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COMPARISON OF CHARGES AND COSTS ASSOCIATED WITH VARIOUS TREATMENTS FOR EARLY GLOTTIC CANCER
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Purpose/Objective: To determine the charges and costs associated with various treatments for early glottic cancer.

Materials & Methods: Two computerized data bases were used to identify patients with carcinoma in situ, T1, or T2 glottic cancer who underwent transoral endoscopic removal, partial vertical laryngectomy, or radiation therapy. A surgical data base was used to identify patients by surgical procedure (CPT-4 code) and ICD-9 code (161 and 231) for the year 1995. The tumor registry of the Division of Radiation Oncology was utilized to identify patients undergoing radiation therapy in 1995 and 1996. Charges and costs associated with each treatment type were determined by three separate methods: (1) charge estimate method. All CPT codes associated with each treatment were listed and the associated charges were tallied. Separate fee schedules were used for Medicare and non-Medicare patients since balance billing is not allowed in Minnesota. (2) Actual charge method. The Mayo Medical Center is a fully integrated health system that includes outpatient clinics and hospitals. Each patient's actual bill, including outpatient and inpatient charges, was grouped by treatment type and a median charge and range determined for each treatment type. (3) Total standard cost method. Mayo has developed a comprehensive decision support system that can track all direct and indirect costs associated with a patient's encounter with the Mayo Medical Center. This system was utilized to determine the cost of the resources utilized by our institution in providing treatment for early glottic cancer for each patient. The costs were then grouped by treatment type and a median cost and range determined. Charges and costs are Mayo confidential so the median cost for the least costly treatment was arbitrarily set at $100 as a reference point.

Results: Using the charge estimate method, the least expensive treatment for the Medicare patient was transoral endoscopic removal which was assigned a 1995 health care charge value of 100. The relative charge for radiation therapy is 137, and the relative charge for partial vertical laryngectomy is 289. Included in the charges for radiation therapy are the charges for direct laryngoscopy and biopsy. For the non-Medicare patient, transoral endoscopic removal remained the least expensive treatment with a relative charge of 170 followed by radiation therapy at 316 and partial vertical laryngectomy at 391. In 1995, six patients underwent radiation therapy, 13 underwent transoral endoscopic removal, and 10 underwent a partial vertical laryngectomy. Using the actual charge method, the least expensive treatment for the Medicare patient was transoral endoscopic removal which was assigned a 1995 health care charge value of 100 (range 76 to 145). This was followed by radiation therapy at a relative charge of 156, and partial vertical laryngectomy at a relative charge of 339 (range 245 to 552). For the non-Medicare patient, the least expensive treatment was transoral endoscopic removal at a relative charge of 174 (range 161 to 236) followed by radiation therapy at 409 (range 393 to 438) and partial vertical laryngectomy at 532 (range 350 to 556). Using the total standard cost method, 13 patients were identified who underwent transoral endoscopic removal in 1995, 10 were identified who underwent a partial vertical laryngectomy in 1995, and 18 were identified who underwent radiation therapy during 1995 and 1996. The 1996 costs for radiation therapy were reduced by an inflation factor of 2.5% to reflect 1995 costs. The lowest cost treatment was transoral endoscopic removal which was arbitrarily set at $100 (range 75 to 296), followed by radiation therapy at $220 (range 107 to 358), and partial vertical laryngectomy at $379 (range 219 to 536).

Conclusion: Transoral endoscopic removal, when anatomically possible, is the least expensive (charges) and least costly treatment for early glottic cancer as determined by charge estimates, actual charges, and total standard costs. However, considering the higher rate of tumor control (95% vs 73%) and superior voice quality associated with radiation therapy, the additional charges and costs associated with radiation therapy bring added value. A partial vertical laryngectomy is the most expensive and costly treatment for early glottic cancer. The higher charges and costs and inferior voice quality make this the least attractive treatment option.

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SALIVARY GLAND CARCINOMAS: PROGNOSTIC FACTORS FOR LOCAL CONTROL AND DISTANT METASTASIS, THE ROLE OF RADIOTHERAPY.
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Purpose: The Dutch Head and Neck Oncology Cooperative Group, in which head and neck groups of all University hospitals and the two cancer institutes are represented, initiated a retrospective study concerning salivary gland carcinomas. A majority of Dutch patients with head and neck carcinomas are treated in the participating centres, and the follow-up is precise. Prognostic factors for local control and survival were studied, with special interest in the role of treatment and the role of histologic type.

Methods and Materials: Results were obtained of 568 patients with a mean follow-up time of 5 years. The parotid gland was involved in 59%, the submandibular gland in 14%, oral cavity in 24% and 1% was located elsewhere. Mean age was 59 years (range 8-100 yr), 48% was female. T-stage was T1 in 27%, T2 in 44%, T3 in 19% and T4 in 11%. Positive necknodes were seen in 15%, 3% was initially M0. Histologic type was acinic cell carcinoma in 12%, mucoepidermoid ca. in 16%, adenoid cystic ca. in 26%, adenoca. in 24%, carcinoma in pleomorphic adenoma in 8%, squamous cell ca. in 6% and undifferentiated ca. in 7%. Resection margins were radical in 37%, close in 20% and irradiad in 40% (3% unknown). Surgery was the primary treatment in 501 patients, combined with postoperative radiotherapy (50-70 GY, mean dose 62 GY) in 389 patients. Radiotherapy was the primary treatment in 40 patients (18 M, 30 N%). 20 patients were not treated and 7 patients were treated otherwise. For statistical analysis the Cox PH regression analysis was used (SPPS-PC+).

Results: Actuarial local control after 8 years was 80% for surgery alone and 92% for the combined modality (in which more advanced cases possibly treated with both surgery and radiation treatment) was 95%. T-stage was T1, in 65%, T2 in 22%, T3 in 13%, T4 in 10%. Stage was stage I in 8%, stage II in 33%, stage III in 44% and stage IV in 15%. 16% of patients underwent surgery alone and 84% underwent surgery and radiation therapy. The median dose to the GTV was 67 Gy (range 40-74 Gy). The median dose to the lymph nodes was 60 Gy (range 45-70 Gy). Time to failure was greater in patients with advanced disease, who received radiation therapy, and with advanced stage (P < 0.05). Independent prognostic factors were: I: T-stage (T2 vs T1; RR 3.7; T3 vs T1; RR 11.7); II: histologic type (acinic cell ca. vs adenoid cystic ca.: RR 0.39, mucoepidermoid ca. vs adenoid cystic ca.: RR 0.29).

Conclusion: Multivariate analysis showed that, in patients with salivary gland carcinoma, postoperative radiotherapy independently improved local control. However, small tumors of the oral cavity, when radically resected, may be treated with surgery alone. Histologic type was an independent factor for distant metastasis, but not for local control. In patients treated by primary radiotherapy with curative intent, a local control rate of 55% may be reached using a tumor dose of 70 GY 5 times 2 GY weekly.