Prevalence and Relationship Between Oral and Anal Human Papillomavirus Infections in Men with HPV Related Anogenital Dysplasia

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ABSTRACT # 277

Objectives: Human papillomavirus (HPV) is the etiologic agent for anogenital carcinoma, and a subset of oropharyngeal carcinoma, however, little is known about the relationship between oral and anogenital HPV infections. We determined the prevalence of oral HPV infection in men with a history of HPV related anogenital squamous intraepithelial lesions (ASIL) and identified risk factors for oral and concordant anal-oral HPV infection. Study Design: Cross-sectional cohort study. Methods: Oral rinse and anal swab samples were collected from 165 men with biopsy proven anogenital squamous cell carcinoma (MSM) with a history of HPV-related ASIL. Samples were analyzed for HPV DNA using consensus MY09/MY11 L1 primers and probes, and typed for 39 specific HPV types. Each participant completed a survey querying demographic history, sexual behaviors, and risk factors to use. Results: Overall oral HPV prevalence was 30% versus 82% for anal samples. The prevalence of oral high-risk HPV subtypes was 11% versus 64% for anal samples, and HPV-16 was the most common high-risk type (3.0% of oral samples and 19.7% of anal samples). Concurrent oral-anal HPV infection with any HPV strain was found in 26% of participants, whereas concordant type-specific HPV infection was found in 4.9%. On multivariate analysis, both number of male partners the participant performed and received oral-genital sex were associated with oral HPV infection and concurrent oral-anal infections (p < 0.05) whereas, CD4 count was the only variable associated with high-risk anal HPV infection. Conclusions: This is the first report of oral HPV infection in this cohort of HIV-infected and HPV-uninfected MSM with HPV related ASIL is high. Increased risk of oral HPV infection was associated with oral sex practices.

SELECTED REFERENCES

RESULTS
The prevalence distribution of HPV specific strains from anal samples was different and more widely varied than that from oral samples. Type specific concordance was low, with only 4.9% (3/60) patients with paired oral and anal analyzable samples having the same strain at both anatomical sites. Concurrent oral and anal infection was more common with 26% (16/60) of patients having simultaneous any type HPV infections at both sites.

DISCUSSION
An increase in CD4 count was associated with lower rates of high-risk anal HPV infection on univariate and multivariate analyses. CD4 count was the only risk factor significantly associated with high-risk anal HPV. Higher level of education trended toward an association with oral HPV infection and was statistically significantly related to concurrent oral-anal HPV infection. Oral sexual practices including both # of partners the participant performed and # of partners the participant received oral-penile sex from were associated with oral HPV infection and concurrent anal-oral HPV infection. No sexual behaviors showed a statistically significant correlation with high-risk anal HPV infection. Due to the low numbers of participants with concordant type-specific HPV infection, risk factors could not be analyzed for this outcome.

CONCLUSIONS
The lower prevalence of oral HPV compared to anal HPV infection was not unexpected given previous data showing nearly all MSM patients with ASIL or anal cancer have prevalent HPV infections. It is likely that both prevalence values were underestimated in the study since the assay used was designed for detection of cervical HPV strains. We found a widespread distribution of HPV types in anal samples than in oral samples. Despite this wide HPV type representation in anal samples and 26% rate of concurrent oral-anal any type HPV infection, concordant type-specific HPV infections were rare (4.9%). This lack of concordance suggests a different predilection of the two anatomical sites to the various HPV strains, a different ability to clear the strains at the two sites, or different exposures causing infection at the two sites. We identified that oral sexual practices including performing and receiving oral-penile sex with increasing numbers of partners were statistically significantly associated with increased risk of oral HPV infection and concurrent anal-oral HPV infection. Since penile-anal sex behaviors did not show a significant correlation with oral HPV infection this provides evidence for the mechanism of transmission of oral sexual behaviors and argues that oral sexual behaviors are not simply surrogate markers for high numbers of any type of sexual encounters. The association of CD4 count with high-risk anal HPV and concurrent oral-anal HPV infection supports the concept of an immune response to HPV in our cohort, or may be explained by co-linearity of behaviors leading to HIV and HPV infection.

Our cohort’s oral HPV prevalence of 30% is 3 times that reported in a population study for U.S. men with HIV. The prevalence of oral HPV of 36% for HIV infected MSM in our study was at least as high as that reported for high-risk HIV infected female cohorts in the literature. The MSM patients in the study, each with a personal history of ASIL, are a group at high risk for oral HPV colonization. With a personal history of ASIL, men in this cohort may be hypothesized to be susceptible to HPV related oropharyngeal dysplasia or cancer, but data on this is limited. Future prevention or screening approaches for oropharyngeal cancer might be successfuly and cost effectively implemented through clinics/practitioners that diagnose and treat HPV related anogenital lesions.

CONCLUSIONS
A cohort of MSM with a documented history of anogenital HPV-related ASIL were found to have high rates of oral HPV infection and thus may be a group at increased risk for development of future oropharyngeal squamous cell carcinoma. Oral sex behaviors were identified as risk factors for oral HPV infection. There was low concordance between the HPV strains infecting the anal and oral anatomic sites precluding analysis of risk factors for concordant type-specific infections. Therefore, larger studies are warranted to investigate the natural history of infection at the two sites and mechanisms of transmission of infection between the two HPV reservoirs.