. Majority of them had cervical nodal metastasis at the time of presentation (N1, 47.4%, N2, 15.8%; and N3, 10.5%). All of them had complete response after concurrent chemoradiation, only presenting after a mean of 22.3 months with locally advanced tumour recurrence in the nasopharynx invading the parapharyngeal space. By studying the specimen from the selective neck dissection performed in these patients, we showed that the chance of the neck harboring microscopic tumour deposits in patients with cN0 statusat the time of salvage for local failures is only 2.6%. In experienced hands, pre-operative ultrasound and MRI is accurate enough to stage the neck in patients with recurrent NPC after previous radiation. The proposed advantage of limited morbidity after selective neck dissection in patients with squamous cell carcinoma of the head and neck region may not apply in patients with NPC, who have previous routine radical radiotherapy to the bilateral neck with radiation boost to those with regionally advanced disease. Selective neck dissection in these patients may induce further fibrosis and neck stiffness after the procedure, and the functional

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outcome of the spinal accessory nerve may be worse, particularly when removing level IIB lymphatics is mandatory in NPC patients.

However, the limitations of the current investigation, including the retrospective nature of the study design and the small number of subjects recruited, must be taken into account before drawing a definitive conclusion. Further large-scale study is indicated to address the issue adequately.

Conclusions

Given the low incidence of microscopic tumour deposit in the neck in patients with recurrent NPC and clinically N0 status, routine elective selective neck dissection during nasopharyngectomy may not be justified. Pre-operative assessment by ultrasound and MRI is adequate for accurate staging of the neck in these patients.

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Conflict Of Interest Disclosures

The authors made no disclosures.

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