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Mini Review

Surgical Dissection of Interstitial Myomas in Poor Responders in Accordance With Their Fertility. A Mini Literature Review

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Abstract

In vitro fertilization (IVF) for poor responders—patients with diminished ovarian reserve and limited response to ovarian stimulation—presents unique challenges to achieving pregnancy. A potential intervention to improve reproductive outcomes in this group is the removal of interstitial myomas, benign tumors within the uterine muscle layer. These fibroids can impair fertility by distorting the uterine cavity, affecting blood flow, and creating an inflammatory environment. Surgical dissection may enhance uterine receptivity, yet its effectiveness for poor responders specifically remains under-explored. This review examines current evidence and highlights the need for targeted studies.

THE CHALLENGE OF POOR RESPONDERS IN IVF

The journey to parenthood through in vitro fertilization (IVF) often presents substantial challenges, particularly for a subgroup known as poor responders. These patients are typically characterized by a limited ovarian reserve and an inadequate response to stimulation, which significantly decreases the chances of successful egg retrieval, fertilization, and pregnancy [1-3]. Poor responders generally include individuals with advanced maternal age (≥40 years), low antral follicle counts, low anti-Müllerian hormone (AMH) levels, and a history of poor ovarian response to standard stimulation protocols [4,5]. This population not only faces biological challenges but also contends with elevated levels of stress and anxiety, further complicating their treatment experience.

Establishing a consensus on the definition of poor responders has been a long-standing challenge in the field of assisted reproductive technology. Various criteria have been proposed, including the number of mature follicles, oocytes retrieved, or embryos available for transfer [6]. The lack of a uniform definition has hindered research efforts and made it difficult to compare outcomes across different studies [7].

Nonetheless, the European Society of Human Reproduction and Embryology has proposed the Bologna criteria, which define poor responders as those who meet at least two of the following three criteria: advanced maternal age (≥40 years) or any other risk factor for poor ovarian response a previous poor ovarian response and an abnormal ovarian reserve test [7]. More recently, the POSEIDON criteria have been introduced, providing a more nuanced classification system that considers both quantitative and qualitative aspects of ovarian response [2].

Managing poor responders is complex for reproductive endocrinologists, as this group's low ovarian response often translates to compromised outcomes and a lower likelihood of conception. Numerous protocols and adjuvant therapies exist to address poor ovarian response, yet their effectiveness remains limited [8,9]. This has spurred the search for alternative strategies that may optimize treatment outcomes for poor responders, particularly those involving potential uterine factors. The surgical removal of interstitial myomas, a type of uterine fibroid located within the muscular wall of the uterus, has emerged as one such potential intervention aimed at improving the uterine environment for embryo implantation and pregnancy success.

UNDERSTANDING INTERSTITIAL MYOMAS AND THEIR IMPACT ON FERTILITY

Uterine fibroids, or myomas, are benign tumors that vary in size, number, and location. The International Federation of Gynecology and Obstetrics (FIGO) has developed a classification system to categorize these fibroids based on their location relative to the uterine layers. The FIGO classification includes nine types of fibroids, numbered from 0 to 8, which describe their relationship to the endometrium (the inner lining of the uterus), the myometrium (the smooth muscle layer), and the serosa (the outer surface of the uterus). Specifically, Type 3 fibroids are completely intramural, in contact with the endometrium, while Type 4 fibroids are completely intramural without any contact with the endometrium or serosa [10,11].

Among these types, interstitial or intramural myomas, such as those classified as Type 3 and Type 4, are embedded within the myometrial layer of the uterine wall. These fibroids can adversely affect fertility through several mechanisms, primarily due to their location and impact on the structural integrity of the uterus. By protruding inward, Type 3 fibroids may create an uneven surface that hinders embryo attachment, thereby reducing implantation success rates. Furthermore, interstitial myomas can compress blood vessels within the myometrium, decreasing blood flow to the endometrial lining. Reduced blood supply can impair endometrial receptivity, which is essential for successful embryo implantation and early embryonic development [12,13].

In addition to their direct effects on the uterine environment, interstitial myomas have also been associated with other fertility-related concerns, such as increased risk of spontaneous miscarriage, preterm birth, and placental abnormalities [3,14].

In addition to these physical barriers, interstitial myomas may create a localized inflammatory environment within the uterus. This inflammatory milieu can negatively impact the receptivity of the endometrium, further hindering successful embryo implantation and early pregnancy development leading to the release of cytokines and inflammatory markers, which could interfere with the hormonal balance required for implantation and pregnancy maintenance [15-17]. Hormonal imbalances associated with myomas can disrupt the overall reproductive hormone environment, adding yet another layer of complexity to fertility challenges faced by poor responders. In this context, myoma removal, or myomectomy, has been proposed as a possible method to enhance uterine receptivity and potentially increase fertility outcomes for this specific patient group.

THE RATIONALE FOR MYOMA REMOVAL IN POOR RESPONDERS

The underlying rationale for considering myomectomy in poor responders is based on the premise that by improving the uterine environment, it may enhance the chances of successful embryo implantation and pregnancy. Removing interstitial myomas could potentially restore the normal anatomical structure of the uterus, improve blood flow to the endometrium, and reduce local inflammatory processes, all of which may contribute to improved endometrial receptivity [14,18-20].

However, there is insufficient evidence to conclude that myomas reduce the likelihood of achieving pregnancy with or without fertility treatment (Grade C) [20]. The impact of myomectomy on fertility outcomes remains uncertain, particularly for intramural myomas that do not distort the uterine cavity [21].

In the context of poor responders, this approach holds promise, as this population often faces multiple challenges, including suboptimal ovarian response and compromised uterine factors. By addressing the uterine component through myomectomy, it may be possible to optimize the overall reproductive potential and increase the likelihood of successful conception and live birth outcomes [19,22].

Surgical dissection is especially considered in cases where interstitial myomas significantly distort the uterine cavity or impede blood flow, as removing these barriers may optimize the uterine environment for implantation [14]. Research indicates that the size and location of intramural fibroids are crucial factors affecting fertility. For instance, intramural fibroids larger than 4 cm can negatively impact pregnancy rates, particularly if they are close to the uterine cavity [23, 24]. Removing these barriers may optimize the uterine environment for implantation. In the general population, myomectomy has been shown to improve reproductive outcomes in women with certain types of fibroids. However, clinical pregnancy rates were not statistically different between groups undergoing myomectomy for intramural fibroids and those without surgery (36% vs. 29% vs. 36% in controls, P=0.25) [25].

Research on the effectiveness of myomectomy in the general population suggests that fibroid removal may enhance reproductive outcomes, particularly in women who experience recurrent implantation failure or recurrent pregnancy loss attributed to uterine fibroids [20,24,26].

For poor responders, myoma removal could theoretically reduce the uterine challenges exacerbated by limited ovarian function. By improving endometrial receptivity, normalizing uterine cavity shape, and enhancing blood flow, myomectomy may create more favorable conditions for embryo attachment and development [27,28]. However, the efficacy of this approach specifically in poor responders remains under investigation, with research primarily focused on general fertility outcomes rather than targeted studies for this unique subset of patients.

EVIDENCE ON MYOMA REMOVAL AND FERTILITY OUTCOMES

Several studies have examined the impact of myomectomy on fertility outcomes in women with uterine fibroids, though few focus specifically on poor responders [14,29,30]. One study reported that abdominal myomectomy was associated with a conception rate of approximately 58% and a lower risk of miscarriage in women with fibroids affecting the uterine cavity [31]. This suggests a potential benefit for patients who undergo myomectomy, as restoring a more normal uterine cavity may facilitate successful implantation and pregnancy.

Research on treatment patterns for uterine fibroids also highlights that although myomectomy and other treatments, such as uterine artery embolization (UAE), can offer symptomatic relief, there remains a risk of fibroid recurrence [32], and potential impact on fertility over time. Therefore, the long-term effects of these interventions on fertility outcomes require further investigation, especially in the context of poor responders.

Some evidence suggests that natural cycle IVF and in vitro maturation (IVM) may offer benefits for poor responders by maximizing the use of available oocytes, despite the limited ovarian reserve [2,6]. Although promising, these approaches require further study to define their role in conjunction with myomectomy as part of an integrated strategy for poor responders.

POTENTIAL BENEFITS AND CHALLENGES OF MYOMECTOMY IN POOR RESPONDERS

Potential Benefits: Surgical dissection may offer several fertility-enhancing effects by addressing specific uterine factors associated with poor responders. By restoring a more regular uterine cavity shape, myomectomy may increase the chances of successful embryo implantation. Improved blood flow following fibroid removal may provide the endometrium with better support for embryo growth and pregnancy maintenance. Furthermore, by reducing the inflammatory and hormonal disruptions linked to fibroids, myomectomy may create a more hospitable uterine environment, enhancing the likelihood of successful conception and pregnancy.

Potential Challenges: Despite these potential benefits, myomectomy presents several risks, particularly for individuals who already face challenges due to poor ovarian response. Surgical risks associated with myomectomy include infection, bleeding, and adhesion formation, each of which can potentially hinder fertility. Additionally, myoma removal does not guarantee improved fertility, particularly in cases where the ovarian reserve is severely limited. Age, the quality of ovarian function, and other individual factors play significant roles in fertility outcomes, and their impact must be carefully considered when assessing the potential benefit of myomectomy.

CONCLUSION AND FUTURE DIRECTIONS

The potential of myomectomy to improve fertility outcomes in poor responders remains an area of active inquiry. Current evidence from studies on general populations with fibroids suggests that removing interstitial myomas may enhance fertility by normalizing the uterine environment. However, the lack of targeted studies specifically focused on poor responders limits the ability to draw definitive conclusions for this subgroup.

There is a need for well-designed, targeted studies to explore the impact of myomectomy on poor responders, considering the unique challenges posed by limited ovarian reserve and advanced maternal age. Future research should aim to delineate the precise role of myomectomy in improving IVF outcomes in this population, potentially through randomized controlled trials or cohort studies that examine the long-term reproductive outcomes associated with myoma removal. Until such data is available, clinicians should weigh the potential benefits of myomectomy against the inherent risks on an individualized basis, considering factors such as fibroid size, location, and the patient's overall reproductive profile.

In summary, while surgical dissection holds promise as a fertility-enhancing intervention, its role in the management of poor responders requires further clarification through focused research efforts. For reproductive specialists and patients alike, a nuanced understanding of the potential benefits and limitations of myoma removal is essential to inform individualized treatment strategies and optimize fertility outcomes.

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