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GLOTTIC LARYNGEAL CARCINOMA WITH FIXED VOCAL CORD TREATED WITH FULL-DOSE RADIATION, TOTAL LARYNGECTOMY OR COMBINED TREATMENT

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Abstract

The results of the therapy of 46 patients with glottic squamous cell cancer with a fixed vocal cord and without regional lymph nodes (glottic T3N0) are reported. Primary surgery (total laryngectomy) in combination with preoperative irradiation gave significantly higher loco-regional control rate and survival rate than surgery alone. Primary radiotherapy with doses of 70 Gy or more and adequate follow-up was found to be an alternative to preoperative radiation and laryngectomy. The result of different treatment modalities speaks in favour of primary irradiation allowing preservation of the larynx and a good voice function. In case of recurrence salvage surgery with total laryngectomy is preferred.

Key words: Larynx, carcinoma, T3, fixed vocal cords, treatment.

Most patients with laryngeal cancer in Europe are given primary radiotherapy while in the USA and South America the treatment is still mainly surgical. Stage I and II patients are generally curable with radiotherapy or surgery. However, irradiation is often preferable since the voice function after this therapy is preserved and salvage surgery can usually be performed on local recurrence without complications (1).

The treatment of glottic squamous cell cancer with a fixed vocal cord and with subglottic spread of less than 5 mm and without regional lymph node metastases (glottic T3N0M0 according to UICC 1987 (2)) is still under debate. Primary radiotherapy with surgical salvage is recommended by Harwood et al (3, 4) and others. However, some laryngeal surgeons, especially in the USA, are of the opinion that total laryngectomy (LE) is the treatment of choice (5–9) and believe that primary irradiation with surgery reserved for failures has a negative impact on survival. Conservation surgery with partial laryngectomy is proposed as an alternative treatment for small glottic lesions associated with a fixed vocal cord (8, 10). Combined therapy with irradiation followed by LE has earlier been presented from our hospital and the results were found to be better than after surgery (LE) alone (1) even if the material was considered too small for definitive conclusions.

The aim of the present paper is to report survival rates and loco-regional recurrence rates in a group of patients with glottic cancer with fixed vocal cord, in whom primary radiotherapy, LE alone or combined treatment with preoperative irradiation and LE was used. We will also discuss the significance of different irradiation parameters used.

Material and Methods

Forty-six male patients with T3 glottic carcinoma without regional lymph node or distant metastases treated from 1963 to 1983 were reviewed. All tumours were histologically verified to be squamous cell cancer and classified according to UICC (2).

The treatment for every case was decided at a weekly tumour conference between otolaryngologists, oncologists and pathologists. The treatment modalities included surgery (LE) alone, irradiation followed by surgery (LE), and primary radiotherapy with curative intention with surgery reserved for salvage.

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Results

The minimum follow-up was 4 years. The patients were followed every second or third month during the first two years, every fourth month during the third to fifth year and then once yearly. The visits took place at the Departments of Otolaryngology and/or Oncology, Sahlgrenska Hospital, Gothenburg. The follow-up comprised hypopharyngo-laryngoscopy and/or microlaryngoscopy, status of regional nodes and when necessary chest radiography. The actuarial loco-regional control and corrected survival (adjusted for intercurrent disease) were calculated by the life table method (11).

Primary surgery. LE was performed in 27 patients and 16 of them were treated with preoperative irradiation (Figs 1 and 2). The loco-regional control rate was significantly higher for patients given radiation therapy before the operation compared with those operated upon without radiotherapy. After three and five years the rate of freedom from loco-regional recurrence was 85 and 55% respectively (Fig. 1). Corrected survival rate showed a tendency to be higher in patients given radiation therapy before LE, 90 versus 78% at 5 and 10 years (Fig. 2).

Primary radiotherapy with salvage surgery. Nineteen patients received radiotherapy primarily and their loco-regional control rate was 48% after 3 years and 39% after 5 and 10 years (Fig. 3). The corrected survival rate was 54% at 3 years and 38% at 4 up to 10 years (Fig. 4).

Different radiation doses were used, during the 20-year period with higher doses during the later decade. The total radiation dose was about 55 Gy (CRE 17 according to Kirk et al. (12)) during 1960 and was later increased to 70 Gy (CRE 19). Fig. 5 shows the dose–response which is based on the loco-regional control rates at 5 years. The loco-regional control rate in the high dose regimen (70 Gy or more) was 70% compared to only 20% for the lower dose (less than 70 Gy).

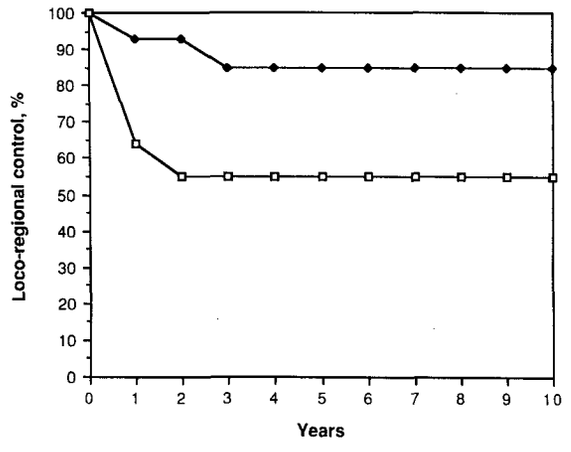

Fig. 1. Glottic cancer T3N0. Primary surgery, 1963–1983. Loco-regional control rate. —◆— preop. irradiation (n = 16). —□— surgery only (n = 11).

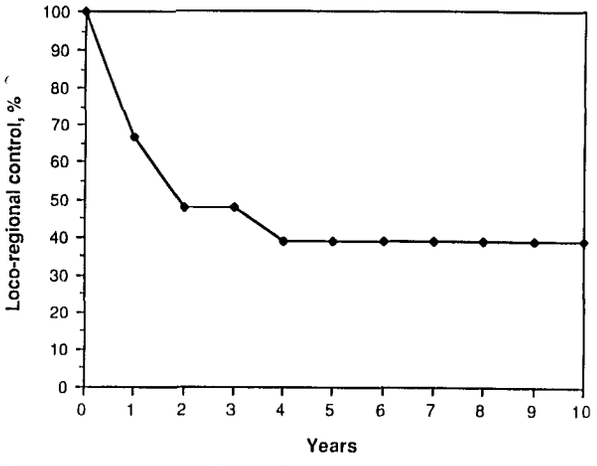

Fig. 3. Glottic cancer T3N0. Primary radiotherapy, 1963–1983. Loco-regional control rate (n = 19).

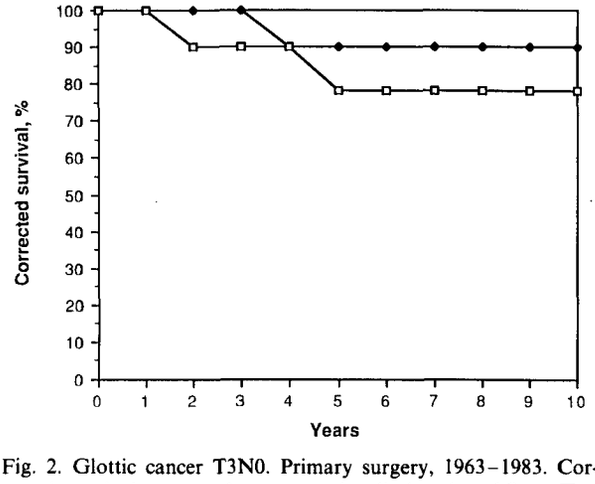

Fig. 2. Glottic cancer T3N0. Primary surgery, 1963–1983. Corrected survival rate. —◆— preop. irradiation (n = 16). —□— surgery only (n = 11).

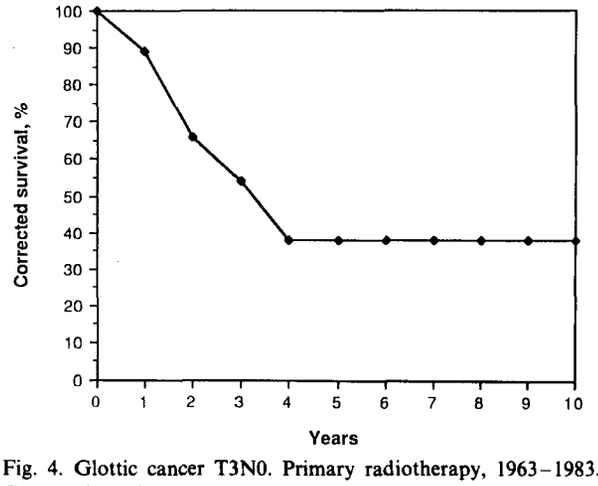

Fig. 4. Glottic cancer T3N0. Primary radiotherapy, 1963–1983. Corrected survival rate (n = 19).

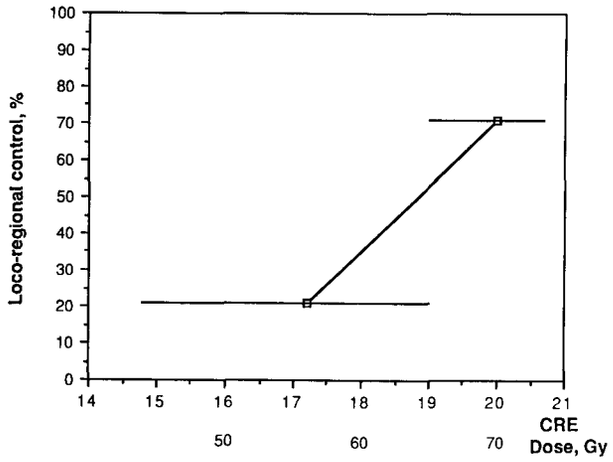

Fig. 5. Dose–response after primary radiotherapy (1963–1983) in glottic cancer T3N0.

Discussion

The main goal in the treatment of glottic laryngeal cancer is to cure the patient with preservation of the larynx. Radiotherapy can achieve this goal for most patients with early vocal cord cancer such as stages T1 and T2 with freely mobile cords. Any impairment of vocal cord function carries significant prognostic importance, with worse outcome after radiotherapy alone. For these more advanced lesions primary irradiation with surgery reserved for failures is advocated by some investigators (13–15) while others maintain that such a treatment policy will ultimately lead to decreased survival (16).

According to the results of the present study, radiotherapy of glottic T3N0 cancers seems to be a good alternative to surgery if adequate follow-up is organized. In case of local recurrence, salvage surgery with total LE is preferred in our hospital and vertical hemilaryngectomy has not been performed for glottic T3 tumours.

In the present fairly small patient material there seems to be a better loco-regional control rate in patients where surgery was planned from the outset, and this treatment regimen also seemed to give a somewhat better survival rate. It should be pointed out, however, that there was an obvious increase in control rate with the higher radiation doses which were used during the later period of the study. This has been stressed by earlier investigators studying larger patients populations (13). Even if the optimal treatment policy for patients with T3N0 glottic cancers cannot be concluded from the present study, it seems to indicate that more patients could be spared laryngectomy if the radiation dose is increased to at least 70 Gy during 7 weeks. This can be done with shrinking target techniques and should not increase the postoperative morbidity, if laryngectomy has to be performed later on. The optimal target volume for radiotherapy of T3 glottic cancer has yet to be determined. Compared to T1 and T2 glottic tumours, neck node recurrences seem to be more common in stage T3. Harwood et al. (3, 4) therefore recommend field sizes not smaller than 6×8 cm^2. Efforts should be taken to find predictive signs of radiation incurability such as large tumour volume or slow regression during the radiotherapy schedule.

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REFERENCES

1. Notter G, Sandberg N, Turesson I, Heikel P. Zur Strahlenbehandlung des Stimmbandcarcinoms. Bericht über 287 Patienten HNO (Summary in English), 1984; 32: 237–44.
2. TNM Classification of Malignant Tumours. Hermanek, Sobin, eds. Berlin, New York: Springer Verlag, 1987.
3. Harwood AR, Beale FA, Cummings BJ, Hawkins NV, Keane TJ, Rider WD. T3 glottic cancer: An analysis of dose time—volume factors. Int J Radiat Oncol Biol Phys 1980; 6: 675–80.
4. Harwood AR, Bryce DP, Walter DR. Management of T3 glottic cancer. Arch Otolaryngol 1980; 106: 697–9.
5. Norris CM. Cancer of the larynx: Classification, staging, and treatment of glottic carcinoma. Otolaryngol 1972; 4: 1–25.
6. Ogura JH, Sessions DG, Spector GJ. Analysis of surgical therapy for epidermoid carcinoma of the laryngeal glottis. Laryngoscope 1975; 85: 1522–30.
7. DeSanto LW. T3 glottic cancer: options and consequences of the options. Laryngoscope 1985; 94: 1311–5.
8. Kirchner JA. Pathways and pitfalls in partial laryngectomy. Ann Otol Rhinol Laryngol 1984; 93: 301–5.
9. Beckford NS, Myers EN. The role of total laryngectomy in the treatment of carcinoma. In: Myers EN, ed. New dimensions in otorhinolaryngology—head and neck surgery, vol 1. Amsterdam: Elsevier Sci Publ BV, 1985: 390–3.
10. Pearson BW, Woods II RD, Hartman DE. Extended hemilaryngectomy for T3 glottic carcinoma with preservation of speech and swallowing. Laryngoscope 1980; 90: 1950–61.
11. Cutler ST, Ederer F. Maximum utilization of the life table method in analysing survival. J Chronic Dis 1958; 8: 699–712.
12. Kirk J, Gray WM, Watson R. Cumulative radiation effect. Part I: Fractionated treatment regimens. Clin Radiol 1971; 22: 145–55.
13. Harwood AR, Deboer G, Kazim F. Prognostic factors in T3 glottic cancer, Cancer 1981; 47: 367–72.
14. Stell PM, Dalby JE, Singh SD, Ramadan MF, Bainton R. The management of glottic T3 carcinoma. Clin Otolaryngol 1982; 7: 175–80.
15. van den Bogaert OF, van der Schaueren E. The primary treatment of advanced vocal cord cancer: laryngectomy or radiotherapy. Int J Radiat Oncol Biol Phys 1983; 9: 329–34.
16. Kaplan MJ, Johns ME, Clark DA, Cantrell RW. Glottic carcinoma. The roles of surgery and irradiation. Cancer 1984; 53: 2641–55.