Laryngeal Cancer Today Compared to a Study 50 Years Ago

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The American Committee for Cancer Staging and End Result Reporting (AJC) was organized in 1959. In 1962 they published a brochure, Clinical Staging of Cancer of the Larynx. This was the origin of the TNM System of staging according to the anatomic site. The intent of this system of classification was to use it in the comparison of survival rates and thereby aid in the selection of the best mode of treatment. The first report using this system was of 600 cases from seven hospitals by the Task Force on Laryngeal Cancer. The next report was by Johnson and Sisson in 1964. It was of 100 cases diagnosed in the hospitals of Syracuse in 1957 and 1958. The study reported today was from the Rhode Island Hospital in Providence, RI in 1965. This study was felt to be of significance, since the cases were all from one institution and represented a uniform plan of treatment. It is our intent today to show the mode of treatment for each stage and the resulting five year survival rates. These will then be compared to a more recent similar study.

This new study was undertaken 50 years later of 100 cases again from the Rhode Island Hospital, noting occurrence, treatment and survival. For statistical survival comparison, 14,350 histologically confirmed cases of cancer of the larynx as reported by SEER were used. SEER is the **Surveillance, Epidemiology and End Results (SEER)** Program of the **National Cancer Institute (NCI)**.

The original study will be referred to as old study. It covered a seven year period from 1952 to 1958 and totaled 91 cases. There were 87 males and 4 females. All were Caucasian, except for one Afro-American. The age range was from 37 to 86, with a mean age of 62.5 years. For site of lesion there were 56 glottic, 31 supraglottic and 5 infraglottic. Infraglottic lesions in the old study were considered extra glottic and were combined with the supraglottic lesions.

The present study with an IRB Registration # 00000396, 00004624 will be called the new study. To obtain 100 cases it took eight years from 1998 to 2005. This allowed a five year survival window. There were 77 males and 23 females. All were Caucasian, except for eight Afro-Americans and one Asian. The age range was 38 to 89, with a mean age of 64.65 years. Site of lesion was 55 glottic, and 45 supraglottic. There were no infraglottic lesions. The main difference here of significance is the increase in females and Afro-Americans. Also of note is that there were no infraglottic lesions, and also an increase in the supraglottis as a site of lesion.

The old study was a retrospective analysis of hospital records for staging. The TNM System had not yet been formulated. The new study is from the Tumor Registry files, and the tumor staging has been entered at the time of diagnosis. However, since the first publication of the AJC there have been many revisions. The first half of these cases is from the 5th revision, and the latter half are from the 6th revision. In January 2010 the 7th revision was released. Most of the changes in these revisions involve modifications in the subgroups. It would be impossible to make an accurate comparison of each stage with its subgroups from one decade to another. Therefore, by necessity, comparisons will be made by the Overall Stage Grouping, also referred to as Roman Numeral Staging I to IV. Table 1 is an explanation of this staging.

Cancer in situ was not recognized as a separate group until 1985 with the 3rd revision by the AJC. It was in the late 1960's that the technique of microlaryngoscopy was introduced and with the use of Toludin Blue dye enabled more accurate biopsy specimen submissions. It was then that the diagnosis of cancer in situ became more evident. Prior to that time these lesions were often considered as keratosis. In the new study, cancer in situ lesions have been combined with the Stage 1 for a total of 38. In some studies cancer in situ is classified as **Tis (Tumor in situ)** or Stage 0. Table 2 is a listing of the old and new cases by stage.

A discrepancy is noted in Stage II, which is probably the result of the many intervening revisions. The increase in Stage I new is due to the combination of ca in situ lesions. Stage III has an increase in the number of supraglottic lesions, but again this may be due to the shifting of nodal cases in the revisions.

Table 1.

Stage I - is one anatomical site within larynx

Stage-II - is one anatomical region within larynx

Stage III - is extending beyond one anatomical region but confined to the larynx

Stage IV - distant metastasis i.e. tumor extending beyond larynx

Note that site in Stage 1 means one area only of disease, such as one vocal cord. Region means further spread of disease such as to both vocal cords etc., but all within the larynx.

Table 2. Occurrance by stage.

Stage	Supraglottic		Glottic		Total	
	Old	New	Old	New	Old	New
I	4	6	19	32	23	38
II	14	8	21	9	35	17
III	3	11	9	4	12	15
IV	14	20	7	10	21	30

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Table 3. Treatment by stage.

STAGE	OLD	NEW
I	20-S 3-R	9-S 29-R
II	28-S 6-R 1 NO RX	13-R 2-RC 2-SL
III	10-S 2-R	4-R 8-RC 2-SRC 1-SR
IV	8-S 13-R	1-S 1-C 4-R 16-RC 1-SRC 5-SR 2-D

S=Surgery R=Radiation C=Chemotherapy L=Laser D=Laryngoscopy RX=Treatment
Note that the 2 surgeries in Stage III in the new study were after chemo and radiation failure.

Table 4. Five year survival rate by stage.

	OLD	NEW
I	91.3% (21A 2D)	94.7% (36A 2D)
II	65.7% (23A 12D)	76.4% (13A 4D)
III	50% (6A-6D)	40% (6A-9D)
IV	15% (3A-20D)	30.4% (7A-23D)

(A=Alive D=Dead)

As noted earlier, Stage III New included a larger number of supraglottic lesions, which may account for the only poorer result in the new study.

Five year overall survival rate for laryngeal cancer

OLD	NEW
53/91=58.2%	62/100=62%

Table 3 lists the varying treatments used by Stage in the old and new studies

Briefly, the plan of treatment in the old study was:

Stage I - Laryngofissure or conservation type surgery
Stage II - Laryngectomy with prophylactic neck where indicated
Stage III - Laryngectomy with radical neck dissection
Stage IV - Surgery and or palliative radiation as indicated

Treatment for laryngeal cancer has shifted over the past fifty years. In the previous study approximately 75% of the patients underwent surgical resection as the treatment option. Our recent study at the Rhode Island Hospital showed only approximately 20% of the patients underwent a surgical procedure. Also 85% received radiation therapy alone or in combination with chemotherapy, and or surgery. 60% of the patients with Stage III or IV received combined chemotherapy and radiation therapy.

Therefore, the plan of treatment in the new study is:

Stage I - Radiation therapy or local laryngeal excision
Stage II - Radiation therapy or partial laryngectomy
Stage III - and IV Combined therapy chemotherapy and radiation (Subtotal or total laryngectomy with or without neck dissection is usually reserved for residual disease, as determined clinically or with PET-CT Scanning)

Clearly this shows the shift in treatment from the surgical era to the present era of chemoradiation and combination treatments. The result and value of this shift will be shown in a comparison of the five year survival rate in Table 4.

Survival analysis for 14,950 histologically confirmed adult cases of cancer of the larynx were obtained the NCI's SEER Program. Their relative survival rate from 1998-2001 was 65.2%. The survival rate in the new RI Hospital study was 62% compared to 58.2% in the old study. Although these samples are smaller, the improvement compares favorably with the national averages.

This study suggests that there has been a trend toward improved survival in carcinoma of the larynx over the past 50 years even though there has been a shift from surgical intervention to combined therapy. However, further information for statistical evaluation (e.g. p-values) would be necessary to determine if the difference between the old and new study are statistically significant.

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Human Subject Approval

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Disclosure of Financial Interests

The authors and or spouses/significant others have no financial interests to disclose.

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