



Myomectomy in Pregnancy: A Review of Current Guidelines

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Abstract

Purpose of Review: To analyse all available data regarding myomectomy during pregnancy.

Introduction: As the incidence of myomas in pregnancy increasing due to hormonal stimuli which can sometime potentially lead to severe symptoms causing complications during pregnancy. In selected cases, where the conservative management strategies fail to manage symptoms with substantial risk of adverse pregnancy outcomes, a surgical approach during pregnancy can be considered.

Keyword: Uterine leiomyomas, Myomas, Cesarean Myomectomy, Cesarean section

Introduction

Uterine leiomyomas are most common benign monoclonal smooth muscle cell tumors. The prevalence of myomas during pregnancy has been reported to be 2-5 % according to several studies ⁽¹⁾ with myomas being more common in African American women(18%) and 8% in white women.

The etiopathogenesis of uterine leiomyomas is due to higher concentration of estrogen and progesterone

receptors. The increase in frequency and severity of myomas is due to early menarche, pregnancy, perimenopause and obese women and the decreasing growth in menopause, clearly denote estrogen dependence.

According to recent updates, molecular biomarkers such as Somatic mutations in the Xq13 gene that encodes the RNA Polymerase II (Pol II) mediator subunit MED12 are the most common, accounting for 45%–90% of uterine leiomyoma cases, with prevalence varying based on patient ethnicity. Further, it is also reported that genetic alterations that result in HMGA2 over-expression, disruption of the COL4A5-COL4A6 locus, and biallelic loss of FH, which encodes the tricarboxylic acid (TCA) cycle enzyme fumarate hydratase are associated with uterine leiomyoma. Many studies have been reported multifactorial origin including genetic, hormonal, and environmental factors that contributes in genesis of uterine leiomyoma. The studies related to chromosomal and molecular analyses have provided data that support the role of genetic factors in the pathogenesis of uterine leiomyoma. ⁽²⁾

Uterine fibroids are common in reproductive-aged women, and myomectomy is often necessary to reduce symptoms or improve fertility. However, performing myomectomy during pregnancy poses unique challenges.

Most of uterine fibroids are usually asymptomatic during pregnancy but may lead to complications affecting the course of pregnancy and during labour such as Abortion, IUGR, Preterm labour, obstructed labour.

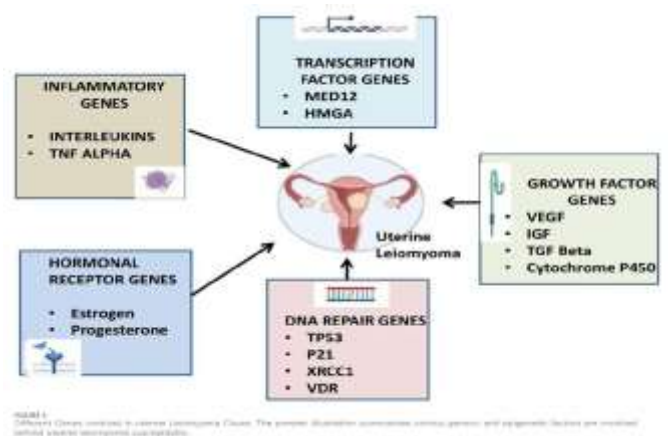


Figure 1:

Effects of Pregnancy on Fibroid

Leiomyomas tend to increase in size especially in the first half of pregnancy in almost 50% cases as a response to increased estrogen. In second trimester and third trimester, the size of myomas may remain unchanged or decrease in size due to estrogen receptor down regulation.

Data from the recent studies suggest that the increase in fibroids during pregnancy is not directly related only to increase of estrogen level, as leiomyomas significantly increases during early part of pregnancy, particular doubling within 6–7 weeks’ gestation, when serum estrogen and progesterone level are still low. Its rather that hypertrophy and hyperplasia of myometrial cells is due of a series of hormones, cytokines, and growth factors produced by the fetoplacental unit through direct and indirect mechanisms. Sometimes very rarely during pregnancy leiomyomas are complicated by secondary changes such as necrosis, degeneration, hemorrhage and leiomyosarcoma. ⁽³⁾

Red degeneration is the most common type of degeneration usually seen during 2nd trimester of pregnancy. It is seen in 5-10% of myomas during pregnancy. Exact cause is not known but can be due to increased vascularity during pregnancy. Clinically, there

is pain and fever with extensive tenderness over the uterus.

Ultrasound evaluation before and during pregnancy is the best modality to determine the size, number, location and its relation with placental attachment and its vascularization.

Effects of Fibroid on Pregnancy

Intramural myomas are common which lead to impaired fertility. Very rarely the presence of fibroids during pregnancy lead to unfavorable outcome. The complications are increased significantly if the placenta is attached on or near the myoma. Fibroids in the lower uterine segment and cervix are more dangerous as they lead to obstructed labour. Therefore the rate of cesarean section was more common among pregnant women with fibroids. The following complications can occur in pregnancy, especially with submucous fibroids (10-40%) such as Abortion (7%), Premature labour (1.3-1.7%), Placental abruption (2-3%), Pressure symptoms (10-30%), Torsion (0.2-2%), Fetal malpresentation (2.6-3.2%), Cesarean section (3.5-3.9%).

Studies has shown that due to reduced blood flow to the fibroid and adjacent tissues which lead to partial ischemia and decidual necrosis in placenta tissue overlying leiomyoma. Larger submucous leiomyomas may compress and distort the uterine cavity causing fetal deformities like dolicocephaly, torticollis and limb reduction defects.

Surgical Approaches

1. Laparotomy (open surgery)
2. Laparoscopy (minimally invasive)

Indications for Myomectomy during Pregnancy

1. Severe symptoms (abdominal pain, bleeding, or pressure)
2. Large or pedunculated fibroids

3. Infertility or recurrent pregnancy loss

4. Obstetric complications (placental abruption, preterm labor)

The first cesarean myomectomy (CM) was performed by Bonney in 1914. Recent studies has been reported that CM does not cause severe complications and is safer, feasible and can be successfully performed with appropriate hemostatic techniques when performed by an experienced surgeon in a selected cases, regardless of size and locations, except if they are located at the fundal or close to large vessels and in absence of uterine atony during surgery. ⁽⁴⁾

Generally, cesarean myomectomy (CM) is discouraged due to risk of complications. However, when myomectomy is performed concurrently with cesarean section (CS), the burden of an additional surgery, interval myomectomy, adhesions are reduced but there was statistically significant increase in postoperative hospitalization and operation time and with respect to the estimated blood loss, hemoglobin differences and postoperative blood transfusion rates were higher in CM. ⁽⁵⁾

Some studies has shown a good outcome if myomectomy is done in the first trimester and second trimester of pregnancy with a success rate as high as 90%.

In symptomatic myomas, conservative management is the first option which includes bed rest, adequate hydration and analgesia. In cases where symptoms persist after 72 hours of conservative management or torsion of a pedunculated fibroid or severe compression of other pelvic organs by large myomas then myomectomy should be considered.

Recently, laparoscopy has been proposed as the first choice for abdominal and pelvic surgery during

pregnancy at any gestational age because it offers better intra-abdominal magnification, a minimally invasive approach and earlier mobilization after surgery for preventing thrombo-embolism. However, in cases of urgent surgery or large myomas laparotomic myomectomy is considered and it has been widely performed so far. ⁽⁶⁾

Anesthetic Consideration during Surgery

Use of intramyometrial terlipressin (analog of vasopressin) causes constriction of smooth muscle in the walls of capillaries, small arterioles, and venules has significantly reduced blood loss during myomectomy. Terlipressin has superiority in minimizing blood loss ⁽⁷⁾ but should be used under strict supervision due to potential risk of uteroplacental insufficiency and fetal distress. The dose terlipressin depends on various factors like pregnancy status and potential risk, but 1mg intramyometrial is suggested to be safer. The half-life is 6 hours. It causes prolonged reduction in portal venous pressure. Moreover, existing data on anesthetic agents have not been associated with teratogenic effects when standard concentrations are used at any gestational age.

Robot-assisted laparoscopic myomectomy has shown similar outcome compare to routine laparoscopy for myomas with pregnancy, ensuring the benefits of minimally invasive technique but this is indicated only in a selected case by a skilled surgeon. Irrespective of the surgical approach, the recurrence rate of myoma is 15%.

The mean gestational age at delivery was significantly lower which is due to the increased contractility of the myometrium and mass effect of the leiomyoma commonly with subserosal fibroids. Similarly, the incidence of preterm labor increased significantly in the CM in various studies and in addition, although not

statistically significant, there was a higher rate of abnormal fetal presentation in the CM. Pregnancy related uterine rupture following myomectomy has been associated with 0.47% risk. ⁽⁸⁾

Uterine rupture during pregnancy following adominal and laparoscopy myomectomy is around 0.2% and 0.26% respectively due to the absence of multilayer myometrial closure, or more frequently use of electrocautery. However, it should not be allowed for trial of vaginal delivery, a minimum period between myomectomy and subsequent pregnancy should be 12months to allows for adequate tissue repair of the myometrium.

Discussion

Fibroids significantly increase in size during early pregnancy and then decrease in the third trimester. Current evidence does not suggest routine myomectomy during pregnancy or cesarean birth, as fibroids-related complications are rare and may overcome by the risks of surgery. However, in selected cases, removal of myomas is safe technique with a good outcome. Myomas in pregnancy require attention to provide adequate management to preserve maternal and fetal wellbeing. As far as studies conducted, the maternal complication rate and obstetrical outcomes of myomas treated via laparoscopy by a trained and experienced team is not inferior to laparotomy.

Regardless of the route of surgery, safety measures should be used while performing an surgery during pregnancy such a minimal manipulation of uterus, use of tocolytics postoperatively.

Current guidelines emphasize the importance of:

1. Multidisciplinary team discussion
2. Careful patient selection
3. Surgical expertise
4. Close post-operative monitoring

Current Guidelines

1. American College of Obstetricians and Gynecologists (ACOG- 2020) :

- Myomectomy may be considered during pregnancy for symptomatic fibroids that don't respond to conservative management.
- Surgery should only be performed if benefits outweigh risks.

2. Society of Obstetricians and Gynaecologists of Canada (SOGC-2019):

- Myomectomy during pregnancy is recommended only for severe symptoms or obstetric complications.
- Laparotomy is preferred over laparoscopy due to pregnant uterus.

3. Royal College of Obstetricians and Gynaecologists (RCOG- 2019):

- Myomectomy should be considered for women with severe symptoms or fertility issues. Multidisciplinary team discussion is been recommended.

4. American Society for Reproductive Medicine (ASRM-2017):

- Myomectomy may improve fertility outcomes in women with fibroids.
- Pregnancy-related complications should be carefully evaluated.



Figure 2:

Conclusion

This review provides a comprehensive overview of current guidelines and recommendations for myomectomy during pregnancy. Despite increasing number of studies reported, the data available concerning the safety of the CM is still scarce.

As every surgical procedure during antepartum period carry increased risks for adverse effects such as abortion, antepartum haemorrhage, or even preterm labour, therefore pregnant women with myomas should be selected carefully with strict criteria while undergoing for myomectomy. However, Current evidences do not suggest routine myomectomy during pregnancy or during cesarean section, as fibroids-related complications are rare which may overcome by the risks of surgery, but in selected cases where fibroids larger (>10cm) or heavier (>500gm), myomectomy is a feasible and safer technique with good outcome.

Recommendations for Future Research

- Prospective studies on maternal and fetal outcomes
- Comparative analysis of surgical approaches
- Development of predictive models for complications
- Long-term complications and fertility outcomes in women who has been undergone CM

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