FACTORS TO GUIDE CLINICAL USE OF EPSTEIN-BARR VIRUS DNA LOAD IN THE DETECTION OF RECURRENT NASOPHARYNGEAL CARCINOMA.

Joshua K Tay, MRCS, Chwee Ming Lim, MRCS, Kwok Seng Loh, FRCS; Otolaryngology - Head & Neck Surgery, National University Health System, Singapore

BACKGROUND

Epstein-Barr Virus (EBV) DNA load has been reported to be a useful indicator for staging, prognosis and disease recurrence in patients with nasopharyngeal carcinoma (NPC). We aimed to look at the pattern of EBV DNA load in a cohort of NPC patients to determine features that are associated with recurrent NPC.

METHODS

Serum samples were prospectively collected from 284 newly diagnosed NPC patients from February 2004 - August 2011. All NPC patients were biopsy-proven and the initial serum samples were taken before treatment was initiated. After treatment, serum samples were collected at yearly intervals.

EBV DNA load was measured with real-time quantitative polymerase chain reaction analysis. EBV Viral Capsid Antigen (VCA) IgA and EBV Early Antigen (Ea) IgA titers were measured using immunofluorescence assays.

RESULTS

EBV DNA load correlated significantly with overall stage, stage of primary tumor, nodal status, and the presence of distant metastasis (p < 0.001). However, EBV DNA load did not correlate well with both EBV-VCA IgA (Spearman's ρ = 0.204, p = 0.001) and EBV-Ea IgA (ρ = 0.283, p < 0.001) geometric mean titers. The median pre-treatment EBV DNA load was 388.9 copies/mL, compared to 20.4 copies/mL one year post-treatment (p < 0.001).

Forty-two patients (14.8%) developed recurrent disease, at a mean of 22.9 months after initial diagnosis. The median EBV DNA load at recurrence was 777.3 copies/ml (range: 3 - 89 182 copies/ml). Patients who developed recurrent disease had higher pre-treatment EBV DNA load (994.0 vs 317.2 copies/ml, p = 0.033), and higher EBV DNA load one year post-treatment (31.1 vs 17.7 copies/ml, p = 0.043). Fifteen of 31 (48.3%) patients who developed recurrent disease after one year demonstrated a raised EBV DNA load of > 100 copies/ml preceding clinical recurrence.

Due to the large variation in EBV DNA load levels, ROC analysis was unable to identify an EBV DNA load level that could accurately select patients who would subsequently develop recurrent disease (AUC: 0.523 - 0.604).

CONCLUSION

EBV DNA load is a useful tool to identify patients at risk of recurrent NPC. High levels of EBV DNA load pre-treatment and at one year post-treatment is associated with disease recurrence. Furthermore, a raised EBV DNA load preceded clinical recurrence in approximately half of our patients with recurrent disease.
BACKGROUND: Nasopharyngeal cancer (NPC) is endemic among Chinese in Southeast Asia. However, the description of the clinical outcomes of NPC in a multi-ethnic society in Singapore is not well reported.

AIM: We aim to examine the clinical outcomes of NPC patients in a multi-ethnic society and to determine if non-Chinese NPC patients have a different prognosis.

METHODS: Retrospective chart review of 558 NPC patients treated at a single academic institution between 2002 and 2012 was performed. Survival and recurrence rates were analysed and predictive factors were identified using the Kaplan-Meier method and Cox regression model.

RESULTS: Our cohort comprised 409 males (73.3%) and 149 females (26.7%) with a median age of 52 years. There were 476 Chinese (85.3%), 57 Malays (10.2%), and 25 of other ethnic groups (4.5%). There were no statistical differences between Chinese and non-Chinese NPC patients in terms of age, gender, T disease, AJCC stage, and modality of treatment. Non-Chinese patients were more likely to be associated with advanced nodal disease at initial presentation (p=0.049), compared with the Chinese NPC patients. However, there were no statistical differences in the overall survival (OS) or disease specific survival (DSS) among non-Chinese patients compared with Chinese patients (p=0.934 and p=0.857 respectively).

As a single cohort, the 3-year and 5-year OS and DSS rates were 79.3%, 70.7%, and 83.2%, 77.4% respectively. On multivariate analyses, age>50 (p=0.018), N2 disease (p=0.028), N3 disease (p<0.001), and metastatic disease (p<0.001) at presentation were independently associated with poor overall survival. Similarly, N2 disease (p=0.015), N3 disease (p<0.001, CI 5.61-14.62) and metastatic disease (p<0.001, CI 5.60-14.62) were also independently associated with poor DSS.

With a median follow-up duration of 41 months, 93 patients (18.4%) experienced loco-regional recurrence (LRR) and 84 (16.6%) distant relapse after definitive treatment. The median time to LRR and distant relapse was 18.0 and 14.6 months respectively. No predictive factors were associated with LRR. N2 disease (p=0.012) and N3 disease (p<0.001) were independently associated with distant relapse. Median survival for patients with LRR and distant relapse was 83 months and 35 months respectively (p<0.001).

CONCLUSION: Although patients of non-Chinese ethnicity are more likely to present with advanced nodal disease, there are no significant differences in their survival outcomes compared with Chinese NPC patients. Patients with N2 or N3 disease are associated with a higher risk of distant relapse and poor overall survival.
Background: NPC is closely associated with Epstein-Barr Virus (EBV) infection with each tumor cell harboring copies of the same viral clone, making the virus easily detectable in early, pre-invasive lesions. NPC is still characterized by late diagnosis with poor prognosis. Tumors detected at an early stage demonstrate improved survival and prognosis.

Objectives: To evaluate a newly developed ambulatory, quantitative Polymerase Chain Reaction (Q-PCR) EBV-DNA based detection and screening system for NPC (NPScreen™).

Study Design: Correlation of the EBV DNA levels from trans-oral brush biopsy of nasopharyngeal epithelium and findings from nasopharyngoscopy and pathologic confirmation of NPC by biopsy.

Setting: Multicenter ENT/Oncology clinics in Hong Kong and Canada. In Hong Kong the clinics were the Radiation Oncology Clinic at the Queen Elizabeth Hospital; and the Radiation Oncology Clinic and Head and Neck Clinic at the Queen Mary Hospital, University of Hong Kong. In Toronto, Canada the clinics were the Otolaryngology-Head and Neck Clinic, Rouge Valley Health System and two large ENT practices in Toronto.

Methods: A single-use trans-oral brush was used for rapid, non-traumatic Nasopharyngeal (NP) epithelial cells DNA harvest in 600 patients, combined with a preservation and shipping kit for remote, real-time Q-PCR EBV DNA determinations.

Results: All 600 Chinese patients had NP brushings using NPScreen™ in an ambulatory environment and no adverse events or complications were recorded. A final 578 patients were included with sufficient amount of DNA for completion of the Q-PCR assay. Of these 578 patients, 94 were confirmed positive for NPC histologically. There were 3 false positive (FP) and 1 false negative (FN) brushings.

The brushing results were reported as the Epstein Barr Virus Detection Level (EDL). The outcome was Negative if the EDL was less than 1.7, Equivocal if the EDL was 1.7 to 2.6 and Positive if the EDL was greater than 2.7. The EDL distribution of the brush biopsy results were clearly delineated by separate curves other than one false negative outlier with an EDL of 1.6 (Fig. 1).

The study yielded a sensitivity of 98.9%; specificity of 99.3%; positive predictive value (PPV) of 96.9%, and negative predictive value (NPP) of 99.7% for NPScreen™ in detecting NPC. In comparing with endoscopy, the sensitivity was 94%; specificity 97.1%, PPV 85% and NPP 98.9%. 69% of the NPC cases with known TNM stages were detected in the T1 and T2 stages using the NPScreen™ (Table 1).

Conclusions: The new trans-oral brushing system fulfils the characteristics of a non-invasive, sensitive, specific detection method suitable for routine, large-scale ambulatory NPC risk assessment for high-risk populations.
Figure 1: The distribution patterns of EDL values for brushed NPC tumor and normal subjects. The two groups were clearly delineated by separate curves other than one false negative result.

Table 1: Tumor staging was available for 67 histological NPC positive patients. Brush biopsy was able to diagnose early stage disease and was at least as comparable to nasoendoscopy.
NASOPHARYNGEAL CARCINOMA: A DIAGNOSTIC CHALLENGE
Kevin H Wang, MD, Stephanie A Austin, MD, Sonia Chen, MD; Kaiser Permanente - Oakland Medical Center

Objectives/Hypothesis:
In the United States, nasopharyngeal carcinoma is rare and usually diagnosed at late stage. In order to achieve earlier detection, we utilized the data from a large US integrated health care system to study the factors involved in the diagnosis of nasopharyngeal carcinoma.

Study Design:
Retrospective chart review.

Methods:
All patients diagnosed with nasopharyngeal carcinoma from 2007-2010 at our institution were reviewed. Each time interval from symptom onset to treatment, symptom quality and diagnostic tests were recorded.

Results:
There were 102 patients who met inclusion criteria. 70% were of Chinese or Southeast Asian descent and 69% were male.

Diagnostic intervals are seen below:

<table>
<thead>
<tr>
<th>Interval</th>
<th>Median Time (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom onset to Primary Care Physician (PCP) visit</td>
<td>6.0</td>
</tr>
<tr>
<td>PCP to Otolaryngologist (Oto-HNS)</td>
<td>2.4</td>
</tr>
<tr>
<td>Oto-HNS to Pathologic Diagnosis</td>
<td>1.1</td>
</tr>
<tr>
<td>Diagnosis to Treatment Onset</td>
<td>5.5</td>
</tr>
<tr>
<td>Total (Symptom Onset to Treatment Onset)</td>
<td>23.5</td>
</tr>
</tbody>
</table>

Mean time intervals were significantly longer; for example mean total time was 41.7 weeks. 43% of patients required longer than 6 months from symptom onset to treatment initiation.

The most common presenting symptoms were otologic (41%), neck mass (39%), nasal (32%), or headache/cranial neuropathy (16%). The initial diagnosis after the first Oto-HNS visit was a nasopharyngeal lesion just 54% of the time. Of the initial nasal endoscopies, 32% did not reveal a nasopharyngeal lesion. Of the initial imaging studies, 32% were not interpreted to have a nasopharyngeal lesion. However, in 91% of these studies, the nasopharyngeal tumor could be seen on retrospective review. There was no correlation between diagnostic delay and stage of disease.

Conclusions:
To our knowledge, this is the most comprehensive study evaluating the pathway to diagnosis of nasopharyngeal cancer in an American healthcare system. It is frequently misdiagnosed as the presenting symptoms are extremely variable. One-third of nasopharyngeal cancers are difficult to visualize on nasal endoscopy. This may be due to the mostly submucosal growth of some tumors or because tumors which originate from the deepest aspect of the fossa of Rosenmüller can be difficult to visualize. They can be missed by the radiologist, especially when the ordering physician does not specify a suspected nasopharyngeal pathology. Men of Chinese or Southeast Asian descent are at higher risk. Therefore otolaryngologists and radiologists should maintain a higher index of suspicion when evaluating these patients.
Background Nasopharyngeal carcinoma is particularly prevalent in the region of Guangdong in Southern China where Hong Kong is situated. The identification of early nasopharyngeal malignancy can be difficult due to the fact that early lesions may be submucosal. For these reasons, adjunctive use is made of serology in an attempt to detect subclinical cases. Whether the submucosal malignancy induces vascular changes in the overlying nasopharyngeal mucosa and if so, whether these are apparent with conventional white light and/or narrow band imaging endoscopy was the aim of this study. Theoretically, narrow band imaging may allow the endoscopist to assess the vascularity of the mucosa and to recognize abnormal vascularization which may indicate mucosal or submucosal malignancy.

Methods Patients who presented to the Otorhinolaryngology clinic with elevated EBV serology underwent white light and then narrow band imaging endoscopy of their nasopharynx prior to a biopsy as part of an institutional review board approved nasopharyngeal carcinoma screening study. The white light endoscopy was graded as normal, low index of suspicion, high index of suspicion or definite carcinoma and the endoscopist was asked to commit to the need to perform a biopsy were the patient not part of a study. The nasopharynx was then reassessed with narrow band imaging endoscopy and once again the endoscopist was asked to commit to the need to perform a biopsy were the patient not part of a study. The findings of the two endoscopies were compared to the biopsy result for accuracy.

Results One hundred and fifty six patients underwent screening endoscopies and a nasopharyngeal biopsy between February 2008 and January 2010. There were 90 males and 66 females with a mean age of 49.5 years (range 17 - 85 years). The nasopharynx was graded as being normal n=81, low index of suspicion n=31, high index of suspicion for malignancy n=31, or definite carcinoma n=13 on white light endoscopy. In 5 cases, the vascularity of the nasopharyngeal mucosa seen on narrow band imaging led to the endoscopist to change the decision regarding the perceived need for a biopsy. Forty one biopsies were positive for nasopharyngeal carcinoma while 115 were negative. There were no complications of the biopsy and no patient needed nasal packing or hospital admission.

Conclusions Narrow band imaging does not offer a significant benefit over white light endoscopy of the nasopharynx when used as a screening investigation for nasopharyngeal carcinoma. The morphology of the nasopharynx is more important than mucosal vascularity when making a decision on the need to biopsy the nasopharynx to exclude carcinoma.
RISK OF SECOND PRIMARY MALIGNANCY FOLLOWING A NASOPHARYNGEAL CARCINOMA IN THE UNITED STATES: A POPULATION BASED STUDY
Zhen Gooi, MBBS, Jason Y Chan, MBBS, Wojciech Mydlarz, MD, Nishant Agrawal, MD; Johns Hopkins Medical Institutions

Introduction:
To evaluate the incidence of second primary malignancies in patients diagnosed with an index nasopharyngeal carcinoma (NPC) in the United States.

Methods:
The cohort was assembled from the SEER database with a primary NPC between 1973-2005.

Results:
There was a 47% increased risk of second primary malignancy. The sites with increased risk include the oral cavity and pharynx (SIR = 7.40, 95% CI 5.35 - 9.96), esophagus (SIR = 3.49, 95% CI 1.60 - 6.63), nose, nasal cavity and middle ear (SIR = 11.57, 95% CI 3.15 - 29.63), lung and bronchus (SIR = 2.42, 95% CI 1.91 - 3.02) and female breast (SIR = 1.59, 95% CI 1.02 - 2.36).

Conclusions:
NPC patients are at an increased risk for second primary malignancies predominantly in the upper aerodigestive tract that may be related to common environmental and genetic risk factors, increased surveillance and treatment related effects given the differing latency periods.
SALVAGE SURGERY FOR RESIDUAL AND RECURRENT LOCOREGIONAL DISEASE IN NASOPHARYNGEAL CARCINOMA - IS THERE A DIFFERENCE IN OUTCOMES?

Jeremy Chee, Yohanes Ting, MBBS, Malcolm Mak, Chwee Ming Lim, MBBS, MRCS, MMed, Thomas Loh, MBBS, FRCS; National University of Singapore, National University Hospital System

Background: Nasopharyngeal cancer (NPC) is endemic in Singapore and is commonly treated with radiotherapy with or without chemotherapy. While good response to definitive radiotherapy or chemoradiation is anticipated, loco-regional relapse remains a problem which contributes to mortality in a small number of these patients. Surgical salvage is the treatment of choice for these loco-regional relapses, but it remains unclear if surgical salvage is equivalently effective in the residual versus the recurrent patient cohort.

Aim: To analyse the clinical outcome of surgical salvage in residual versus recurrent nasopharyngeal carcinoma treated at a single academic centre and to identify and evaluate the prognostic factors for successful surgical salvage.

Methods & materials: 507 newly diagnosed non-metastatic NPC patients were treated at our institution from 2002 to 2012. 51 patients required surgical salvage for locoregional relapse (n=14 for residual disease; n=37 for recurrent disease). Residual disease was defined as relapse occurring within 6 months of definitive therapy, while recurrent disease was defined as relapse beyond 6 months after definitive therapy. 27 patients received nasopharyngectomy for primary disease while 30 received neck dissection for regional neck disease. Out of these patients, 6 patients received concurrent nasopharyngectomy with neck dissection. The clinical outcome of overall survival (OS), disease-specific survival (DSS) and disease free survival (DFS) were compared between the residual versus recurrent group using the Kaplan-Meier survival analysis. Univariate and multivariate analyses were performed to identify prognostic factors for overall disease control (OC) following surgical salvage.

Results: The median follow up was 44.4 months. No statistical difference in age, gender, stage of cancer or site of salvage were identified between patients with residual or recurrent disease. Patients with recurrent disease fared poorly compared to those with residual disease following surgical salvage in terms of OS (100% vs 36.5%, p=0.001), DSS (100.0% vs 64.8%, p=0.025) and DFS (76.2% and 14.4%, p=0.005) at 5 years. Relapse status (recurrence vs relapse) and nodal involvement at initial presentation were independent prognostic factors for OS (p=0.004 and p=0.036) and DFS (p=0.003 and p=0.027) respectively. Mean time to relapse of cancer following salvage surgery was 80.2 months and 43.5 months for recurrent and residual disease respectively (p=0.037). In the Cox-regression analysis, patients with locoregional relapse requiring nasopharyngectomy and concurrent neck dissection had a worse overall disease control than isolated relapse requiring either neck dissection or nasopharyngectomy (p=0.011).

Conclusion: Surgical salvage for loco-regional relapse of NPC was more effective for patients with residual disease than those with recurrent disease. Nodal disease at presentation also was associated with a worse survival following surgical salvage. Patients receiving concurrent neck dissection and nasopharyngectomy for loco-regional relapse had a worse overall disease control than those receiving surgery isolated primary or nodal relapse.

Valerie A Fritsch, Caroline Banks, MD, Terry Day, MD; Department of Otolaryngology - Head and Neck Surgery, Medical University of South Carolina

Purpose/Objectives: Historically, laryngeal cancer has been regarded as the most common type of head and neck cancer. Head and neck squamous cell carcinoma (HNSCC) epidemiologic trends are shifting primarily due to the rising incidence of HPV-related oropharyngeal squamous cell carcinoma (OPSCC) predominantly among middle-age Caucasian males. Meanwhile, the incidence of tobacco- and alcohol-related HNSCC involving other subsites is decreasing. Our objective was to identify current trends in HNSCC based on age and anatomic location using a population-based approach.

Materials/Methods: HNSCC patients were identified using the Surveillance, Epidemiology, and End Results database and then categorized into groups based on tumor location: oral cavity, oropharynx, larynx, hypopharynx, sinonasal, and nasopharynx. Primary site was further classified into anatomic subsite. Patients were classified according to age at diagnosis by decades [i.e. <20yo (years old), 20-29yo, 30-39yo, etc. up to 90+yo]. The proportion of cancers at each site and subsite was analyzed and compared between each successive age grouping.

Results: Most HNSCC in our 68,771 patient cohort were located in the oropharynx and larynx (32.2% and 31.5%, respectively). The most common subsite of HNSCC varied by age at diagnosis, as follows: Nasopharynx among <20yo patients, oral cavity in 20-39yo patients as well as patients >80yo, oropharynx in 40-59yo patients, and larynx in 60-79yo patients. The proportion of hypopharyngeal cancers progressively increased with age, peaking in the 7th decade; and the proportion of sinonasal SCC remained relatively consistent among age groups, with slight peaks in the youngest and oldest patients. Within the OPSCC subgroup, tonsil primaries predominate in younger patients, but base of tongue becomes the most common subsite after age 60. In the oral cavity, tongue SCC was exceedingly more common among younger patients. The proportion of floor of mouth cancers rapidly increased with age, peaking in the 5th-6th decade, and then gradually declined with advancing age. In the larynx, the glottis was the most commonly involved subsite for the youngest and oldest age groups; however, the proportion of glottic and supraglottic primaries were nearly equal among patients in their 40s-50s.

Conclusions: The oropharynx has now surpassed the larynx and oral cavity as the most common subsite of HNSCC. If confirmed in subsequent studies, the observed site-specific distribution of HNSCC by age may help to guide early detection recommendations, molecular analyses, and even direct targeted biopsies in patients who present with unknown primaries. Age-related differences in the proportion of tonsil and tongue base SCC are particularly intriguing, as well as the apparent bimodal age-distribution of oral tongue and glottic SCC.
TABLE 1. Age and Subsite Distribution in the Oropharynx, Larynx, and Oral Cavity.

<table>
<thead>
<tr>
<th>AGE</th>
<th>&lt;20 yrs</th>
<th>20-29 yrs</th>
<th>30-39 yrs</th>
<th>40-49 yrs</th>
<th>50-59 yrs</th>
<th>60-69 yrs</th>
<th>70-79 yrs</th>
<th>80-89 yrs</th>
<th>90+ yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OROPHARYNX</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base of tongue</td>
<td>0</td>
<td>45</td>
<td>38</td>
<td>33</td>
<td>40</td>
<td>46</td>
<td>50</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>Tonsil</td>
<td>0</td>
<td>50</td>
<td>59</td>
<td>61</td>
<td>52</td>
<td>44</td>
<td>38</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Soft palate/Uvula</td>
<td>0</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Oropharyngeal wall</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>LARYNX</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glottis</td>
<td>75</td>
<td>87</td>
<td>60</td>
<td>50</td>
<td>52</td>
<td>57</td>
<td>65</td>
<td>74</td>
<td>81</td>
</tr>
<tr>
<td>Supraglottis</td>
<td>25</td>
<td>13</td>
<td>38</td>
<td>40</td>
<td>46</td>
<td>41</td>
<td>33</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>Subglottis</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>ORAL CAVITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tongue</td>
<td>46</td>
<td>90</td>
<td>73</td>
<td>52</td>
<td>41</td>
<td>36</td>
<td>32</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>Gums</td>
<td>31</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>11</td>
<td>20</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Hard palate</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Buccal/mucosa</td>
<td>0</td>
<td>3</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>RMT</td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>FOM</td>
<td>15</td>
<td>0</td>
<td>8</td>
<td>26</td>
<td>33</td>
<td>31</td>
<td>24</td>
<td>16</td>
<td>14</td>
</tr>
</tbody>
</table>
SEXUAL BEHAVIOR, HPV KNOWLEDGE, AND ASSOCIATION WITH HEAD AND NECK CANCER AMONG A HIGH-RISK GROUP
Nosayaba Osazuwa-Peters, BDS, MPH, CHES, David D Wang, BS, Matthew M Snider, BA, Devin S Thompson, BA, BS, Mark A Varvares, MD, FACS; Saint Louis University School of Medicine, Department of Otolaryngology-Head and Neck Surgery

Background

Human papillomavirus (HPV) currently affects more than 600 million people globally, and is regarded as the most common sexually transmitted infection (STI) in the United States. In developed countries including the United States, HPV is associated with up to 90% of oropharyngeal cancer cases. Although it is the most common STI, overall knowledge of HPV and its association with head and neck cancer (HNC) is very low in the general population.

Objective

The objective of this study was to understand level and source of knowledge of HPV, and how knowledge of HPV and its association with HNC is associated with sexual habits, sexual risk taking, and perception of risk in a high-risk population.

Methods

A cross-sectional survey was conducted among attendees of an annual Drag Racing event in East St Louis in 2013. Participants completed a paper-based questionnaire assessing demographics, sexual history, source of HPV information, and a subset of 8 previously validated questions that elicited knowledge of HPV and HNC. Risk level was estimated based on sexual habits and history. Bivariate associations between variables were assessed using Pearson's correlation and one-way ANOVA.

Results

Three hundred and four adults participated in the study as part of an oral head and neck cancer screening program at the event. Among participants, 28.2% were race car drivers, 70% were fans, and 1.7% were vendors. Mean age was 48.1 ± 12.7, and 55.3% were ≥41 years; 46.4% were married, and 60.4% have had five or more sexual partners. Only 55% have heard about HPV, only 29.9% knew that HPV definitely increases the risk of developing oral, head and neck cancer, 42.4% thought HPV was same as HIV, and 44.4% did not think an individual's chance of developing HPV increases with their number of sexual partners. Of those who have heard about HPV, 68.9% reported that they get their information from television or radio, 24% from the internet, and only 25.1% from a healthcare practitioner. There was a significant correlation between knowledge and risk perception (r=.29, p<.001), and those who thought number of sexual partners did not increase risk of developing HPV were more likely to have very low knowledge scores (r=.74, p<.001). There were also significant correlations between knowledge and number of sexual partners (r=.21, p<.001), and age of initial coitus (r=.17, p<.005). One-way ANOVA showed a significant main effect that participants with more than 5 lifetime sexual partners perceived a significantly higher risk of developing HNC, F(5, 298) = 3.127, p=.009, ω=.18.

Conclusion
Knowledge of HPV and its association with HNC has significant gaps in this population, and a large number accessing HPV information from sources other than a healthcare provider. Otolaryngologists and other healthcare professionals may need to develop interventions aimed at increasing awareness of HPV and its link to head and neck cancer in high risk populations in order to improve oral, head and neck cancer prevention and control.