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Research Paper

Detailed Review on Uterine Fibroids

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ABSTRACT: *Uterine fibroids (also known as leiomyomas or fibroids) are the most common form of benign tumors. Clinical manifestations include abnormal bleeding, pelvic masses, pelvic pain, infertility, mass symptoms and obstetric complications. Uterine fibroids are common in reproductive age and incidence is comparable in different age groups throughout the reproductive period. Nearly one-third of women with leiomyoma will seek treatment because of their symptoms. Current treatment strategies primarily involve surgery, but the choice of treatment depends on the patient's age and desire to preserve fertility or avoid 'radical' surgery. Other surgical and non-surgical approaches include hysteroscopic myomectomy, laparotomy or laparoscopic myomectomy, uterine artery embolization, and radiation to induce thermal ablation of uterine fibroids. or includes procedure*
performed under ultrasound guidance. With the use of selective progesterone receptor modulators (SPRMs), such as ulipristal acetate (UPA), there is growing evidence for an important role of the progesterone pathway in the pathophysiology of uterine fibroids. The need for alternatives to surgery is very real, especially for women who want to preserve their fertility.

Keywords: *uterine fibroids / leiomyoma / selective*
progesterone receptor modulator / ulipristal acetate /surgery / drug therapy / myomectomy.

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I. INTRODUCTION

A. Background

The most typical type of benign uterine tumor is uterine fibroids, also known as leiomyomas or fibroids. They originate from the myometrium as they are monoclonal cancers of the smooth muscle of the uterus. They are primarily composed of an extracellular matrix (ECM) containing proteoglycans, fibronectin, and collagen. By the age of 50, 50% to 60% of women will have leiomyoma, and in 30% of these cases, abnormal uterine flow (heavy monthly bleeding leading to anemia) and pelvic pressure are associated with morbidity (urinary disorders). , constipation, tenesmus). Pelvic masses, pelvic pain, infertility, and postpartum complications are some of the clinical manifestations of uterine leiomyoma.

The key variables that influence symptoms and problems are size and location. Subserosal, intramural, and submucosal fibroids are all in different locations. Removal is required if the cause is abnormal uterine bleeding, pressure symptoms, infertility, or large fibroids due to significant cavity distortion. Removal of submucosal fibroids increases fertility to near baseline levels. Submucosal fibroids and intramural fibroids are the main manifestations of these conditions. In addition to the location, size, and weight of fibroids, their volume also contributes to symptoms.

B. Classification

In the literature, fibroids are classified differently. Any degree of intramural dilatation and/or distortion of the uterine cavity is considered. The ESGE (European Society for Gynecological Endoscopy) classification of uterine fibroids has the advantage of being very simple (G0 is pedunculated endometrial fibroids and G1 is the largest proportion within the uterine cavity (> 50%), and G2 has the largest percentage (> 50%).) in the myometrium). The FIGO classification was recently published, describing 8 fibroid types and hybrid classes (association of two fibroid types) (Fig. 1). Since different types of fibroids often co-exist (depending on their location), this classification provides a more representative "map" of fibroid distribution and is used to further establish new algorithms. .

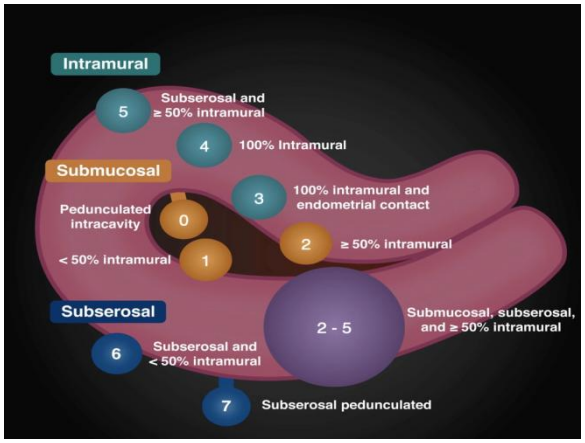

Fig 1: Diagram describing the uterine fibroid classification system. Organized according to the location between the submucosal (0 - 2), intramural (3 - 5), and subserosal (6 - 7) layers of the uterus.

C. Symptoms

Many fibroids are asymptomatic, but they present with different symptoms in 30-40% of cases, depending on their location and size. Heavy menstrual bleeding caused by fibroids can lead to fatal anemia. Compared to white women, African American women experience more severe symptoms such as heavy bleeding and anemia. Large fibroids can also cause pressure (mass) symptoms such as: B. Increased frequency of urination during the day, urgency and incontinence. This can lead to bowel and bladder dysfunction. Quality of life may also be affected by abdominal distension or distortion, pelvic pressure against the ureters, and pelvic vascular pressure.

Dysmenorrhea and pelvic pain are common, affecting quality of life and making everyday life difficult. It depends on the type of fibroid, its location and size, especially submucosal and intramural fibroids that distort the uterine cavity. Infertility and repeated miscarriages are possible symptoms. Uterine fibroids can affect fertility through several possible mechanisms, including: Increased uterine contractility and endometrial disorders, and changes in myometrial blood supply and alterations in paracrine molecules to the local hormonal environment induced by uterine fibroids that may affect gamete transport.

D. Diagnosis

Pelvic Examination

Examination may reveal a large or prominent pelvic nodule. Hemoglobin testing allows identification of iron deficiency anemia when fibroids are suspected and women report excessive menstrual bleeding.

Magnetic Resonance Imaging

The proximity of the endometrial cavity to the serous surface and the boundary with normal myometrium can all be determined by MRI (Figure 2). However, MRI, like ultrasound, cannot definitively detect cancer. MRI results can indicate a diagnosis of sarcoma, but currently no preoperative test can rule it out completely.Future imaging technologies will improve the accuracy of sarcoma detection, but this is still the case. It is a very rare conditions(1/1500 in women under 40 and 1/1100 in women aged 40-44).

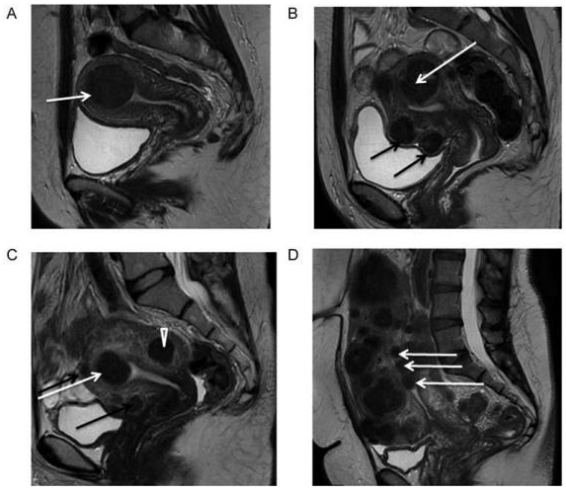

Fig 2. Magnetic resonance imaging of fibroids. Midline sagittal T2-weighted images show different types of myomas according to the FIGO classification. Fibroids vary in size, number and site in the uterus. (A) Submucosal type 2 myoma. (B) Large type 2–5 myoma (white arrow): submucosal and subserosal, each with less than half the diameter in the endometrial and peritoneal cavities respectively. Subserosal type 5 myomas (subserosal, >50% intramural) (black arrows). (C) Submucosal type 2 myoma (>50% intramural) (white arrow). Intramural type 4 myoma (arrowhead). Small type 5 myomas (black arrows). (D) Multiple myomas, three of which are type 0 (intracavitary) (white arrows).

Ultrasonography: The best test for uterine fibroids is an ultrasound. Its broad accessibility makes almost all instances of confirmation simple and affordable. Additionally, after saline has been infused into the uterine cavity, ultrasound can be used to define submucous myomas and show how close intramural myomas are to the endometrial cavity. Due to its capacity to reconstruct the coronal plane of the uterus, 3D ultrasound has emerged as a useful tool for the examination of myometrial pathology since the development of 3D imaging technology.

Hysteroscopy: A hysteroscopy may be required to distinguish between large endometrial polyps and intraluminal fibroids. It is often done on an outpatient basis without anesthesia. For diagnostic hysteroscopy, saline-infused ultrasonography should be seen more as an adjunctive examination.

II. Current Surgical Treatment Strategies

Although most current treatment techniques require surgical intervention, the patient's age and desire to preserve fertility are considered in surgical selection. Examples of surgical techniques include myomectomy, hysterectomy, and other procedures performed under ultrasound or X-ray guidance.

A. Hysterectomy

A hysterectomy is the surgical removal of the uterus. Although not required to treat fibroids, the ovaries may be removed. Hysterectomy is an option as a permanent treatment for fibroids when previous treatments have failed or are inappropriate.After a hysterectomy, women cannot conceive. A hysterectomy results in immediate menopause if the ovaries are also removed. 1) There are different types of hysterectomy

such as total hysterectomy (removal of the uterus and cervix). 2) Total hysterectomy or supratrachelectomy (removing the uterus while sparing the cervix). 3) Ovariectomy (removal of ovaries)

Fig 3: Hysterectomy Treatment Procedure

B. Myomectomy

Myomectomy is the surgical removal of a tumor from the uterus. Myomectomy therapy is well established and proven to be safe and effective in the uterine-sparing treatment of fibroids. Myomectomy is an alternative to hysterectomy for women who want to keep their uterus. However, it carries a higher risk of bleeding, takes longer than a hysterectomy, and may affect future fertility. Her 10% of women who have had a myomectomy will eventually need a hysterectomy within 5-10 years. A myomectomy can be done in different ways. Depending on the size, number, and location of the fibroids, they may be candidates for abdominal myomectomy, laparoscopic myometomy (Figure 4), or hysteroscopic myometomy (Figure 5).

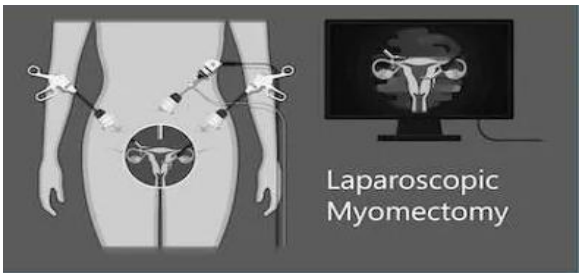

Fig 4: Illustration of Laparoscopic Myomectomy

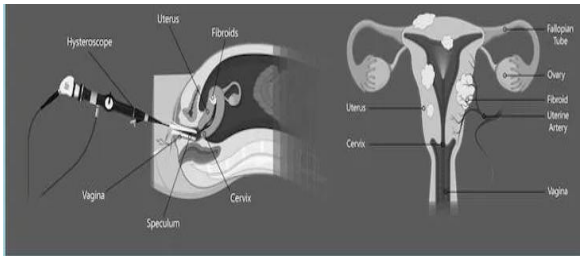

Fig 5: Illustration of Hysteroscopic Myomectomy

III. Surgical Alternatives

A. Uterine Artery Embolization (UAE)

UAE, a minimally invasive procedure, is most commonly used to relieve vaginal bleeding caused by uterine fibroids (benign tumors in the uterus). UAE can treat uterine fibroids plus excessive bleeding in emergencies caused by trauma, malignant (cancerous) gynecologic tumors, or postpartum bleeding.Fibroid embolization (UFE) and uterine artery embolization (UAE) are often used interchangeably. However, they are different. UFE is a specific type of UAE used to treat uterine fibroids. Uterine fibroids and many other conditions that can cause vaginal bleeding are both treated in the UAE.

In the United Arab Emirates, small particles are injected into the blood vessels leading to the uterus. Fluoroscopy, an X-ray technique, is used to pass these particles through the uterine arteries using small, flexible tubes known as catheters that capture moving images. When blocked by these particles, the tumor or fibroid shrinks because it cuts off the blood supply. The cells are then destroyed, leading to necrosis.

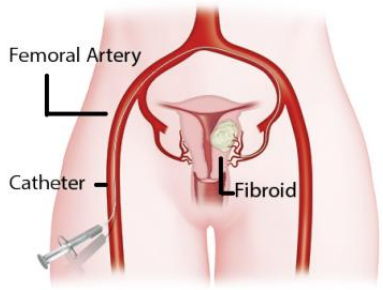

Figure 6: Uterine artery embolization process

High-frequency MRI-guided focused ultrasound surgery Define and observe fibroids. When ultrasound energy is focused at a specific location within the fibroid, the fibroid undergoes coagulative tissue necrosis. Adjacent tissue is not compromised, but it is impossible to rule out impact on adjacent vital structures. MRI scans are associated with lower treatment success rates compared with hypointense imaging of fibroids

IV. MEDICAL MANAGEMENT

The efficacy and/or associated side effects of drug therapy for uterine leiomyoma have limited its usefulness until recently. Future studies may lead to more effective long-term management decisions at the receptor and gene level. Since progesterone induces mitogenesis during the luteal phase, followed by estrogen upregulation of both ER and PR during the follicular phase,
all hormonal treatments of uterine bleeding seek to mitigate the effects of these two gonadal steroids.

Oral Contraceptives
Fibroids do not contraindicate the use of low-dose oral contraceptives because there is no evidence that they induce the growth of benign fibroids. In the short term, oral contraceptives are effective in reducing menstrual bleeding and can prevent the development of uterine fibroids.

Progesterone
It is a naturally occurring hormone, is an insulin-like growth factor that can limit growth. -1 and increases epidermal growth factor, which accelerates fibroid growth.Progestin also suppresses estrogen and progesterone receptors in fibroid tissue. Endometrial atrophy is a side effect of both synthetic and natural progestins and helps women with uterine fibroids lose less blood during their period.

Gonadotropin-Releasing Hormone Agonists
It is provided as a sexual injection, subcutaneous injection, and nasal spray. Within 3 months of treatment, fibroids typically reduce to up to 50% of their original volume. However, treatment with GnRH agonists is limited to intervals of 3–6 months, after which fibroid regeneration usually occurs within 12 weeks. Long-term use of GnRH agonists with estrogen add-back therapy requires investigation. GnRH agonists can help shrink fibroids preoperatively and reduce anemia associated with uterine bleeding.

Estrogen Receptor Antagonist (Fulvestrant)
Estrogen Receptor Antagonist Fulvestrant promotes the breakdown and downregulation of estrogen receptors However, fulvestrant was not as effective as the GnRH agonist goserelin in reducing fibroids and uterine volume and in inducing amenorrhea.

Selective Estrogen Receptor Modulators
SERMs bind to estrogen receptors and act as agonists or antagonists on specific tissues. They are usually used to treat and prevent recurrence of breast tumors with estrogen receptors. Raloxifene is his most studied SERM for the treatment of leiomyoma, while tamoxifen has agonistic effects on the uterus. Although it may be a useful adjuvant to GnRH agonists that cause fibroid contractions, the true efficacy of raloxifene in fibroids is difficult to determine given the limited and conflicting data on its use alone. .

Selective Progesterone Receptor Modulators
Fibroids overexpress estrogen and progesterone receptors relative to the myometrium and 'crosstalk' between ER and PR. Fibroid growth has been shown to occur primarily during the secretory phase of the menstrual cycle, and exogenous progesterone increases fibroid mitotic activity and cellularity.

V. Pathologies Associated with Uterine Fibroids

Endometriosis and Adenomyosis are Commonly Associated with Uterine Fibroids

Endometriosis: In mammalian models, SPRM stimulates the production of prostaglandins by endometriotic lesions. and may also alleviate discomfort as a direct result of this. It should be noted that although both endometriosis and fibroids are estrogen-dependent diseases, they respond very differently to progesterone. Endometriosis is characterized by progesterone resistance, whereas fibroids grow as a result of progesterone.

Adenomyosis: There are two distinct clinical manifestations known as adenomyoma and adenomyosis. Severe full-thickness adenomyosis is characterized by the presence of multiple sites of ectopic endometrium within the myometrium of an enlarged uterus, but may respond quite differently from adenomyoma. is a particular entity and the latter may respond very well to SPRM. By causing amenorrhea, SPRM may help relieve pain associated with adenomyosis, but it is unlikely to cause the uterus to contract significantly. As PAECs are also present in ectopic endometrium, clinical studies are currently being conducted to investigate this particular situation and the impact of endometrial alterations.

VI. Conclusions

Symptomatic uterine fibroids require surgical or pharmacological treatment depending on severity of symptoms, age, infertility, uterine preservation desires, and FIGO classification. Most of the current techniques involve surgical interventions including hysterectomy, hysteroscopic myomectomy, and laparoscopic or laparotomy myomectomy. Hysterectomy is the most successful treatment for fibroids, but is not always necessary. The size, number, and location of uterine fibroids, as well as the gynecologist's personal experience and equipment accessibility, influence the choice of less invasive treatment modalities (selection of uterine-sparing therapies such as uterine fibroids). give. Desire for future pregnancies is a relative contraindication to non-surgical procedures such as UAE and MRgFUS.

However, the right to medical care remains. The development of new therapies is critical as non-surgical alternatives to surgical intervention are urgently needed, especially when fertility preservation is the goal. GnRH agonists have been used to reduce uterine fibroids and increase hemoglobin levels in symptomatic women, but long-term treatment is not recommended due to side effects. With the use of SPRM, evidence is accumulating that progesterone plays an important role in the signaling pathways underlying the pathogenesis of uterine fibroids. Therefore, it depends on your age and symptoms (infertility, bleeding, etc.). In summary, asymptomatic uterine fibroids do not require treatment when diagnosed by ultrasound or MRI. Women should be informed of all available treatment options (radiation and surgery).

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