Chapter 1

Introductory Chapter: Cervical Cancer - Screening, Treatment and Prevention

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Additional information is available at the end of the chapter

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1. Introduction

This book covers the above topics in a nutshell. The authors from various countries have contributed valuable topics, enriching the contents scientifically and socially. This introductory chapter gives the important and updated details of the topics covered in the book.

2. The uterus

The uterus, anatomically, is a pear-shaped organ, placed between urinary bladder and rectum. The etymology of 'cervix' is that it is from Latin, meaning 'neck' and it opens into the vagina. The invasive cancer occurs in the cervix and is called cervical cancer (**Figure 1**).

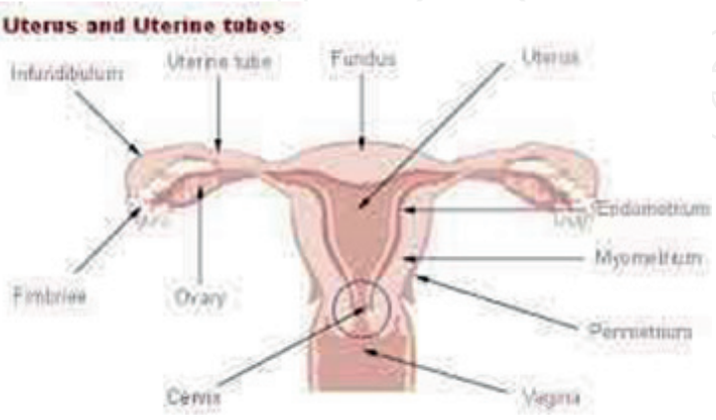

Figure 1. The anatomy of uterus.

3. Natural history of cervical cancer

3.1. Histology

Squamous epithelium and columnar epithelium are both types of epithelium lining in the surface of the cervix.

The squamocolumnar junction is the junction between squamous epithelium and columnar epithelium and it migrates from the periphery of the ectocervix inward towards the external os and finally to the distal cervical canal when age increases.

The process by which the columnar epithelium is replaced by stratified squamous epithelium is termed as squamous metaplasia and the area where this transformation takes place is referred to as the transformation zone (IARC, 2005; WHO, 2006).

3.2. The development of cervical cancer

The cervix is protected by stratified squamous cell epithelium from injuries by toxins and from infections. The human papilloma virus (HPV) primarily targets the squamous cells, and persistent infection by the high-risk strains leads to change of cells to metaplasia and dysplasia, which is the precancer stage and this occurs in the transformation zone—TZ.

3.3. The HPV epidemiology: HPV: The causal factor

HPV16 and 18 are responsible for the development of all the precancers and invasive cancers of the uterine cervix.

HPV types:

High-risk 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59;

Low-risk 6, 11, 40, 42, 43, 44, 54, 61, 70, 72, 81.

3.4. HPV transmission

HPV transmission occurs through skin and mucous contact during sexual contact, and the cofactors are early sexual exposures and multiple partners.

Persistent HPV infections cause cervical cancers but most of the HPV infections are transient due to the protection from cell-mediated immunity.

4. Classification of precancers and invasive cancers

1. Low-grade squamous intraepithelial lesion (LSIL):
   occurs due to persistent HPV infection;
   cervical intraepithelial neoplasia grade 1 (CIN1);

mild squamous dysplasia;
flat condyloma; koilocytotic atypia; koilocytosis.

2. High-grade squamous intraepithelial lesion (HSIL):
a squamous lesion with high risk of developing into cancer;
cervical intraepithelial neoplasia grade 2 (CIN2);
cervical intraepithelial neoplasia grade 3 (CIN3);
carcinoma in situ (CIS).
3. Squamous cell carcinoma (SCC):

an invasive epithelial tumour composed of squamous cells of varying degrees of differentiation.

4.1. Associated risk factors

Cervical cancer begins with abnormal changes in the cervical tissue. The risk of developing these abnormal changes has been associated with the following factors:
relationship to sexual intercourse;
many partners during lifetime;
frequent intercourse;
early onset of sexual activity;
first pregnancy in teenage years;
multiparity (several children) by mid 20s;
venereal diseases;
genital herpes (herpes simplex virus type 2—HSV-2);
human papilloma virus (HPV);
race: incidence higher in blacks and Hispanics;
low socioeconomic status;
poor genital hygiene;
cigarette smoking;
peak incidence over 40 years.

4.2. Signs and symptoms

post-coital or unexplained vaginal spotting or bleeding;
persistent vaginal discharge;
pelvic pain.

4.3. Five-year survival rates

Adenocarcinomas of the cervix have a worse prognosis than squamous cell cancers.

Squamous cell carcinoma, adenocarcinoma:
Stage 0 = 100%;
Stage I = 60–85%;
Stage II = 40–60%;

Stage III = up to 40%;
Stage IV = <15%.

5. Treatment of cervical intraepithelial neoplasia

Ablation: cryotherapy, laser ablation.

Excision: loop electro excision procedure—LEEP, laser conisation, or cold knife conisation —CKC.

Success rate of all the above modalities is 80–100%.

6. Efforts t o prevent HPV infection

6.1. HPV vaccination

GARDASIL is a quadrivalent vaccine against HPV types 6, 11, 16 and 18 and is given in a three-dose schedule.

CERVARIX is a bivalent vaccine against HPV types 16 and 18 for the prevention of CIN and cervical cancer in females aged 10–25 years.

The efficacy of these vaccines ranges from 0 to 80%.

7. Cervical cancer: prevention and control

7.1. The three-tier system of primary, secondary and tertiary prevention

7.1.1. Primary prevention

HPV infection is the causal factor and it can be prevented by Health Education and Vaccination.

Health education:

genital and menstrual hygiene;

stop tobacco use;

encourage male circumcision;

condom promotion;

safe sex;

Prophylactic HPV vaccines for girls before sexual life exposure;

Two-dose vaccine.

The WHO recommends two-dose vaccine (given at 0 and 6 month or 0 and 12 month) for those starting vaccine before 15 years of age.

7.1.2. Secondary prevention

7.1.2.1. Screening

Screening is a process in which the apparently normal population is subjected to a rapidly applied test to detect an abnormality or a disease condition.

7.1.2.2. Cytology screening

Pap smear screening of women from the age of 25 years can be implemented in the population and the resources need to be planned well to ensure success.

7.1.2.3. HPV testing

HPV testing is a highly sensitive test, but is costly and resource intensive.

7.1.2.4. Visual screening

The most successful and cost-effective methods are as follows:

1. visual inspection with acetic acid (VIA);
2. magnified visual inspection with acetic acid (VIAM);
3. visual inspection with Lugol's iodine (VILI).

7.1.2.5. Colposcopy

Colposcopy is very useful in visual inspection positive lesions to make colposcopic diagnosis, apply a directed biopsy and in guidance of LEEP.

Screen and treat policy for low-resource settings:

Most suited strategy for limited resource settings. A single visit approach has resulted in reduction of incidence rate and mortality rate due to cervical cancer in many countries.

Modalities:

VIA positive—cryotherapy;

VIA positive—colposcopy positive—cryotherapy;

VIA positive—colposcopy positive—biopsy taken—cryotherapy;

VIA positive—colposcopy positive—biopsy taken—biopsy positive—recall for treatment.

In most research settings and in some programmatic settings (e.g., mostly in Asia in countries such as India, Bangladesh and Nepal), colposcopy is used for triaging VIA positives in screen and treat policy.

Criteria to provide cryotherapy:

1. less than 75% of TZ is involved;
2. lesion does not extend to endocervical canal or vagina;
3. no extension of the lesion onto the vaginal walls;
4. lesion adequately covered by cryoprobe;
5. entire squamocolumnar junction is visible;
6. no doubt of invasive cancer.

LEEP:

Ideal to treat CIN 3 lesions and large lesions.

7.1.3. Tertiary prevention

The diagnosis and management of invasive cervical cancer is called tertiary prevention.

7.1.4. Carcinoma of the cervix uteri management according to FIGO staging system

7.1.4.1. Stage description standard treatment

Stage 0: Carcinoma in situ, preinvasive carcinoma.

LEEP, conisation.

Stage I: Invasive carcinoma strictly confined to the cervix.

Stage IA: Invasive carcinoma identified microscopically (all macroscopically visible lesions, even with superficial invasion, should be assigned to stage IB):

Stage IA1: Measured invasion of stroma 3.0 mm or less in depth and 7.0 mm or less in horizontal spread;

Simple hysterectomy or trachelectomy, conisation in selected cases.

Stage IA2: Measured invasion of stroma more than 3.0 mm but not greater than 5.0 mm in depth and 7.0 mm or less in horizontal spread;

Simple or radical hysterectomy and bilateral pelvic lymphadenectomy (or trachelectomy and pelvic lymphadenectomy) depending on local or regional guidelines.

Stage IB: Clinically visible lesion confined to cervix or microscopic lesion greater than stage IA2:

Stage IB1 Clinical lesions of 4.0 cm or less in size;

Radical hysterectomy and bilateral pelvic lymphadenectomy or radiotherapy (or trachelectomy and pelvic lymphadenectomy).

Stage IB2 Clinical lesions more than 4.0 cm in size;

Chemoradiation or radical hysterectomy and bilateral pelvic lymphadenectomy +/− adjuvant radiotherapy or chemoradiation.

Stage II: Carcinoma extending beyond cervix but not to pelvic sidewall; carcinoma involves vagina but not its lower third.

Stage IIA: No parametrial involvement

Chemoradiation or radical hysterectomy and bilateral pelvic lymphadenectomy in selected patients +/− adjuvant radiotherapy or chemoradiation

Stage IIB: Parametrial involvement

Chemoradiation or radical hysterectomy and bilateral pelvic lymphadenectomy in selected patients +/− adjuvant radiotherapy or chemoradiation

Stage III: Carcinoma extending onto pelvic wall; the tumour involves lower third of the vagina. All patients with hydronephrosis or nonfunctioning kidney are included unless known to be result of other causes.

Stage IIIA: Involvement of lower third of the vagina; no extension of pelvic sidewall.

Stage IIIB: Extension to pelvic sidewall and/or hydronephrosis or nonfunctioning kidney.

Chemoradiation or radiotherapy

Stage IV: Carcinoma extends beyond true pelvic or clinically involves mucosa of bladder or rectum. Bullous oedema does not allow a case to be designated as stage IV.

Stage IVA: Spread of growth to adjacent organs:

Chemoradiation or radiotherapy.

Stage IVB: Spread to distant organs:

Palliative chemotherapy or radiotherapy.

Sources: (Benedet, 2000; FIGO, 2009).

8. Conclusion

Cervical cancer, though a highly prevalent cancer, is largely and effectively preventable and treatable. The great advances in science and sociology well contribute towards the global crusade to eliminate cervical cancer, especially among the underserved and unreached poor women in the world. The InTech publishers, editor and authors, dedicate this book towards this noble mission (**Appendix A** and **B**).

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Appendix

Samples of Health education materials as seen in www.

Appendix A. Cervical cancer—health education pamphlet.

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Appendix B. Cervical cancer—clinical information banner.

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