1 Benign Growths of the Cervix

1.1 Cervical Myomas

Cervical myomas are firm smooth muscle tumors that comprise about 3-8% of all myomas (Patel et al., 2011). They are usually solitary and may arise from any part of the cervix. Majority of these actually arise from the uterine isthmus but the relative paucity of smooth muscle fibers in the cervical stroma may contribute to their apparent cervical origin. Most often the lesions are asymptomatic. When symptomatic, the presentation includes meno-metrorrhagia, blood tinged vaginal discharge and urinary symptoms like urgency, dysuria and frequency of micturition. At times, the myoma acquires a peduncle and is then termed cervical myomatous polyp. The condition is diagnosed by symptomatology and examination. Rarely, the polyp may extend outside the introitus (1 and 2) but is most often evident on a speculum examination which reveals a red, shaggy, rounded mass projecting out of the cervix. A larger cervical myoma may appear to be filling the upper vagina. Bimanual digital evaluation may reveal a large circular mass in upper vagina with the opposite cervical lip appearing stretched over the mass while a normal sized uterus may be felt sitting atop the large mass (Figure 3).

Microscopically, these tumors consist of circular smooth muscle bundles interspersed with thick, hyalinised blood vessels which are thought to be the source of origin of this tumor in the cervix (hence the term ‘vascular leiomyoma’).

The management depends on the symptoms, tumor size, patient's age and future reproductive plans. Very small and asymptomatic lesions qualify for expectant management while the larger ones may be treated surgically (myomectomy or hysterectomy). Medical treatment in the form of GnRH analogues may be used preoperatively to reduce the size and vascularity of the tumor though the cleavage planes may be obscured at surgery by these agents. Lateral growing myomas may invade between the leaves of the broad ligament and tend to push the ureters and uterine vessels posterolaterally thus posing a surgical challenge. For this reason, a preoperative intravenous pyelogram may be helpful in the presence of large cervical myomas. This anatomic proximity to important structures predisposes to increased risk of bladder, ureter or vascular injury. Rarely, urethrovaginal fistula may result due to a prolapsed cervical myoma (Lal et al., 2006). Occasionally, a large cervical myoma may elongate and prolapse out of the uterus and even out of the introitus and present with retention of urine. Uterine artery embolization has also been tried as a conservative therapy and may predispose to degeneration and subsequent prolapse of the cervical tumor. A small pedunculated myomatous cervical polyp may be removed surgically by twisting the mass on its stalk while a large myoma with a thick stalk may be enucleated vaginally after clamping, cutting and

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Figure 1: A small cervical polyp protruding at the external os.

Figure 2: A large myomatous cervical polyp coming out of the introitus.

Figure 3: An intraoperative picture showing a normal sized uterine body sitting atop a large cervical myoma.

Ligating it. Large sessile cervical myomas are better approached abdominally and a myomectomy or hysterectomy may be carried out laparoscopically or by laparotomy, depending on the patient’s age and desire for fertility preservation.

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They are benign tumors projecting above the surface of the ectocervix and are found in 0.03-1.4% of cervical biopsies (Simcock, 1994). Histologically, they consist of stratified squamous epithelium covering papillary processes of connective tissue. The average age at presentation is 20 years in non-pregnant and 24 years in pregnant women.

1.2 Cervical Papillomas

Vaginal discharge is the commonest presenting symptom though the condition may be totally asymptomatic and may be detected incidentally at routine vaginal examination. Rarely, it may cause intermenstrual bleeding. A speculum examination may reveal multiple papillomas on the cervix which may also be present in the vagina. Cervical malignancy forms an important differential diagnosis of this condition. Fluhmann in 1966 described two varieties of cervical papillomas.

1. Multiple papillomas on the cervix and similar lesions elsewhere in the genital tract (condyloma acuminata).

2. Solitary papilloma: This type was divided into two subtypes by Hertig and Gore (1960) on the basis of whether a co-existing pregnancy is present or not - papillomas of pregnancy and true papillomas.

The disease is caused by various strains of Human Papilloma Virus (HPV) and is most often self-limiting.

1.3 Cervical Endometriosis

The ovaries are the commonest sites affected by endometriosis, followed by uterosacral ligaments and posterior uterine serosal surface. Rarely, the cervix, lungs, brain and eyes may also be involved. The condition is commonly asymptomatic and may be diagnosed on abnormal
Pap smear reports, at colposcopy or on histology of cervical biopsy or hysterectomy specimen. While endometriosis presents chiefly as dysmenorrhoea (in 60-80% women), infertility (in 30-40%) and pelvic pain (in 30-50%), cervical endometriosis may cause intermittent metrorrhagia and post coital bleeding in 12.5% cases (Veiga-Ferreira et al., 1987). The lesions on the cervix are commonly flat, circular and cherry red or blue in colour. Rarely, they may be polypoid or may appear as a uterine like mass within the cervix (Kano & Kand, 2003; Fukunaga, 2001).

Cervical endometriosis, like endometriosis elsewhere, is affected by ovarian sex steroid variations during the menstrual cycle. As a result Pap smears of the affected women are likely to be misinterpreted as atypical glandular cells of undetermined significance (AGUS), high grade squamous intraepithelial lesion (HSIL) or adenocarcinoma in situ (Symonds et al., 1997; Lundeen et al., 2002). FNAC has also been used to diagnose cervical endometriosis but is not the preferred modality (Veiga-Ferreira et al., 1987).

Endometrioid adenocarcinoma and clear cell adenocarcinoma arising from cervical endometriosis have also been reported (Park et al., 2009; Hiromura et al., 2009). It has also been documented in a case of malignant pleural mesothelioma mimicking cervical cancer (Engel et al., 2011).

Symptomatic cervical endometriosis responds to superficial electrocauterization, laser or cryotherapy. Sonography has also been used to localize and aspirate deep endometriotic cyst of the cervix (Coccia et al., 2010).

1.4 Cervical Haemangioma

Vascular tumors, usually cavernous haemangiomas, are rare benign lesions arising from the cervix with less than 50 cases reported till date (Ozyer et al., 2006). Most of these are asymptomatic and are detected incidentally on histology of hysterectomy specimens. Occasionally, they may present as menometrorrhagia and contact bleeding in women between 28 to 60 years of age (Bharti & Shah, 2012). Baxi in 2005 reported incidental detection of cavernous haemangioma in the cervix of a 61 years old lady who had undergone hysterectomy for uterine prolapse. Rarely the condition may cause intractable cervical bleeding requiring emergency hysterectomy (Riggs et al., 2003). Attempts at biopsing the cervix in unsuspecting cases may result in torrential, life-threatening haemorrhage. Rapid growth in pregnancy is common and the condition is an important non placental cause of antepartum haemorrhage (Petry et al., 1994).

Hemangioma of the cervix may occur in association with focal nodular hyperplasia of the liver and both these congenital vascular anomalies may exhibit increased growth under the influence of exogenous sex steroid administration (Padmanabhan et al., 2001). The diagnosis can also be aided by sonography and magnetic resonance imaging though it is most often diagnosed on a speculum and vaginal examination (Haws, 1991). Cervical malignancy is an important differential diagnosis of the condition.

1.5 Cervical Tuberculosis

Cervical tuberculosis accounts for 0.1-0.65% of all cases of tuberculosis and 5-24% cases of genital tract tuberculosis (Carter, 1990; Chowdhury, 1996). The condition commonly affects women of reproductive age group and is most often secondary to primary pulmonary affec-
tion. The fallopian tubes are invariably affected by genital tuberculosis through direct or lymphatic routes. Rarely, the cervix may be the primary site of infection from an infected partner (Richards & Angus, 1998).

The condition is usually asymptomatic or presents as vague abdominal or pelvic pain, menstrual irregularity (usually hypomenorrhoea) or infertility. Speculum examination of the cervix may reveal a vegetative or papillary growth accompanied at times by ulceration and may mimic a cervical malignancy (Shobin et al., 1976).

Cervical cytology may occasionally reveal granulomata but the diagnosis is confirmed only if caseating granulomas are evident on histology of a cervical biopsy specimen. Conditions like sarcoidosis, schistosomiasis, brucellosis, amoebiasis and tularemia may cause a similar histological presentation and these conditions should also be excluded (Koller, 1975). The isolation of Mycobacterium tuberculosis from the lesion remains the gold standard for diagnosis even as one-third cases are culture negative. Polymerase Chain Reaction (PCR) for the causative organism is more sensitive but less specific than culture.

Pelvic ultrasound and magnetic resonance imaging have a limited role in the diagnosis. Pelvic lymphadenopathy and radiological appearance of the uterus mimicking that of Asherman’s Syndrome may be evident due to extensive destruction of endometrium and intrauterine adhesions (Lamba et al., 2002).

Multiagent antitubercular therapy for 6-9 months usually causes regression of the disease. Serial cervical biopsy specimens can confirm a therapeutic response though restoration of fertility may still be compromised due to healing by fibrosis (Lamba et al., 2002; Sinha et al., 1997).

2 Malignant Growths of the Cervix

Normally the ectocervix is lined by squamous epithelium, the endocervix and the glands have a tall columnar lining while the stroma is made of fibroblasts, muscle fibers, vessels and nerves. Usually the epithelial proliferation takes an upper hand as compared to the mesenchymal proliferation.

2.1 Carcinoma of the Cervix

Carcinoma of the uterine cervix is one of the leading causes of cancer death among women worldwide and it continues to be a significant health care problem especially in the third world countries. Cervical cancer is the third most common cancer in the world ranking after breast (1.38 million cases) and colorectal cancer (0.57 million cases) and the fourth most common cause of cancer death ranking below breast (458,000 deaths), lung (427,000 deaths) and colorectal cancer (288,000 deaths). Eighty-five percent of all cervical cancers and 88% of all deaths caused by cervical cancer occur in developing countries (Ferlay et al., 2010).

More than 80% of cases of carcinoma cervix are diagnosed at an advanced clinical stage and five-year survival in them is less than 40% (Siegel et al., 2011). In many developed nations, a decline in the incidence and mortality caused by cervical cancer has been observed in the past 30 years as a result of screening by cytology. It is considered a preventable disease given its long pre-invasive state, availability of cervical cytology screening programmes and
effective treatment of pre-invasive lesions. The mean age for cervical carcinoma is 47 years and the distribution of cases is bimodal, with peaks at 35 to 39 years and 60 to 64 years of age.

2.1.1 Risk Factors

Young age at first intercourse (less than 16 years), high parity, multiple sexual partners, chronic immune suppression, lower socio-economic status, race and consumption of tobacco are some of the risk factors for carcinoma cervix (International Collaboration of Epidemiological studies of Cervical Cancer, 2007). Oral contraceptive use has been proposed to increase cervical glandular abnormalities by causing cervical ectropion thus exposing the transformation zone to potential carcinogens. However, a definite role is debatable.

Infection with human papilloma virus (HPV) is believed to play a causal role in the development of cervical cancer, with herpes virus and Chlamydia trachomatis being cofactors. The role of HIV in causation of cervical cancer is believed to be mediated through immune suppression (Munger et al., 1992).

2.1.2 Clinical Features

Vaginal bleeding is the most common symptom of carcinoma cervix. Most often, it presents as postcoital bleeding, but may occur as menorrhagia, metrorrhagia or post-menopausal bleeding. Many patients with advanced disease have a profuse and often malodorous discharge. Women with late stage disease may have obstructive uropathy, weight loss and obstructive bladder or bowel symptoms. Involvement of the lumbosacral and sciatic nerve roots by the disease may result in excruciating chronic pelvic bone pain radiating down the leg. Edema of the lower extremities may indicate obstruction of lymphatic or venous drainage by the malignant process.

In asymptomatic women, cervical cancer is most commonly identified through abnormal cytology screening evaluation. As the false negative rate for Pap smear in the presence of invasive cancer can be as high as upto 50%, a negative Pap test should not be relied upon in a symptomatic patient (Sasieni et al., 2009).

Figure 4: Fungating pale growth of the cervix coming out of the introitus.
2.1.3 Screening for Carcinoma Cervix

According to ACOG 2009, screening for cervical cancer should begin at the age of 21 years, regardless of the age of onset of sexual activity. It is recommended every 2 years for women aged 21-29 years with either conventional or liquid-based cytology.

More frequent screening is required in women who are infected with human immunodeficiency virus (HIV), are immunosuppressed (such as those who have undergone renal transplantation), exposed to diethylstilbestrol in utero or have been previously treated for CIN 2, CIN 3 or frankly invasive cancer.

Primary HPV testing is not FDA approved. However HPV co-test with cytology can be done for age >30 years, no more than every 3 years, if HPV negative and cytology normal, but not in women younger than 30 years. The screening should continue up to age 65-70 years with 3 consecutive normal cytology tests and no abnormal tests in the past 10 years; an older woman who is sexually active and has multiple partners should continue to have routine screening (ACOG, 2009).

2.1.4 Evaluation

The supraclavicular, axillary and inguino-femoral lymph nodes should be examined to exclude the presence of metastatic disease in women with invasive cervical malignancy. On speculum examination vagina and cervix are inspected for suspicious areas. This may be aided by visual inspection after application of 3-5% acetic acid (VIA- Visual Inspection after Acetic acid) or Lugol’s iodine (VILI- Visual Inspection after Lugol’s Iodine) application can be done. The suspicious areas appear as noticeable opacity against normal pinkish hue of the cervix (Miller & Elkas, 2009). There may be a pale or cherry red, friable growth that bleeds to touch.

Digital examination may reveal a hard punched out or elevated growth on the cervix. It is important to establish cervical size and consistency and parametrial extension, particularly in women with endocervical malignancy. Rectal examination is important to help establish parametrial extension and involvement of rectal mucosa & is the only way to determine cervical size in women in whom the vaginal fornices have been obliterated by menopausal changes or by extension of the disease to parametrium (Miller & Elkas, 2009).

When obvious tumor growth is present, a cervical biopsy is sufficient for diagnosis. If gross disease is not present, a colposcopic examination with cervical biopsies and endocervical curettage is warranted. If the diagnosis cannot be established conclusively with colposcopy and directed biopsies, which may be the case with endocervical carcinoma, cervical conization may be necessary.

2.1.5 Spread of Carcinoma Cervix

Cervical carcinoma spreads by direct invasion (into the cervical stroma, corpus, vagina, and parametrium), through lymphatics (to pelvic and para-aortic lymph nodes), blood or by intraperitoneal implantation. Lesions that involve the cervix and vagina are designated as cervical primaries.

2.1.6 Staging of Cervical Carcinoma

Cervical cancer is a clinically staged disease. The FIGO staging system is applicable to all histologic types of cervical cancer. Table 1 depicts the FIGO staging system for carcinoma cervix.
The staging procedures recommended by FIGO are listed in Table 2. Investigations like lymphangiography, computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET) suffer from poor sensitivity, high false-negative rates and variable availability. When there is doubt/ambiguity about stage allocation, the earlier stage should be selected. After a clinical stage is assigned and treatment is initiated, the stage must not be changed because of subsequent findings by either extended clinical staging or surgical staging. The accuracy of clinical staging is limited as lymph node involvement, an important factor that affects prognosis, cannot be assessed, and thus surgical evaluation, although not practical and feasible in all patients, can more accurately identify metastatic disease (Miller & Elkas, 2009).

<table>
<thead>
<tr>
<th>Stage</th>
<th>The carcinoma is strictly confined to the cervix (extension to the corpus should be disregarded).</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>Invasive carcinoma which can be diagnosed only by microscopy, with deepest invasion ≤ 5 mm and largest extension ≥ 7 mm</td>
</tr>
<tr>
<td>IIA1</td>
<td>Measured stromal invasion of ≤ 3.0 mm in depth and extension of ≤ 7.0 mm</td>
</tr>
<tr>
<td>IIA2</td>
<td>Measured stromal invasion of &gt; 3.0 mm and not &gt; 5.0 mm with an extension of not &gt; 7.0 mm</td>
</tr>
<tr>
<td>IB</td>
<td>Clinically visible lesions limited to the cervix uteri or pre-clinical cancers greater than stage IAa</td>
</tr>
<tr>
<td>IB1</td>
<td>Clinically visible lesion ≤ 4.0 cm in greatest dimension</td>
</tr>
<tr>
<td>IB2</td>
<td>Clinically visible lesion &gt; 4.0 cm in greatest dimension</td>
</tr>
<tr>
<td>Stage II</td>
<td>Cervical carcinoma invades beyond the uterus, but not to the pelvic wall or to the lower third of the vagina.</td>
</tr>
<tr>
<td>IIA</td>
<td>Without parametrial invasion</td>
</tr>
<tr>
<td>IIA1</td>
<td>Clinically visible lesion ≤ 4.0 cm in greatest dimension</td>
</tr>
<tr>
<td>IIA2</td>
<td>Clinically visible lesion &gt; 4.0 cm in greatest dimension</td>
</tr>
<tr>
<td>IIB</td>
<td>With obvious parametrial invasion</td>
</tr>
<tr>
<td>(a). All macroscopically visible lesions—even with superficial invasion—are allotted to stage IB carcinomas. Invasion is limited to a measured stromal invasion with a maximal depth of 5.00 mm and a horizontal extension of not &gt; 7.00 mm. Depth of invasion should not be &gt; 5.00 mm taken from the base of the epithelium of the original tissue superificial or glandular. The depth of invasion should always be reported in mm, even in those cases with “early (minimal) stromal invasion” (~1 mm). The involvement of vascular/lymphatic spaces should not change the stage allotment. (b). On rectal examination, there is no cancer-free space between the tumor and the pelvic wall. All cases with hydronephrosis or non-functioning kidney are included, unless they are known to be due to another cause.</td>
<td></td>
</tr>
<tr>
<td>Stage III</td>
<td>The tumor extends to the pelvic wall and/or involves lower third of the vagina and/or causes hydronephrosis or non-functioning kidney.</td>
</tr>
<tr>
<td>IIIA</td>
<td>Tumor involves lower third of the vagina, with no extension to the pelvic wall</td>
</tr>
<tr>
<td>IIIB</td>
<td>Extension to the pelvic wall and/or hydronephrosis or non-functioning kidney</td>
</tr>
<tr>
<td>Stage IV</td>
<td>The carcinoma has extended beyond the true pelvis or has involved (biopsy proven) the mucosa of the bladder or rectum. A bullous edema does not permit a case to be allotted to Stage IV.</td>
</tr>
<tr>
<td>IVA</td>
<td>Spread of the growth to adjacent organs</td>
</tr>
<tr>
<td>IVB</td>
<td>Spread to distant organs</td>
</tr>
</tbody>
</table>

**Table 1:** FIGO Staging of Carcinoma of the cervix uteri (2009).
### Physical examination
- Palpate lymph nodes
- Examine vagina
- Bimanual rectovaginal examination anaesthesia

### Radiologic studies
- Intravenous pyelogram
- Barium enema
- Chest X-ray
- Skeletal X-ray

### Procedures (a)
- Biopsy
- Conization
- Hysteroscopy
- Colposcopy
- Endocervical curettage
- Cystoscopy

### Optional studies (b)
- Proctoscopy
- Computerized axial tomography
- Lymphangiography
- Ultrasonography
- Magnetic resonance imaging
- Positron emission tomography
- Radionucleotide scanning
- Laparoscopy

(a) Allowed by the International Federation of Gynecology and Obstetrics (FIGO).
(b) Information that is not allowed by FIGO to change the clinical stage preferably under.

**Table 2: Staging Procedures.**

### 2.1.7 Treatment Modalities

The therapeutic modalities for cervical carcinoma include surgery, radiation, chemotherapy and a combination of chemo-radiation. The modality chosen depends on the clinical stage and while radiation therapy can be used in all stages of the disease, surgery is limited to patients with stage I or IIa disease. Table 3 summarizes the stagewise management of the disease.

The 5-year survival rate for stage I cancer of the cervix is approximately 85% with either radiation therapy or radical hysterectomy (Brewster *et al.*, 2001). Surgical treatment may be preferred in the young as vaginal length is better preserved with surgery. Moreover, the ovaries may be left behind at surgery in these women without compromising results. Optimal therapy consists of either radiation or surgery so as to limit the increased morbidity of combination therapy.

**Surgery**

The surgical options for management of cervical cancer include conization, radical trachelectomy and radical hysterectomy.

**Conization**

Conization not only confirms the diagnosis but is also a treatment modality for stage IA1 disease when preservation of fertility is desired. For effective treatment, there must be no lymph-vascular space invasion (LVSI) and both endocervical margins and curettages must be nega-
<table>
<thead>
<tr>
<th>Stage</th>
<th>Extend</th>
<th>Therapeutic modality</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA1</td>
<td>≤3mm invasion, noLVSI</td>
<td>Conization or type I hysterectomy</td>
</tr>
<tr>
<td></td>
<td>≤3mm invasion, w/LVSI</td>
<td>Radical trachelectomy or type II radical hysterectomy with pelvic lymphadenectomy</td>
</tr>
<tr>
<td>IA2</td>
<td>&gt;3-5mm invasion</td>
<td>Radical trachelectomy or type II radical hysterectomy with pelvic lymphadenectomy</td>
</tr>
<tr>
<td>IB1</td>
<td>&gt;5mm invasion, &lt;2cm</td>
<td>Radical trachelectomy or type III radical hysterectomy with pelvic lymphadenectomy</td>
</tr>
<tr>
<td></td>
<td>&gt;5mm invasion, &gt;2cm</td>
<td>Type III radical hysterectomy with pelvic lymphadenectomy</td>
</tr>
<tr>
<td>IB2</td>
<td></td>
<td>Type III radical hysterectomy with pelvic and para-aortic lymphadenectomy or primary chemoradiation</td>
</tr>
<tr>
<td>IIA1, A2</td>
<td></td>
<td>Type III radical hysterectomy with pelvic and para-aortic lymphadenectomy or primary chemoradiation</td>
</tr>
<tr>
<td>IIB, IIIA, IIIIB</td>
<td></td>
<td>Primary chemoradiation</td>
</tr>
<tr>
<td>IVA</td>
<td></td>
<td>Primary chemoradiation or primary exenteration</td>
</tr>
<tr>
<td>IVB</td>
<td></td>
<td>Primary chemotherapy ±radiation</td>
</tr>
</tbody>
</table>

**Table 3: Management of invasive cancer of the cervix (FIGO, 2009)**

tive for dysplasia or anaplasia. If the endocervical margins or curettings are positive for dysplasia or malignancy, further treatment is necessary as there may be residual disease. In cases of adenocarcinoma in situ, the status of the cone margins is particularly important as there may be residual pre-invasive and invasive disease in up to 25% and 3% respectively, of cases with negative margins and up to 80% and 7% respectively in cases with positive margins (Wolf et al., 1996).

**Radical Trachelectomy**

Radical trachelectomy is increasingly being used for women with stage IA2 and IB1 disease, who desire uterine preservation and fertility (Hopkins, 2000). The intent of the procedure is to resect the cervix, upper 1-2 cm of the vagina, parametrium and paracolpos similar to radical hysterectomy but sparing the uterine corpus. It is a fertility sparing surgery and is accompanied by cervical cerclage placement. Ideal candidates for this procedure are those with tumors less than 2 cm in diameter and negative lymphnodes. Lymph node dissection can be performed at the beginning of the procedure, and depending on the results, the procedure can be continued or abandoned further. Although radical trachelectomy is performed with curative intent, it must be remembered that if a recurrence develops, definitive therapy with surgery or radiation is necessary.

**Type I Hysterectomy**

Type I or simple extrafascial hysterectomy is an appropriate therapy for stage IA1 tumors without LVSI in women who are not desirous of future fertility.

**Radical Hysterectomy**

Primary radical surgery should be done if it is likely to result in complete removal of the central tumor with an adequate margin of tumor free tissue around it. This surgery should not be
performed with the idea that radiotherapy with and/or chemotherapy can be used postoperatively to eliminate residual fragments of tumor tissue left behind after incomplete resection. Such women are better treated with concurrent pelvic radiation and chemotherapy from the outset. Various types of radical hysterectomy are Type II, III, IV and V (Piver et al., 1974). Table 4 outlines the differences between type II and III procedures.

<table>
<thead>
<tr>
<th></th>
<th>Type II hysterectomy</th>
<th>Type III hysterectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parametrium &amp; paracolpos</td>
<td>Parametrium and paracolpos near the ureteric dissection</td>
<td>Divided near the sidewall lateral to ureter</td>
</tr>
<tr>
<td>Uterine vessels</td>
<td>Ligated at the level of ureter, preserving the ureteral branch to the ureter</td>
<td>Ligated at origin from hypogastric vessels</td>
</tr>
<tr>
<td>Anterior &amp; posterior vesicouterine ligament</td>
<td>Anterior ligament is divided but posterior is conserved</td>
<td>Both ligaments are divided</td>
</tr>
<tr>
<td>Vaginal cuff</td>
<td>1-2cm removed</td>
<td>Upper one third removed</td>
</tr>
</tbody>
</table>

**Table 4:** Differences between type II & III Radical Hysterectomy (Boyce et al., 1981)

In type IV extended radical hysterectomy, the periureteral tissue, superior vesicle artery, and as much as three fourths of the vagina is removed. In the type V operation, portions of the distal ureter and bladder are resected. However these procedures are rarely performed because radiotherapy can be used when extensive disease is encountered (Piver et al., 1974).

**Ovarian Conservation**

Although the incidence of ovarian metastasis is slightly higher in women with adenocarcinoma of the cervix as compared to squamous cell carcinoma, ovarian conservation is recommended in young women (FIGO, 2009). In premenopausal patients, the ovaries may be surgically transposed to the paracolic gutters before initiation of radiotherapy (ovariopexy).

**Pelvic Lymphadenectomy**

The primary group of lymph nodes draining the cervix is parametrial, internal iliac, external iliac and obturator group of nodes. The lymphatics from primary group drain into common iliac and superior lumbar group. At the time of surgery lymph nodes that are suspicious for gross disease should be excised and evaluated by frozen section. If metastatic disease is identified, consideration should be given to abandoning radical surgery in favor of primary chemo-radiation therapy (Miller & Elkas, 2009). If the patient has no gross evidence of metastatic disease, the pelvic lymphadenectomy should be combined with the primary surgery.

**Complications of Radical Hysterectomy**

A variety of complications may result from radical surgery for carcinoma cervix. Hemorrhage (0.8%), pulmonary embolism (1-2%), small bowel obstruction (1%), ureterovaginal (1-2%) and vesicovaginal fistula (1%) formation and febrile morbidity (25-50%) may complicate the acute phase of surgery (Hopkins, 2000). The subacute complications include bladder dysfunction, venous thrombosis and lymphocyst formation in up to 5% women. Adequate bladder drainage is an important preventive measure in the postoperative period. The pelvis should also be
drained of all collected blood at the end of surgery. However, routine placement of pelvic drains at surgery is not recommended. Bladder denervation may cause chronic bladder hypotonia in 3% women (Boyce et al., 1981). Nerve sparing radical hysterectomies have been described in an attempt to diminish the bladder dysfunction, sexual dysfunction and colorectal motility disorders.

![Figure 5: Wertheim's hysterectomy specimen.](image)

### Advantages of Surgery over Radiation Therapy for Early Stage Disease

The cure rates of primary radiation therapy and primary radical surgery are almost equal for early stage disease. Table 5 compares the surgical and radiation modalities of therapy for early cancer cervix.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Surgery</th>
<th>Radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival</td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td>Serious complications</td>
<td>Urologic fistulas 1 - 2 %</td>
<td>Intestinal and urinary strictures and fistulas 1.4% - 5.3%</td>
</tr>
<tr>
<td>Vagina</td>
<td>Initially shortened, but may lengthen with regular intercourse</td>
<td>Fibrosis and stenosis, particularly in postmenopausal patients</td>
</tr>
<tr>
<td>Ovaries</td>
<td>May be conserved</td>
<td>Destroyed</td>
</tr>
<tr>
<td>Chronic effects</td>
<td>Bladder atony in 3%</td>
<td>Radiation fibrosis of bowel and bladder in 6 - 8%</td>
</tr>
<tr>
<td>Applicability</td>
<td>Best candidates are those younger than 65 years, weight &lt; 200 lbs</td>
<td>All patients are eligible</td>
</tr>
<tr>
<td>Mortality</td>
<td>1% (surgical or anaesthetic complications)</td>
<td>1% (from pulmonary embolism during intracavitary therapy)</td>
</tr>
</tbody>
</table>

Table 5: Comparison of Surgery versus Radiation for Stage IB/IIA Cancer of the Cervix (Brewster et al., 2001).

Although neither surgery nor radiation is without complications, primary radical surgery offers several advantages for early stage disease (Hatch et al., 1984). It helps in accurate evaluation of the extent of the disease and is helpful in determining prognosis by identifying those at greater risk of persistence or recurrence of disease necessitating additional therapy.
Ovariopexy also protects against premature loss of ovarian function following radiation therapy in young women. Marked fibrotic changes in the vagina and paravaginal tissues following radiation treatment may cause vaginal stenosis and dryness. The hypoestrogenism induced by radiation adds to this effect. The surgically shortened vagina on the other hand remains soft, pliant and moist and helps in better preservation of sexual function.

Late complications are less frequent with primary radical surgery while the progressive obliterative endarteritis may cause cystitis, proctitis, enteritis, pyelonephritis and colpocleisis several years after radiation treatment. Moreover, surgery offers psychologic benefits over radiation. Thus radical hysterectomy is preferred in women with early stage disease. However, women with lesions larger than 4 cm in diameter are better managed by primary radiation therapy. The complication rates can be minimized by careful selection of cases (Hatch et al., 1984).

**Conclusion**

Carcinoma cervix continues to be a major gynecologic malignancy affecting Indian women. Various screening modalities have been devised for early diagnosis. Diagnosis is clinical and is confirmed by cervical histology. With recent advances in radiotherapy, the 5-year survival has improved in the last decade. However, given the large numbers affected by the disease, more needs to be done on the screening front so as to detect more and more cases in preinvasive and early invasive stages.

### 2.2 Sarcomas of the Cervix

Primary cervical sarcomas are exceedingly rare neoplasms (<1% of all cervical malignancies) and are believed to be associated with poor prognosis (Rotmensch et al., 1983). Most of the available data regarding these tumors is derived from case reports and small case series. Due to the rare occurrence of these tumors, treatment strategies are often derived from data for uterine and soft tissue sarcomas.

Rhabdomyosarcoma, most commonly of the embryonal subtype, represents the most commonly reported sarcoma at this location. Occurring most often in children and young adults, the tumor is composed of grapelike polypoid nodules commonly known as botryoid sarcoma. The diagnosis depends on the recognition of rhabdomyoblasts on histological examination (Rotmensch et al., 1983).

Since cervical involvement by uterine corpus leiomyosarcomas (LMS) is not uncommon, the diagnosis of a primary cervical LMS requires the exclusion of origin of the tumor from uterine isthmus. Approximately 30 cervical LMS have been reported till date (Wright et al., 2005). They generally occur in the perimenopausal and postmenopausal population in 4th to 6th decades of life. Women with these tumors most often present with abnormal vaginal bleeding and/or abdominopelvic pain and pressure symptoms (Abell & Ramirez, 1973). Grossly, the tumors are typically large, poorly circumscribed masses that either protrude from the cervical canal or widen and expand it circumferentially (Figure 6 and 7). Kasamatsu et al. in 1998 reported the largest cervical LMS weighing 10.5 kg in a 47 year-old woman who had presented with hypermenorrhea and abdominal distention. The central least vascular area of a large leiomyoma may be the site of the sarcomatous change and hypoxia may have a role in its aetiology. The histologic findings for diagnosing cervical LMS should conform to
Norris and Taylor’s criteria (1966) for LMS of the uterine corpus. Other criteria were proposed by Bell et al. in 1994. Microscopically, they display a spectrum of morphologic subtypes similar to those seen in their corpus counterparts, including the myxoid variant, epithelioid variant and cases with an abundance of xanthomatous cells apart from the conventional types. The epithelioid variety is an extremely rare variety with only 4 cases reported so far (Toyoshima et al., 2005). The tumor is composed of bipolar fibroblasts with bizarre nuclei and light basophilic cytoplasm in myxoid stroma. There may be varying degree of cellular atypia, mitotic activity and coagulative tumor cell necrosis. In 2001 Gotoh et al. reported the first case of triple uterine cancer in which cervical epithelioid LMS was found coexisting with endometrial adenocarcinoma and cervical squamous cell carcinoma. Application of judicious immunohistochemical panel is useful. The prognostic indicators include tumor stage, grade and mitotic count. As the number of reported cases in the literature is exceedingly small, the optimum means of managing cervical leiomyosarcoma has yet to be established. Aggressive surgical treatment is the management of choice as these tumors have low metastatic potential.

![Figure 6: A large cervical leiomyosarcoma protruding out of the vaginal incision at hysterectomy.](image1)

![Figure 7: Surgical specimen of the uterus with a large leiomyosarcoma of the cervix.](image2)

Complete surgical resection with a tumor free margin of 1cm is the treatment of choice. For disease confined to the cervix, total abdominal hysterectomy with bilateral salpingo-oopherectomy is usually sufficient. As these tumors are usually large, neoadjuvant chemotherapy may be given to reduce the size pre-operatively and ensure complete surgical resection (Bhaviskar & Angarkar, 2003). Given the low incidence of lymph node dissemination by leiomyosarcomas, the value of routine lymphadenectomy has been questioned. In the Gynecologic Oncology Group’s surgicopathologic evaluation of uterine leiomyosarcomas, the incidence of nodal disease was only 3.5% (Major et al., 1993). Likewise, in over 1200 soft tissue leiomyosarcomas, the incidence of lymph node involvement was found to be only 5.8% (Weingrad & Rosenberg, 1978). Accurate imaging and follow-up is essential for improving survival. There is no firm evidence from prospective studies as to whether adjuvant radiation therapy or chemotherapy is of benefit to women with uterine sarcomas. Several studies show a trend for improved local control in patients receiving pelvic radiation therapy; however, adjuvant radiation therapy does not appear to improve survival for patients with leiomyosar-
coma of the uterus (Giuntoli et al., 2003). Similarly, adjuvant chemotherapy has not significantly improved survival for patients with uterine leiomyosarcoma. Most patients with advanced disease are considered to be candidates for chemotherapy due to its tendency to metastasize haematogenously (Giuntoli et al., 2003).

A number of other sarcomas like sarcomatoid carcinomas, adenosarcomas, endometrial stromal sarcomas (ESS), alveolar soft part sarcoma and neurofibrosarcoma have been reported to arise within the cervix (Brown et al., 2003; Fukunaga et al., 1998). Sarcomatoid carcinoma is a distinctive histovariant of carcinomas typically characterized by a squamous cell component that merges with a spindle cell component. These tumors tend to be aggressive, and most patients with advanced stage disease are refractory to treatment (Brown et al., 2003). Extraterine endometrial stromal sarcomas (ESS) are rare tumors. Extraterine ESS commonly arise within foci of endometriosis and histologically resemble ESS found in the uterus. The tumors have been reported in a variety of locations including the peritoneum, omentum, and ovary. Extraterine endometrial stromal sarcomas arising in the cervix are uncommon, with only two cases reported so far (Fukunaga et al., 1998).

Based upon the data of sarcomas originating from other sites, it would appear logical to attempt surgical extirpation in women with tumors confined to the cervix. Management usually consists of total abdominal hysterectomy with bilateral salpingo-oophorectomy followed by combination chemotherapy in the form of VADIC and Hydroxyurea, DTIC and Etoposide (Kasamatsu et al., 1998). Further research into the natural history and optimal management of women with these rare neoplasms is warranted.

2.3 Metastatic Lesions on the Cervix

Metastatic lesions on the cervix from distant primary lesions are rare. Among the genital organs, breast carcinoma may metastasize to the ovaries, endometrium or cervix in that order of frequency. 56 Cervical involvements may be asymptomatic or manifest as intermenstrual, postcoital or postmenopausal vaginal bleeding and dyspareunia. These lesions may be picked up on Pap smear or on colposcopy and cervical biopsy. Magnetic Resonance Imaging may detect the cervical mass and/or the parametrial involvement. Histologically, the lesion is identical to that at the primary site. Aggressive treatment of the isolated cervical metastasis is advocated where feasible (Bogoliolo et al., 2010). In others, systemic chemotherapy with taxanes could be beneficial.

References


