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Cancer of the nasal cavity and paranasal sinuses: A series of 115 patients*

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SUMMARY

A total of 115 patients with sinonasal cancer was assessed during the period 1978-1995. Ninety-one patients received treatment with curative intent. A combination of irradiation and operation was used. The 5-year crude survival for patients, who were treated with curative intent, was 41%; the disease-specific survival throughout the period was 48%. Primary irradiation followed by maxillectomy was widely used in the first half of the period. Treatment in the last part was changed to primary lateral rhinotomy with post-operative irradiation whenever possible. Twelve maxillectomies were performed during the first half of the period, and during the last part, only two. Disease-specific survival was equal in the first and the second halves of the period.

Key words: nasal cavity cancer, paranasal sinus cancer, rhinotomy, maxillectomy, survival

INTRODUCTION

Sinonasal cancer is a rare disease and the age-adjusted incidence has not changed in Denmark for some 50 years, being 0.4 for females and 0.9 for males, respectively, per 100,000 persons per year (Olsen, 1987). The tumours are often diagnosed at an advanced stage and therapy is therefore difficult. It often consists of several treatment modalities, e.g., surgery and radiotherapy. However, treatment strategy differs around the world and has changed in our centre towards less use of maxillectomy and the use of higher doses of radiotherapy. The purpose of this presentation is to perform a clinical analysis and evaluate the results of treatment, especially in relation to the change in treatment strategy.

MATERIAL AND METHODS

One hundred and fifteen patients with sinonasal cancer were admitted to the Centre for Head and Neck Cancer at the University Hospital of Odense, Denmark, during the period 1978-1995. Thirty-eight per cent were females and 62% males. The mean age at the time of diagnosis was 65 years (range: 15-94 years). A wide range of histopathological diagnoses was found (Table 1). The most frequent primary symptoms and signs were bleeding from the nose and unilateral stenosis. Inverted papilloma preceded squamous cell carcinoma in four patients as did recurrent, exophytic papilloma in one.

Table 1. Histological diagnosis in a series of 115 patients with sinonasal cancers.

epidermoid carcinoma	41
adenocarcinoma	22
adenoid cystic carcinoma	11
malignant melanoma	10
sarcoma	7
olfactory neuroblastoma	7
non-differentiated carcinoma	3
mucoepidermoid carcinoma	1
salivary gland carcinoma	2
malignant lymphoma	11
total	115

Altogether, 11 patients with malignant lymphoma were excluded from further analysis. All histological slides were revised. Initially, the series contained six cases of undifferentiated carcinoma, but up-to-date immunohistochemisty changed the diagnosis to lymphoma in three cases and confirmed the diagnosis in the other three (excluding low-differentiated squamous cell carcinoma, melanoma, and olfactory neuroblastoma). Two patients had malignant salivary gland tumours (Table 1). One of these could not be classified exactly, and the other had features compatible with a malignant pleomorphic carcinoma. The site of origin was the nasal cavity in 41% of the patients, the maxillary sinus in 41%, and the ethmoid sinus in 8%. The site of ori-

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gin was undetectable in 10% of the patients, due to the advanced stage of the disease. In twenty-nine patients with squamous cell carcinoma the site of origin was the maxillary sinus, and were classified according to the rules of UICC (1992): 17% (5/29) were stage II, 21% (6/29) stage III and 62% (18/29) stage IV. Eight per cent (9/107) had lymph-node metastases in the neck when first seen.

Treatment

Ninety-one patients received irradiation and surgery with curative intent (Table 2). The strategy was adjusted to the histology, the extent of the disease, and the general condition of the patient. Radiotherapy was administered using opposing fields or a 3-field technique shielding the bulbus oculi, whenever possible. The fields of irradiation did not include the neck, apart from five cases with lymph-node metastases in the neck. Four patients, also with primary lymph-node metastases in the neck, were subjected to neck dissection. Only one patient had combined craniofacial surgery. The tumour dose of irradiation was approximately 58 Gy during the first half of the period in question, and during the last half it was increased to 62 Gy. When histology indicated radiosensitivity, or tumour extent made the patient inoperable, the patient received primary irradiation; the need for further surgery was evaluated two months after irradiation. A rather fixed schedule with primary irradiation and maxillectomy two months later was preferred from 1977 to 1986. This strategy was changed after 1986 to the following procedure: Primary lateral rhinotomy with post-operative irradiation, whenever possible (Table 3). Nine patients had curative treatment of recurrence. One partial maxillectomy was extended to a total maxillectomy by exenteration of the orbit, and eight patients had neck dissection. A number of patients had palliative laser surgery.

Follow up

The patients were followed regularly over a period of 10 years.

Table 2. Primary treatment with curative intent of 91 patients with sinonasal cancer.
Additional chemotherapy was used in 21 cases.

surgery	12
surgery + irradiation	27
irradiation	26
irradiation + surgery	26
total	91

Table 3. Type of primary surgery in a series of 91 patients with sinonasal cancer treated with curative intent according to treatment period.

	before 1 July 1986	after 1 July 1986
lateral rhinotomy	20	22
maxillectomy	12	2
other types	3	5
total	35	29

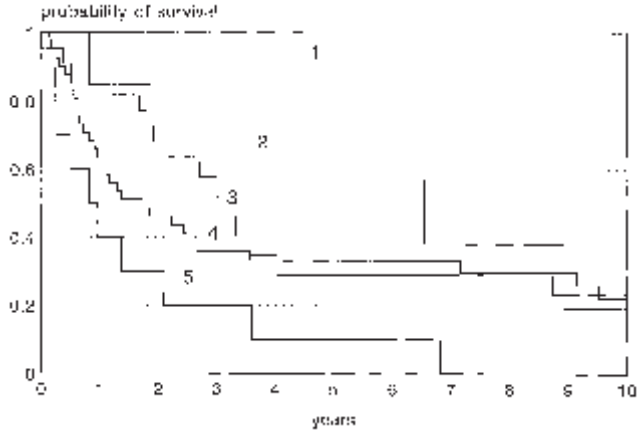

Figure 1. Kaplan-Meier plot of the estimated crude survival of 91 patients with sinonasal cancer according to five most frequent histological types. *Plot 1:* 11 patients with adenoid cystic carcinoma, which lies along the upper line; *plot 2:* 7 patients with olfactory neuroblastoma; *plot 3:* 22 patients with adenocarcinoma; *plot 4:* 41 patients with squamous cell carcinoma; *plot 5:* 10 patients with malignant melanoma.

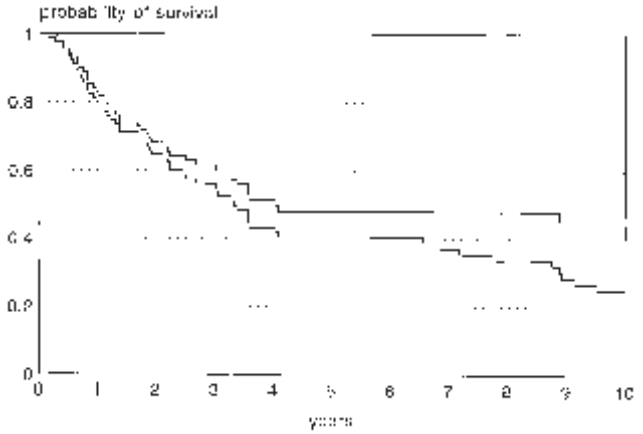

Figure 2. Kaplan-Meier plot of the estimated survival of 91 patients curatively treated for sinonasal cancer. The lower curve is the crude survival rate and the upper curve the disease specific survival rate. S.E. at 5 years is 5.4 and 5.8, respectively.

Statistical analysis

All data were analysed using the Medlog analysis and database system. Kaplan-Meier plots and log rank test were used for survival estimates and analysis. Crude and disease specific survival calculations were estimated. A Cox regression analysis was performed in order to reveal independent prognostic factors.

RESULTS

Exposure to dust from hardwood

The patients' records showed that 12 out of 22 patients with adenocarcinoma, and 3 out of 40 patients with epidermoid carcinoma, had been exposed to hardwood dust. This difference was statistically highly significant (p=0.0001).

Survival and histology

Figure 1 shows the crude survival plots according to type of histology of the five most frequent types. It is evident that adenoid cystic carcinoma has by far the best prognosis. The survival of this group of patients differs with a high degree of statistical significance from the remaining groups.

Treatment results

Five-year crude survival for patients treated with curative intent was 41%, and disease-specific survival was 48% (Figure 2). Closing date for the analyses was January 1, 1997. A lack of local control was by far the most frequent finding in cases of failure.

The change in treatment policy was reflected in the frequency of maxillectomies. During the first half part of the period, 12 maxillectomies were performed and during the last part only two. Table 3 indicates the primary surgical activities in the two periods in question. The number of patients in the two periods was 46 and 45, respectively. The two groups were comparable as to age, gender, histology, stage of disease, and palliative or no treatment. The observed difference as to maxillectomies was statistically significant ($p<0.025$). Disease-specific and crude survival in the two periods were the same, the estimated difference in crude survival after seven years being only 1%.

Cox regression analysis was performed including the following parameters: gender, age, histopathology (all types of adenocarcinoma as well as adenoid cystic carcinoma, muco-epidermoid carcinoma, and salivary gland carcinoma versus remaining types), location of primary tumour (maxillary sinus versus other locations), and period of treatment. Only weak trends and no period effect were found.

DISCUSSION

Only about 35 new cases of sinonasal cancer are seen in Denmark per year (Olsen, 1987). The population basis of our centre is close to 1 million inhabitants, corresponding to one-fifth of the total population of Denmark. We have received 115 patients during a period of 17 years and the expected number is 119. This fact, combined with the histological distribution, indicates that it is likely that the series is representative for a certain geographic area. Hardwood dust is carcinogenic and exposure to it can lead to the development of sinonasal adenocarcinoma, and to a lesser degree squamous cell carcinoma (Hansen et al., 1984; Olsen, 1988; Leclerc et al., 1994). Our findings agree with other published observations.

We found it remarkable, when analysing the results, that there were 22 adenocarcinomas and only eight patients where the site of origin was the ethmoid sinus. However, five patients with extensive lesions probably had the site of origin in the ethmoidal sinus. A further seven patients were classified as having the site of origin in the lateral wall of the nasal cavity, and these might as well be added.

We have analysed the crude survival in the series according to type of histology. Only adenoid cystic carcinoma differs significantly with a better survival. However, the group consists of 11 patients with one failure only. This does not permit meaningful Cox regression analysis. It should also be emphasized that the long-term prognosis for patients treated for adenoid cystic carcinoma is poor (Batsakis, 1979).

Combinations of surgery, irradiation and, sometimes, chemotherapy are widely used (Lederman, 1970; Sato et al., 1970; Gadeberg et al., 1984; Knegt et al., 1985; Sisson et al., 1989; Jiang et al., 1991; Stern et al., 1993; Osguthorpe, 1994). The choice of treatment is made individually taking into consideration the extent of the tumour, the histology, age, and the general condition of the patient. A number of authors (Sato et al., 1970; Knegt et al., 1985) have reported acceptable results using less aggressive methods. Our series includes only one patient subjected to craniofacial surgery. More patients have been treated with this modality of surgery at our centre during recent years. Experience at larger centres has been positive (McCutcheon et al., 1996).

A rather fixed schedule with pre-operative irradiation and maxillectomy eight weeks later has been used in Denmark until one or two decades ago (Gadeberg et al., 1984). This regimen causes considerable discomfort to the patient even if the best prosthetic treatment is used. Our experience with lateral rhinotomies instead of maxillectomies, whenever possible, together with a higher tumour dose of radiation is limited, but indicates that it is possible to achieve better tissue preservation with an unchanged survival rate similar to that of other centres.

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