Best Practice & Research Clinical Obstetrics and Gynaecology 34 (2016) 66–73

Contents lists available at ScienceDirect

Best Practice & Research Clinical Obstetrics and Gynaecology

journal homepage: www.elsevier.com/locate/bpobgyn

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# Infertility and uterine fibroids

Leonidas I. Zepiridis, MD, PhD, Assistant Professor,
Grigoris F. Grimbizis, MD, PhD, Professor,
Basil C. Tarlatzis, MD, PhD, Professor *

*First Department of Obstetrics and Gynaecology, Papageorgiou University Hospital, Aristotle University of Thessaloniki, Greece*

*Keywords:*
uterine fibroid
myoma
infertility
fertility

Uterine fibroids are the most common tumors in women and their prevalence is higher in patients with infertility. At present, they are classified according to their anatomical location, as no classification system includes additional parameters such as their size or number. There is a general agreement that submucosal fibroids negatively affect fertility, when compared to women without fibroids. Intramural fibroids above a certain size (>4 cm), even without cavity distortion, may also negatively influence fertility. However, the presence of subserosal myomas has little or no effect on fertility. Many possible theories have been proposed to explain how fibroids impair fertility: mechanisms involving alteration of local anatomical location, others involving functional changes of the myometrium and endometrium, and finally endocrine and paracrine molecular mechanisms. Nevertheless, any of the above mentioned mechanisms can cause reduced reproductive potential, thereby leading to impaired gamete transport, reduced ability for embryo implantation, and creation of a hostile environment.
The published experience defines the best practice strategy, as not many large, well-designed, and properly powered studies are available. Myomectomy appears to have an effect in fertility improvement in certain cases. Excision of submucosal myomas seems to restore fertility with pregnancy rates after surgery similar to normal controls. Removal of intramural myomas affecting pregnancy outcome seems to be associated with higher pregnancy rates when compared to non-operated controls, although evidence is still not sufficient. Treatment of subserosal myomas of

* Corresponding author. First Department of Obstetrics and Gynaecology, Papageorgiou Hospital, Medical School of Aristotle University of Thessaloniki, Greece.
*E-mail address:* basil.tarlatzis@gmail.com (B.C. Tarlatzis).

http://dx.doi.org/10.1016/j.bpobgyn.2015.12.001

reasonable size is not necessary for fertility reasons. The results of endoscopic and open myomectomy are similar; thus, endoscopic treatment is the recommended approach due to its advantages in patient's postoperative course.



## General issues

Uterine fibroids are the most common tumors in women and are almost always benign [1]. Moreover, they are highly dependent on the ovarian steroids. Although their cellular origin remains unknown, they are considered to be monoclonal tumors, arising from the mutation of a single myometrial somatic stem cell after multiple cycles of growth followed by involution under hormonal influence [1].

According to recently published data, approximately 7–8 out of 10 women will have a fibroid during their lifetime [1]. Pathological examination of hysterectomy specimens also revealed prevalence of >75% [2]. Nevertheless, their overall rate does not seem to exceed 8–10% in 30–40 years [1].

It is worth noting that the prevalence of fibroids is higher in patients with infertility [3]. Thus, among women undergoing in vitro fertilization (IVF) or intracytoplasmic sperm injection (ICSI), more than one out of four women do have fibroid(s), although it is estimated that if all other causes of infertility are excluded, fibroids might be responsible for only 2–3% of the cases [1]. Therefore, fibroids are the most common benign uterine condition, and their location and size determine their clinical presentation, if any.

## Classification

Fibroids represent a heterogeneous disease, varying from a single small lesion to multiple extra large lesions that may fill the whole peritoneal cavity [1,4] having different location characteristics. Similarly, the reproductive prognosis and clinical presentation of women with fibroids are variable, from totally asymptomatic to symptomatic requiring treatment.

There is no widely accepted classification system to categorize fibroids. Fibroids are generally classified according to their anatomical relationship with the myometrium and endometrium. Thus, at present, the fibroid location is the only basic criterion for classification, while additional parameters such as the size or the number are not taken into account, although they could have a prognostic role for their clinical significance. Thus, any correlation effort makes the assessment and any comparisons difficult [2].

Usually, they are divided into three topographic categories: the submucosal, the intramural, and the subserosal fibroids. According to the needs of hysteroscopic treatment, the submucosal category is

**Table 1**
Fibroid classifications systems.

| Fibroid Classification | | |
|---|---|---|
| Classical | | FIGO (2011) |
| Submucosal – type 0 | 100% intracavity | 0 |
| Submucosal – type I | >50% intracavity | 1 |
| Submucosal – type II | <50% intracavity | 2 |
| Intramural | In contact with endometrium | 3 |
| Intramural | 100% intramural | 4 |
| Intramural | Intramural but <50% subserosal | 5 |
| Subserosal | Subserosal but <50% intramural | 6 |
| Subserosal | Pedunculated | 7 |