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Nonsurgical Alternatives for Uterine Fibroids

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Uterine leiomyomata are the direct cause of a significant health-care burden for women, their families, and society as a whole.
Because of the long experience with the mode of treatment, surgical myomectomy remains the gold standard for treating reproductive-age women; however, in the recent years, the wide evolution of less invasive approaches led to a change in the options used by the clinician to treat symptomatic fibroids.
Minimally invasive procedures such as uterine artery embolization (UAE) are increasingly used to treat symptomatic fibroids. Other alternative treatments are becoming more diffuse, such as magnetic resonance–guided high-frequency focused ultrasound surgery (MRgFUS), cryomyolysis, vaginal occlusion, and laparoscopic closure of the uterine arteries. Both advantages and limitations of these techniques under development must be taken into account, but this wider range of choices is being increasingly considered for a tailored treatment.
This article aims to enable health-care providers with the tools to provide the latest evidence-based care in the minimally invasive or noninvasive management of this common problem.

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Introduction

Uterine leiomyomas, also known as myomas or fibroids, are the most common benign uterine tumors in women of reproductive age, occurring in 20–25% of women [1,2]. Fibroids develop from a single myometrial smooth muscle cell and are therefore classified as a clonal disease caused by a disruption in the hormonal receptors [3–5]. Depending on localization, the symptoms vary in frequency and severity, and include anemia caused by heavy bleeding, bulk-related symptoms, pelvic pain, pressure, dysmenorrhea, infertility, and reduced quality of life [6].

During the 1970s, hysterectomy was the treatment of choice for symptoms caused by fibroids such as menorrhagia, anemia, and abdominal and pelvic pain. Hysterectomy represents still an important treatment with 600,000 operations performed annually in the United States and Canada, most commonly because of uterine myomas, but is an unacceptable treatment for many women desiring uterine preservation [7]. Depending on the underlying cause, maintaining the uterus is of main importance in patients with fibroids, not just for reproduction, but also to avoid "radical" surgery.

Over the last 30 years, advances in technology have promoted different pathways of treatment, leading to less invasive techniques [8].

The target of these treatments is to achieve good results in terms of fertility, bulk-related symptoms, and menstrual disorders, without the great invasiveness of the previous procedures and without the unattractive side effects of the medical therapy.

Myomectomy, particularly hysteroscopic myomectomy, is the treatment of choice for submucous fibroids in reproductive age women and can increase the chance of pregnancy and live birth [9]. Laparoscopic myomectomy is instead the treatment of choice in case of other localizations such as intramural or subserous fibroids. However, myomectomy is associated with risk and adverse outcomes such as hemorrhage, conversion to hysterectomy, uterine rupture, and abnormal placentation in following pregnancies. Conversely, non-excisional alternative techniques cannot provide a histological confirmation of the disease, with the risk of missing an underlying malignancy. The possibility of inadvertent treatment of malignant disease, thus delayed diagnosis and worsened prognosis exists with all non-excisional therapies for uterine leiomyomas [10].

In fact, laparoscopic myomectomy and uterine artery embolization (UAE) are the most commonly used therapies, but alternative treatments and less invasive procedures are under development [11].

Uterine Artery Embolization

UAE has been developed in recent times in a variety of clinical settings including postpartum hemorrhage, bleeding after cesarean section, and bleeding following gynecological surgery treatment of arterial venous malformations of the genital tract as well as gestational trophoblastic disease. Ravina has first used this technique in 1995 to treat uterine fibroids [12]. Since then, the UAE has been further developed, thanks to the new technologies in the field of Interventional Radiology; a prospective randomized trial demonstrated its efficacy in treating symptomatic fibroids, thus establishing this technique as a validated alternative to surgery [13,14].

The goal of the technique is the occlusion or marked reduction in blood flow to the fibroids causing selective ischemic necrosis acting at arteriolar level minimizing the uterine damage [15].

UAE is usually performed by an interventional radiologist where the arterial access is obtained at the level of the femoral artery. The access can be ether mono- or bilateral; the monolateral approach reduces complications due to arterial puncture but exposes the patient to a fluoroscope for a longer duration [16].

A 4-5F catheter or microcatheter is inserted into the uterine artery, and then the embolic agent is released. Several types of embolic agent are available in market (polyvinyl alcohol (PVA) particles, PVA microspheres, tris-acryl gelatine (TAGM), acrylamido PVA microspheres, or gelfoam) with size ranging from 350 to 900μ. Despite a trend toward a greater reduction using TAGM, a recent meta-analysis reported no significant differences when comparing embolic materials [17].

Both magnetic resonance imaging (MRI) and ultrasound are suitable for preoperative assessment of localization, number, and dimension of the myomas. MRI has been demonstrated to be superior to both trans-abdominal and trans-vaginal ultrasonography in terms of reproducibility, and provides

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