

Carcinoma of the Tonsillar Region —Results of External Irradiation—

J.S. Seong, M.D., S.G. Kim, M.D., C.O. Suh, M.D., G.E. Kim, M.D., and J.K. Loh, M.D.

*Dept. of Radiation Oncology, Yonsei University College of Medicine
Yonsei Cancer Center*

Thirty-six patients with carcinoma of the tonsillar region treated with radical radiotherapy at Yonsei Cancer Center between Jan. 1971 and Dec. 1980 were retrospectively reviewed.

The purpose of this study is to evaluate the clinical characteristics and the treatment results.

Seventy-five per cent of patients were in advanced stage when they were first seen. Incidence of nodal involvement at the time of initial presentation was 64%. Bilateral nodal involvement was found in 19% of cases.

Three-year local control rates for T1, T2, T3, and T4 were 88%, 46%, 25%, and 11%, respectively. Advanced neck nodes were poorly controlled (N1 70%, N2 20%, N3 12%). The prognosis is mainly affected by the status of the primary and neck nodes.

Overall three-year local control rate was 42%.

Key words: Carcinoma of the tonsillar region, External irradiation, Local control rate
Pattern of failure.

INTRODUCTION

The carcinoma of the tonsillar region is one of the most common malignancies of the head and neck region. Early detection of this cancer is rarely possible due to lack of significant symptoms. Therefore the majority of the patients are in advanced stage with large primary tumor and or lymph node metastasis, which poses difficult therapeutic problems. Radiation therapy has been proven to be very effective in the management of carcinoma of the tonsillar region while surgery being reserved for radiotherapy failure.

This study presents our clinical experience of the treatment of carcinoma of the tonsillar region with particular reference to the treatment results and the pattern of failure through the retrospective analysis.

MATERIALS AND METHODS

1. Materials

The radiotherapy records of 36 patients with car-

cinoma of the tonsillar region treated at the Dept. of Radiation Oncology, Yonsei University College of Medicine, Yonsei Cancer Center between Jan. 1971 and Dec. 1980 were treated with megavoltage teletherapy machine as definite treatment modality.

The patients' age ranged from 21 to 84 years (mean, 53). Majority of the patients were in their fifties(42%). Thirty-two patients were male and 4 patients were female with the ratio of 8:1.

Thirty-one patients showed squamous cell carcinoma, histologically(Table 1).

2. Staging

All of the cases were staged according to the American Joint Committee staging system(1978).¹⁾ Histologic diagnoses were established in all patients by tissue biopsy of the primary lesion.

3. Treatment Technique

Cobalt-60 teletherapy unit was employed in all patients. Electron beam with 6-12 MeV generated from Linac-13 teletherapy unit was used in 9 patients as a boost irradiation to the cervical neck nodes. Upper neck nodes and the primary lesion were treated through pararell opposing fields. And the lower neck was treated ordinarily through anterior single port.

Various treatment techniques were used depending on the extent of disease. For instance, two pararell opposing lateral portals with 1:1, 2:1, or 3:1 loading, single ipsilateral portal, or ipsilateral oblique wedged portals, etc. were used. All patients were treated 5 days a week with a daily dose of 200 cGy. The total tumor dose varied from 5,000 cGy in 5 weeks to 8,000 cGy in 8 weeks, with usual dose being in an order of 6,000-7,000 cGy in 6-7 weeks.

Chemotherapy was added in 4 patients, however its effect was not taken into consideration because entire course of chemotherapy was not completed with various reasons.

Table 1. Patients Characteristics

Entry of this study;	Radical radiotherapy alone 36 cases (1971-1980)	
Sex	; male:female = 32:4	
Age distribution;	below 40	5
	40 - 49	7
	50 - 59	15
	60 - 69	6
	above 70	3
Histological type;	squamous cell ca.	31
	undifferentiated ca.	3
	lymphoepithelioma	2
AJC staging	; stage I	4
	II	5
	III	9
	IV	18

Table 2. Sites of Tumor Extension

	No. of patients	Per cent
Tonsillar fossa	34	94 %
Anterior pillar & retromolar trigone	21	58 %
Soft palate	13	36 %
Buccal mucosa	8	22 %
Glossopharyngeal sulcus	7	19 %
Base of tongue	6	17 %
Posterior pilla	4	11 %
Lateral pharyngeal wall	3	8 %
Gum	2	6 %
Nasopharynx	1	3 %

4. Follow up

The patients were followed by us as well as the referral physicians. Every patients were followed monthly basis for the first year; once every three month for the second year; then two times every year thereafter. For those who had not come to our follow up clinic, letter and telephone inquiries were made to complete the follow up. Thirty-one patients out of 36 could be followed as such with 86% of follow up rate.

RESULTS

1. Clinical Feature

1) Sites of Tumor Extension

The most common site of the involvement was tonsillar fossa(94%). Next, anterior pillar and retromolar trigone(58%), soft palate(36%), and buccal mucosa(22%) were involved, in that order. Base of tongue was also involved in 17% of cases(Table 2).

2) Distribution of Cases by T and N Stages

The distribution of patients according to T and N stages is illustrated in Table 3. Thirteen patients had no palpable neck nodes. The incidence of neck node involvement increased proportionally with T stage. Fifty percent of the T1 cases had clinically

Table 3. T Stages versus Nodal Incidence

	N0	N1	N2	N3	Total incidence of node
T1	4	4			4/8 (50%)
T2	5	3	1	2	6/11 (55%)
T3	2		2	4	6/8 (75%)
T4	2	3	2	2	7/9 (78%)
Total	13	10	5	8	23/36 (64%)

Table 4. Three-year Local Control Rate (including salvage treatment) according to T and N

	N0	N1	N2	N3	Total (%)
T1	4/4	3/4			7/8 (88%)
T2	3/5	1/3	0/1	1/2	5/11(46%)
T3	1/2		*1/2	0/4	2/8 (25%)
T4	0/2	*1/3	0/2	0/2	1/9 (11%)
Total	8/13	5/10	1/5	1/8	15/36(42%)

*Salvage radical neck dissection for neck node failure was done in these 2 cases

palpable nodes in the neck. The overall incidence of neck node involvement at the time of presentation was 64%. Seven patients presented with bilateral neck nodes. No patients presented with contralateral neck node without ipsilateral neck involvement. The ipsilateral subdiaphragmatic nodes were the most frequently involved node(Fig. 1).

2. Treatment Results

1) Local Control Rate

The three year local control rates for T1, T2, T3,

Table 5. Neck Node Controls According to N Stages at the Time of Presentation

N stages	No. of cases	3 year local control rate of neck node
N1	10	70%
N2	5	20%
N3	8	12%

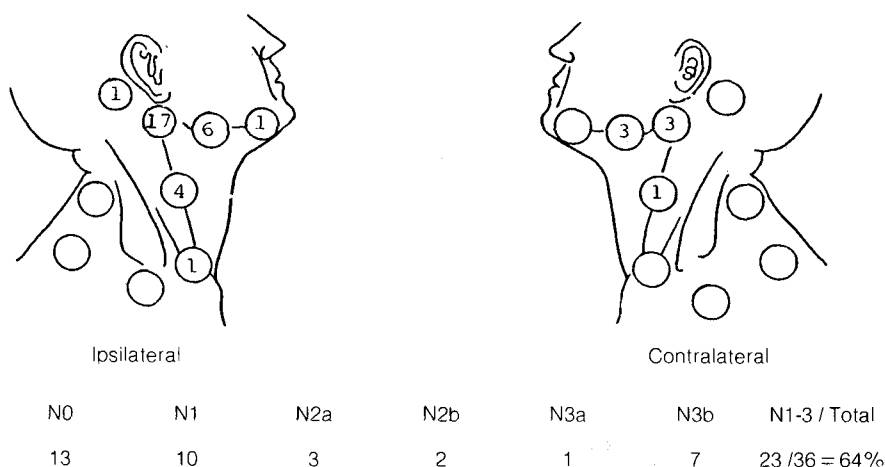


Fig. 1. Nodal distribution.

and T4 were 88%, 46%, 25%, and 11% respectively, as shown in Table 4. Neck node controls according to N stages were 10% for N1, 20% for N2, and 12% for N3(Table 5).

The local control rates decreased as T or N stages increased.

2) Pattern of Failure

The pattern of failure is analysed by T stage(Table 6). Failure in the primary site alone was 7 cases (19%), in the neck node, 11 cases (31%), and in both primary and neck, 5 cases (14%). There was 1 cases of distant metastasis to brain.

Salvage surgery was performed and successful in two cases, who had failed in the neck.

The pattern of failure according to stage and treatment technique was analysed in Table 7. In advanced stage, much higher failure rate is shown in unilaterally irradiated group(all three patients failed). And total number of failure was slightly higher in unilaterally irradiated group than bilaterally irradiated group.

Table 6. Pattern of Failure

Stage	No. of patients	Site of failure			Salvage surgery	Ultimate failure
		Primary	Neck	Primary & neck		
T1	8	1				1 (33%)
T2	11	3	2	1		6 (55%)
T3	8**	2	3	2	1*	6 (75%)
T4	9	1	6	2	1*	8 (89%)
Total	36	7	11	5	2	21 (58%)

* Salvage radical neck dissection was done

** One patient subsequently developed distant metastasis to brain

Table 7. Pattern of Failure by Stage and Treatment Technique

Stage	Unilateral Irradiation (N = 6)					Bilateral Irradiation (N = 30)				
	Primary failure	Neck failure	Primary & neck	Ultimate Salvage	Ultimate failure	Primary failure	Neck failure	Primary & neck	Salvage	Ultimate failure
I					0/1					0/3
II	1				1/3					0/2
III	2				2/2	2	1			3/11
IV		1			1/1	2	*9	5	2	14/17
Total	3	1			4/6	4	10	5	2	17/30

* There included one patient with bilateral neck failure

DISCUSSION

The tonsillar region is anatomically consisted of anterior pillar, tonsillar fossa, and posterior pillar. Carcinoma of the tonsillar region originates mostly from the tonsillar fossa. As these lesions enlarge, they tend to involve contiguous structures, such as soft palate, lateral pharyngeal wall, base of tongue, and buccal mucosa. In our study 75% of the patients already had spread to adjacent area at the time of presentation. Nodal involvement has been reported as high as 60-70% when the patients are first seen.^{2, 6, 10} Sixty-four per cent of our patients had nodal involvement. Bilateral lymph node metastasis was found in 19% of the patients, and this figure is similar to other series.^{2, 6, 10} Subdigastic node was the most frequently involved as has been shown in other reports.^{2, 6, 10}

It has been generally accepted that radical external radiation therapy would be the best treatment for carcinoma of the tonsillar region, covering both primary and cervical lymphatics in many series.^{11, 14} The results of radiotherapy for early stage tonsillar carcinomas have been quite good. Fay⁷ reported 80% control rate for T1 and 76% for T2. In Wang's² series, 3 year relapse free rate was 82% for T1 and 60% for T2. Weller's¹⁶ and Tong's¹⁰ reports were similar to Wang's. Million and Cassisi's¹⁵ results was even more superior-100% control rate for T1 and 83% control rate for T2.

But in advanced stage, treatment results with radiation alone has not been satisfactory. Treatment result for T3 lesion was in an order of 20-40% in many series.^{2, 10, 16, 17} Therefore combined modality with surgery and radiotherapy, either pre- or postoperatively, has been attempted. Perez¹⁸ attempted combined treatment with 2000-3000 cGy of preoperative irradiation and en bloc resection but significant improvement of the cure rate was not

shown as compared to radical radiation therapy alone plus salvage surgery if needed. Improvement of the cure rate for advanced disease could be able to be achieved by Shumrick²⁰ with high dose preoperative radiation up to 4500-5000 cGy in 5 weeks. The control rate for T3 could be improved up to 60% in his report. In our study, control rates for T3 lesions with radical radiation treatment were 25% and 11%, respectively. Therefore, it is desirable to consider possible surgical intervention with radiation treatment for advanced stage.

Irradiation of metastatic disease in the neck was difficult in our study, especially for N2 and N3 (70% for N1, 20% for N2, 12% for N3). Therefore it is desirable to consider combined treatment with radiation and surgery for N2 and N3 lesions.

The most important prognostic factors are the extent of the primary and neck node status in many series and those are cases in our study.^{6, 7, 10, 21} Besides, involvement of base of tongue, histologic grade, radiation dose, and treatment techniques are the important prognostic factors.²⁴

Regarding to the treatment technique, unilateral vs. bilateral irradiation have been compared in terms of failure pattern. This has been discussed for a long time by many authors. Grant and Fletcher,²² Bedwineck,²³ and Tong¹⁰ had claimed that unilateral or pararell opposing ports with heavy differential loading resulted in increasing risk for contralateral failure and osteonecrosis of mandible. But mandibular osteonecrosis could be avoided by Gelinis and Fletcher,³ and Amornman,²⁴ who used parallel opposing ports with 1:1 or 2:1 loading. And intraoral cone or interstitial implant when boost irradiation was needed. Shukovsky⁹ used simple lateral reduced field for boost irradiation without any remarkable increase in complication rate.

Risk of contralateral failure could be significantly reduced by Million and Cassisi.¹⁵ They found that tongue invasion, invasion of soft palate within 1cm to 2cm of the midline, or clinically positive ipsilateral neck node increased risk for bilateral neck disease. Therefore pararell opposing ports with 2:1 or 3:2 loading and 1:1 loading in cases who already had positive contralateral nodes or across the midline, were used. They also used unilateral port when there's no risk for bilateral neck disease. In our study local control couldn't be achieved in all three patients who were in advanced stage and treated with unilateral port. Therefore we suggest that high risk group with advanced stage should be treated with bilateral ports. It is hard to draw definite conclusion, however, with these small number of patients.

Radiation therapy is still the best treatment for the early cancer of the tonsillar region, while combined treatment with radiation and surgery might be the best for advanced lesion. Therefore, close cooperation between the radiotherapist and the surgeon is very important to improve the clinical results for advanced lesion.

CONCLUSION

Through the retrospective analysis, following conclusions were obtained.

1. Most patients(75%) were in advanved stage and neck node incidence was 64%. In 19% of patients bilateral nodal involvement was found.
2. Three-year local control rates for T1, T2, T3, and T4 were 88%, 46%, 25%, and 11%, respectively.
3. Neck node controls were 70% for N1, 20% for N2, and 12% for N3.
4. Both primary disease and neck node involvement strongly affected the prognosis.
5. Overall three-year local control rate was 42%.

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== 국문초록 ==

편도선 암의 방사선 치료

연세대학교 의과대학 치료방사선과

성진실 · 김수곤 · 서창옥 · 김귀언 · 노준규

1971년 1월부터 1980년 12월까지 연세암센터에서 방사선치료를 받은 36예의 편도선암 환자군을 대상으로 후향성 분석을 통해 임상적 고찰 및 치료결과를 살펴 보았다.

환자의 75%는 초진시 이미 진행된 병기에 속하였고, 경부 임파절 전이율은 64%였다. 환자의 19%에서는 양측성 경부 임파절 전이가 있었다.

3년 국소치유율은 T₁에서 88%, T₂에서 46%, T₃에서 25%였고 T₄에서는 11%에 불과했다. 경부 임파절 전이의 치유율은 N₀와 N₁인 경우가 87%였고 N₂와 N₃에서 16%로서 뚜렷한 차이를 보였다. 원발병소와 경부 임파절 전이의 정도가 심할수록 예후가 좋지 않았고 전 환자의 3년 국소치유율은 42%였다.