Oral Cavity Cancer

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Key Points

- Oral cavity cancer is relatively uncommon, which consists of 1.6% of all cancers diagnosed in the United State annually.
- Tobacco exposure is a major risk factor.
- Oral tongue cancer is the most common site for oral cavity cancer and has the highest risk of regional and distant metastasis.
- Lip cancer has the best and oral tongue has the worst prognosis.
- Increasing tumor thickness correlates with the disease control and survival.
- Surgery alone is the most commonly used treatment modality for oral cavity cancer, followed by combined surgery and radiotherapy.
- Radiotherapy alone is used in less than 15% of patients.
- Either surgery or radiotherapy alone can achieve excellent local control for early-stage disease.
- For locally advanced-stage cancer combined surgery and radiotherapy offers the best chance of local and regional control of the disease.

1.1 Epidemiology and Treatment Outcome

1.1.1 Oral Cavity Cancer

1.1.1.1 Epidemiology of Oral Cavity Cancer

Overall Incidence

The oral cavity is the most anterior subdivision of the head and neck, which involves the mucosal lip anteriorly to the junction of the hard and soft palates superiorly and to the circumvallate papillae inferiorly. It is further divided into several anatomical subsites, including mucosal lip from the junction of the skin–vermillion border, buccal mucosa, lower alveolar ridge, retromolar trigone, upper alveolar ridge, hard palate, floor of the mouth, and oral tongue (anterior two thirds of the tongue). According to the National Cancer Institute SEER (Surveillance, Epidemiology, and End Results) Program, the oral tongue is the most common site for oral cavity cancer in both American men and women, which consists of 38% of all oral cavity cancers diagnosed in the USA between 1988 and 2004. The second most common site is the floor of mouth (26%), followed by all other sites of mouth (18%) and lip (18%) (Ries et al. 2007).

Oral cavity cancer is relatively uncommon in the USA and developed countries. According to the American Cancer Society (ACS 2008), an estimated 22,900 new cases of oral cancer (excluding oropharynx) are expected in 2008 in the USA, which represents 1.6% (2.0% for men and 1.1% for women) of all
cancer cases. Among all head and neck cancers (295,022) collected between 1985 and 1994 in the USA by the National Cancer Data Base (NCDB), 17.5% were oral cavity cancers, including lip cancers and 14.1% when lip cancers were not included (Hoffman et al. 1998). The incidence rates are more than twice as high in men (15,250 cases) as in women (7,650 cases). An estimated 5,390 deaths (3,590 in men and 1,800 in women) from oral cavity cancer are expected in 2008, which represents about 1% of all cancer mortality (565,650 deaths) in the USA (ACS 2008).

Worldwide, cancers of the oral cavity accounted for 274,000 cases in 2002. The region of the world with the highest incidence is Melanesia (31.5/100,000 in men and 20.2/100,000 in women). Rates in men are high in Western Europe (11.3/100,000), southern Europe (9.2/100,000), south Asia (12.7/100,000), southern Africa (11.1/100,000), and Australia/New Zealand (10.2/100,000). In females, incidence is relatively high in southern Asia (8.3/100,000; Parkin et al. 2005). Oral cavity cancer is also more common in developing countries with estimated cases of 129,356 in men (3.6% of all cancers in men) and 84,840 in women (2.7% of all cancers in women) in 2007. It represents the seventh most common malignancy for men in developing countries with an estimated mortality rate of 2.6% (Garcia et al. 2007).

In the last few decades it has been suggested that the incidence of oral cancer in all age groups has been rising worldwide (Boyle et al. 1990). The similar trend has also been observed in the USA, especially among African American men (Canto and Devesa 2002) and in young adults, a group with less tobacco and/or alcohol exposure. Despite the decline in incidence rates for the majority of oral cancer sites for the period 1973–2001 among White American men and women between ages 20 and 44, the incidence of oral tongue cancer has continued to rise by 1.7% per year during this time period as reported by Shiboski et al. (2005). Furthermore, oral tongue cancer incidence in this age group grew more rapidly at an annual rate of 6.7% from 1975 to 1985 before reaching a plateau. However, despite a plateau in oral tongue cancer incidence rates in the late 1970s and early 1980s, the incidence of base of tongue and tonsil cancers continued to increase by 2.1 and 3.9% per year through 1998, predominantly among African American and White men younger than 60 years in the USA (Frisch et al. 2000). The age-standardized incidence rates for oral cancers, including oral cavity and oropharyngeal carcinomas, are strongly influenced by age, sex, race, primary site, year of birth, and geographic region.

1.1.1.1.2 Major Risk Factors for Oral Cancer

Tobacco Smoking

Tobacco exposure is clearly a major risk factor for oral cancer in adults. Tobacco contains at least 55 known carcinogens, which can be grouped into three classes: polycyclic aromatic hydrocarbons, N-nitrosamines, and Asz-arenes (Hecht 1999). The risk of oral cancer is definitely increased in smokers of all tobacco products, whether smoked, chewed, or taken as snuff, although the risk is reported to be higher in smokers who consume cigarettes without filters. Furthermore, there is a strong association of oral cancer and unfiltered tobacco products, namely pipes or cigars (Franceschi et al. 1990; Zheng et al. 2004).

The risk of oral cancer increases with amount and duration of smoking, with duration of smoking having a greater impact on risk than amount. In addition, the risk of oral cancer is higher in current smokers than in ex-smokers and is higher in people who start smoking at an early age than in people who start smoking at a later age (IARC 2004). The relative risks (RRs) for oral cancer were 5.3 for people who smoked less than 15 cigarettes/day and 14.3 for people who smoked 25 or more cigarettes/day compared with people who never smoked. Likewise, the RRs were 5.9 for people who had smoked for less than 30 years, which increased to 18.0 if he or she had smoked at least 40 years. The age of exposure also has a significant impact on the risk of oral cancer, with RRs of 13.6 for people who had started smoking before age 17 (Davis and Severson 1987). Depue (1986) reported that the rising mortality and increasing incidence of oral tongue cancer among young males in the USA has been linked to the use of smokeless tobacco products as one of the possible etiological factors. Additionally, environmental tobacco smoke exposure, also known as second-hand smoking, may be an important risk factor for oral cancer in both individuals with a history of tobacco smoking and among never smokers (Zhang et al. 2000).

Despite overwhelming evidence of the strong association of tobacco and oral cancer, only a minority of the overall smoker population actually develop cancer. Studies have suggested a possible link between genetic polymorphisms and risk of oral cancer (Geisler and Olshan 2001). Certain polymorphisms