

# Leiomyoma – uterine infertility key factor

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## ABSTRACT

Uterine leiomyoma is described in the literature as one of the most common benign tumors that is encountered and which cause relevant public health problems; it affects the fertile capacity especially on women that are in their thirties or younger, which makes it even more difficult to obtain an optimal treatment idea that transform into a physiologic pregnancy, naturally achieved or by ART.

In order to understand this, we have decided to conduct this review with the purpose to bring up to date an insufficiently discussed matter, namely reducing the incidence in women diagnosed with uterine leiomyoma that associates loss of fertility, through a modern management of diagnostic resources, especially ultrasound, and treatment as well.

Our main goal was to analyze the published articles from the PubMed database between 2015-2021, using keywords such as leiomyoma, female infertility, pregnancy, miomectomy, for relevant information and studies that include the easiest methods of diagnosis of leiomyoma and treatment, but also to cover the psychosocial impact related to those women who try to conceive.

Patients in whom uterine leiomyoma are the main cause of infertility visit the clinic, for the first time maybe, with a history of habitual abortions for at least 2 years. The uncertainty of the evolution of the tumor and the pathological gynecological spectrum of some women tend to develop challenges for doctors in terms of what treatment is required and what is the reproductive prognosis. The doctor-patient relationship in these difficult cases is perhaps more important than ever, the advice and recommendations that the medical practitioners offers still follow the same treatment notion.

**Keywords:** leiomyoma, female infertility, miomectomy, pregnancy

## INTRODUCTION

Uterine leiomyoma is characterized as a benign tumor which develops mainly from the myometrium, being discovered in most cases at women under the age of 30-35 years old [1]. Over the last few years, there were some impressive improvements in terms of transvaginal ultrasound, 3D imaging or hysteroscopy that can help the doctor achieve a correct diagnosis, track the evolution of the tumor and eventually planning the surgical procedure [2]. The perks of the treatment are weighted against the risks; so many women have so little options when it comes to hopes of achieving pregnancy. Until this date, it is not established a long-term and especially genuine and safe treatment option, despite the fact that open miomectomy or laparoscopic miomecto-

my, hysteroscopy and newer techniques like robotic-assisted surgery are still need to become well-established [3].

Counseling a patient about the risks regarding the recurrency of a leiomyoma or the risks regarding a long-time intended pregnancy is foremost morally, ethically and professionally. Our main reason for the dedication that we put it up is only for the patient's decisions and preferences, as well as lowering the rate of unnecessary surgeries and thereby allowing enhanced personalized treatment [4].

## EPIDEMIOLOGY

Up to 27% of the patients with leiomyomas have infertility issues. African-American women (they

have a higher cumulative risk to develop such tumors 10 years earlier than white race, representing 1/3 of hysterectomies performed in United States on account of leiomyomas) and those with risk factors like the number of past pregnancies, age at diagnosis onset, early menarche or higher BMI (the involvement of sexual hormones for a very long time) can have pretty badly effects on reproduction natural process. Some dietary aspects, social and behavioral status, vitamin D deficiency or sexually transmitted infections can be put to blame – 3 cohort studies expressed an opinion about some of the patients they studied with strange Pap-smear test results that HPV may act as a defense factor for tumor growth [3,5].

## PHYSIOPATHOLOGY

Some studies found that leiomyomas are responsible also for impaired or dysfunctional chromosomal activity by up to 40%, therefore patients must be evaluated for their genetic background [6].

There are several ways in which leiomyomas can alter the physiological process of fecundity, most of them are interconnected and they trigger in the same manner in the same time. The endometrial glands have altered structural and morphological structures, there is a cystic glandular hyperplasia and endometrial venous ectasia; the chronic endometrial inflammation which engage ulceration and glandular atrophy also plays a big role in this situation. Furthermore, endocrine and paracrine mechanisms that are incompletely studied can create an unfavorable site for embryo implantation and furthermore diminish the fertility chances a woman has [6-8].

The action of local inflammatory markers, vasoactive amines and the impair leiomyoma gene expressions which act during "window of implantation" act as factors that lower the chances of achieving pregnancy [7-9].

## DIAGNOSIS

A thoroughly and accurate ecographic manner description of the leiomyoma is a big first stage for diagnosis. We can use eco-Doppler for comprehending the difference between an extracavitary leiomyoma and other pelvic region tumor or a submucosal leiomyoma and an endometrial polyp or adenomyosis (Magnetic Resonance Imaging remains a very useful but also a time-consuming and expensive tool in these cases). Speaking of adenomyosis, it can be profoundly found inside the myometrium, without clear margins, that is why transvaginal ultrasound (TVUS), when used with lower frequency (< 6.5 MHz), it can help us achieve details about the posterior outline of the tumor (defined as a hypo-

echoic mass) due to its pseudocapsulae, even in the presence of very small ones, being able to strike deep in the tissue [10,11]. The 3D ultrasonography can be available for doctors to see a clearer view of the junctional zone (JZ), obtain a coronal plane of the uterus, especially if acquired anatomical uterine anomalies such as septate or arcuate uterus are present within. The perfect moment to capture valuable news about the tumor and its relationship with other structures around it is mid-luteal phase, with hyperechoic endometrium [10,11].

International Federation of Gynecology and Obstetrics (FIGO) classification from 2011 gave us precise information about the size and location of the leiomyoma for what to do pre-operatively or what may be the post-operatively short-term and long-term outcome.

The rules and the procedures that follow up were issued as a guideline mainly for the size of the tumor, but the question is if the surgery itself can have cost-benefit terms regarding reproductive prognosis. The studies we analyzed are inconsistent and self-inflicting, without a straight idea about implantation ratio, term-pregnancy or live birth ratio [10-12].

We also need to consider helpful an evaluation of ovarian reserve or recommend ovulation tests [12,13]. Hysterosalpingography has low sensitivity and specificity compared with sonohysterography, being more accurate on evaluating the uterine cavity.

Saline-infused sonography is another diagnostic method proposal (in a 2003 review about submucosal leiomyomas it was considered as efficient as hysteroscopy, both being ranked greater than TVUS). With its specificity as close as 90%, even if transabdominal ultrasound fails to discover important elements, it has been considered to detect those leiomyomas that generate uterine cavity distortion especially before surgery, being important as a tool for assessment of the degree and rate of myometrial infiltration [10-13].

## MANAGEMENT

All of the inquiries are overlaid by inconsistent data achieved from literature.

A perfect and ideal treatment can vary from "watchful waiting" and regular check-up to pharmacological regimens as GnRH agonists/antagonists, intrauterine system, hysteroscopic/laparoscopic/laparotomy myomectomy or recent techniques like high-intensity focused ultrasound therapy. Nevertheless, the surgeon's experience is the main factor here [14].

Laparoscopic myomectomy, being recognized for its shorter recovery period, early mobilization, little or no bleeding, pain and esthetic outcome, still has

some ups and downs. Open miomectomy is a major surgical procedure for resection of large or multiple subserosal/intramymetrium tumors and where doctors expect to penetrate into the uterine cavity. The risk of uterine rupture in a future pregnancy state seems to be increased at those patient with laparoscopic miomectomy. The factors we take in are the pregnancy and live births rate and they are improved in those particular cases where it has been a laparoscopic intervention [14].

We must not forget the fact that if the correct procedures and surgical techniques are in order, the level of unsuccessful surgery is < 1%. Anyway, in both cases, the counseling of the patient regarding important risks and complications that may interfere with its short or long-term outcome after the surgery is mandatory [14].

The JZ as described earlier, is a sensitive area where we can have leiomyomas developing, with signs and symptoms that can make the women be rushed to the hospital with abnormal heavy uterine bleeding, great pain or pressure in their lower abdomen and consequently fertility issues and fecundity difficulty. Office/outpatient hysteroscopy along with sonography is targeted nowadays as a gold-standard for diagnosis and treatment of type 0-1 leiomyomas. A Cochrane study issued a 39% chance for women to obtain pregnancy and term births after hysteroscopic myomectomy compared with 21% where no surgery was required [10,14,15].

We can safely say that after intervention is performed, the conception rates are growing, with less miscarriage rates and less heavy bleeding when all the other causes and reasons for infertility were discussed and achieved by the patient with her doctor. The recommendations are strictly intimate within the couple; they both have to plan conceiv-

ing no more than 3 to 4 weeks after hysteroscopic resection of leiomyomas, recalling that the endometrium is healing and maybe take into account a second-look opinion if things are not followed as we expect [11,14,15].

## CONCLUSIONS

Being such a heterogenous condition, every scenario that involves leiomyomas and furthermore infertility must be graded and individualized. The judgment for surgery stays put for fertility desire, but we make this decision being aware of the tumor features, patients age and their all-together well-being.

Uterine leiomyoma that influence fertility is not exactly seen as a general condition per se. It is often described discouraging and ambiguous for both patients and doctors and must fit in an elaborate perspective with many missing pieces. These situations are worthy of struggle for their complexity; for instance, parity is evolving as a protective pattern for leiomyoma background onset, but it cannot be established if infertility plays a role within these tumors just for the fact that those women did not accomplish and complete none or more than one child, without the possibility to rule out the partner.

The sonographic or hysteroscopic evaluation are important parts of the diagnosis for collecting information about the location, size, number and proportion of leiomyomas against other pelvic viscera.

The debate behind the effect of leiomyomas concerning women's fertility odds is still present, which takes robust studies that can cover long-term trials and research in order to guarantee an insight of this goal.

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