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Referral Delay in Diagnosis of Oro/oropharyngeal Cancer in Israel

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The delay, stage at diagnosis and referral pattern of 543 oro/oropharyngeal cancer patients in Israel were investigated. About two-thirds of the malignancies were diagnosed at early stages. In more than two-thirds there was a delay of at least 2 months from the onset of signs and symptoms up to diagnosis, with a non-significant relationship between stage and delay. A significant correlation ($P=0.002$) was found between delay and malignancy site. A delay of more than 4 months was observed in 71% of the patients with lip cancer. Cancers of the lip, palate and buccal mucosa were more frequently diagnosed at early stages. A significant correlation ($P=0.001$) was found between stage at diagnosis and referral source. Although 86% of the cancers were diagnosed by physicians, nearly half were already at an advanced stage; when the cancers were diagnosed by dentists, 81% of the remainder were at early stages. No significant relationship was found between the referral medical profession and site of diagnosis. No nasopharyngeal, oropharyngeal or laryngeal cancers were diagnosed by dentists.

Keywords: oral cancer, diagnosis, referral pattern

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INTRODUCTION

THE IMPORTANCE of an early diagnosis of oro/oropharyngeal cancer for a better prognosis is well known. In the United States about half oral cancer patients do not survive 5 years after being dignosed [1], probably because most of them were already in an advanced stage at the time of diagnosis [2]. The direct relationship between early diagnosis and survival has been shown [2].

At a conference held in Denmark [3] concerning the role of dentists in cancer prevention, it was concluded that dentists play an important role in oral cancer prevention by promoting a healthier life style and by performing oral screening for an early diagnosis.

Delay in referral and diagnosis of oro/oropharyngeal cancer has been studied in several populations as well as the role of the dental profession compared to that of the general medical profession in early detection [4–9]. The present study is the first which evaluates the delay, stage at diagnosis, and referral pattern of oro/oropharyngeal cancer patients in Israel.

MATERIALS AND METHODS

Data were collected from a sample of 543 (363 men and 180 women) oro/oropharyngeal cancer patients in Israel over a period of 10 consecutive years with the aid of the Department of Epidemiology of the Ministry of Health and through information available from the computers of eight Israeli hospitals (which provided data to the cancer registry). These hospitals serve the main metropolitan areas of the largest cities in Israel (about 70% of the population). The time from the first onset of signs and symptoms (which included any anatomic changes or discomfort on site of diagnosis) up to the definite diagnosis was defined as the delay in diagnosis. The delay in diagnosis, site of involvement, gender and referral source (dentist or physician) were obtained from the patients' charts. Those charts which did not contain the above information were excluded from the study.

Cancer lesions up to 4 cm with no distant metastasis and no clinically positive lymph nodes were defined as early stages (stages 0–2 defined according to the TNM system of the American Joint Committee for Cancer Staging and End Results Reporting, 1988); lesions larger than 4 cm and/or with distant metastasis and/or clinically positive nodes were defined as advanced stage (stage 3 and over).

Statistical analysis, where used, was carried out using the chi-square test for significance. The results were considered statistically significant if the P-value was ≤ 0.05.

RESULTS

The distribution of the 543 patients according to age of onset, gender and stage at time of diagnosis is shown in Table 1. A male to female ratio (2:1) was found and the age of onset ranged between 10 and 99 years (mean 56.9 years). In more than half of the patients, the age ranged between 50 and 70 years. About two-thirds of the malignancies were diagnosed at early stages.

When delay in diagnosis was investigated, most of the patients (68%) were diagnosed with a delay of at least 2 months

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Table 1. Distribution of oro/oropharyngeal cancer patients (%)

Gender	No.	Age (years) Range	Age (years) Mean	Stage Early	Stage Advanced
Male	363 (67)	10–99	55.6	230 (63)	133 (37)
Female	180 (33)	11–97	59.5	120 (67)	60 (33)
Total	543 (100)	10–99	56.9	350 (64)	193 (36)

Table 2. Onset of signs and symptoms up to the final diagnosis (in %)—delay in diagnosis

Stage	No.	Up to 1 month	1–2 months	2–4 months	Over 4 months
Early	278	28 (10)	59 (21)	41 (15)	159 (54)
Advanced	146	14 (10)	34 (23)	25 (17)	73 (50)
Total	424	42 (10)	93 (22)	66 (15)	223 (53)

Table 3. Delay time from signs and symptoms up to definite diagnosis of the malignancy in different sites

Site	Time (months) >1	1–2	2–4	>4	Total
Lip	3	12	13	68	96
Tongue	15	20	21	51	107
Floor of mouth	1	7	3	10	21
Buccal	2	4	6	9	21
Gingivae	4	13	7	14	38
Palate	1	4	1	15	21
Nasopharynx	5	21	8	37	71
Other*	11	11	7	18	47

*Oropharynx and larynx.

(Table 2). There was no difference whether lesions were at an early or advanced stage at diagnosis (69 and 67%). Only 10% of the patients were diagnosed during the first month. Of the 42 patients who were diagnosed within 1 month, 40% were during the first 2 weeks (data not shown) with no difference between those that were in the early stages and those at the advanced stages. The relationship between time and stage at diagnosis was non-significant.

The delay in the diagnosis in the different sites of involvement is presented in Table 3. A delay of up to 2 months was noted in 47% of the oropharyngeal and the laryngeal cancers and in 45% of the gingival lesions. The greatest delay (more than 2 months) was noted in 84% of the lip cancers, and even after 4 months a delay in 71% of the samples was observed. In tongue cancer about half (48%) were diagnosed with a delay of more than 4 months. The correlation between delay in time and the site of the malignancy was significant ($P=0.002$).

When the stage at diagnosis was studied in the different sites (Table 4), the lip, palate and the buccal mucosa were most

Table 4. Stage at diagnosis in different cancer sites

Site	Stage Early	Stage Advanced
Lip	96	21
Tongue	75	55
Floor of mouth	20	14
Buccal	26	9
Gingivae	37	17
Palate	24	6
Nasopharynx	40	46
Other*	29	25
Total	347	193

*Oropharynx and larynx.

Table 5. Stage at diagnosis in relation to medical/dental profession

Profession	No. (%)	Stage Early (%)	Stage Advanced (%)
Physician	194 (86)	107 (55)	87 (45)
Dentist	31 (14)	25 (81)	6 (19)
Total	225 (100)	132 (59)	93 (41)

frequently (at least 70%) diagnosed at early stages (82, 80 and 74%, respectively). More than 50% of the nasopharyngeal cancers were diagnosed in an advanced stage. Of the tongue lesions, 75 (58%) were diagnosed in the early stages of which only 17 (23%) were tumours at the base of the tongue. A significant correlation was found between the stages and the sites $P<0.001$.

A significant ($P=0.001$) correlation was found between the stage at diagnosis and the medical profession (physician or dentist). Table 5 presents the correlation between the stage of diagnosis and the medical or dental profession based on the examination of 225 charts. Physicians diagnosed 86% of the cancers of which about half were in advanced stages; dentists diagnosed only 14% of which 81% were in the early stages. Information regarding the delay time in the two medical professions was available in only 190 charts. Of the 25 patients whose disease was diagnosed by a dentist only, in 16% the diagnosis was established during the first month and in 44% the diagnosis was delayed more than 4 months. When the above data were compared to that of the 165 patients diagnosed by a physician, the results were similar (15 and 47%). There was no significant correlation between the profession and the magnitude of time delay.

The site of malignancy in relation to the referral medical profession was examined in 224 charts (Table 6). No cancer of the nasopharynx, larynx, or oropharynx was diagnosed by a dentist. Of all of the sites diagnosed by dentists, 37% were of the gingivae, 17% floor of the mouth, 10% buccal, palate and lip. When the above sites were compared with those diagnosed by a physician, only 6% of all sites were of the gingivae, 3% floor of the mouth, 6% buccal and palatal, and 15% were lip cancers. Although only 13% of all sites were primarily diagnosed by a dentist, the number of gingivae and floor of the

Table 6. Site of malignancy diagnosed by profession

Site	Profession		Total
	Physician	Dentist	
Lip	30	3	33
Tongue	51	5	56
Floor of mouth	6	5	11
Buccal	12	3	15
Gingivae	11	11	22
Palate	11	3	14
Nasopharynx	38	0	38
Other*	35	0	35
Total	194	30	224

*Oropharynx and larynx.

mouth cancers were similar. A significant relationship ($P < 0.001$) between profession and site of diagnosis was found.

DISCUSSION

The present study was conducted in order to examine the role of dentists and general physicians in the detection and referral of patients with oro/oropharyngeal cancer in Israel. Generally, the stage of the lesion did not influence the time between the first onset of signs and symptoms up to the final diagnosis, since in both stages at least 50% of the lesions were diagnosed after more than 4 months. It was interesting to note that 86% of the lesions were diagnosed by physicians and only 14% by dentists. However, while only about half of the patients diagnosed by physicians had cancer in the early stages, 81% of the lesions diagnosed by dentists were at those stages. This difference can be attributed to the fact that general physicians are less aware of oro/oropharyngeal lesions suspected as early cancers. The lesions were probably asymptomatic and their clinical manifestations were commonly misinterpreted as benign or innocuous oral/dental problems.

However, these findings may also be attenuated by the existence of hospital delays, since many clinicians are involved in clinical staging and this may have an effect on the total delay as defined here. This time delay is equivalent for both dentists and physicians, as both professionals usually send their patients to hospitals or clinics in medical centres. Our database did not allow for separation of the different periods of referral delay, such as hospitals or medical centres. Additionally, the characteristics of the healthcare delivery system in Israel (i.e. economics, medical manpower availability, registration with dentists) may influence patient visits from lower socio-economic strata to physicians rather than dentists. This may result in larger, more advanced oral cancers becoming the responsibility of physicians. Such an added burden may, in part, explain the higher rate of physician delay.

Most cancers diagnosed by general physicians (79%) were of the lip, tongue, nasopharynx, oropharynx and larynx (154 of 194 cases). Thus, the site being more exposed, such as the lip or tongue, or less exposed, such as the nasopharynx, oropharynx and the larynx, appears to have no effect on the delay in early diagnosis. However, an interesting finding is that approximately 71% of lip cancers were not diagnosed for over 4 months, yet 82% of these were staged as early cancers.

This apparent discrepancy may be explained as follows. Lip cancer first appears as a small innocuous abnormality and is believed to be a "cold sore". This is actually the onset of time measurement. Final diagnosis occurs only after more than 4 months during which time the patient is untreated. If treated, it is for the "cold sore". Once diagnosed, most of these cancers are in the early stage, probably because of the slower growth rate of lip cancer and its later deep invasion in the course of the disease; metastasis to local submental or submandibular lymph nodes is uncommon [10]. Most lip cancers are moderately or well-differentiated at the time of diagnosis [11] which means a better prognosis. Thus, a possibility that the biology of tumour growth in lips has an influence on the early stage at diagnosis.

The physician's role in the diagnosis of oro/oropharyngeal cancer is mandatory since the dentist is mainly confronted with the diagnosis of lesions presented within the boundaries of the oral cavity (the gingivae, floor of the mouth, tongue, palate and buccal mucosa). This supports the need for knowledge and recognition of the clinical manifestations of asymptomatic early lesions by a family physician and is in agreement with other studies [3–5, 8]. Usually, dentists are aware of these kinds of lesions and this explains why the majority of lesions presented within the boundaries of the oral cavity were diagnosed in their early stages.

In Israel, many individuals first consult their family physician in cases of symptoms unrelated to dentition or dentures, which may explain why most lesions were diagnosed by the physician and not by the dentist. It is suggested that the general physician should be aware of the features of oral premalignant and malignant suspected lesions.

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