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Modified radical neck dissection for residual neck disease after radiotherapy of nasopharyngeal carcinoma

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ABSTRACT

Objective: Although radical neck dissection is proposed as a standard salvage procedure for the management of radiotherapy-resistant nasopharyngeal carcinoma of the neck, modified radical neck dissection may be appropriate for select patients. This study was designed to evaluate the efficacy of individualized neck dissections based on preoperative imaging studies and intraoperative exploration for the management of radiotherapy-resistant nasopharyngeal carcinoma of the neck.
Methods: The study included 42 consecutive patients who failed radiotherapy or chemo-radiotherapy for nasopharyngeal carcinoma of the neck and underwent a total of 46 radical neck dissections or modified radical neck dissections. Selection of the proper type of neck dissection was based on preoperative imaging studies and intraoperative exploration. The patients' clinical features, pathologic characteristics, complications, and treatment outcome were estimated and analyzed.
Results: Radical neck dissection and modified radical neck dissection were performed on 19 and 27 necks, respectively. Thirty-three necks (71.7%) had multiple node metastases. Nineteen necks (41.3%) had node metastases at two or more levels. The overall morbidity rate was 11.9%. The 5-year neck control rate (NCR) was 79.1% for 46 necks. The 5-year overall survival and disease free survival for 42 patients were 58.0% and 44.0%, respectively. No statistically significant differences were found in comparing OS, DFS, NCR between the MRND and RND groups.
Conclusions: Individualized neck dissection based on preoperative imaging studies and intraoperative exploration is appropriate for the management of radiotherapy-resistant nasopharyngeal carcinoma of the neck.

1. Introduction

Because nasopharyngeal carcinoma (NPC) is highly radiosensitive, its standard initial treatment is radiotherapy (RT) for early stage disease and concurrent chemo-radiotherapy (Chemo-RT) for advanced locoregional disease [1]. With the advancement of the modern radiation techniques and the use of Chemo-RT, the overall cure rate of NPC is 60–70% [2–4]. Cervical lymph node metastases occur in up to 75% of NPC patients at first presentation. Initial radiotherapy treatment fields routinely include both primary site and neck [2,3]. Studies on treatment outcome of NPC show that patterns of failure after definitive RT or Chemo-RT include local failure, regional failure, and distant metastasis [5]. The incidence of residue or recurrence in the neck, with or without local failure and/or distant metastasis, has been reported to be 7–18% [6,7]. Isolated nodal failures after Chemo-RT are not rare, ranging from 3.5% to 6.9% [8,9].

Treatment options for regional failure of NPC after RT include re-irradiation and salvage surgery. Re-irradiation had been used to treat RT-resistant NPC of the neck; however, the reported survival rate is poor (5-year survival rate: 19.7%), and the potential radiation toxicity is severe [10]. It has been recommended in the recent 2 decades that surgery rather than re-irradiation should be

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the first choice for cervical residue or recurrence of NPC after initial RT or Chemo-RT. Surgery results in better tumor control and long-term survival with minimal complications compared to re-irradiation [10–12]. However, it remains controversial with regard to the type of neck dissection that should be performed [13]. Although radical neck dissection (RND) is the most recommended procedure by some authors [11,14–19], modified radical neck dissection (MRND), selective neck dissection (SND), and lymph node resection have also been reported [20–22]. In this study, we report a series of 42 patients who underwent an individualized neck dissection, RND or MRND, based on preoperative imaging studies and intraoperative exploration, for residual or recurrent cervical metastases after definitive RT or Chemo-RT for NPC. The purpose of our study was to evaluate the efficacy and safety of this individualized neck dissection strategy in the management of radiotherapy-resistant NPC of the neck.

2. Patients and methods

The study was approved by the Ethics Committee of the Cancer Hospital of Shantou University Medical College. Medical and pathologic records of all patients with newly diagnosed NPC who underwent radiotherapy or Chemo-RT between January 2001 and December 2011 at the Cancer Hospital of Shantou University Medical College were retrospectively reviewed. A total of 42 consecutive patients with pathology-proven isolated regional residue or recurrence after primary treatment were recruited for this study. Thirty-five patients were men, and 7 were women. Their ages ranged from 32 to 66 years, with a median of 50 years. All patients initially had radical doses of radiation to the nasopharynx and the neck. The radiation doses ranged from 66 to 82 Gy to the primary tumor and 66–80 Gy to the involved lymph nodes; uninvolved but at-risk nodal regions received 50 Gy. A standard initial dose of 66 Gy was used for involved lymph nodes. In select cases, if there was persistent nodal disease after 66 Gy, treatment extension up to 80 Gy was considered. Concomitant chemotherapy was employed in 19 patients. Residual metastasis was found in 7 necks (tumor persisted without complete remission within 3 months after RT), and the other 39 necks had recurrent metastasis (tumor reappeared after initial complete regression).

Of the 42 patients, 38 were diagnosed with unilateral neck residue or recurrence and underwent ipsilateral neck dissection. The remaining four patients who developed bilateral neck metastases, synchronously ($n = 2$) or metachronously ($n = 2$), underwent bilateral neck dissection. Subsequently, a total of 46 neck dissections were analyzed in this study. All patients had WHO type III carcinoma. The demographic data of these 42 patients, divided according to neck dissection type [23], are shown in Table 1.

Routine clinical workup included blood cell count, renal and liver function tests, chest X-ray, and liver ultrasonography. In addition, a flexible nasopharyngoscopy with blind biopsy of the nasopharynx was routinely performed to exclude primary tumor residue or recurrence. CT and/or MRI of the nasopharynx and neck were performed in all patients. Whole body bone scan with Tc-99m was selectively performed in 17 patients. Patients with simultaneous primary failure or distant metastasis were treated with chemotherapy, RT or Chemo-RT, and they were excluded from this study.

All 42 patients underwent RND or MRND. The decision of the appropriate type of neck dissection was based on preoperative CT or MRI studies and intraoperative exploration. If CT or MRI scan showed parenchymal invasion of the spinal accessory nerve (SAN), the internal jugular vein (IJV), and/or the sternocleidomastoid muscle (SCM), which was verified during intraoperative exploration, RND was performed (Figs. 1–3). When no invasion of SAN, IJV, and/or SCM presented on CT or MRI scan, meticulous dissection with loupes magnification (4×) was attempted to preserve these structures during the operation. If intraoperative exploration found the tumor to be adherent but easily dissected from the non-lymphatic tissues, these structures were preserved; otherwise, they were sacrificed. In three patients, the overlying cervical skin

Table 1
Demographic data and pathologic parameters of the 42 patients divided according to neck dissection type.

Group status	RND group ($n = 19$)	MRND group ($n = 27$)	p value
Gender			
F/M	4/15	3/24	0.424[a]
Age (Mean ± SD)	49.05 ± 6.88	52.11 ± 7.78	0.199[b]
Initial tumor stage			
Stages I + II	3	7	
Stages III + IV	16	20	0.488[a]
Initial treatment			
RT	9	16	
Chemo-RT	10	11	0.550[a]
No. of lymph nodes at presentation			
Solitary	11	17	
Multiple	8	9	0.612[a]
Size (largest diameter)			
≤3 cm	7	11	
>3 cm	12	16	1.000[a]
Mobility			
Mobile	13	24	
Fixed	6	3	0.133[a]
Multiple lymph node metastases			
Yes	15	18	
No	4	9	0.510[a]
Multiple level metastases			
Yes	11	8	
No	8	19	0.073[a]
ESC			
Yes	17	19	
No	2	8	0.210[a]
VLI			
Yes	6	8	
No	13	19	1.000[a]
ITC identified			
Yes	1	3	
No	18	24	0.632[a]

[a] Fisher's exact test (two-sided).
[b] Wilcoxon rank sum test.

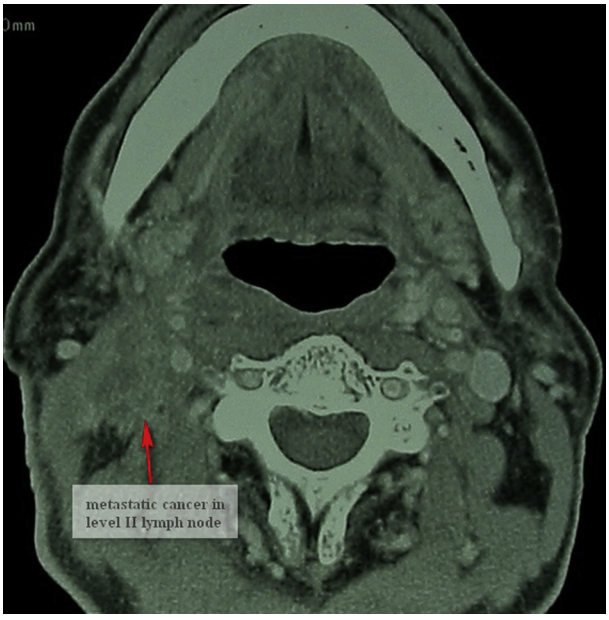

Fig. 1. Preoperative CT scan demonstrating the infiltration of the sternocleidomastoid muscle and the internal jugular vein by metastatic cancer in level II.

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