“Head & Neck Cancers-Link to Human Papillomavirus (HPV)”

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Objectives

- Define head and neck cancers
- Understand the epidemiology and pathophysiology of HPV related head and neck cancer
- Discuss the risk factors and nursing implications for HPV related head and neck cancer
Cancers arising in the oral cavity, oropharynx, hypopharynx, lip, larynx, paranasal sinus, salivary gland, mucosal melanoma.
Epidemiology

- H&N cancers represent 3%-5% of all cancers in the U.S. with $3.1 billion spent annually on treatment.

- 2012 40,250 people (28,540 men and 11,710 women) will develop oropharyngeal cancer in the U.S.

- Over 2,370 new cases of HPV-associated oropharyngeal cancers in women and about 9,356 in men each year in the U.S.

- 7,850 deaths (5,440 men and 2,410 women) will occur this year from this disease.

- 15%-20% of people with H&N cancer are nonsmokers and nondrinkers.

www.cancer.net/cancer-types/oral-and-oropharyngeal-cancer/statistics
HPV-Associated Oropharyngeal Cancer Rates by Race, Ethnicity, and Sex, United States, 2004–2008

Epidemiology

- 15%-20% of people with H&N cancer are nonsmokers and nondrinkers.

- Historically, older males with multiple comorbidities who drank excessive amounts of alcohol and smoked cigarettes were more prone to developing H&N cancer.

- Decrease in H&N cancer early 1980’s (decreased smoking r/t tobacco use therefore preventable?)

- Well educated healthy, Caucasian males 40-59 years old. Eliminated the dramatic racial disparity that existed in oral cavity/pharyngeal cancer incidence.
Clinical Study

- Retrospective study of overall survival (OS) and HPV status of 106 Caucasian patients and 95 African American patients with squamous cell carcinoma of the head and neck.

- The median OS for Caucasians was 52.1 months, versus 23.7 months for African Americans. For the subgroup of patients with oropharyngeal cancer, the OS was 69.4 months for Caucasians versus 25.2 months African Americans.

- Patients who were HPV positive had a fivefold improvement on OS compared with those who were HPV negative. Survival was similar for Caucasian and African American HPV negative patients.

More than 100 HPV types

Low-risk HPV types can cause genital warts and low-grade changes in the cells, but rarely cause cancer. High-risk HPV types can cause low-grade changes, high grade changes, pre-cancer, and cancer.
HPV-Type Distribution in HPV DNA-Positive Oropharynx Cases

Prevalence (%)

- HPV 16: 92%
- HPV 18: 3%
- HPV 33: 3%
- HPV 35: 0.6%
- HPV 45: 0.3%
- HPV 59: 0.3%

N=325.

Incidence and Distribution of Cancers Attributable to HPV

Adapted from Parkin et al, Eur J Cancer 37:S4, 2001
Cervical cancer and HPV

- 12,000 new cases a year

- 80% women have had HPV by age 50

- 2011 study reported 45% women 20-24 year old had high risk HPV and 25% were 14-19 year old.

- No test for HPV in men but studies have found 1 in 3 (ages 18 and up) positive for high risk types HPV.

Risk factors for genital HPV

- Having many sex partners
- Being younger than 25 years of age
- Starting to have sex at an early age (16 or younger)
- Have a partner who has had many different sex partners
- Have a male partner who is uncircumcised male
Risk factors for head and neck cancer

- Smoking
- Alcohol
- Chewing tobacco and bettle nut
- Industrial occupations (woodwork)
- Chronic irritation
- HPV
Pathophysiology

- Virus must enter a host cell though mucous membrane
- HIV infects T cell and macrophages of the immune system.
- HPV live only in squamous epithelial cells
- Initial infection follows trauma to the epithelium which allows the virus to reach and infect the basal cells of the epithelium.
- Epithelial cells that are infected with HPV undergo transformation, proliferate, and form a warty growth
Staging of head & neck cancer

- In H&N cancer, the pathologic stage provides additional precise data used for estimating the prognosis of the patient and calculating end results. Accurate staging of cancer is important in determining treatment and prognosis.
Staging classification of head and neck cancer

- **Stage I**  
  T1  
  N0  
  M0

- **Stage II**  
  T2  
  N0  
  M0

- **Stage III**  
  T3  
  N0  
  M0
  
  T1  
  N1  
  M0
  
  T2  
  N1  
  M0
  
  T3  
  N1  
  M0

- **Stage IVa**  
  T4a  
  N0  
  M0
  
  T4a  
  N1  
  M0
  
  T1  
  N2  
  M0
  
  T2  
  N2  
  M0
  
  T3  
  N2  
  M0
  
  T4a  
  N2  
  M0

- **Stage IVB**  
  T4b  
  Any N  
  M0
  
  Any T  
  N3  
  M0

- **Stage IVC**  
  Any T  
  Any N  
  M1
Genetic data

- Oncogenicity of HPV determined by the viral gene products E6 and E7 proteins, necessary for host cell immortalization.

- HPV types 6 and 11 considered inactive or weakly capable of transformation, whereas E6 and E7 proteins in HPV types 16 and 18 are capable of producing progressive squamous epithelial neoplasia in experimental studies.
Genetic data (cont’d)

- HPV travels along the same two molecular pathways as alcohol and tobacco

- The E6 oncoprotein binds to protein ligase E3A and degrades TP53, which causes the nullation of TP53 and leads to uncontrolled cell growth.

- E7 oncoprotein binds with the retinoblastoma protein causing uncontrolled cell division
Direct damage vs. indirect alteration
Most oral cancers develop from direct damage to DNA caused by tobacco-associated mutations or indirect alteration of DNA caused by viral proteins.

In normal cells, p53 and Rb help to control cell division by suppressing DNA replication. By binding to normal host proteins that control cell division, viral proteins indirectly alter DNA replication and give rise to mutations.

In infected cells, HPV produces viral proteins E6 and E7 that bind to and inactivate p53 and Rb so that DNA replication proceeds unchecked.

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• J.G. 68 year old Caucasian male with hoarseness, pain and difficulty swallowing for approximately 2 weeks prior to developing a palpable and slowly enlarging right neck lymph node.

• Fine needle aspiration of neck mass showed cells that looked suspicious for squamous cell carcinoma.

• CT scan of neck soft tissue with contrast revealed 2.5 x 3.1 cm complex solid and cystic mass just dorsal to the right angle of the mandible and anterior sternocleidomastoid muscle, suspicious for malignant metastasis to level II A lymph node.
Case Report

- Chest X-ray clear
- Labs within normal limits
- Meds- ASA 81 mg daily, Omeprazole 20mg daily, Lisinopril 20 mg daily, and Carvedilol 12.5 mg 2 tabs daily.
- No known drug allergies
Case Report (cont’d)

- PMH- hypertension, gastroesophageal reflux disease, chronic rhinitis, chronic left knee pain, cholecystectomy, appendectomy and right hemicolecctomy after extensive lysis of adhesions.

- Social Hx- distant history of cigarette use 1 pack per day for 35 years. Quit 15 years ago. Drinks beer in the social setting. No history of illicit drug use. Married with adult children and lives with his wife. Resident of Delaware 54 years and is a self-employed contractor, performing roofing and siding.

- Family History-stomach cancer in mother diagnosed at age 64. Alive and well.

- Physical examination- Calm and cooperative. Denied pain or difficulty breathing. Edentulous. Neck dissection scar healed well. No difficulty speaking or swallowing. Denied choking on liquids.
Case Report (cont’d)

- Evaluation under anesthesia by surgeon for biopsies of nasopharynx, oral cavity and base of tongue. Bilateral tonsillectomy and right neck dissection.

- Pathology report showed 1/24 lymph nodes contained metastatic squamous cell carcinoma with suggestion of extra nodal extension. Biopsies from the base of tongue confirmed the presence of moderately to poorly differentiated squamous cell carcinoma. HPV positive pathology result.

- Then presented to H&N MDC for an opinion regarding treatment options for local regionally advanced base of tongue squamous cell carcinoma.
Treatment options

• Not a candidate for treatment on clinical trial, due to extranodal extension of disease

• Multimodality treatment to include surgery, chemotherapy, and radiation in accordance with National Comprehensive Cancer Network (NCCN, 2011) guidelines.

• Biologic agent, Cetuximab, to be delivered weekly during 7 week course of radiation.

• Cetuximab shown to extend the median overall survival (10.1 months versus 7.4 months, p=0.04) in patients with H&N cancer
Treatment options (cont’d)

- Treated with radiation with concurrent cisplatin or cetuximab, induction chemotherapy followed by radiation with/without concurrent systemic therapy, and surgery with postoperative radiation with/without concurrent cisplatin.

- Intensity-modulated radiation therapy (IMRT), has significantly improved the efficacy of radiation therapy.

- Gardasil (Merck)

- Cervarix (GlaxoSmithKline)
Gardasil

- Quadrivalent vaccine because it protects against four HPV types: 6, 11, 16, and 18.

- Given through a series of three injections over a 6-month period.

- FDA approved for use in females for prevention of cervical cancer, vulvar and vaginal cancers, caused by HPV types 16 and 18.

- FDA approved for use in males and females for the prevention of anal cancer and precancerous anal lesions caused by HPV types 16 and 18.

- FDA approved for the prevention of genital warts caused by HPV types 6 and 11.
Cervarix

- Bivalent vaccine because it targets two HPV types: 16 and 18.

- Given in three doses over a 6-month period.

- FDA has approved for use in females ages 9 to 25 for the prevention of cervical cancer caused by HPV types 16 and 18.
Implications for Nurses

- Health promotion and disease prevention
- Ensure parents and adolescents make informed decisions about HPV vaccines base on the most current information
- Community wide education efforts to explain HPV and its transmission through various sexual behaviors, as well as developing culturally sensitive educational materials to target high-risk populations.
Nurses should discuss risk factors for head and neck cancer with adolescents and adults.

Assume more active roles in research initiatives involving HPV-associated malignancies.

Provide education and emotional support before, during and after cancer diagnoses and treatment.
Conclusion

- Increasing incidence of oropharyngeal cancer in the U.S are the result of HPV associated cancers.

- Younger patients with higher socioeconomic status

- Prevention effort need to expand beyond tobacco/alcohol control

- Better prognosis for HPV positive head and neck cancer
Web Resources

- [http://www.cdc.gov/vaccines/who/teens/for-hcp.html](http://www.cdc.gov/vaccines/who/teens/for-hcp.html)
- [http://www.cdc.gov/vaccines/who/teens/refs-pubs.html](http://www.cdc.gov/vaccines/who/teens/refs-pubs.html)
- [http://www.cdc.gov/hpv](http://www.cdc.gov/hpv)
- [http://www.cdc.gov/vaccinesafety/vaccines/HPV/Index.html](http://www.cdc.gov/vaccinesafety/vaccines/HPV/Index.html)
Support for people with head and neck cancer

- Support for People with Oral, Head, and Neck Cancer (SPOHNC)
- Toll-free number: 1-800-377-0928
- Web site: www.spohnc.org
References


References


