


Procedures to Reduce Haemorrhage during Myomectomy for Fibroids

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ABSTRACT

Uterine fibroids are the most common solid tumors in the female pelvis. Myomectomy is the first choice of treatment for woman who want to keep their uterus. Haemorrhage, uterine perforation, cervical injury, and metabolic problems from excessive absorption of the distension medium, such as glycine, are risks of hysteroscopic myomectomy. There are several procedures and techniques to reduce haemorrhage during myomectomy for fibroids. Some research demonstrated excellent outcomes with uterine artery ligation.

Keywords: Artery ligations, fibroids, myomectomy, vasopressin

ABSTRAK

Mioma uteri adalah tumor jinak yang paling sering dijumpai pada wanita. Tindakan miomektomi adalah salah satu pilihan terapi pada wanita yang tetap ingin mempertahankan rahim. Perdarahan, perforasi uterus, cedera serviks, dan masalah metabolisme akibat penyerapan berlebihan media distensi, seperti glisin, adalah risiko prosedur histeroskopi miomektomi. Beberapa prosedur dan teknik dapat mengurangi perdarahan saat miomektomi pada kasus mioma uteri. Beberapa penelitian menunjukkan hasil yang sangat baik dengan ligasi arteri uterina. **I Gede Sastra Winata, Nicholas Renata Lazarosony. Prosedur untuk Mengurangi Perdarahan Selama Miomektomi Fibroid.**

Kata kunci: Fibroids, ligasi arteri, miomektomi, vasopressin

INTRODUCTION

Uterine fibroids are the most common solid tumors in the female pelvis.[1] Asymptomatic fibroids are usually diagnosed through regular checkups. Myomectomy, either by abdominal or laparoscopic technique, should be considered for symptomatic patients or those with larger or increasing tumors who want to preserve their fertility. Patients who do not want to preserve their fertility may be offered a hysterectomy; however, nowadays more women prefer to keep their uterus.[1] The ability to have future children is no longer the main reason to seek myomectomy.[2]

Haemorrhage, uterine perforation, cervical injury, and metabolic problems from excessive absorption of the distension medium, such as glycine, are all risks of hysteroscopic myomectomy.[3] Laparoscopic myomectomy carries the standard hazards of laparoscopy, such as trocar (surgical instrument) placement mishaps, as well as excessive uncontrolled bleeding, which necessitates a laparotomy and increases the risk of uterine rupture in subsequent pregnancies.[4]

Bleeding, fever, infection, visceral injury, and thromboembolism are among short-term consequences of abdominal myomectomy. Transfusion is required in up to 20% cases following abdominal myomectomy.[5] Myomectomy can result in intraoperative or postoperative blood loss, as well as haematoma formation. Myomectomy is a more technically difficult than hysterectomy due to the significant blood loss associated with the dissection of large fibroids. If bleeding becomes unmanageable or uterus repair is impossible due to the many defects left by multiple removal of myomas, myomectomy is sometimes converted intraoperatively to hysterectomy. Excessive bleeding may demand an emergency blood transfusion.[6] Procedures and techniques to reduce haemorrhage during myomectomy for treating fibroids such as certain medications, tourniquet techniques combined with vasopressin, and ligation of artery, are available.

MEDICATIONS

A few well-designed randomised trials have looked into the impact of each intervention on blood loss.[6] Misoprostol, vasopressin, bupivacaine plus epinephrine, tranexamic acid, gelatin-thrombin matrix, pericervical tourniquet, mesna, ascorbic acid, dinoprostone, loop ligation of the myoma pseudocapsule, and a fibrin sealant patch (collagen sponge with thrombin and fibrinogen) were found to reduce bleeding significantly during myoma[6]. When compared to placebo or no therapy, oxytocin, myoma morcellation, and temporary cutting of the uterine artery did not significantly reduce blood loss.[6]

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Some interventions such as misoprostol and dinoprostone have shown promising effects on reducing blood loss during myomectomy.[7] Prostaglandin E2 analogues were shown to significantly reduce blood loss, probably by causing uterine contraction and reducing uterine blood flow.[7] Trials on oxytocin, a known utero-tonic agent, showed no statistically significant effect on blood loss during myomectomy.[7]

Tranexamic acid, like prostaglandin E2 analogues, has been shown to minimize blood loss following myomectomy.[8] Tranexamic acid is an antifibrinolytic by blocking the lysine-binding site on plasmin, thereby preventing fibrinolysis - the breakdown of a fibrin clot, a coagulation product. Since the 1960s, tranexamic acid has been used in clinical settings to reduce blood loss and the need for blood transfusions in cardiac surgery,[8] liver transplantation,[8] and orthopaedic surgery[8]

Bupivacaine plus epinephrine has been proved to significantly reduced blood loss.[8]

TOURNIQUET TECHNIQUES

Arteria uterina, which branches out from arteria iliaca interna, and arteria ovarica, branches from aorta abdominalis, provide the majority of uterine blood flow.[9] These two end branches of arteries anastomose in ligamentum proprium ovarica. Some study was able to decrease bleeding after myomectomy by using a pericervical tourniquet to reversibly stop blood flow at the uterine artery. Ovarian blood flow was also unaffected, hence ovarian function remained unaffected.[10] The use of diluted vasopressin intramyometrial injection to minimize bleeding during hormonal tourniquet myomectomy surgeries is possible, but the total dose (20 units diluted in 20 mL normal saline) is limited, and intraoperative arterial or central monitoring is required.

Multiple leiomyomas as well as very large uterine leiomyomas (>20 weeks) can be successfully treated with the pericervical tourniquet procedure.[11] There was a statistically significant difference ($p < 0.001$) in mean blood loss for the no-tourniquet group and the tourniquet group around 200 mL.[18]

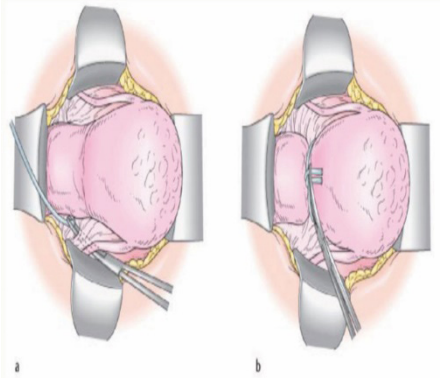

Figure 1. Tourniquet techniques for myomectomy (Source: Konishi Ikuo, 2019)[10]

VASOPRESSIN

Local infusion of vasopressin caused vasospasm. A significant of 500 mL difference in mean blood loss ($p = 0.001$) was found in a randomized controlled experiment to examine the efficacy of vasopressin vs. normal saline solution in minimizing blood loss after myomectomy. Injection of dilute epinephrine before laparoscopic myomectomy is also comparable to injection of dilute vasopressin in terms of operative blood loss, surgery time, subjective surgical difficulty, and postoperative discomfort.[12] Injection of intramyometrial vasopressin has been associated with bradycardia, cardiac arrest, and severe hypotension.[13]

ARTERY LIGATION/TAMPONADE

During myomectomy procedures, uterine artery blockage has been found to induce successful hemostasis. Even when using a much more concentrated solution, which was reported and showed apparently improved hemostasis, injection of concentrated solution vasopressin does not always prevent massive bleeding during myomectomy; it can significantly reduce intraoperative hemorrhage when combined with uterine artery occlusion.[14] Patients who do not underwent a uterine artery ligation lose more blood than those who have a uterine artery occlusion and primary myomectomy.[1]

After surgical ligation of both the internal iliac and ovarian arteries, pregnancy is still possible.[15] After bilateral uterine artery ligation for post-Cesarean section hemorrhage, 12 successful pregnancies have been documented[14]. Obstetricians have commonly used uterine artery ligation to address postpartum hemorrhage before resorting to ultimate hysterectomy. Research demonstrated excellent outcomes in reducing postpartum blood loss with uterine artery ligation for pregnant women with uterine leiomyomas who are having a Cesarean section.[16]

The uterus and the leiomyomas will be affected differently by obstruction of the uterine artery because collateral arteries serve the uterus but not the leiomyomas; if the uterine arteries are occluded, the uterus can regain its perfusion within hours or days, whereas the leiomyomas eventually necrotize. These theoretical implications provide justification for treating leiomyomas with uterine artery ligation without regard of uterine function or future fertility.[17]

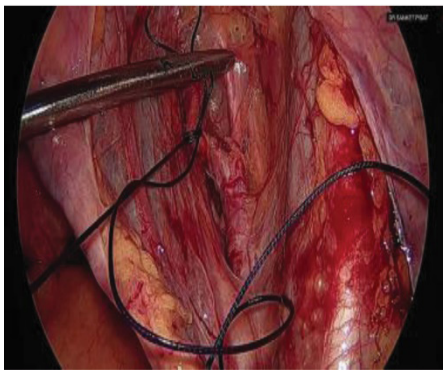

Figure 2. Artery ligation technique.[19]

CONCLUSION

Myomectomy is an effective treatment option to preserve fertility or retain the uterus for women with symptomatic fibroid. Several procedures and techniques to reduce haemorrhage during myomectomy for treating fibroids such as certain medications, tourniquet techniques combined with vasopressin, and ligation of artery must be considered.

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