

Risk Factors and Prevalence of Penile Cancer

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Squamous cell carcinoma of the penis is a rare malignancy of the genito-urinary tract. Penile cancer, though rare regionally and internationally is a major medical condition in specific high-risk groups. The cancer leads to physical genital disfigurement, which may alter normal male voiding patterns, impair normal penetrative intercourse and lead to psychological and emotional distress, and even death. In addition, in a society where masculinity is defined by and associated with the presence of the phallus, penile cancer affects male self-esteem and may lead to depression. The vexing issue with penile cancer lies in the fact that it is a largely preventable disease, where significant risk factors are modifiable.

Epidemiology of penile cancer

There is a geographic variation in the distribution of penile cancer, which is modulated by socio-economic status and religious beliefs. Penile cancer is most commonly seen in developing countries. Whereas penile cancer has the lowest rates in Israel, it represents about 10% of cancers in South America and specific African countries (1). In fact, in Maranhão, a poorly developed region in Brazil, penile cancer was reported in 53% of males (2).

The highest incidence rate of penile cancer in the world is reported in Brazil. A rate of 2.9 to 6.8 per 100 000 has been recorded, with a high prevalence of the disease in Caucasian, uncircumcised, low-income men (2). Uganda has the second-highest rate of penile cancer in the world. It is believed that improvement in socio-economic conditions has led to a general decline in this high rate of 3–4 per 100 000 over the past several decades (3). In addition, implementation of World Health Organization circumcision recommendations in African nations has been thought to modify disease patterns of penile cancer.

The United States of America (USA) and Europe have considerably low incidence rates of penile cancer compared

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to other geographic regions. The incidence rate of penile cancer in the USA is 0.58 per 100 000 (4). In Europe, the incidence rate of the disease is 1.33 per 100 000 (1). Even with the USA reporting low incidence rates, ethnic and geographic differences occur nationally. Hispanics in the USA are disproportionately affected with penile cancer, with rates 72% higher than in other ethnic groups. Penile cancer incidence rates are 43% higher in low socio-economic counties in southern USA. The incidence of the disease increases with age, but Hispanics have the lowest age at diagnosis and a lower mortality rate than other groups.

Few reports have been published on the epidemiology of penile cancer in the Caribbean region. These reports, however, are in keeping with ethnic variation in incidence rates seen elsewhere. The incidence of penile cancer in Puerto Rico, a Caribbean country with a largely Hispanic population is 2.8 per 100 000 (5). This rate is three times higher than that in the USA. In Puerto Rico, the disease presents at a lower age and has a higher mortality rate than in the USA. In Jamaica, penile cancer is rare, accounting for only 0.6% of all cancers (6). With improvement in socio-economic conditions over several decades, the rate of penile cancer has fallen from 6 per 100 000 (1962) to 1.2 per 100 000 (2002). Despite this, mortality of the disease is high with most men being diagnosed at an advanced clinical stage (7). In this issue of the Journal, Ramdass *et al* reported on recent trends in penile cancer in north Trinidad and Tobago. The incidence is low, at 0.6 per 100 000 with a higher incidence in Afro-Trinidadians (8).

Risk factors

The major risk factors for penile cancer are phimosis and human papillomavirus (HPV) infection (1). Other risk factors include tobacco smoking, sexual promiscuity, poor hygiene and low socio-economic status. These risk factors are largely modifiable, and in populations where risk factors have been modified, rates of penile cancer have declined.

Phimosis

Phimosis associated with poor hygiene leads to accumulation of smegma, chronic inflammation and increases the risk of developing penile cancer. Phimosis is associated with as many as 90% of cases of penile cancer (9). Religious practices influence rates of penile cancer, since the disease is rare

in Jewish men and even supposedly high-risk Indian and Nigerian groups that practise neonatal circumcision. Seventy-nine per cent of men in the USA are circumcised and rates of the disease are low (10). Penile cancer rates are reduced by neonatal circumcision. It is controversial if adult circumcision has a similar protective effect. Circumcision reduces the risk of infection with oncogenic-serotypes of HPV and other sexually transmitted infections (STIs). Despite the obvious benefits of routine circumcision, opponents emphasize the protective effect of preputial skin, hence advocating that routine circumcision remains controversial.

HPV infection

The prevalence of HPV in penile cancer is 42–48% (1). In the high-risk region of Maranhão, Brazil, HPV infection was seen in 63% of penile cancers (1). The risk of HPV acquisition increases with sexual promiscuity, ano-genital warts and concomitant STIs. Oncogenic HPV serotypes are 16 and 18. The mechanism of carcinogenesis is thought to be due to E6 and E7 oncogene products which bind to tumour suppressor genes and alter cell cycle activities.

In Puerto Rico, where high rates of penile cancer are found, 80% of men initiate intercourse before 18 years and have multiple partners (5). Public education campaigns on safe sexual practices may be able to reduce penile cancer cases. The utility of the HPV vaccine in reducing rates of penile cancer is controversial.

Other risk factors

Tobacco smoking has been linked to an increased risk factor for penile cancer in a number of studies. However, several studies have not shown an association. Lichen sclerosis, penile trauma and ultraviolet A photochemotherapy have all been associated with penile cancer in several studies.

CONCLUSION

Penile cancer is an uncommon disease; however, it is associated with high mortality and significant adverse effects post-treatment. Major risk factors for penile cancer are phimosis associated with poor personal hygiene and HPV infection. Vulnerable groups who are at risk for penile cancer are those in developing countries where socio-economic conditions are poor. Public education, improvement in social conditions and personal hygiene and, debatably, routine circumcision may reduce the rates of penile cancer in high-risk groups.

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