

# Cervical cancer prevention and treatment: a succinct review

## Abstract

Cervical cancer is the fourth most common form of cancer in women worldwide. In 2012, the most recent accounting, there were approximately 528,000 cases of cervical cancer and more than 266,000 deaths resulting from such.<sup>1</sup> Human papillomavirus (HPV) is the most commonly known sexually transmitted virus in the world; more than 75% of sexually active adults have been infected with HPV.<sup>2</sup> The interrelationship of this virus with the advancement of precancerous lesions (that can result in developing cervical cancer) has been established. For these reasons, cervical cancer could be considered a global epidemic. The prevention of cervical cancer via the HPV route is based on early detection. The sooner a woman learns of having contracted HPV and takes action, the better the outcome of treatment.<sup>3</sup> In developing countries, cervical cancer continues to be the prime cause of cancer-related deaths in women.<sup>4</sup> In advanced countries, the occurrence is relatively less due to concerted efforts in identifying precancerous lesions early on.<sup>5,6</sup> DNA testing for HPV, cytologic screening, visual inspection with acetic acid (VIA), together with HPV vaccines is some of the measures which have proved effective in reducing cervical cancer in susceptible women. Numerous studies have shown that women's awareness of the established link between HPV and cervical cancer, and the importance of cervical screening, is still lacking.<sup>7,8</sup> The favorable outcome of early cervical cancer screening and detection are proportional to women's awareness and understanding of cervical cancer, and its causes and prevention-and how to screen (test) for such.<sup>1</sup>

**Keywords:** cervical cancer, chlamydia, human papillomavirus, HPV vaccine, uterus

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**Abbreviations:** ACCP, alliance for cervical cancer prevention; DES, diethylbesterol; ECC, endocervical cutterage; HPV, human papillomavirus; IUD, intrauterine device; LEEP, loop electrosurgical excision procedure; PATH, program for appropriate technology in health; WHO, world health organization

## Introduction

Cancer can begin when a cell develops abnormally. Cancer can start almost anywhere in the human body. Cervical cancer begins in the surface tissue of the lower region of the female genitalia: the uterine cervix. There are two types of cells seen in the female genitalia: squamous cells and epithelial cells. Where they meet and overlap is collectively known as the transformation zone. This is where cancer cells most commonly manifest. The initial stage of cervical cancer is asymptomatic.

## Discussion

### Causes, symptoms and predisposing factors in cervical cancer

Cervical cancer is frequently observed in women in their mid-30s. The chance of developing this disease increases as the body ages. Regular cervical screening is an invaluable tool to combat this pernicious disease. Ignorance of or disregard toward HPV-and its link to cervical cancer-has adversely affected a vast number of women; in particular, Hispanic, African American, Native American, and Alaskan Natives.

Many factors can compromise a host and contribute to the development of cervical cancer: HPV infection (predominantly

HPV strains 16 and 18); cigarette smoking; immunosuppression (immunocompromised patients on medication); chlamydia infection (may be asymptomatic); giber deficient diet (diet low in fruits and vegetables); oral contraceptives; intrauterine devices (IUDs); exposure to diethylstilbestrol (DES); and a family history of cervical cancer.<sup>9-10</sup> Cervical cancer is usually asymptomatic until the cancer cells begin to invade the surrounding tissues. Symptoms may include atypical periods, pelvic pain, pain during intercourse, vaginal discharge and oozing during sexual activity, and in the post-menarche years. Women in their teens are susceptible to cervical cancer. Their reproductive systems are still immature, and they may be more sexually active and, thus, more exposed to infection. Poverty and ignorance are significant co-factors. Women in poverty or with low incomes cannot afford proper medical care or screening. Women living in rural areas can be negatively affected due, in some cases, to lack of education and community awareness.

### Screening and diagnosis of cervical cancer

- Pap test (Pap smear, smear test or cervical smear) is used to determine the presence of precancerous or cancerous cells; wherein, utilizing a speculum, cervical tissue is gently collected (by swab or brush) and subjected to microscopic evaluation. An abnormal Pap test may indicate the need for further investigation. (Although, it must be kept in mind that the Pap smear is not 100% reliable.)
- Naked eye visual inspection is carried out after a Pap smear has demonstrated the presence of abnormal cells. A speculum is inserted into the vagina to inspect the cervix. An acetic acid solution of 5% (VIA) and/or of Lugol's iodine (VILI) is applied to make any precancerous lesions or early invasive cancer cells

be visualized more clearly. If abnormal tissue is detected, a small portion of the tissue is removed from the surface (a biopsy) which is then sent to a pathologist for further evaluation.

- iii. Colposcopy utilizes a low-powered microscope to view the cervix and vagina so the doctor can locate any abnormalities, and biopsy the area. However, a biopsy can be performed without colposcopy.
- iv. Endocervical curettage (ECC) is a procedure in which the mucous membrane of the cervical canal is scraped using a spoon-shaped surgical instrument called a curette. ECC is used to test for abnormal tissue, precancerous conditions or cervical cancer. Slight bleeding can occur due to this procedure.
- v. Conization (cold knife conisation-CKC) is a technique wherein tissue is removed from the cervix in a cone shape for diagnostic or treatment purposes. Loop electrosurgical excision procedure (LEEP) utilizes an electrical current wire loop to separate the subject tissue from the cervix (also for diagnostic or treatment purposes).

### Diagnostic techniques for advanced stages of Cervical Cancer

Nuclear medicine imaging, full-body CT scan, full-body MRI, PET scan, intravenous urography (IVU)-also known as intravenous pyelogram (IVP)-and standard chest x-ray may be performed to determine if any cancer cells have spread elsewhere in the body.

### Surgical, chemical, pharmaceutical and other methods to remove, destroy and/or inhibit cervical cancer

- I. **Cryosurgery:** liquid nitrogen is injected from inside a metal probe; destroys cancer cells by freezing them.
- II. **Laser surgery:** abnormal cells are destroyed through vaporization (via laser beam).
- III. **Hysterectomy:** involves the removal of the uterus using laparoscopy. Laparoscopy enables the physician to see the abdomen and pelvis for the surgery to be carried out. This procedure does not affect the sense of sexual pleasure.
- IV. **Trachelectomy:** a method used to remove cancer and still maintain fertility. The uterine cervix is removed, but the uterine body is preserved.
- V. **Pelvic exenteration (or pelvic evisceration):** a radical surgery that removes organs from the urinary and gynaecologic systems.
- VI. **Pelvic lymph nodes dissection:** hysterectomy and lymph nodes dissection is done together if the lymph nodes are affected.
- VII. **Radiation therapy:** involves high energy x-ray for destroying cancer cells. This procedure is very effective, but it comes with many undesirable side effects.
- VIII. **Brachytherapy:** an advanced procedure. Radioactive seeds are placed in or near the tumor, resulting in a high radiation dose specific to the tumor. This reduces the radiation exposure to the surrounding healthy tissues.
- IX. **Chemotherapy:** intravenous and oral administration of anti-cancer drugs. These drugs travel via blood to eradicate cancer cells; also has many undesirable side effects.

X. **Novel drugs:** new drugs that limit angiogenesis, which is required for a tumor development. The work of these advanced drugs is to block the growth of new blood vessels surrounding the tumor, thereby denying the cancer cells access to the nutrients needed to proliferate.

XI. **Hyperthermia:** preventing cancer from reoccurring; performed by adding hyperthermia to radiation in order to increase the temperature where the tumor resides, thereby destroying it.

The treatment for cervical cancer depends on the stage of malignancy. The gynaecologist and oncologist are the medical specialists that determine and oversee the treatment plan. Treatment options include surgery, pharmacotherapy, chemotherapy, radiation therapy, hyperthermia, cryotherapy and laser. Treatment options are based on the stage of the cancer, the type of cancer, the patient's age and the patient's desire to have children.

### Conclusion

An effective way to minimize the complications of cervical cancer is through early screening. The most common and reliable investigation for such is the Pap test (which is also effective for HPV identification). The Pap smear, however, is not 100% reliable. Failing to present for screening for early detection reduces the survival rate should cancer occur.<sup>7</sup> Due to its connection to HPV, cervical cancer can be regarded, in part, as a sexually transmitted disease. It is advisable to have one's sexual partner screened for HPV, and be proactive in avoiding or minimizing other contributory factors; and living healthy lifestyle choices (diet, exercise, rest, and clean water and air) and practicing safe sex. These favorable choices can help prevent an initial episode of cervical cancer or its reoccurrence. A sexually active woman, and/or a woman with an active sexual partner(s), should have her partner use a condom in order to reduce the risk of infection and the contraction of HPV.<sup>11,12</sup>

Funding for initiatives in cervical cancer awareness and regular screening need to be further put forth. The Alliance for Cervical Cancer Prevention (ACCP), Program for Appropriate Technology in Health (PATH) and the World Health Organization (WHO) continue to work to help women living in underdeveloped countries gain access to screening programs. In this regard, their combined efforts have resulted in decreased morbidity and mortality in a relatively short span of time. Women must continue to become more aware of the factors contributing to the development of cervical cancer, and face the challenges at hand; such as, becoming involved in developing screening programs and in creating public awareness. Even in developed countries, many women still ignore or delay screening and disregard the HPV vaccine which is readily available to them. In 2012, the American Cancer Society recommended avoiding exposure to HPV, receiving an HPV vaccine and undergoing a regular Pap smear and pelvic examination for the prevention and early detection of cervical cancer.

### Conflict of Interest

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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