Oral Cancer

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Oral Cancer Quiz

- True/False. Oral cancer ________.
  - is more common than cervical cancer and melanoma combined.
  - has an overall death rate of 50% which has not change in 50 years.
  - has a multifactorial cause.
  - is most often diagnosed in the late stages.
  - is readily visible to the unaided eye even in early and precancer stages.
U.S. Oral CANCER STATISTICS

- Cancer of the H&N is the 5\textsuperscript{th} most common cancer in the world
  - “H&N: oral cavity, throat and larynx”
  - “Oral: oral cavity and oropharynx”

- 31,000 NEW CASES Oral Cancer in US YEARLY
  - More common than cervical cancer and melanoma combined
  - Causes more deaths/yr than cervical cancer or skin cancer
Overall 5 year survival rate 50%
- 50% of patients have distant spread at time of diagnosis
- Mortality rate has remained unchanged for last 50 years
- 8,000 Americans die of OC/yr (1 per hour)

Early detection = improved survival
Oral CANCER

- Over 95% Oral Cancer is the squamous cell carcinoma type (SCCa)

- SCCa arises from the surface mucosal epithelium of the mouth and throat
Oral CANCER

- Tongue = 50% of Oral Ca in US (esp post lateral and ventral)

- Floor of the mouth = 35% of Oral Ca in US (more common in men), very associated with the development of second primary of aerodigestive tract
Oral SQUAMOUS CELL CARCINOMA
Gender and Age

Gender and Age

- Male : female ratio 1.8:1

- Develops predominantly between
  - ages 50 – 70 years in men and
  - 60 – 80 years in women

- Between 1 – 3% of case develop under age 40
  - Young patients do not have the usual risk factors
Oral SQUAMOUS CELL CARCINOMA
US Incidence Trends: Gender

- Prior to 1940 male : female ratio - 10:1
  - 1980s ratio 3:1
  - Current ratio 1.8:1

- Reason: The major risk factor for OPH Ca is smoking. And tobacco use among women has steadily increased in women beginning in the early decades of the century
Etiology of Oral Cancer

- DNA damage
- Mucosal stem cells (in the basal layer) self renew and also generate daughter cells that divide more rapidly (parabasal layers) and undergo maturity to terminal differentiation
- Mucosal stem cells and their daughter cells undergo continuous assault from carcinogens (e.g. tobacco) and oncogenic viruses (e.g. HPV) which cause DNA damage (also spontaneous)
Etiology of Oral Cancer

- Damaged DNA in mucosal stem cells may be repaired by the cell (your previous lecture) or may remain to be maintained in the self renewal process and transmitted to daughter cells.
Etiology of Oral Cancer

- Genetically damaged daughter cells and stem cells are continuously exposed to new carcinogens (e.g., cigarette smoke) and co-carcinogens (e.g., alcohol) & can eventually be transformed into a malignant cell undergoing uncontrolled division (Multiple hit theory of carcinogenesis).
Etiology of Oral Cancer

- Critical #/event? Est. 5 events in humans are required to transform a normal cell to a cancer cell

- The genetic alterations: tumor suppressor gene inactivated by mutation (eg p53) or oncogene activated by mutation or amplification
RISK FACTORS/Carcinogens

- Tobacco (esp. smoking)
- Alcohol
- Actinic radiation
- Human papillomavirus infection (HPV)
- Iron deficiency
Tobacco smoking

- Most popular in US in the 1940s
- Declining prevalence (65% in 1940s; 25% today in US)
Smoking and Cancer
Lung cancer emerges as a threat to the tobacco industry in 1940s

- 1946: R.J. Reynolds’ Campaign For the Camels Brand

Post-war cigarette advertising: lung cancer emerges as a threat to the tobacco industry. To reassure a worried public was to incorporate images of physicians in their ads.
MEDICAL AUTHORITIES KNOW PHILIP MORRIS

Proved less irritating to the smoker's nose and throat!

WHEN SMOKERS CHANGED TO PHILIP MORRIS, EVERY CASE OF IRRITATION OF NOSE OR THROAT—DUE TO SMOKING—EITHER CLEARED UP COMPLETELY, OR DEFINITELY IMPROVED! Facts reported in medical journals on clinical tests made by distinguished doctors.

CALL FOR PHILIP MORRIS
Finer flavor...less irritation...America's FINEST Cigarette!

See Good Housekeeping's Advertising Guaranty—Page 6
Tobacco smoking

- 1950-1960 definitive evidence (epidemiologic and laboratory studies) linking smoking to lung cancer

- Mostly indirect clinical evidence that implicates tobacco smoking in the development of oral SCCa
  - 80% of oral cancer pts smoke
TOBACCO & ALCOHOL

- Effects are synergistic
- Some studies show people who smoke and drink have 15X increased risk
ALCOHOL

- Risk of dysplasia (precancer) 2X greater than in nondrinkers

- Risk is however dose and time dependent
Radiation

- UV radiation and x-irradiation from radiotherapy to the head and neck causes decrease in immune reactivity and DNA damage
- Dose dependent risk
Role of Viruses

- Epstein Barr virus -
  Burkitt’s lymphoma, nasopharyngeal ca in China
- Human papillomavirus,
  high risk - HPV 16,18,31,32
  low risk - HPV 6, 11
- Herpes Simplex Virus – no evidence
HUMAN PAPILLOMAVIRUS

50% OF HEAD AND NECK CANCERS ARE INFECTED WITH HUMAN PAPILLOMAVIRUS

There is increasing evidence that HPV is responsible for a subset of oral cancers, especially those of the oropharynx and tonsils.
Chronic severe iron deficiency is associated with impaired cell-mediated immunity and high turnover rates of upper GI epithelium.
Genetic Susceptibility

- Heredity does not appear to play a major etiologic role in oral cancer

- DNA repair deficiency syndromes
  - Bloom syndrome
  - Fanconi anemia
  - Ataxia-telangiectasia
  - Xeroderma pigmentosa – from previous lecture: Individuals with *Xeroderma Pigmentosum* are unable to perform the first step of nucleotide excision repair.
Clinical features of Oral SCCa and precancer

- Symptoms:
  - Precancers and early cancers: painless, asymptomatic
  - Advanced cancers: pain, paresthesia, loss of function, mass (at site and/or neck)

- Signs:
  - Precancers and cancers cause visible color and texture changes of the oral mucosa
What does Oral SCCa and precancer look like clinically?

Leukoplakia (white patch)
Erythroplakia (red patch)
Leukoplakia-erythroplakia (red & white patch)

Chronic Ulcer

ENDOPHTYIC - ULCERATED, DEPRESSED, ROLLED BORDER - INFILTRATION UNDER MUCOSA

Tumorous mass

EXOPHTYIC - IRREGULAR SURFACE USUALLY INDURATED
precancer
cancer
precancer
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Oral Cancer Screening:

- Visual examination of the oral cavity in asymptomatic people increases survival (Kerala Study: inc. survival for males with high risk habits like tobacco use

  *(Lancet 2005;365(9475):1927-33)*

- Opportunistic Screening

- Conclusion: Scalpel biopsy is the gold standard for diagnosis. Noninvasive screening techniques and adjunctive diagnostic tests such as toluidine blue, brush cytology, tissue reflectance and autofluorescence should not be considered as substitutes for biopsy. Moreover, the use of these tests to improve detection of oral cancers and precancers beyond conventional oral examination alone has yet to be rigorously confirmed.
Oral Cancer Screening

Video Demonstration