

Cancer of the Mobile Tongue in Finland

Increasing Incidence, but Improved Survival

Olli-Pekka Alho, Saara Kantola, Ulla Pirkola, Esa Läärä, Kalevi Jokinen and Eero Pukkala

From the Departments of Otorhinolaryngology (O.-P. Alho, K. Jokinen), Oral and Maxillofacial Surgery (S. Kantola), Mathematical Sciences (U. Pirkola, E. Läärä), University of Oulu, Finland, and the Finnish Cancer Registry (Eero Pukkala), Helsinki, Finland

Correspondence to: O.-P. Alho, MD, Oulu University Hospital, Kajaanintie 52, FIN-90220 Oulu, Finland. Tel: +358 8 31 53 473. Fax: +358 8 31 53 459. E-mail: opalho@cc.oulu.fi

Acta Oncologica Vol. 38, No. 8, pp. 1021–1024, 1999

A population-based descriptive study was conducted to describe incidence and survival of cancer of the mobile tongue in Finland between 1953 and 1994. The study included 1504 patients, drawn from the Finnish Cancer Registry, with first primary mobile tongue cancer diagnosed between 1953 and 1994. Incidence and relative survival were determined. The age-standardized overall incidence rate was 0.6 per 100 000 years in 1953–1994. At the time of diagnosis 78% of the patients had either localized or regional disease. The age-standardized incidence rate decreased after the mid-1960s, but increased in the 1990s. The 5-year relative survival rate increased gradually from 40% in 1953–1959 to 58% in 1988–1994. Disease stage at the time of the diagnosis strongly affected the survival rate. Survival increased especially in regional disease. Cancer of the mobile tongue is increasing in Finland, but survival has increased particularly in regional disease, probably because of improved treatment. Early diagnosis is emphasized for a good prognosis.

Received 14 April 1999

Accepted 7 May 1999

Oral cancer constitutes roughly 3% of all malignant tumours and accounts for some 2% of cancer deaths in Finland (1). Epidemiological studies on population-based cancer registry data in Europe and in the United States have shown that both the incidence and mortality rates of oral cancer are increasing, particularly in young people (2–5). Changing attitudes to the main known risk factors, namely smoking and alcohol consumption, have been suggested as possible reasons for these changes. There has, however, been criticism of the fact that most epidemiological studies deal with clinically heterogeneous entities (6); for example, the oropharynx (2, 3), the whole oral cavity (4, 6), and both the oral tongue and the base of tongue combined (4, 5) have been examined.

Cancer of the mobile tongue is the most common malignancy of the oral cavity. Clinically, it forms exclusively the category of tongue cancer, as tumours in the base of the tongue, which have a distinctive behaviour clinically, are considered oropharyngeal tumours, as shown in the TNM staging system (7). A previous study showed that the incidence of mobile tongue cancer has roughly doubled over the past 20 years in both women and men in northern Finland (8), and we sought to investigate its incidence and survival trends over a longer period, using data from the nationwide Finnish Cancer Registry.

MATERIAL AND METHODS

The study included all patients with a first diagnosis of primary mobile tongue cancer in Finland between 1953 and 1994. Data were collected from the Finnish Cancer Registry, which was founded in 1953. The Finnish Cancer Registry covers the whole population nationwide. All hospitals, pathological and cytological laboratories and practitioners report every new cancer case that comes to their attention. Moreover, annual checks are made against the registry files of all death certificates issued in the country. Accordingly, the registry acquires information on deaths from cancer, whether diagnosed before or after death, and from deaths of cancer patients from causes other than cancer. Various checks have indicated that the registry files can be considered practically complete for the cases of cancer diagnosed in Finland, and that the follow-up of cancer patients is also virtually complete (9).

In total, 1 504 patients were reported to the Finnish Cancer Registry as having cancer of the mobile tongue (ICD-7 141, except 141.0 base of tongue) between 1 January 1953 and 31 December 1994. Data on the patients' age, sex, place of residence and tumour stage at diagnosis were gathered. Tumour stage was recorded on the basis of clinical examinations supplemented by pathologists' reports and classified into three categories: localized (cancer

confined to the mobile tongue regardless of size), regional (cancer extending to regional lymph nodes), and distant (cancer spreading beyond the tongue or having involved tissues beyond those immediately draining the tongue). Spread cases with unknown width were classified as distant. Tumour stage could not be classified in 187 patients.

Having obtained estimates of both the number of cases and the population in 5-year age classes for the whole period, we calculated the overall incidence rates standardized to the world population (10). Survival was calculated as 5- and 15-year relative survival rates, relative survival being the ratio of observed to expected rates. The expected survival rates were calculated from population life tables (supplied by Statistics Finland) compiled according to age, sex and year of diagnosis (5-year calendar period) using the Relative Survival Analysis program (11). In addition, age-standardized incidence rates and actuarial relative survival curves were computed for each age category (< 65 and $\geq$ 65 years), sex and tumour stage.

To analyse trends in incidence and survival, the 42-year study period was divided into six 7-year calendar periods: 1953–1959, 1960–1966, 1967–1973, 1974–1980, 1981–1987 and 1988–1994. The periodic incidence and survival rates were further analysed according to age, sex and tumour stage.

RESULTS

Incidence

The mean age of the 1504 patients at diagnosis was 63 years (range 1–97), and 52% were female (Table 1). At the time of diagnosis, 60% of the patients had localized dis-

ease, 18% regional disease, 10% distant disease, and in 12% the stage was unknown. The proportion of local tumours was higher in females (63%) than in males (57%) and higher in patients aged 0–64 years (62%) than in those aged 65 years or over (58%). There were no marked geographical differences in the incidence rate in Finland (data not shown).

The age-standardized incidence rate was 0.59 per 100000 years in 1953–1994. The incidence was higher in males than in females, and increased with age (Table 1). The age-standardized incidence rate decreased after the mid-1960s in men, but started to increase again in the early 1970s. In women, the incidence decreased slightly towards the end of the 1980s, but since then has increased rapidly. The proportion of unstaged tumours increased over the study period, whereas the proportion of local disease decreased.

Survival

The overall 5-year and 15-year cumulative relative survival rates were 49% and 40%, respectively. Disease stage at the time of diagnosis had the most powerful effect on survival, the 5-year relative survival being 62% for localized disease, 31% for regional disease and 5% for distant disease (Table 2). Overall survival was higher for younger patients and females than for older patients or males.

The 5-year relative survival rate increased gradually from 40% in 1953–1959 to 58% in 1988–1994 (Table 2). Relative survival increased in local and particularly regional disease, but remained low in distant disease. Similarly, the increase in relative survival was seen in both younger and older patients and in males and females.

Table 1

Trends in age-adjusted incidence rate (I) and distribution (%) of cases in 1 504 patients with cancer of the mobile tongue in Finland 1953–1994*

Subpopulation	Calendar period						
	1953–1959 I (%) (n = 207)	1960–1966 I (%) (n = 235)	1967–1973 I (%) (n = 193)	1974–1980 I (%) (n = 231)	1981–1987 I (%) (n = 266)	1988–1994 I (%) (n = 372)	Overall I (%) (n = 1 504)
All patients(n = 1 504)	0.67 (100)	0.67 (100)	0.49 (100)	0.52 (100)	0.51 (100)	0.69 (100)	0.59 (100)
Patients aged 0–64 years (n = 755)	0.44 (62)	0.36 (51)	0.29 (52)	0.34 (51)	0.31 (43)	0.44 (47)	0.36 (50)
Patients aged $\geq$ 65 years (n = 749)	3.7 (38)	4.8 (49)	3.1 (48)	3.0 (49)	3.3 (57)	4.0 (53)	3.6 (50)
Males (n = 720)	0.85 (52)	0.83 (50)	0.52 (44)	0.59 (46)	0.64 (48)	0.76 (45)	0.69 (48)
Females (n = 784)	0.54 (48)	0.56 (50)	0.46 (56)	0.47 (54)	0.40 (52)	0.60 (55)	0.51 (52)
Patients with localized disease (n = 904)	0.45 (67)	0.45 (67)	0.32 (65)	0.30 (56)	0.31 (60)	0.35 (50)	0.36 (60)
Patients with regional disease (n = 268)	0.16 (24)	0.12 (17)	0.06 (13)	0.08 (14)	0.09 (18)	0.15 (20)	0.11 (18)
Patients with distant disease (n = 145)	0.02 (4)	0.06 (9)	0.04 (8)	0.07 (15)	0.06 (11)	0.06 (10)	0.06 (10)
Patients with unknown disease stage (n = 187)	0.03 (5)	0.04 (7)	0.06 (14)	0.08 (15)	0.05 (11)	0.13 (20)	0.07 (12)

* Incidence rate per 100 000 person-years adjusted for age to the world standard population.

Table 2

Trends in 5-year relative survival (RSR,%) in 1 504 patients with cancer of the mobile tongue in Finland 1953–1994

Subpopulation	Calendar period						
	1953–1959 RSR (n)*	1960–1966 RSR (n)*	1967–1973 RSR (n)*	1974–1980 RSR (n)*	1981–1987 RSR (n)*	1988–1994 RSR (n)*	Overall RSR (n)*
All patients	40 (207)	49 (235)	46 (193)	45 (231)	49 (266)	58 (372)	49 (1504)
Patients aged 0–64 years	46 (128)	48 (120)	50 (101)	50 (117)	51 (115)	56 (174)	51 (755)
Patients aged ≥65 years	27 (79)	50 (115)	41 (92)	40 (114)	48 (151)	61 (198)	47 (749)
Males	36 (110)	48 (118)	42 (85)	44 (106)	44 (131)	52 (170)	45 (720)
Females	44 (97)	49 (117)	50 (108)	47 (125)	55 (135)	64 (202)	52 (784)
Patients with localized disease	54 (141)	63 (158)	57 (127)	57 (131)	64 (159)	70 (188)	62 (904)
Patients with regional disease	10 (49)	22 (41)	26 (24)	32 (32)	40 (47)	47 (75)	31 (268)
Patients with distant disease	16 (7)	7 (21)	0 (16)	0 (34)	4 (32)	8 (35)	5 (145)
Patients with unknown disease stage	0 (10)	20 (15)	44 (26)	60 (34)	30 (28)	66 (74)	49 (187)

* Total number of patients at the beginning of the follow-up.

DISCUSSION

Incidence

We studied mobile tongue cancer, the largest clinical entity of oral malignomas, in a population-based study in Finland in 1953–1994 and found the incidence to be 0.59 per 100 000 years. This figure coincides with the incidences of tongue cancer in Scotland (5) and the United States (4), if the tongue base, which is reported to constitute some 30% of the cases (12), is excluded, but is much lower than that in India and France (13). We found that mobile tongue cancer was a disease of the elderly, the mean age being 63 years, and that the incidence was higher in males than in females, similarly to oral cancer (2, 6). Nearly two-thirds of our cases were local at the time of diagnosis in contrast to oral cancer, which is reported to be more advanced at initial staging (4). Oral cancer is often quite symptomless and tumours in the mobile tongue can be detected earlier by both the patient and the physician than those elsewhere in the mouth.

In the United States and Scotland tongue cancer is increasing, particularly in young men (4, 5). We found a decrease in mobile tongue cancer incidence during the 1960s mainly in men, and a sharp increase since the early 1990s, mostly among women. This increasing proportion of women is in agreement with other findings including those made in Connecticut (6). In Finland, cigarette smoking increased among males until 1960 and among females until the end of 1970s, but has steadily decreased since then (14). The use of smokeless tobacco (snuff) has been very rare. Registered consumption of alcohol has increased from 2.0 L of pure alcohol per person per year in 1955 to 7.7 L in 1990 (15). The decrease in cigarette smoking by males during the 1960s could partly explain the decline seen in the incidence of tongue cancer in men in the 1960s, and the increased alcohol consumption could account for at least part of the recent increase in both men and women.

Survival

The high proportion of local cases also offers one explanation for our 5-year overall relative survival, 49%, being higher than that reported for oropharyngeal cancer in Switzerland (2) and Scotland (3), 33% and 39%, respectively. The majority of oropharyngeal tumours present with advanced stage, which decreases the chances of survival (4, 12). Indeed, we found that stage at initial presentation was the most important factor influencing survival, which confirmed earlier clinical findings (16). The slightly higher survival of women compared with that of men was explainable by the fact that a higher proportion of cases were local.

Some population-based studies have alarmingly also shown an increasing mortality rate for tongue cancer in young men (4, 5). Although this could be due to the increased incidence rate, the survival rate is reported to have declined, particularly in socially deprived areas (3). We found a significant improvement in the survival of mobile tongue cancer patients with localized and particularly regional disease irrespective of age and sex, confirming the earlier findings from a clinical series (17). This increased survival was probably due to improved treatment. The decreasing survival found in earlier population-based studies may be due to changes in stage distribution.

In accordance with the earlier findings in the United States (4), we saw no change towards a more favourable stage distribution at the time of diagnosis during the past 40 years despite the rapid development in the health care system. However, the actual definition of the stages may not have remained stable over the decades. For example, the increasing number of unstaged cases with a rapidly rising survival rate indicates that physicians may have become more cautious about classifying a tumour as localized. This stage migration could lead to an overestimation of the increased survival in localized cases and to underestimation of survival in distant cases towards the end of the period.

In conclusion, mobile tongue cancer, the largest clinical entity of oral malignomas, is a disease of the elderly with a slight male preponderance and local in the majority of cases. The incidence is increasing in Finland, but survival has also increased, particularly in regional disease, probably due to improved treatment. The survival for distant disease has remained poor, and therefore early diagnosis is emphasized for a good prognosis.

ACKNOWLEDGEMENTS

We thank Kalevi Hyrynkangas, senior otolaryngological surgeon at Oulu University Hospital, for his help and comments.

REFERENCES

1. Cancer incidence in Finland 1995. Cancer Statistics of the National Research and Development Centre for Welfare and Health. Publication No. 58. Helsinki: Cancer Society of Finland, 1997.
2. Levi F, Randimbison L, Te V-C, Franceschi S, La Vecchia C. Trends in cancer survival in Vaud, Switzerland. *Eur J Cancer* 1992; 28a: 1490–5.
3. MacFarlane GJ, Sharp L, Porter S, Franceschi S. Trends in survival from cancers of the oral cavity and pharynx in Scotland: a clue as to why the disease is becoming more common? *Br J Cancer* 1996; 73: 805–8.
4. Swango PA. Cancers of the oral cavity and pharynx in the United States: an epidemiologic overview. *J Public Health Dent* 1996; 56: 309–418.
5. MacFarlane GJ, Boyle P, Scully C. Oral cancer in Scotland: changing incidence and mortality. *Br Med J* 1992; 305: 1121–3.
6. Chen J, Katz RV, Krutchkoff DJ. Intraoral squamous cell carcinoma. Epidemiologic patterns in Connecticut from 1935 to 1985. *Cancer* 1990; 66: 1288–96.
7. International Union against cancer. TNM classification of malignant tumours. 4th ed. Berlin: Springer-Verlag, 1987: 16–9.
8. Kari S, Alho OP, Jokinen K, Hyrynkangas K, Läärä E. Carcinoma of the oral tongue in Northern Finland: trends in overall incidence and patient and tumour characteristics. *J Oral Pathol Med* 1997; 26: 480–3.
9. Teppo L, Pukkala E, Lehtonen M. Data quality and quality control of a population-based cancer registry. *Acta Oncol* 1994; 33: 365–9.
10. Doll R, Payne P, Waterhouse JAH. Cancer incidence in five continents. Vol 1. Berlin: Springer, 1966.
11. Hakulinen T, Abeywickrama KH. A computer program package for relative survival analysis. *Comput Programs Biomed* 1985; 19: 197–207.
12. Ildstad ST, Bigelow ME, Remensnyder JP. Squamous cell carcinoma of the tongue. A comparison of the anterior two thirds of the tongue with its base. *Am J Surg* 1983; 146: 456–61.
13. Muir C, Waterhouse J, Mack T, Powell J, Whelan S, eds. Cancer incidence in five continents. Vol 5. Lyons: International Agency for Research on Cancer (IARC Scientific Publication No 88).
14. Rimpelä M. Adult use of tobacco in Finland in the 1950s to 1970s. Publication M40, University of Tampere, 1978.
15. Statistical Yearbook of Finland 1996. Jyväskylä: Gummerus, 1996: 398–9.
16. Ildstad ST, Tollerud DJ, Bigelow ME, Remensnyder JP. A multivariate analysis of determinants of survival for patients with squamous cell carcinoma of the head and neck. *Ann Surg* 1989; 209: 237–41.
17. Franceschi D, Gupta R, Spiro RH, Shaw JP. Improved survival in the treatment of squamous carcinoma of the oral tongue. *Am J Surg* 1993; 166: 360–5.