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 [1]. Human papillomavirus (HPV) is the most common sexually transmitted virus in the world; more than 75% of sexually active adults have been infected with HPV [2]. 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 [3]. In developing countries, cervical cancer continues to be the prime cause of cancer-related deaths in women [4]. In advanced countries, the occurrence is relatively less due to concerted efforts in identifying precancerous lesions early on [5,6]. DNA testing for HPV, cytologic screening, visual inspection with acetic acid (VIA), together with HPV vaccines is one 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 [7,8]. 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 [1].

Keywords: Cervical cancer; Chlamydia; Human papillomavirus; HPV vaccine; Uterus

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 [9-10]. 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
acetate 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.

- **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.

- **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.

- **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

- **Cryosurgery**: liquid nitrogen is injected from inside a metal
probe; destroys cancer cells by freezing them.

- **Laser surgery**: abnormal cells are destroyed through
vaporization (via laser beam).

- **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.

- **Trachelectomy**: a method used to remove cancer and still
maintain fertility. The uterine cervix is removed, but the
uterine body is preserved.

- **Pelvic exenteration (or pelvic evisceration)**: a radical
surgery that removes organs from the urinary and
gynaecologic systems.

- **Pelvic lymph nodes dissection**: hysterectomy and lymph
nodes dissection is done together if the lymph nodes are
affected.

- **Radiation therapy**: involves high energy x-ray for
destroying cancer cells. This procedure is very effective, but
it comes with many undesirable side effects.

- **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.

- **Chemotherapy**: intravenous and oral administration of
anti-cancer drugs. These drugs travel via blood to eradicate
cancer cells; also has many undesirable side effects.

- **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.

- **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 [7]. 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 [1,1,12].

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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None.

References


