Conservative surgical treatment of uterine fibroids

Fibroids are the most common benign tumours of the genital organs in women of childbearing age, causing significant morbidity and largely disturbing quality of life. Myomectomy is a choice of choice for women who want to preserve reproductive function. Conventional myomectomy via laparotomy is commonly used for large subserosal and intramural fibroids and in cases of a large number of fibroids. Number, size and location of fibroids in most cases do not represent a limiting factor for conventional myomectomy. Vaginal myomectomy is possible in cases of nascent submucosal fibroids. Laparoscopic myomectomy is an option for patients with smaller uterus, as the size of the uterus could represent a limiting factor for this approach. Hysteroscopic resection of submucosal fibroids is the method of choice for most patients with submucous fibroids. There is no consensus yet on the maximum size and type of fibroids that can be operated with this approach. Myoma pseudocapsule research during the past decade led to introduction of a surgical technique called "intracapsular myomectomy", as a method which spares the pseudocapsule as an important structure for optimal myometrial healing after myomectomy, positively affecting future reproductive function. The clinical rationale for intracapsular myomectomy can be applied to all myomectomies, therefore it has been used both for laparoscopic and laparotomic myomectomy, as well as for cesarean myomectomy. Several studies demonstrated that CM is probably safer procedure than previously believed. CM is justifiable when performed following proper patient selection by experienced surgeons.

Key Words: Uterine fibroid; uterine myoma; myomectomy; surgery; hysteroscopy; laparoscopy.

INTRODUCTION

Fibroids are the most common benign tumours of the genital organs in women of childbearing age, causing significant morbidity and largely disturbing quality of life. Fibroid surgical enucleating is the worldwide used treatment for patients affected by symptomatic fibroids and infertility. Myomectomy is indicated in patients with severe bleeding and anemia, failure of conservative pharmacological treatments, in cases of compressive symptoms and pain, as well as when fibroids significantly disrupt the quality of life. Myomectomy is a choice option for women who want to preserve reproductive function. The leading indications for myomectomy in sterile or infertile women are submucosal and intramural fibroids: distorting uterine cavity, obstructing fallopian tubes, larger than 50 mm in diameter and multiple symptomatic fibroids. Myomectomy is also recommended in infertile patients without any other identified cause of infertility, as well as in patients scheduled for assisted reproduction procedures.

Surgical approach of fibroids depends on its localization in uterine body. Laparoscopy and laparotomy is recommended for subserosal, intramural, cervical and infriligamentary fibroids. Vaginal myomectomy is preferred in the case of submucosal or nascent fibroids. The duration of postoperative recovery depends by surgical approach: from 7 to 10 days after hysteroscopic surgery, one to two weeks after laparoscopic surgery, and six to eight weeks after the classic myomectomy.

CONVENTIONAL MYOMECTOMY

Myomectomy was introduced in gynecological practice in 1844, when Washington and John Atlee performed the first abdominal myomectomy. William Adam Alexander performed the first operation of multiple uterine fibroids in 1898. Myomectomy was modified by Victor Bonney...
in 1930, still currently used. Conventional myomectomy is commonly used for large subserosal and intramural fibroids (greater than 80 mm), in cases of a large number of fibroids (more than 5), and when it is expected that one cannot avoid the opening of the uterine cavity during myomectomy. Generally, number, size and location of fibroids in most cases do not represent a limiting factor for conventional myomectomy.

During hysterotomy, it is recommended to perform just one or two incisions (possibly one and the front wall of the uterus, even with multiple fibroids), to improve the hemostasis and hysterorrhaphy. Myomectomy should be completed using a vertical hysterotomy, avoiding incision of the posterior uterine body, when possible.

To reduce intraoperative blood loss and need for transfusions, many surgeons use different hemostatic methods, as tourniquets applications, peri-fibroid injection of vasoconstrictive substances (as vasopressin or gipressin), vaginal administration of misoprostol, intravenous drip of tranexamic acid, preoperative uterine arteries embolization or clipping and intraoperative blood salvage.

Some authors recommend in infertile patients the intraoperative use of methylene blue, in order to clearly identify the endometrium during myomectomy and test the fallopian tube patency.

There are, however, consistent data on the possibility that myomectomy does not affect the rate of subsequent possibility of fibroids recurrence and the need for repeated myomectomy. Fibroids detection in long term follow up after myomectomy is due to the small fibroids growth left during the surgery or to new fibroids appearance. Fibroids are generally detected by ultrasound in 50% of patients during five years after myomectomy, and re-operation is requested in 11% of patients operated for single myomectomy and in 26% treated for multiple fibroids.

In summary, myomectomy has a temporary benefit, because overall the 20% to 25% of patients who experienced myomectomy need for repeated surgery for fibroids recurrence, even if this is less frequent in patients treated for single compared to those operated for multiple fibroids, as well as in those who had at term delivery after the myomectomy. One of the causes of discrepant data on fibroid recurrence is the preoperative use of GnRH analogues. They shrink fibroid, decreasing their volume, so that smaller fibroids during surgery cannot be identified and remain in uterus after surgery, turning to their previous size during long term follow up after myomectomy.

In any case, myomectomy increases the fertility rate after the surgery. Literature data suggest that the rate of pregnancy after myomectomy is highest during the first year after surgery, and it significantly decrease thereafter. Myomectomy may also have an adverse effect on the potential fertility, due to the formation of postoperative adhesions and deformation of the uterine cavity shape, after large fibroids removal. Postoperative adhesions occur after traditional myomectomy in up to over 90% of cases; they can: decrease fertility and promote chronic pelvic pain, ectopic pregnancy and intestinal occlusion.

As above reported, vaginal myomectomy is possible in cases of nascent submucosal fibroids. Pedunculated fibroids can be removed by peduncle ligation and cutting. When the intrauterine fibroid pedicle is thin, fibroid can be easily detached by tumor twisting. After intrauterine myomectomy, it is often recommended an instrumental revision of uterine cavity by a sharp curette, to stop the eventual bleeding from the pedicle base. Literature also describes the vaginal approach technique in order to remove corporal fibroids, who can be visualized via colpotomy. Infection is a most frequent complication of vaginal myomectomy. Rarely, in the case of large fibroids originating from the uterine fundus, this intervention may be complicated with the uterine inversion.

Large cervical fibroids represent a significant surgical problem for vaginal access, since their enucleation is technically difficult for the reduced vaginal space and it may be complicated by the ureter and bladder injuries.
LAPAROSCOPIC MYOMETECTOMY

The first case of laparoscopic myomectomy was published by Semm and Mettler in 1979. Experience with the first series of laparoscopic myomectomy was published Dubuisson et al. in 1991. Laparoscopic myomectomy is an option for patients with uterus up to 16 weeks of gestation and smaller, who have subserosal and intramural fibroids. The limiting factor for laparoscopic surgery is the size of the uterus, which allows the placement of the umbilical port, although literature provides descriptions of alternative locations for placing supra-umbilical ports in cases of larger fibroids.

Most of laparoscopic surgeons have their own criteria on size and number of fibroids suitable for laparoscopic approach, even if this method is conventionally suitable for the cases of one or two fibroids diameter up to 8 cm. On the contrary, there are opinions that the laparoscopic approach is possible even in cases of single fibroid up to 15 cm in diameter or for up to 3 fibroids with diameter 5 cm or less. Most surgeons agree that contraindications for laparoscopic myomectomy include diffuse leiomyomatosis, the presence of more than three fibroids with diameter greater than 7 cm, the presence of a single fibroid greater than 15 cm, the size of the uterus more than 20 weeks of gestation, and any condition of the patient, which is a contraindication for prolonged general anesthesia.

The most important factor determining the success of laparoscopic myomectomy is the appropriate closure of the myometrium defect after fibroids removal. Laparoscopic hysterorrhaphy requires significant experience and skills in endoscopic surgery, and some authors recommend the second-look laparoscopy surgery after enucleating of intracapsular and deep subserosal fibroids, to check the surgical scar integrity.

Possible complications of laparoscopic myomectomy include the need for conversion to laparotomy, subcutaneous emphysema, uterine fistula and uterine rupture during pregnancy and childbirth. The common advantages of laparoscopic myomectomy are: less intraoperative blood loss and a lower transfusion risk, less postoperative adhesions, less postoperative pain and need for analgesics, lower incidence of transient febrile episodes, faster return of normal bowel activity, shorter postoperative recovery and length of hospital stay, as well as aesthetic effect in terms of absence of laparotomy scar, although the duration of the surgery a little longer compared to conventional myomectomy. Lower risk of postoperative adhesions is caused by minimal tissue trauma during surgery, bloodless surgical technique, reduced intraperitoneal contamination and desiccation of the tissue.

Literature data suggest that reproductive outcome after laparoscopic myomectomy is the same as after the classic myomectomy. Thus Seracchioli et al. observed similar pregnancy rates, the incidence of miscarriages and premature births between patients operated on by the classical method and those operated by laparoscopy. Pregnancy rates after laparoscopic myomectomy are comparable with those after conventional myomectomy, and range between 11 and 75%.

HYSTEROSCOPIC MYOMECTOMY

Hysteroscopic resection of submucosal fibroids was introduced in clinical practice by Neuwirth in 1976, and is the method of choice for most patients with submucous fibroids.

Hysteroscopic procedure is safe, relatively simple and effective in solving the problems such as irregular uterine bleeding, infertility and recurrent miscarriages. There is no consensus in the literature on the maximum size and type of fibroids that can be operated with this approach: the best results are in the case of fibroid diameter up to 3 cm. Hysteroscopy is the method of choice...
for fibroids with diameter of less than 4 to 5 cm, where
more than 50% of the volume of fibroids is in uterine
cavity. For submucosal fibroids where less than 50% of
the volume is in uterine cavity, this procedure is not al-
ways suitable and should not be performed without lap-
aroscopic control. There are opinions that such fibroids
should be operated by abdominal approach, either by lap-
aroscopy or laparotomy. Literature describes also a
two step operation, with the first for partial
myomectomy and second step to complete the fibroid re-
moval.

In cases of submucosal fibroids complicated by heavy
bleeding, this method offers the possibility of simulta-
neous endometrial ablation, absolutely indicated in pa-
tients with severe bleeding and not interested in repro-
ductive function. According to the literature data, this
combined surgical approach leads to amenorrhea in
95.5% of patients.

The advantages of hysteroscopic myomectomy are nu-
merous, and the risks are relatively reduced. Intervention
can be performed within the framework of one-day sur-
gery. Other advantages of the method include a lower
intraoperative blood loss, shorter recovery, greater com-
fort for the patient, and the overall lower complication
rate.

Compared to conventional myomectomy, hysteroscopic
myomectomy has the advantage that the risk of develop-
ing adhesions into the pelvis is significantly lower, so as
the risk of uterine scar rupture in subsequent pregnancies
and during labor is significantly lower. Potential
hysteroscopic myomectomy complications include: cervi-
cal laceration, uterine perforation, burns of the genital or-
gans and infections. Major complications of operative
hysteroscopy are injuries extra genital organs (in case of
uterine perforation), bleeding, hyponatremia and water
intoxication, which can lead to cerebral edema, pulmo-
nary edema, coagulopathy, and death. The incidence of
complications depends on the complexity and duration of
the procedure. Late postoperative complications include
intrauterine adhesions and rupture of the uterus during
pregnancy and childbirth.

The effect of hysteroscopic myomectomy in infertility
treatment is difficult to estimate, as the submucous fib-
roids are rarely isolated cause of infertility. According
to the available literature data, the pregnancy rate and
live birth after hysteroscopic myomectomy is 33% to
77%, and 67% to 92%, respectively.

**INTRACAPSULAR MYOMECTOMY**

Fibroids are clearly separated from the surrounding
myometrium by a pseudocapsule, which anatomy, histol-
ogy and physiology was widely investigated during the
past decade. Compression of the myometrium during fi-
broid growth causes its formation. Pseudocapsule is a
neurofibrovascular structure surrounding fibroids and
containing many neuropeptides and neurotransmitters,
extremely important for myometrial functionality or for fertility.

As myomectomy is the most common conservative
gynecological surgery, it should be as less traumatic as
possible. Therefore, research in this area led to introduc-
tion of a surgical technique called "intracapsular myo-
mectomy", as a method of removing the fibroid inside its
surrounding pseudocapsule. This method spares the
pseudocapsule as an important structure for optimal
myometrial healing after myomectomy, positively affect-
ing future reproductive function, labor and delivery. Apart
from fibroid pseudocapsule sparing, this technique
avoids the use of ischemic solution into myometrium and
extensive diathermocoagulation with high electrical watt-
age (>30 watts), allowing the normal healing of the uter-
ine scar. All these should minimize the risk of uterine
rupture in subsequent pregnancy and delivery. The clini-
cal rationale for intracapsular myomectomy can be ap-
plied to all myomectomies, therefore it has been used
both for laparoscopic and laparotomic myomectomy, as
well as for cesarean myomectomy (CM). All these ben-
efits have favorable impact on uterine functionality for future concep-
tion, pregnancy and delivery.

**SURGICAL TREATMENT OF FIBROIDS IN PREG-
NANCY**

A surgical intervention is necessary during pregnancy
in only 2% of pregnant women with fibroids. Indica-
tions for myomectomy during pregnancy are pain resis-
tant to conservative therapy, particularly in the case of
subserosal and pedunculated fibroids and in cases of
rapid growth of fibroids. In all cases of acute abdo-
men, an exploratory laparotomy is indicated. Although
the pedunculated fibroids up to 5 cm can be removed
without significant complications, the extirpation of ne-
crotic fibroids in pregnancy usually leads to bleeding and
miscarriage. The most common complication of
myomectomy during pregnancy is massive bleeding re-
quiring blood transfusion. Myomectomy during preg-
nancy significantly increases the incidence of miscarriage
and premature birth.

Having in mind the risk of uterine rupture delivery is
mainly carried out by cesarean section (CS). Accord-
ing to literature data 93.7% of pregnancies after
myomectomy in pregnancy end by CS, and the incidence
of hysterectomy after CS in these patients is 4.5%.

Bearing in mind that only 1% of fibroids diagnosed
during pregnancy are cervical fibroid, recommendations
for their treatment published in the literature are scarce,
even if, without a recommended indication, it is advis-
able to be as conservative as possible.

In cases of fast fibroids growth or suspected cervical
carcinoma, a biopsy in pregnancy is recommended. Indi-
cations for intervention in such cases include: bleeding,
pain, obstruction of the birth channel, infection and urin-
ary obstruction.
CM was considered to be an intervention associated with increased risk of perioperative complications, mainly hemorrhage and it was considered relatively contraindicated in many obstetric textbooks. Therefore it was advised just in cases of necessity for safe fetal extraction and lower uterine segment (LUS) suturing after incision. Several studies demonstrated that CM is probably safer procedure than previously believed. Most authors agree that pedunculated and subserosal fibroids can be safely removed during CS, while deep intramural and multiple fibroids enucleating might cause several complications. The only absolute contraindication for CM stated in the literature is uterine hype/atology.

Majority of the recent publications concluded that CM should not increase the hemorrhage and postoperative fever risks, thus promoting it as a safe and feasible procedure when performed by an experienced surgeon. Thus, literature data nowadays indicate that pedunculated and subserosal fibroids can be removed without serious complications. Furthermore, subserosal and intramural fibroids located at the LUS could also be removed in order to avoid traditional uterine incision. In cases of fibroids from other locations, CM should be considered with caution, as hemorrhage can occur and lead to severe consequences.

The benefits of CM include avoiding the risks of re-laparotomy and further anesthesia, reducing direct costs of re-hospitalizations and of re-operations, and expenses for later myoma treatment. Those who favor CM also postulate that CM results in better quality of uterine scar than interval myomectomy, thus making uterus less prone to rupture in subsequent pregnancies. For the abovementioned reasons, CM is justifiable when performed following proper patient selection by experienced surgeons in comprehensively informed patients. Even in such cases, it requires careful surgical planning by surgeon able to handle perioperative complications in case he/she encounters those.

SUMMARY

KONZERVATIVNO HIRURŠKO LEČENJE MIOMA UTERUSA

Miomi su najčešći benigni tumori genitalnih organa žena u reproductivnom periodu, koji uzrokuju značajne morbidity i umogome remete njihov kvalitet života. Miomektomija je metoda izbora kod žena koje žele očuvati reproduktivnu funkciju.

Klasična miomektomija sa laparotomijom se obično koristi u slučajevima velikih subseroznih i intramuralnih mioma, kao i kod većeg broja mioma. Broj, veličina i lokalizacija mioma kod većine žena ne predstavljaju ograničavajuće faktore za klasičnu miomektomiju. Vaginalna miomektomija je moguća u slučaju nasentnih submukoznih mioma. Laparoskopska miomektomija je opcija kod pacijentkinja s manjim uterusom, s obzirom na to da veličina uterusa može biti ograničavajući faktor za ovu vrstu pristupa. Histeroskopska resekcija submukoznih mioma je metoda izbora kod većine žena s ovom vrstom mioma. Konsenzus u vezi s maksimalnom veličinom i tipom mioma koji se mogu operisati ovim pristupom, medijutim, još uvek ne postoji.

Istraživanja pseudokapsule mioma tokom poslednje decenije dovela su do uvođenja hirurške tehnike nazvane "intrakapsularna miomektomija". To je metoda očuvanja pseudokapsule, kao značajne strukture za optimalno zaražanje miometrijuma nakon miomektomije, što pozitivno utiče na reproduktivnu funkciju u budućnosti. Klinički razlog za intrakapsularnu miomektomiju može se primećiti na sve miomektomije, tako da se ova tehnika koristi i pri laparoskopskoj i pri miomektomiji laparotomijom, kao i kod miomektomije tokom carskog reza. Nekoliko studija je pokazala da je miomektomija tokom carskog reza bezbednija procedura nego što se ranije mislilo. Ona je opravdana kada se izvodi uz odgovarajući odabir pacijentkinja i od strane iskusnih hirurga.

Ključne reči: fibrom materice; miom materice; miomektomija; hirurgija; laparoskopijska; histeroskopijska.

REFERENCES


