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Epidemiology of penile cancer

Michelle Christodoulidou, MSc (ESSQ), MRCS,
Varun Sahdev, BSc, BMBS, MRCS,
Selda Houssein, BSc (Hons), MBBS,
Asif Muneer, MD, FRCS (Urol)

Introduction

Penile cancer is a rare genital malignancy and most of the lesions are histologically classified as squamous cell carcinomas (SCCs). Although it is a rare tumor in developed countries, the incidence of penile cancer is significantly higher in developing countries.[1] In this section we review the epidemiology of penile cancer in different population groups globally and also examine predisposing risk factors.

Epidemiological trends

The total number of penile cancers globally has been estimated to be 26,000 cases per year.[2] The incidence is much higher in some areas of Asia, Africa, and South America as compared with Western Europe and North America. This may be partly due to differences in socioeconomic conditions and religious practices.[3,4] For example, in Israeli Jews the protective effect of neonatal circumcision leads to the extremely low incidence of 0.1 in 100,000.[5] It has been observed that even in developing countries that have a high incidence of penile cancer, such as Nigeria and India, the disease is rare among those religious groups that practice childhood circumcision.[6] In this section we will focus on the incidence trends in different subpopulations and age groups, and the association with socioeconomic status.

The highest incidence rate of penile cancer is reported from Brazil,[5,7] where an epidemiological study reported an incidence between 2.9 and 6.8 per 100,000, predominantly affecting low income, white, uncircumcised men. However, there is variability even within Brazil, where the highest incidence is reported in populations living in the northeastern region (53.2%),[7] which has the lowest human development index and is considered to be the poorest region. There is a higher incidence in Caucasian ethnic groups (75.61%) compared with African-Americans (22.26%) and Asians (2.12%) but no difference between Hispanics and non-Hispanics. The incidence increases with age, being the highest at 39% in the $>$66-year-age group. Regarding associated risk factors, phimosis was found in approximately 60% of their cohort and tobacco use in 35%. On the contrary, human papillomavirus (HPV) infection was reported in only approximately 6% of patients.[7]

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Uganda has the second highest reported incidence of penile cancer in the world.[5,8] However, a study reviewing the types of cancer in Uganda's Kyadondo County showed that the incidence has been decreasing and was lower in the 1990s compared with the 1960s.[8] Even though the rate remains high at 3-4 per 100,000 men, the decline could be related to improved penile hygiene as a consequence of urbanization and the wider availability of piped water supplies.[8] The World Health Organization 2009 recommendation on circumcision found that a high proportion of African men would consider the procedure in order to improve penile hygiene. Evidence suggests that circumcision can reduce the risk of both HPV and human immunodeficiency virus (HIV) infections, as well as penile cancer. It is advised that men should be counseled about the risks and benefits of circumcision as part of the sexual health service that is offered globally.[9]

An epidemiological study conducted on banana plantation workers in Costa Rica in 2006, investigated the role of dermal contact with pesticides on the risk of developing various types of cancer.[10] The risk for any type of cancer increased with the length of exposure to pesticides. In males there was a higher incidence of both penile cancer and melanoma. The standardized incidence ratio for penile cancer was 149 (95% CI: 55-324). A higher incidence of cervical cancer was found among female workers. The increase in both penile and cervical cancer in banana plantation workers suggests a common etiology such as the higher prevalence of HPV infection and low socioeconomic status. Despite this, the authors propose further investigation of dermal contact with pesticides as a cause for penile cancer.[10]

In the United States (USA), the incidence of penile cancer between the years 1993 and 2002 has been estimated at 0.58 per 100,000 with Hispanics having the highest incidence, followed by Alaskan Native Americans and African-Americans.[3] Although the incidence increased with age,[3] Caucasians had the lowest incidence of penile cancer when compared with the other ethnic groups. A follow-up study by Hernandez et al. examined penile cancer data in the US from 1998 to 2003 and found an increasing trend of 0.81 cases per 100,000 men, representing just under 1% of new cancers in men.[11] In the same study, the incidence was similar in Caucasian and African-American men but was 2-fold lower in Asians and Pacific Islanders and 72% higher in Hispanics. Although the incidence of penile cancer increases steadily with age, Hispanics and African-Americans are diagnosed at a lower age compared with non-Hispanics and Caucasians (Fig 1). The lowest age at diagnosis is in the Hispanic group at a mean of 58 years; paradoxically they have a lower mortality compared with non-Hispanics. Higher rates of mortality were observed in African-Americans compared with Caucasians. Regarding geographical locations, penile cancer was 43% higher from poorer counties in the South. This again reflects the effect of socioeconomic status on the incidence of this disease.[11]

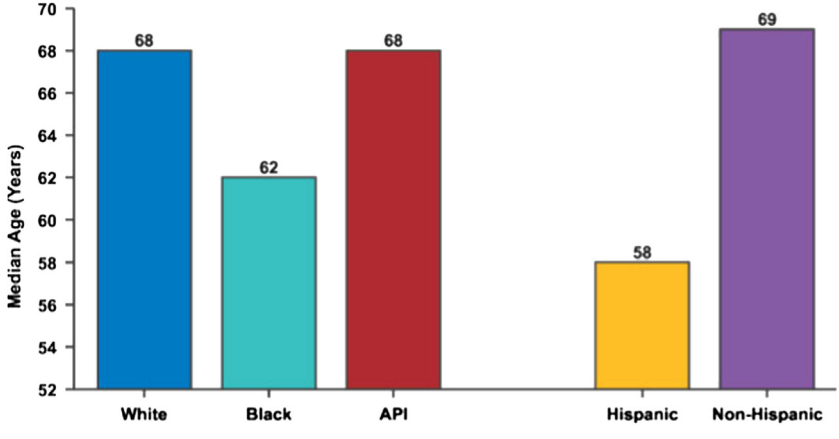

Fig. 1. Median age of invasive penis SCC in whites, blacks, Asian and Pacific Islanders, Hispanics, and non-Hispanics. (Adapted with permission from Hernandez et al.[11]) (Color version of figure is available online.)