Squamous Cell Carcinoma of the Supraglottic Larynx Treated with Radiation Therapy

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Sixty-six patients with squamous cell carcinoma of the supraglottic larynx received irradiation with curative intent between 1979 and 1985 were retrospectively analysed.

All patients had a minimum follow-up of 4 years. Of the entire group consisting of 73% T3 and T4 lesions and 58% lymph node metastases, a 5-year acturial survival rate was 31.3%. A 5-year acturial survival rates for stage II, III and IV were 60.7%, 46.7% and 13.5% respectively ($p<0.05$).

Patients without lymphnode metastases had better survival rate than those with postive lymphnode metastases (54.8% vs 12.2%) ($p<0.005$). Surgical salvage rate was 4/7 (57%).

Three patients developed distant metastases. Major complications requiring surgery were seen in 11%. Radiation therapy alone with surgical salvage was an effective, voice preserving treatment for stage I, II and selected III carcinoma of the supraglottic carcinoma, however planned combined treatment with surgery and radiation therapy is advised for stage III and IV carcinoma of the supraglottic larynx with resectable neck disease.

Key Words: Squamous cell carcinoma, Supraglottic larynx, Radiation therapy, 5-year survival rate

INTRODUCTION

Surgery and radiation therapy, alone or with in combination are the main stays of treatment for carcinoma of supraglottic larynx.[1~4]

The selection of thearpy for patients with carcinoma of the supraglottic larynx depends upon the stage of the lesion, the patient's medical condition and treatment philosopy of physicians.

A retrospective analysis of patients with carcinoma of the supraglottic larynx, treated with radiation therapy alone, was carried out.

Its purpose is to analyze the results and complications of treatment in this patient population.

MATERIALS AND METHODS

Sixty-six patients with squamous cell carcinoma of the supraglottic larynx, include the epiglottic fold, false, cord, aryepiglottic fold, arytenoid and ventricle treated with radiation therapy for curative intent at the Depatment of Therapeutic Radiology, Seoul National University Hospital between 1979 and 1985.

All patients had a minimum follow-up of 4 years.

There were 47 male and 18 female, given the known male predominance in this disease. The age ranged from 44 to 75 years with a median age of 63.

Patients were staged clinically according to the American Joint Committee for cancer staging.[5] Stage distribution was shown in Table 1.

Table 1. Stage at Presentation

	N0	N1	N2	N3	No. (%)
T1	3				3 (5)
T2	11	2	1	1	15 (23)
T3	8	6	9	7	30 (45)
T4	5	3	2	8	18 (27)

Table 2. Local Control by T-Stage

Stage	RT alone	Surgical salvage	Ultimate control
T1 & T2	15/18 (83%)	3/3	18/18 (100%)
T3	10/30 (33%)	3/4	13/30 (43%)
T4	7/18 (39%)	0/0	7/18 (39%)

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When grouped into clinical stages, there were stage 1, 3 patients (5%); stage II, 11 patients (17%); stage III, 16 patients (24%); stage IV, 36 patients (55%).

The most common site of origin was epiglottis (58%), followed by aryepiglottic fold (20%), false cord (11%), ventricle (6%) and arytenoid (5%).

Radiation therapy was given with a cobalt-60 teletherapy.

Radiation therapy techniques included two lateral opposed fields and anterior low neck fileds in all patients except three, who were treated by two lateral opposed fields only.

All fields were treated daily.

The tumor doses of 6500 to 7500 cCY in 7 to 8 weeks were delivered depending on the size and extent of the lesion. After a spinal cord dose of 4500 ccy, fields were reduced to exclude the spinal cord and posterior triangles were boosted with 6 MeV to 9 MeV electrons.

The life table method were used to calculated survival curves.

The log-rank test was used to test for differences between the survival curves.

Table 3. Salvage Therapy

Stage	Disease-free interval (Months)	Salvage treatment	Outcome (Months)
T2N0	9	laryngectomy	NED 76+
T2No	18	laryngectomy	NED 84+
T2N1	46	laryngectomy	NED 66+
T3N0	12	laryngectomy	NED 78+
T3N1	4	laryngectomy	Died of postop bleeding
T3N3	–	Neck dissection	Died, 8
T3N3	–	laryngectomy + neck dissection	Died, 6

NED, no evidence of disease

Table 4. Complications

Arytenoid edema requiring tracheostomy	5
Laryngeal necrosis	1
bronchoesophageal fistula	1
	7/66 (11%)

RESULTS

Of the 66 patients treated with radiation therapy alone, 16 patients were free of disease at the end of 4 years and the 5 year acturial suruival rate for the entire patients were 31.3% (Fig. 1).

Acturial 5 year survival rate for stage I+II, III and IV were 60.7%, 46.8% and 13.5%, respectively ($p<0.005$) (Fig. 2).

Local control rates for patients with T1+2, T-3 and T-4 were 83%, 34% and 39%, respectively. However, three patients with T-2 lesions who had local recurrence were surgically salvaged for>60 months, for an ultimate local control rate of 100%.

Seven patients with T-3 lesions who had residual disease or recurrence at the primary site, were treated with total laryngectomy. Of these, two

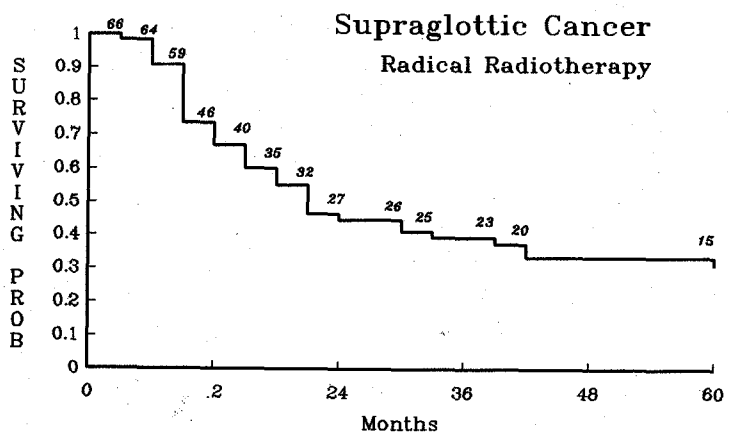

Fig. 1. Actuarial survival of supraglottic cancer patients after radiation therapy.

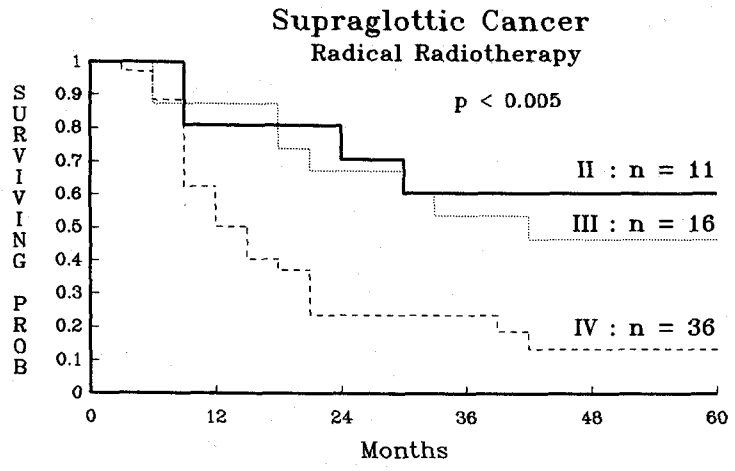

Fig. 2. Actuarial survival of supraglottic cancer patients after radiation therapy by the stage.

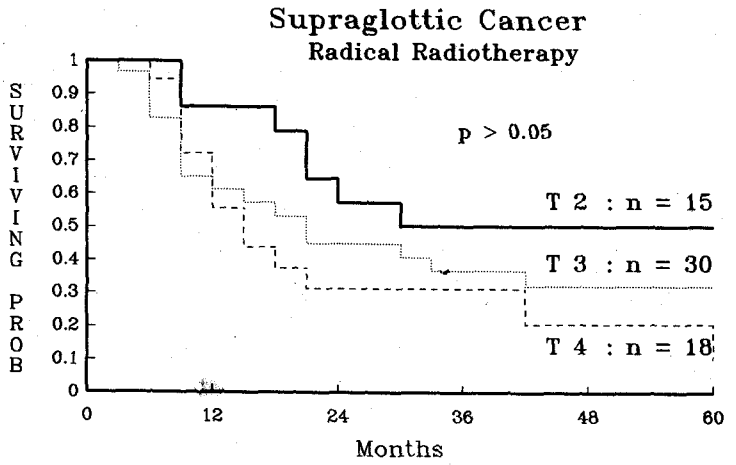

Fig 3. Actuarial survival of supraglottic cancer patients after radiation therapy by the T stage.

patients were alive for > 70 months, one patient died of regional recurrence but free with local disease and one patient died of post-surgical bleeding. Therefore, an ultimate local control rate for T-3 was 43%.

5-year survival rate for T 1+2, T-3 and T-4 were 50.3%, 32.3% and 10.4%, respectively. No relationship between T-stages and survival was observed in our study.

However, N-stage was major impact on survival and increasing tumor related deaths with the uncontrolled nodal disease.

5-year survival rate for NO, NI, N2 and N3 were 54.8%, 32.5%, 13.6% and 6.3%, respectively($p<0.005$).

15/31 patients (48%) developed local and regional recurrence, of which thirteen patients (87 %) occured within 24 months.

Eight patients who received tracheostomy before starting radiation therapy died of uncontrolled and/or recurrent local disease. The median survival was 15 months (range, 4-39 months).

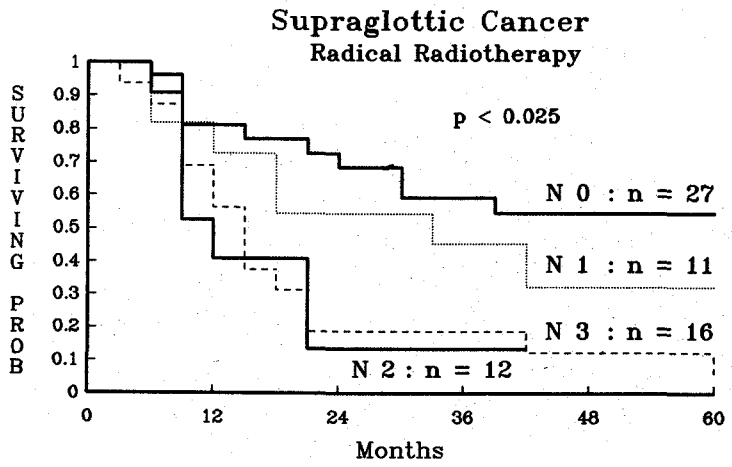

Fig. 4. Actuarial survival of supraglottic cancer patients after radiation therapy by the N stage.

Because of small numbers, no relationship could be made between locoregional control rate and tracheostomy.

Three patients, presenting N-disease, developed distant metastases (bone 1, bone and lung 1, lung 1). Of these, 2 patients had no evidence of local/regional disease.

Two patients developed second primary tumors. One had lung cancer which diagnosed 10 years preceding supraglottic carcinoma. The one developed lung and stomach cancer simultaneously and died of stomach cancer with residual primary disease.

Major complications were seen in 7/66 patients (11%). Of these, two patients died of arytenoid edema with no evidence of disease 5 months and 21 months following treatment. Four patients who developed arytenoid edema with local recurrence, underwent tracheostomy only and died of local lesions 7months, 8 months, 12 months and 31 months following tracheostomy. One who had tracheostomy before radiation therapy developed laryngeal necrosis 7 months after receiving 7,000 cCY. He refused total laryngectomy and died of complication.

DISCUSSION

The data presented indicate that radiation therapy with surgical salvage for recurrence constitutes adequate treatment for patients with stage I and II carcinoma of supraglottic larynx.

Radiation therapy alone, with surgical salvage, yields 5 year surval rate of 61% in patients with stage I and II.

The survival rate in the literatures obtained radiation therapy alone ranged from 75%-90% for stage 1 to 50%-60% for stage II[1,6,7].

Our results were therefore comparable with those of others.

Of the 14 patients with stage I and II, 7 patients have survied more than 5 years. Of survivors, 2 patients underwent total laryngectomy for local recurrence, therefore patients surviving retained their voice was 70%.

Radiation therapy only, with the advantage of voice preservation should be balanced against the risk on unsuccessful salvage surgery in case of recurrence.

Failures after radiation therapy or surgery can be usually salvaged by either surgery or radiation therapy in one half of patients.

The chance for voice preservation is greater for patients treated by conservative surgery than for radiation therapy patients because those irradiated patients who fail are salvaged by total laryngectomy with loss of voice.

In our series, 73% of the carcinoma of supraglottic larynx was detected in a more advanced stage of disease (T3 and T4).

The majority of these patients had a bulky, endophytic tumors, which frequently associated with air-way obstruction which findings are unfavorable for radiation therapy.

5 year survival rates for patients with stage III and IV were 46.8% and 13.5%, respectively.

Local control rates for T3 and T4 were 34% and 39%, respectively.

The survival rates in the literatures ranged from 34%-37% for stage III to 23%-30% for stage IV[4,6,7,9].

Although our results in patients with stage III and IV disease treated with radiation therapy only, were comparable with those reported in the literature, these results was worse as compared to the results of patients who were treated with combined surgery plus radiation therapy. In a selected series, total laryngectomy and post-operative radiation therapy in T3-4 lesions obtained a 5-year survival of 38% to 69% depends on the location and extent of the lesion.

However, voice preservation was obtained in 7/10 patients of survivors (70%). The results of carcinoma of the supraglottic larynx with stage III and IV, treated with either radiation therapy alone or with a combination of surgery and radiation therapy vary among the reported series, because of differences in selection criteria, heterogeneity among patients with advanced stage and differences in the technical factors of radiation therapy.

Most of the radiation failures were due to inability to control local disease as well as metastatic nodes in the neck[13].

Although radiation failures may be rescued by salvage surgery, the surgical salvage rate is very low[7]. Unfortunately, two-thirds of the radiation failures were not eligible for salvage surgery. The salvage rate by surgery is expected to increase with improved surgical tediniques and close follow-up. Therefore, the carcinoma of the supraglottic larynx with stage III and IV when treated with primary radiation therapy, the treatement should be aggressive and less conservative.

Even with local and regional disease control, several of these patients developed either distant metastases (5%) or secondary malignancies (3%).

The patients, all with postive neck nodes, developed distant metastases.

The frequency of distant metastases noted in our study is constant with that noted in other series[7,8,14]. The distant metastases were not the major problem in carcinoma ot the supraglottic larynx.

Radiation therapy given in multiple daily fractions had been used to improve the local and regional control in advanced head and neck cancers.

Some authors with uncontrolled study reported the promising results[15], but the prospective randomized studies demonstrated that there were no statistically differences in local control rates and survival between conventional treatment and hyperactionated treatment[16,17].

Two patients developed second malignancies. Of these, one had lung cancer preceding supraglottic carcinoma and the one had lung and stomach cancer simultaneously.

The comparatively high frequency of second malignancy in patients with the carcinoma of the supraglottix larynx has been reported by several auhors.[18,19].

The crude incidence of a second respiratory tract malignancy was 14~25%,[8,18,19] and the majorities were lung cancer. Some auther reported that one-thirds of the patients with carcinoma of the suprglottic larynx died of intercurrent disease. Of intercurrent disease, half were caused by secondary respiratory tract cancers.[18]

The 11% incidence of serious complications is comparable with generally reported complication rates of 9~20% for corresponding treated patients[9,20].

The higher complication rate is acceptable if the alternative is total laryngectomy. The reason for this high incidence of complications is not clear but it may be related to smoking during treatment.

In our results primauy radiation therapy is a successful teatment for patients with stage I-II and selected stage III carcinoma of the supraglottic larynx and it has resulted in high survival rates with satisfactory voice preservation. However for patients with stage III and IV with resectable neck disease, planned combined surgery and radiation therapy is advised.

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국문초록 =

성문상부암의 근치적 방사선 치료

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김 광 현

1979년 3월부터 1984년 2월까지 성문상부의 편평상피암으로 진단되어 근치적 방사선치료를 시행한 66명을 대상으로 치료성적을 분석하였다. 전체 환자군의 최소 추적기간은 4년이었다. 진단당시 전체 환자군의 78%가 T3 T4 병변이었고 임파절 전이율은 58%이었으며, 전체 환자군의 5년 생존율은 31.3%, 병기에 따른 생존율은 병기 II, III, IV에서 각각 60.7%, 46.7% 및 13.5%이었다. 3명의 환자(5%)에서 원격전이가 관찰되었으며 수술을 요하는 주부작용률은 11%이었다. 방사선치료후 잔유병변 또는 재발에 대한 구제수술 성공률은 57%이었다. 병기 I, II 및 병기 III 초기의 성문상부암은 방사선 단독 치료만으로도 높은 근치율과 생존자의 성대기능 보존이 가능하나, 병기 III과 IV의 성문상부암 환자중 경부에 전이된 임파절의 절제가 가능한 환자는 수술과 방사선치료의 병용이 권장된다.