Human Papillomavirus

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The human papillomavirus (HPV) is the most common sexually transmitted infection. It can affect the genitals, oropharynx, and anus. HPV is passed by sexual intercourse, and oral sex can be an infected partner, though many people do not know they are infected. There are many different classifications of the HPV that differ in the risk of the cancer-causing ability. HPV16 and 18 in the most dangerous form of the human papillomavirus in that it is most likely to cause cancer of the cervix (Singopal, Kim, & Bosire, 2017, p. 1).

HPV is becoming an epidemic, and it is predicted that by next year it will be one of the leading causes of head and neck cancers (Waxtrath, Warren, & Pyerson, 2017, p. 2).

“While the majority of the human population acquires HPV infections, about 10-15% of individuals establish lifelong persistent infections, and only a subset of this has the potential to progress to invasive cancer. This suggests that, for a majority of HPV-infected individuals, host defense mechanisms are effective in eliminating initial HPV infections” (Waxtrath, Warren, & Pyerson, 2017, p. 2).

Underlying Pathophysiology

HPV is a virus that attacks DNA replication and can be oncogenic or nononcogenic, the virus causes disruption to the squamous epithelium of the cervix and male female reproductive organs, vulva, and the oropharynx. (Singopal, Kim, & Bosire, 2017, p. 1).

Papillomaviruses infect squamous epithelium and mucous membranes in cells to undergo cell division and remain in the host’s system (Hardin & Mangurian, 2017, p. 4).

The virus must penetrate through the basal layer of the epithelial stem cells, although the cells have multiple stratums for protection to make them difficult to access (Hardin & Mangurian, 2017, p. 4).

Micro-wounds have to be present revealing the basal epithelial layer in order to be infected, the cervix and anus are vulnerable to micro-wounds causing them to be inhabitable for the virus to penetrate (Hardin & Mangurian, 2017, p. 4).

The long control region of the HPV cell is what binds to the epithelium and allows for transcription and replication (Nowińska et al., 2017, p. 540).

All host cells the infected, the cell becomes self-directed and does not follow normal cell replication; this change causes the cell to initiate a cycle of binding virus DNA with the infected genome (Nowińska, Cieślak, Podurska-Olszew, & Drzegl, 2017, p. 540).

When DNA is virus-infected, the sequence of cell replication is affected; this causes an increased risk of cervical gene expression (Nowińska et al., 2017, p. 540).

Significance of Underlying Pathophysiology

The significance of the pathophysiology is that the invasion of HPV can lead to uncomfortable manifestations such as genital warts. It can also lead to multiple cancers. Although the virus is usually asymptomatic, it can lay dormant for years causing symptoms later. Knowing how the cells become infected will help the provider understand the virus, what to look for, and how to treat it. HPV can lead to multiple cancers which is an important aspect when considering screening methods for patients at risk for HPV.

The provider should understand from the pathophysiology that the virus once the basal layer of the cell is penetrated. People can come in contact with the infection, and the bodies immune system can fight it off, but if the basal layer is penetrated, the virus will not lose the body. This means that prevention is the key to best help patients.

It is also important for the provider to be educated on how the risk for cancer is increased. It is increased because the virus changes the sequences of cell replication and can express a cancer gene after laying dormant for an extended period of time.

Therefore patients with abnormal cells on a pap smear should be investigated, and those with HPV should be screened for cancer. They should be screened for multiple cancers such as cervical, vaginal, vulvar, oropharynx, and anal.

Implications for Nursing Care

The advanced practice nurse should be well versed in the role of the Human Papillomavirus because it is prevalent in all communities and education can save lives. The key factors that the nurse practitioner can implement into their practice: Educate patients on prevention because there is no cure to HPV.

Educate families and new parents on the need to vaccinate and the importance of screening. Counseling of men and females for HPV can be in all age groups. The annual vaccination before becoming sexually active is also important because the virus can still enter the body after this time and not follow normal cell replication; this change causes the cell to initiate a cycle of binding virus DNA with the infected genome (Nowińska et al., 2017, p. 540).

In conclusion, HPV is a common sexually transmitted infection that infects the lives of millions of people worldwide. HPV penetrates the bottom layer of cells and can change the DNA of a cell that has already been infected with the virus. This is important because changing the DNA of a cell can cause an increased risk for cancer gene expression. There is no cure for HPV, although there are preventative measures that a health care provider should be well educated on. Educating and advocating to parents and patients about the available vaccines for HPV prevention at the appropriate age is one of the most preventative measures against HPV. Health care providers should also inform their patients about the importance of routine health care such as the pap smear. The importance of sharing evidence-based knowledge and advocating for patients to uptake preventative measures against the Human Papillomavirus can save lives.

References


Risk Factors

• Being sexually active
• Not receiving annual pap smear
• Unprotected sex increases the risk of contracting HPV
• Unvaccinated individuals do not prevent the spread of HPV, but it can decrease transmission
• More than one sexual partner
• Not utilizing the vaccination before becoming sexually active

A pregnant woman can pass the virus to her infant during birth, although it does not happen frequently (Centers for Disease Control and Prevention, 2015).

Signs and Symptoms

HPV does not always have symptoms, but a routine Pap smear (Pap Smear) can tell a provider if there are abnormal cells that need further testing:

- Asymptomatic
- Genital Warts
- Cancer of the vagina, penis, vulva, anus, throat, or mouth

Most cervical cancer is caused by HPV, although having HPV does not mean a person will develop cervical cancer. Cervical cancer is usually asymptomatic like HPV, until the cancer progresses. People should be aware of the signs and symptoms of cervical cancer:

• Bleeding from the vagina in unusual circumstances
• After intercourse, after menopausal cycles have ceased, between menstrual cycles, and causing periods to last more days than usual with more menstrual cycles

The virus must travel through the squamous epithelium and can change the DNA of the cells, although the cells have multiple stratums for protection to make them difficult to access (Nowińska et al., 2017, p. 540).

Malignant cells are abnormal cells that can become invasive cancerous, continue to grow, and can metastasize to other organs and tissues (American Cancer Society, 2016).

HPV replication in squamous epithelial cells

HPV takes advantage of the differentiated cellular functions that are critical to the normal cell replicating. Since HPV is a virus that does not have a cellular nucleus, it does not require any of the cellular functions that are needed for the normal cell to replicate. Instead, it takes advantage of the differentiation of the keratinocyte, which are key functions in keratinization and cell differentiation. The keratinocyte is a stratified squamous epithelial cell that is the outermost layer of the epithelial cells that line the skin and mucous membranes and are shed from the outermost layer of epithelial cells.

In conclusion, HPV is a common sexually transmitted infection that infects the lives of millions of people worldwide. HPV penetrates the bottom layer of cells and can change the DNA of a cell that has already been infected with the virus. This is important because changing the DNA of a cell can cause an increased risk for cancer gene expression. There is no cure for HPV, although there are preventative measures that a health care provider should be well educated on. Educating and advocating to parents and patients about the available vaccines for HPV prevention at the appropriate age is one of the most preventative measures against HPV. Health care providers should also inform their patients about the importance of routine health care such as the pap smear. The importance of sharing evidence-based knowledge and advocating for patients to uptake preventative measures against the Human Papillomavirus can save lives.

Additional Sources
