

MOYOMAS (FIBROIDS)

JU/ 5th Year Medical Students

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Nomenclature & Epidemiology

- The terms fibroid, myoma, and leiomyoma are synonymous and are the commonest gynaecological tumours, with an overall incidence of 40% to 60% by age 35 and 70% to 80% by age 50.
- A hysterectomy study has found leiomyomas in 77% of uterine specimen.

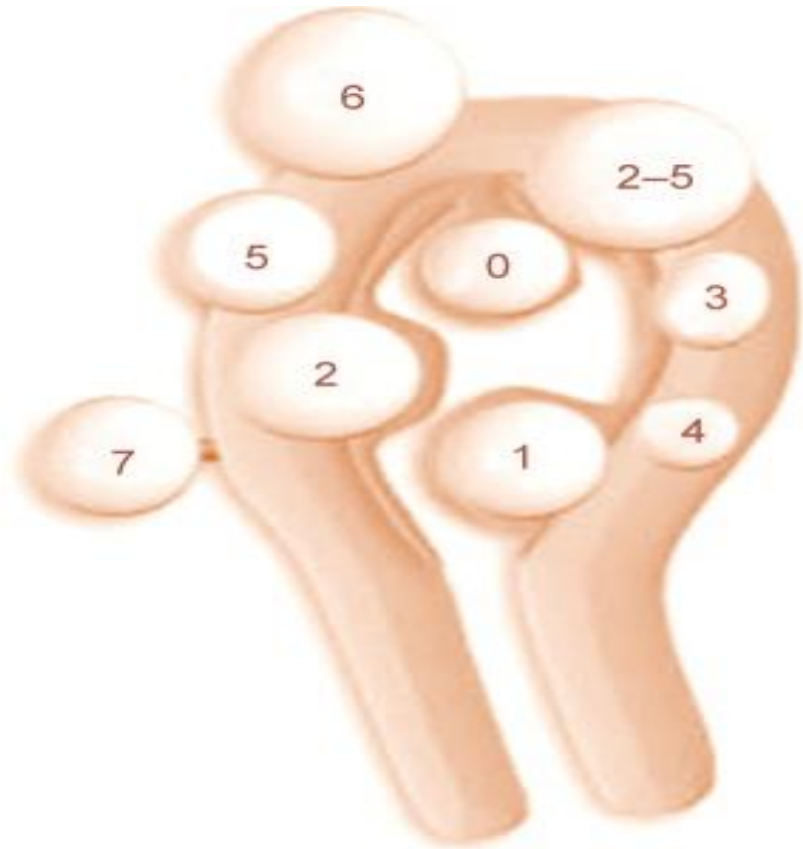
Nomenclature & Epidemiology

- Uterine fibroids are currently the most common indication for hysterectomy worldwide.
- 200,000 hysterectomies, 30,000 myomectomies, and thousands of selective uterine artery embolizations (UAEs) are performed annually in the USA to eliminate UFs, with a psychological load and economic costs to the patient and the health care system.

Uterine Fibroids

- Uterine fibroids are noncancerous monoclonal tumours that arise from the uterine smooth muscle tissue (i.e. the myometrium).
- They are benign neoplasms composed of disordered “myofibroblasts” buried in abundant quantities of extracellular matrix that accounts for a substantial portion of tumour volume.
- Their growth is hormone dependent.
- They depend on the ovarian steroids estrogen and progesterone and therefore most fibroids shrink after menopause.

The International Federation of Gynecology and Obstetrics (FIGO) classification system for uterine fibroids



Type	Description
0	Pedunculated intracavitary
1	<50% intramural
2	≥50% intramural
3	Contacts endometrium 100% intramural
4	Intramural
5	Subserosal ≥50% intramural
6	Subserosal <50% intramural
7	Subserosal pedunculated
8	Other

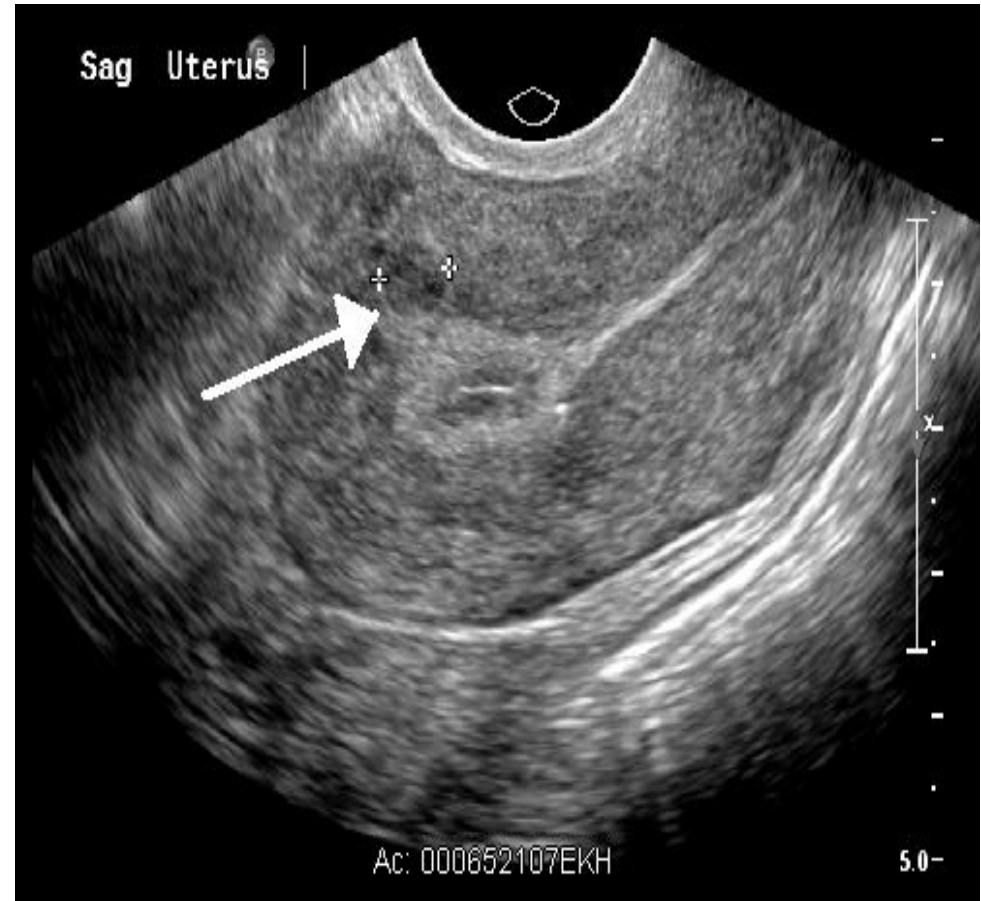
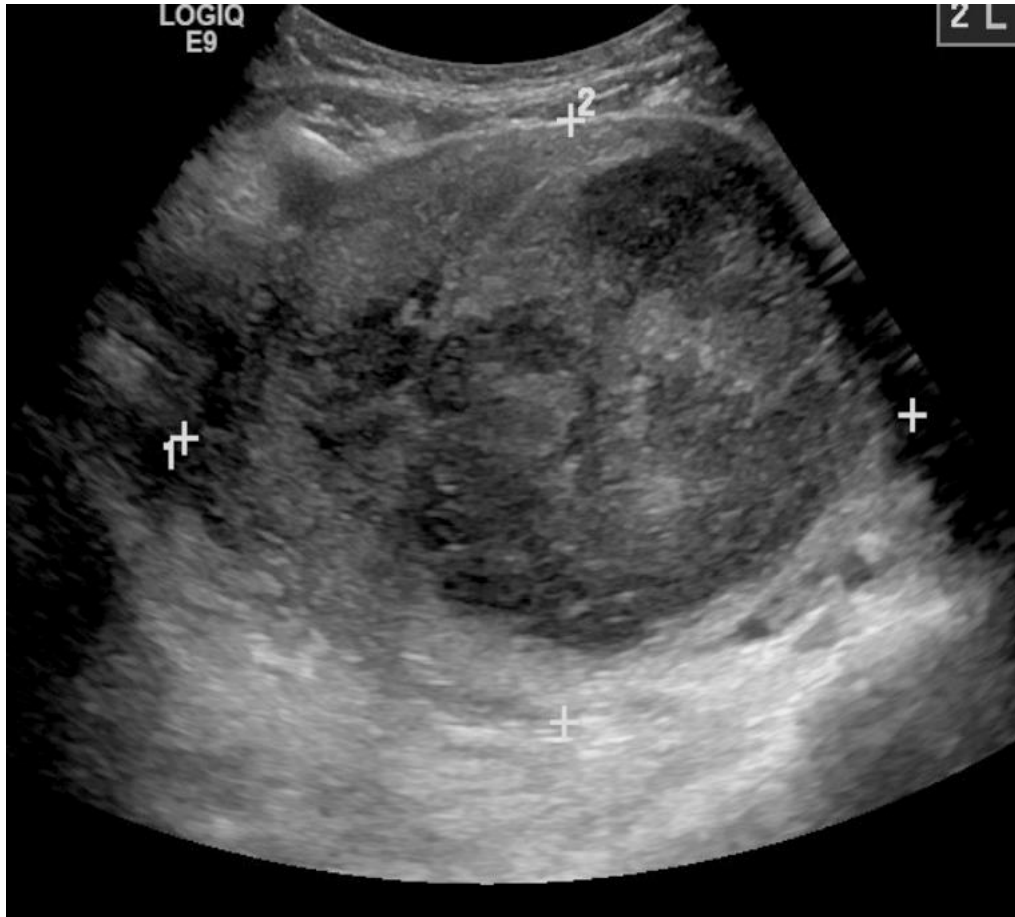
(FIGO) Classification

- **FIGO employs a nine-point numerical system to describe the location of UFs in relation to the endometrium and the serosal surface:**
- Type 0 are pedunculated UFs localized in the submucosa, extending inside the uterine cavity.
- Type 1 and type 2 are submucosal UFs that have $\pm 50\%$ of intramural location.
- Type 3 UFs are completely located intramural with contact to the endometrium.
- Type 4 UFs are intramural lying entirely in the myometrium.
- Types 5–6 represent subserosal UFs with $\pm 50\%$ of intramural location and type 7 is attached to the serosa by a stalk (pedunculated).
- Type 8 covers all other UFs not related to the myometrium such as cervical or parasitic lesion.

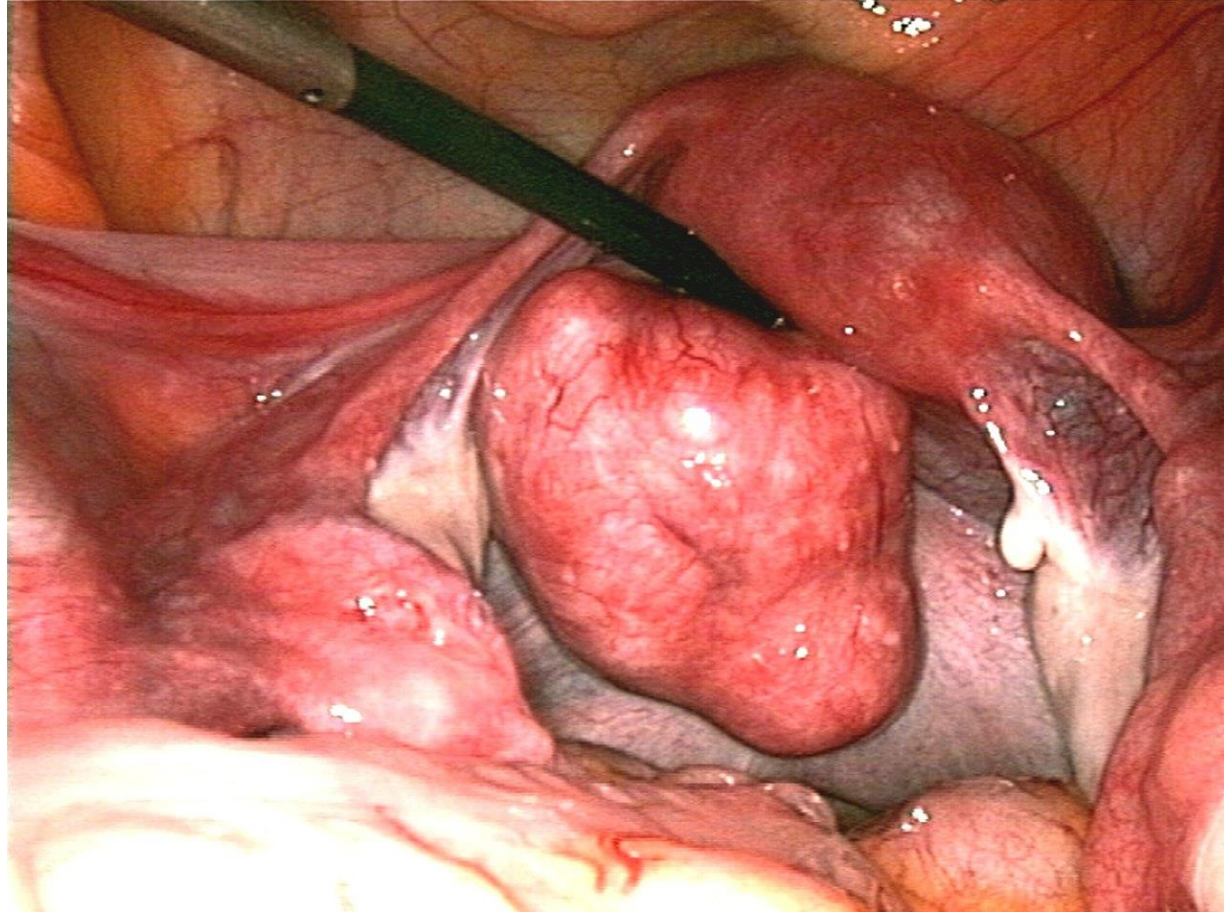
Risk Factors

- **Several factors may affect a woman's risk for having uterine fibroids, including the following:**
 - Age (older women are at higher risk than younger women) (peak incidence at 40 to 50).
 - African American race
 - Obesity
 - Family history of uterine fibroids
 - High blood pressure
 - Nulliparity
 - Early Menarche
 - Genetic variants
 - Vitamin D deficiency
- **Factors that may lower the risk of fibroids:**
 - Pregnancy (the risk decreases with an increasing number of pregnancies)
 - Long-term use of oral or injectable contraceptives

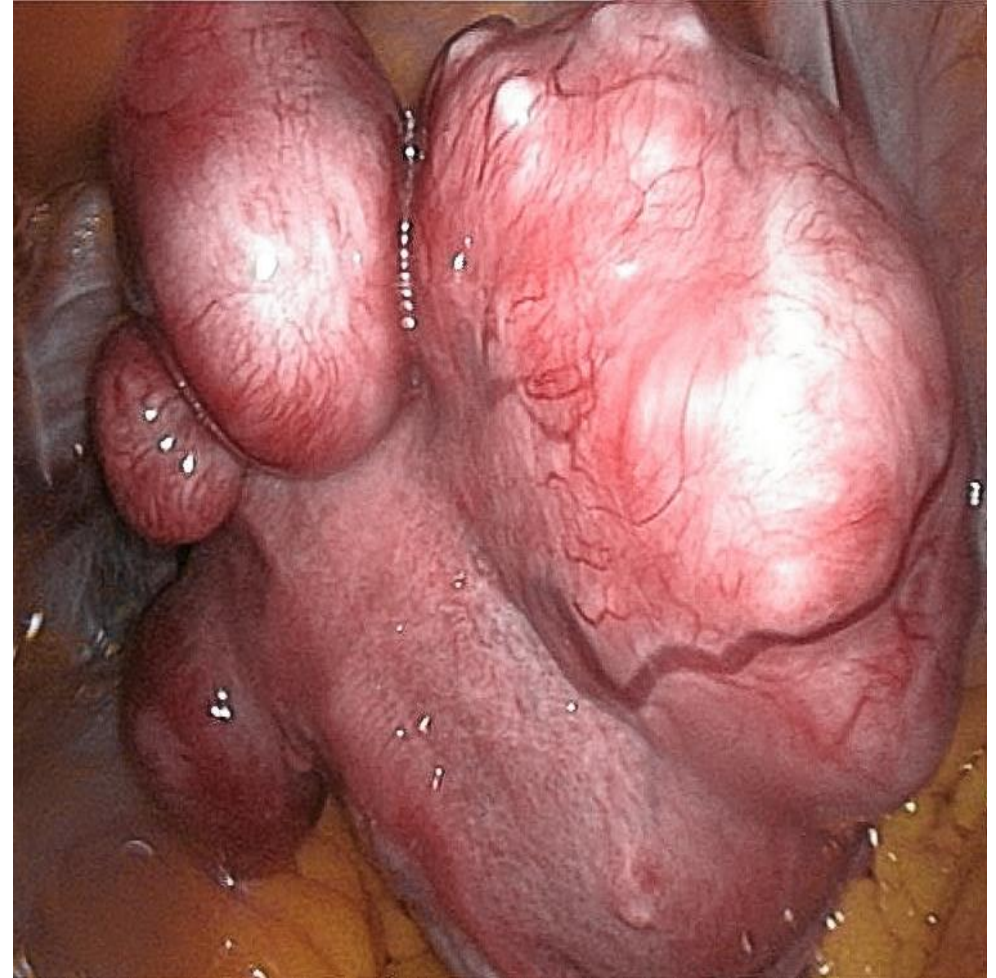
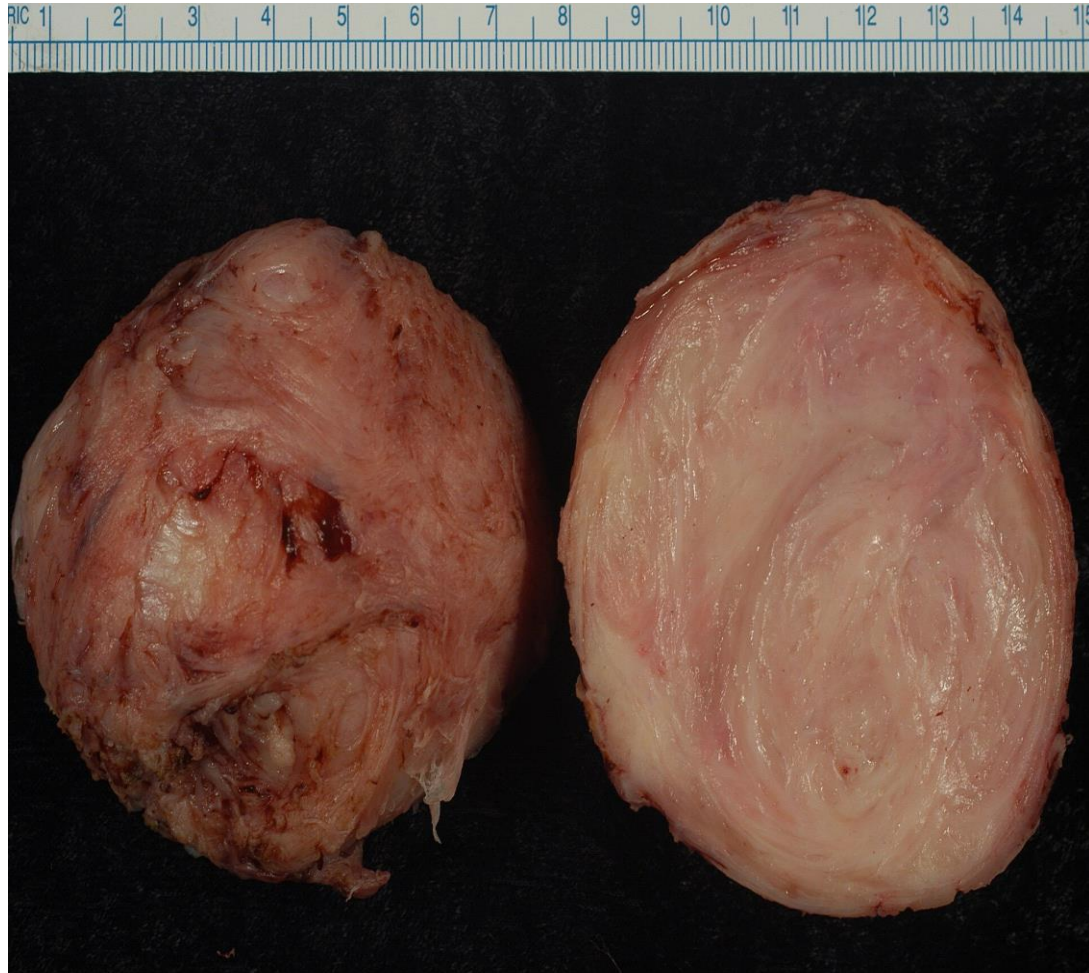
Fibroid on Ultrasound



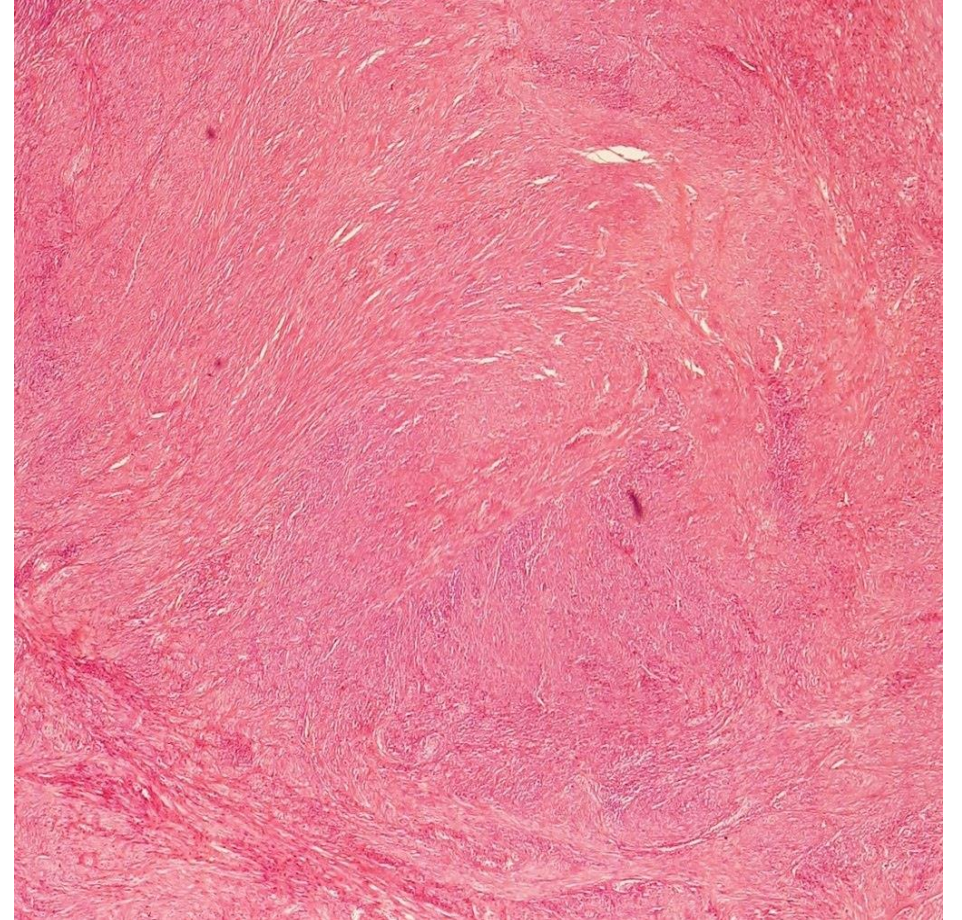
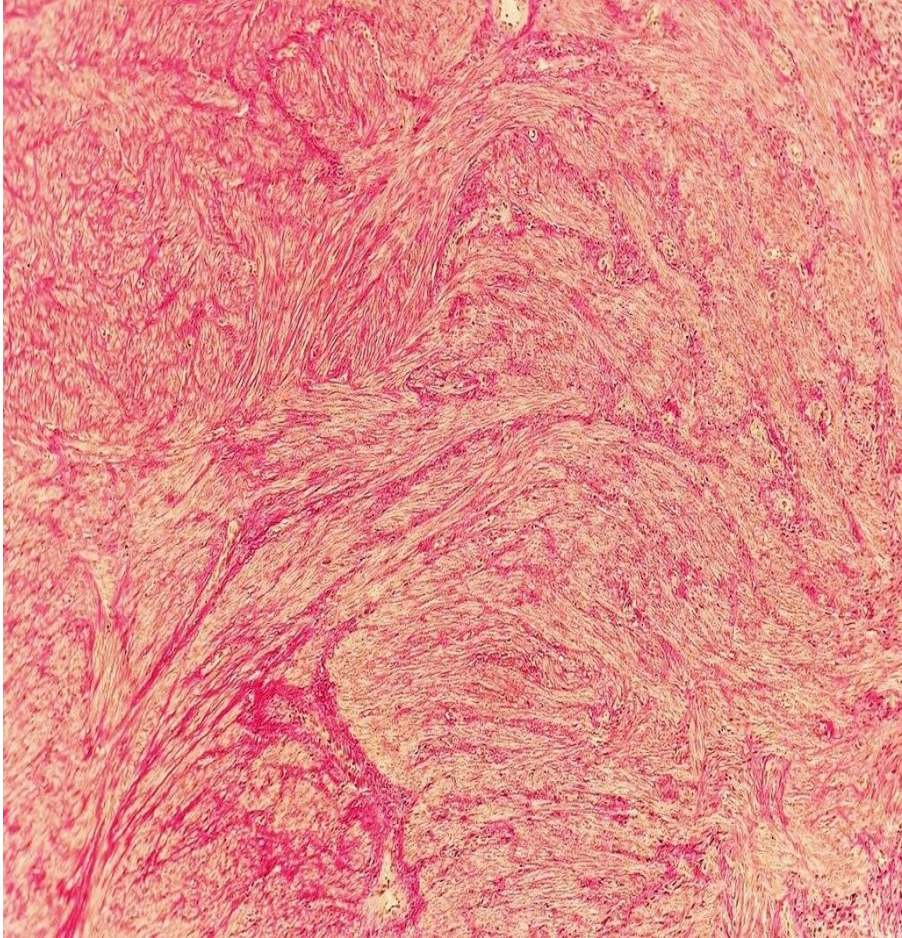
Subserosal Fibroid



Multiple Uterine Fibroids



Histopathology of uterine fibroids typically show smooth muscle in a whorled (fascicular) pattern.



Asymptomatic Fibroids

- The majority of uterine leiomyomas are asymptomatic and will not require therapy. But they need follow-up.
- Women with asymptomatic fibroids should be reassured that there is no evidence to substantiate major concern about malignancy and that hysterectomy is not indicated.

Symptomatic Fibroids

- 20% to 50% are clinically symptomatic, causing bleeding, iron deficiency anemia, bulk effects, and/or reproductive issues, and may require treatment.
- Symptomatic fibroids impact on women's quality of life as well as their productivity: in one survey of more than 21 000 women from 8 different countries, these symptoms had a negative impact on sexual life (43%), performance at work (28%), and relationship, and family.

Abnormal vaginal bleeding

- **Heavy or prolonged menstrual bleeding**
- Increased endometrial surface area, vascular dysregulation, and interference with endometrial hemostasis have been offered as possible explanations.

Bulk related symptoms

- **Bulk related symptoms:**
- 1-Pelvic pressure or pain
- 2-Urinary tract or bowel issues
- 3-Venous compression
- Pelvic pressure, bowel dysfunction, and bladder symptoms such as urinary frequency and urgency may be present with larger fibroids.

Pelvic Pain

- **Causes of pelvic pain with fibroids:**
- Degeneration
- Torsion
- Impaction
- possible associated adenomyosis and/or endometriosis

Fibroids and Fertility

- Most women with fibroids are able to get pregnant without a problem.
- Studies show that, while women with fibroids may be more likely to have miscarriages (pregnancy loss) than women without fibroids, the increased risk of miscarriage may be related to increasing age and not the fibroids.
- It is advised to remove the Intracavitary fibroids in women with infertility or recurrent pregnancy loss.
- Myomectomy of other sites can be considered in women with unexplained infertility or recurrent pregnancy loss, although whether such surgical interventions actually improve fertility rates and perinatal outcome remains unclear.

Fibroids & Pregnancy

- The majority of fibroids do not change their size during pregnancy, but one-third may grow in the first trimester.
- Most patients with fibroids do not have any complications during pregnancy related to the fibroids.
- Pain is the most common complication of fibroids in pregnancy, and is seen most often in women with fibroids > 5 cm during the second and third trimesters of pregnancy.
- Pain due to “red degeneration,” torsion, or impaction

Fibroids & Pregnancy

- There may be a slightly increased risk of obstetric complications, such as early pregnancy loss, bleeding in early pregnancy, preterm labor and birth, fetal malpresentation, and placental abruption, particularly in patients with multiple fibroids, retroplacental fibroids, and size greater than 5 cm.
- The risk of Fetal Malpresentation, labor dystocia, and cesarean delivery and postpartum hemorrhage slightly increased.
- It would seem that women with fibroids, especially large ones, merit close obstetrical follow-up but are likely to have a good outcome.
- The majority of fibroids show no change during the puerperium, although 7.8% will decrease in volume by up to 10%

Myomectomy during pregnancy or C/S

- It is very rare for fibroids to be treated surgically during pregnancy.
- Acceptable indications include intractable pain from a degenerating fibroid especially if it is subserosal or pedunculated, a large or rapidly growing fibroid, or any large fibroid (> 5 cm) located in the lower uterine segment.
- Most authorities agree that every effort should be made to avoid performing a myomectomy at the time of cesarean delivery due to the well-substantiated risk of severe hemorrhage requiring blood transfusion, uterine artery ligation, and/or puerperal hysterectomy.

Fibroid Degeneration

- Degeneration happens when fibroids outgrow their blood supply.
- Degeneration is described as hyaline, myxomatous, calcific, cystic, fatty, red (most common during pregnancy), or necrotic.
- Hyaline degeneration (63%) is the most common degenerative change in fibroid.

Red Degeneration of Fibroids

- Red degeneration is a hemorrhagic infarction of the uterine leiomyoma, which is a well known complication, especially during pregnancy.
- Pain may be associated with a low grade fever, uterine tenderness on palpation, elevated white blood cell count, or peritoneal signs.
- Pain is usually managed conservatively by bed rest, hydration, and analgesics.

Fibroid and malignancy

- Most recent reviews are consistent with older studies and estimate that in women undergoing surgery for fibroids approximately 1 in 400 (0.25%) is at risk of having a leiomyosarcoma.
- Whether leiomyosarcomas develop from leiomyomas or arise independently is not known. The challenge lies in the fact that leiomyomas and leiomyosarcomas cannot reliably be distinguished clinically or by any imaging technique.
- Rapid growth of a fibroid does not seem to be a predictor of leiomyosarcoma. However postmenopausal growth or onset of symptoms should carry a higher index of suspicion for malignancy.

DIAGNOSIS

- History
- Physical Examination
- Laboratory testing
- Imaging

History

- Analysis of the chief complaint
- Characteristics of vaginal blood loss.
- Interference with daily activities, performance at work, sexual life and social & family relations.
- Menstrual history
- Intermenstrual bleeding and Postcoital bleeding
- Anemia symptoms
- Urinary and bowel symptoms
- Associated pain
- Family history of fibroid, gynecological malignancies.
- Medical history
- Drug history

Physical Examination

- General : Vital Signs, Pallor
- Abdomen Exam: tenderness, masses (if the fibroid size >12 w it may be palpable)
- Pelvic Exam:
 - 1- Bimanual Exam: enlarged, mobile uterus with an irregular contour is consistent with fibroid uterus.
 - 2- Speculum Exam:
 - A prolapsed submucosal fibroid may be visible at the external cervical os.
 - Other cervical pathologies may be detected
 - HVS & Pap Smear may be taken

Imaging

- Ultrasonography (transabdominal, transvaginal, contrast sonohysterography) is the most widely used modality because of its availability, ease of use, and cost-effectiveness.
- Contrast infusion saline or gel sonography and 2D and 3D sonohysterography are very accurate diagnostic procedures to detect *submucosal lesions*, all with sensitivity and specificity of 98% to 100%.
- MRI is the most accurate modality in assessing the adnexae and the uterus because it provides information on the size, location, number, and perfusion of leiomyomas as well as the presence of other uterine pathology including adenomyosis and/or adenomyoma.
- Diagnostic Hysteroscopy

Management

- Treatment of women with uterine leiomyomas must be individualized, based on:
 - Associated symptoms.
 - The size, number and location of fibroids.
 - Age and proximity to menopause
 - The needs and desires of the patient for preservation of fertility or the uterus, and the preferences of the patient.
 - General medical condition.
 - The availability of therapy, and the experience of the therapist.

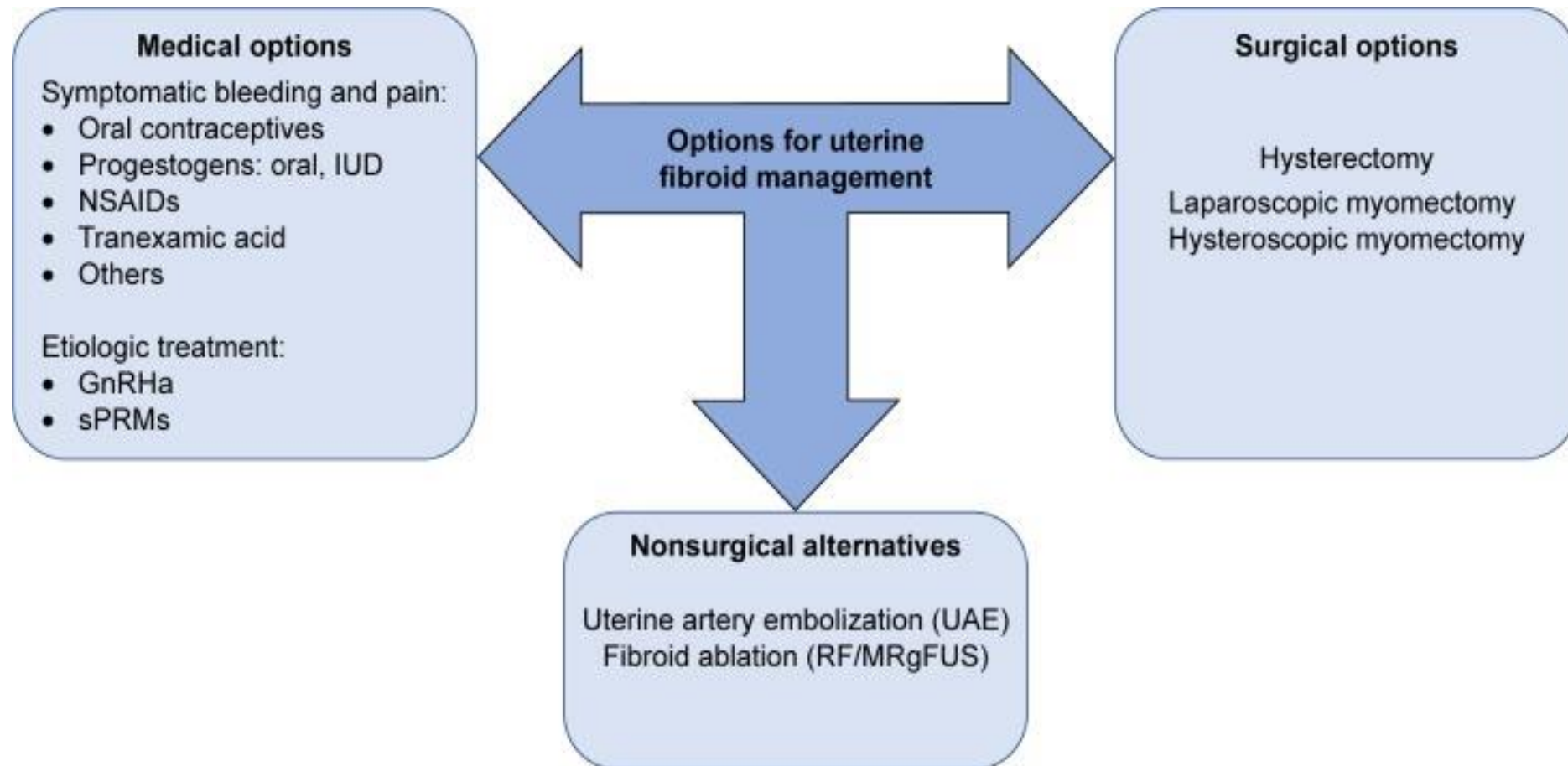
Management

- Good quality of life and patient satisfaction must be our goals in the management of fibroids.
- Treatment should be efficient with the maximum efficacy and the minimum risk and cost.
- We should be as non-aggressive and noninvasive as possible
- Asymptomatic UFs do not require treatment regardless of their size.
- The probability of malignancy is extremely rare

Treatment options

- Correct Anemia
- Expectant management
- Medical therapy
- Nonexcisional procedures (eg, Endometrial ablation, Uterine Artery Embolization, Magnetic Resonance Guided Focused Ultrasound)
- Surgery (Myomectomy, Radiofrequency Ablation, Hysterectomy).

Surgical, Nonsurgical, and Medical therapy currently used for the management of UFs



Expectant Management

- Expectant management is for asymptomatic women, except in the case of a woman with moderate or severe hydronephrosis or a woman with a hysteroscopically-resectable submucous leiomyoma who is pursuing pregnancy.
- Most women experience shrinkage of fibroids and relief of symptoms at menopause; therefore, depending on the severity of their symptoms, women who are approaching menopause may choose to wait for the onset of menopause before deciding on treatment.

Medical Therapy

- NSAID
- Tranexamic acid
- Oral Contraceptives
- Progestins
- Danazol
- The levonorgestrel Intrauterine System (LNG IUD) (MIRENA)
- Gonadotropin-Releasing hormone analogues (GnRh analogues)
- Selective Progesterone Receptor Modulators

The LNG-IUS

- Significantly reduces menstrual blood loss and uterine volume in women with menorrhagia, with and without fibroids, while it does not significantly reduce fibroid volume.
- The LNG-IUS was more effective in reducing menstrual blood loss than combined oral contraceptives in women with fibroid-related menorrhagia.

The Non Contraceptive Uses of LNG - IUD

- In the UK, LNG-IUS is licensed for use in menorrhagia and to provide endometrial protection to perimenopausal and postmenopausal women on estrogen replacement therapy.
- The LNG-IUS has the potential to specifically treat a range of pre-existing gynecological conditions such as heavy menstrual bleeding due to a wide range of underlying causes, endometrial hyperplasia, uterine fibroids, adenomyosis, and endometriosis.

Medical Therapy

- Gonadotropin-Releasing Hormone Agonists

- GnRH agonists are available in nasal spray, subcutaneous injections, and slow-release injections.
- Downregulation >>>> Menopause State
- Fibroids may be expected to shrink by up to 50% of their initial volume within 3 months of therapy.
- GnRH agonist treatment is restricted to a 3- to 6-month interval, following which regrowth of fibroids usually occurs within 12 weeks.
- **Concerns:** significant symptoms can result from the severe hypoestrogenism that accompanies such therapy, including hot flashes, sleep disturbance, vaginal dryness, myalgias and arthralgias, and possible impairment of mood and cognition. Bone loss leading to osteoporosis after long-term (12+ months) use is the most serious complication and most often limits therapy.
- GnRH agonists are useful preoperatively to shrink fibroids and to reduce anemia related to uterine bleeding.
- GnRH agonists reduce intraoperative bleeding and operative time, increase postoperative hemoglobin and haematocrit values, and decrease postoperative complications and length of hospital stay.

Medical Therapy

• Selective Progesterone Receptor Modulator

- Ulipristal acetate UPA is an SPRM that exhibits antiproliferative effects on leiomyoma cells and the endometrium.
- Repeated 3-month UPA courses effectively and safely controlled bleeding and shrunk fibroids in patients with symptomatic fibroids.
- It produces amenorrhea in 80% of the patients, thus improving the clinical of the patients.
- It provides an excellent safety and tolerability profile.
- Fibroid volume reduction in patients receiving UPA also appears to be maintained in the majority of patients for 6 months after the end of treatment.

Nonexcisional procedures

- Nonexcisional procedures:
- Endometrial ablation
- Uterine Artery Embolization
- Magnetic Resonance Guided Focused Ultrasound (MRgFUS)

- The fact that ovarian reserve and healthy myometrium may be compromised by Uterine Artery Embolization still discourages its use in women who desire future pregnancy.

- MRgFUS do not appear to affect fertility, and is also a good method for UFs with difficult surgical access.

Myomectomy

- Myomectomy is the surgical removal of leiomyomas from the uterus, leaving the uterus in place.
- Myomectomy is an option for women who wish to preserve their uterus or fertility.
- Myomectomy can be accomplished using:
 - Open abdominal approach,
 - Laparoscopic approach
 - Hysteroscopic approach (For intracavitary fibroids)

Hysteroscopic myomectomy

- Hysteroscopic myomectomy should be considered first-line conservative surgical therapy for the management of symptomatic intracavitary fibroids a term that refers to (1) submucosal leiomyomas and (2) some intramural leiomyomas for which most of the fibroid protrudes into the uterine cavity.
- The ability to remove intracavitary fibroids depends on the surgeon's experience and skill, surgical device used, and size and depth of the leiomyoma.
- Taking in consideration the associated risk of bleeding, perforation and volume overload.
- When the main symptom is heavy menstrual bleeding, consideration should be given to concomitant EA at the time of transcervical resection of myoma when preservation of fertility is not desired.

Abdominal myomectomy(laparoscopy, Open)

- Abdominal myomectomy (laparoscopy or laparotomy)
- In general, open abdominal myomectomy is performed for patients with symptomatic intramural, transmural, or subserosal leiomyomas in whom future childbearing is desired **and** a hysteroscopic or laparoscopic myomectomy is not feasible. The abdominal approach is also reasonable for some type 2 fibroids.
- Depending on the number, size, and location of fibroids, the optimal surgical approach is chosen.
- Myomectomy is an option for women who have not completed childbearing or otherwise wish to retain their uterus. Although myomectomy is an effective therapy for menorrhagia and pelvic pressure, the disadvantage of this procedure is the risk that more leiomyomas will develop from new clones of abnormal myocytes.
- Fibroids have a 15% recurrence rate and 10% of women undergoing a myomectomy will eventually require hysterectomy within 5 to 10 years.

Myomectomy

- Although myomectomy allows preservation of the uterus, there is a higher risk of blood loss and greater operative time with myomectomy than with hysterectomy, although the risk of ureteric injury may be decreased with myomectomy.
- Hysterectomy should be noted and included in the informed consent as an unexpected consequence if a myomectomy is to be performed. However, the risk is low and should never exceed 2%–3% of myomectomies.
- Use of vasopressin, bupivacaine and epinephrine, misoprostol, peri-cervical tourniquet, or gelatin-thrombin matrix should be considered to reduce blood loss during myomectomy.

Hysterectomy

- Hysterectomy is the most effective treatment for symptomatic uterine fibroids.
- This option is a radical and definitive treatment for UFs, particularly for women who do not wish to conceive and/or women aged above 40–50 year.
- Abdominal, laparoscopic, or vaginal route

Hysterectomy

- Women with asymptomatic fibroids should be reassured that there is no evidence to substantiate concern about malignancy, and that hysterectomy is not indicated.
- The only indications for hysterectomy in a woman with completely asymptomatic fibroids are enlarging fibroids after menopause without HRT, which raises concerns of leiomyosarcoma, even though it remains very rare.

Morcellation

- Because laparoscopic hysterectomy and myomectomy often requires morcellation of the specimen, complications related to this step may occur, including vascular or visceral trauma with the use of a mechanical rotating blade. Furthermore, morcellation can lead to dissemination of leiomyoma chips leading to parasitic leiomyomas (leiomyomatosis) or dissemination of incidental leiomyosarcoma.
- When morcellation is necessary to remove the specimen, the patient should be informed about possible risks and complications, including the fact that in rare cases fibroid(s) may contain unexpected malignancy and that laparoscopic power morcellation may spread the cancer, potentially worsening their prognosis.
- An increased rate of recurrence and lower rate of survival following morcellation of a uterine sarcoma has been reported in several studies, implying that morcellation results in the upstaging of the disease.

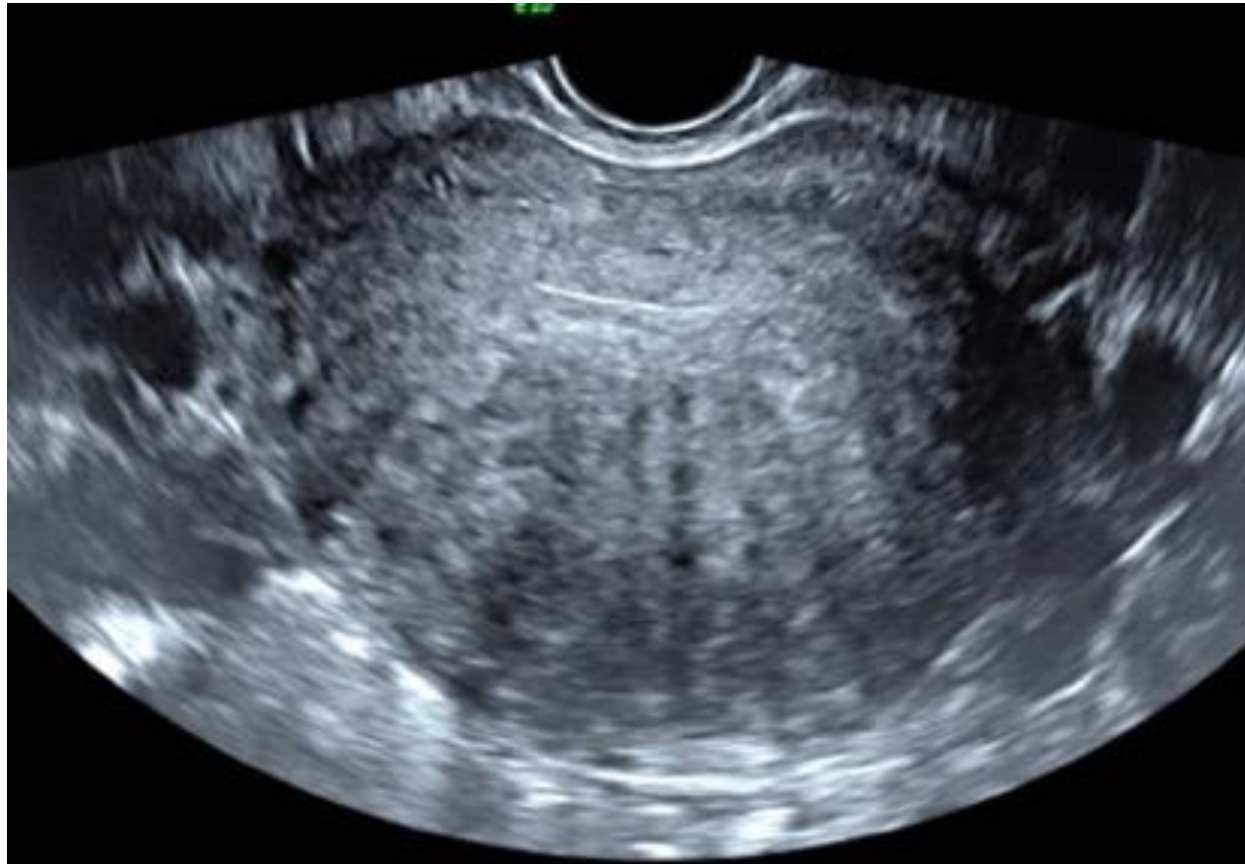
Adenomyosis

- Adenomyosis refers to a disorder in which endometrial glands and stroma are present within the uterine musculature (uterine adenomyomatosis).
- The ectopic endometrial tissue appears to induce hypertrophy and hyperplasia of the surrounding myometrium, which results in a diffusely enlarged uterus (often termed "globular" enlargement)

Adenomyosis

- The incidence of adenomyosis has not been determined accurately since the diagnosis can only be made with certainty by microscopic examination of the uterus, typically following hysterectomy.
- Microscopic appearance — The pathognomonic feature of adenomyosis is the presence of endometrial tissue within the myometrium
- Adenomyosis appears to be more common in parous than nulliparous women.
- Adenomyosis can cause: dysmenorrhea, dyspareunia, pelvic pain and bleeding disorders

Adenomyosis is seen as asymmetrical wall thickening and small myometrial cysts.



Adenomyosis

- A definitive diagnosis of adenomyosis can only be made from histological examination of a hysterectomy specimen.
- The preoperative diagnosis is suggested by characteristic clinical manifestations (ie, menorrhagia and dysmenorrhea with a uniformly enlarged uterus) in the absence of endometriosis or leiomyomas.
- MRI is clearly the best imaging technique, but is expensive.
- Transvaginal ultrasound, although less accurate than MRI, can be useful for assessment of a woman with suspected adenomyosis.

Adenomyosis

- The only guaranteed treatment for adenomyosis is total hysterectomy. Since disease is confined to the uterus, ovarian conservation can be employed unless there are other contraindications.
- There are no large or controlled studies of medical or limited surgical therapy for this disease.
- Hormonal manipulation with progestins (including the levonorgestrel-releasing intrauterine contraception [IUC]), gonadotropin releasing hormone analogs, or aromatase inhibitors may be effective for reducing menorrhagia and dysmenorrhea, as in endometriosis.
- While estrogen-progestin contraceptives are frequently used as primary treatment for dysmenorrhea, the efficacy of these contraceptives specifically for adenomyosis is not known.
- Conservative surgery using endomyometrial ablation or resection, laparoscopic myometrial electrocoagulation, or excision of adenomyosis has been helpful in some patients, although follow-up has been restricted to three years.

Blood Supply of the Uterus

- The majority of the blood supply to the uterus derives from the uterine arteries, and there is also collateral perfusion from the ovarian arteries.
- The uterine arteries originate from the anterior division of the internal iliac arteries in the retroperitoneum.
- They may share a common origin with the obliterated umbilical artery, internal pudendal, or vaginal artery.
- In the myometrium, the uterine artery further branches out to the arcuate artery, radial artery, spiral artery, and basal artery. The descending branch supplies blood to uterine cervix and vagina.
- The ovarian arteries arise from the abdominal aorta.
- The right ovarian vein returns to the inferior vena cava while the left ovarian vein returns to the left renal vein.