

To B or not to B: the application of uterine compression sutures to reduce blood loss after myomectomy

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Abstract

Introduction: The aim was to assess the hemostatic impact of B-Lynch sutures following an open myomectomy for efficacy.

Material and methods: In this prospective clinical research, performed in Alazhar university hospitals (Al-Hussain, Damietta, Assiut) and Minia University Maternity Hospital, 250 women scheduled for open myomectomy between January 2021 and January 2023 had multiple fibroid uteri with uterine sizes corresponding to 12–22 weeks. There were two groups of women. Group I (125) underwent standard open myomectomy surgery, whereas Group II (125) underwent normal open laparotomy surgery followed by B-Lynch sutures. Certain inclusion and exclusion criteria were applied to every patient. We recorded vital data, length of the procedure, complications (bleeding during the procedure, bleeding from multiple bites, bladder injury, fever, wound infection), complete blood count before and after surgery, need for blood transfusion, postoperative vital data, time until ambulation, passing flatus, and ability to eat and drink, as well as the amount of blood lost during and after the procedure.

Results: There was no statistically significant difference between the two groups in age, parity, weight, number of fibroids, or uterine size as measured by ultrasonography. Between groups I and II, there was a significant difference in the average intraoperative blood loss (Group I lost 562.6 ml, whereas Group II lost 411.3 ml) as well as the mean blood loss following surgery (205 ±82 ml in Group I and 117 ±41 ml in Group II). No significant difference was observed in the mean length of hospital stay between groups I and II (2 ±0.3 days and 2 ±0.6 days, respectively).

Conclusions: Using a B-Lynch suture can help minimize blood loss during and after an open myomectomy. Therefore, if the uterus is large and has a lot of fibroids, it is recommended to be done frequently.

Key words: fibroid, open myomectomy, B-Lynch.

Introduction

The majority of fibroids are benign and tiny. Most often, they are discovered by accident. Fibroids can be classified according to where they appear. Depending on their location, they may produce excessive menstrual flow, period discomfort, or other symptoms [1]. A myomectomy is a surgical procedure that removes the leiomyoma from the uterus while leaving it *in situ* [2].

Myomectomy is performed through three methods: laparotomy, laparoscopic, and hysteroscopic. The most invasive surgical method for removing fibroids is open myomectomy [3]. Compared to open surgery, laparoscopic myomectomy involves less discomfort and less time spent in the hospital. One can remove small fibroids using hysteroscopy or laparoscopy [4].

Through the broad ligament, the uterine arteries supply the ascending blood supply of the uterus.

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The ovarian arteries provide the descending blood supply, and the ovarian and uterine vessels anastomose at the cornu to feed the uterus with blood [5–7].

Christopher Balogun Lynch published his brace suture for reducing postpartum hemorrhage in March 1997. The main objective of the quick and easy surgery was to compress the uterus without obstructing the uterine arteries or the uterine cavity [8].

A modified version of the traditional B-Lynch technique was introduced in the literature recently to compress the uterus following an open myomectomy as a hemostatic strategy to reduce blood loss both during and after the procedure.

Material and methods

Between January 2021 and January 2023, a prospective randomized clinical study was conducted in Alazhar university hospitals (Al-Hussain, Damietta, Assiut) and Minia University Maternity Hospital, Egypt. Following counseling of all participants and signed consent in the patient's file, 250 patients with multiple fibroid uteri with uterine sizes corresponding to 12–22 weeks had open myomectomy following statistical sample size justification.

Patient groups

Two hundred and fifty patients with fibroid uteri scheduled for open myomectomy were split up as follows:

- Group I: A standard myomectomy was performed on 125 individuals;
- Group II: 125 individuals had a modified B-Lynch suture after a normal myomectomy.

Patients were submitted to meticulous history taking and examination (general, abdominal and pelvic). The size, location, and number of fibroids in the uterus were assessed using ultrasound along with a general, abdominal, and vaginal examination. In order to compute the difference and estimate the quantity of intraoperative blood loss, a complete blood count was performed both prior to the procedure and in the morning of the third day following the procedure. Preoperative vital data, length of the procedure, complications (bleeding during the procedure, bleeding from multiple bites, bladder injury, fever, wound infection), preoperative and third postoperative complete blood count, need for blood transfusion, postoperative vital data, time until ambulation, time until passing gas and the ability to eat and drink, amount of blood lost during the procedure as estimated by the acute normovolemic hemodilution technique, and postoperative blood loss as measured by the blood collected were recorded.

Estimated blood volume (EBV) was calculated from the following:

$EBV = \text{woman weight in kg} \times 70 \text{ ml/kg}$

Average Hb or hematocrit was estimated from the following [9–11]:

$\text{Average Hb} = \text{initial} + 3^{\text{rd}} \text{ day Hb}/2$

$\text{Amount of blood loss} = \frac{\text{Initial} - 3^{\text{rd}} \text{ day Hb} \times EBV}{\text{Average HB}}$

Inclusion criteria

Patients with symptomatic fibroids, uterine size equivalent to 12–22 weeks, age 20–38 years, any parity, no bleeding diathesis or anticoagulant therapy use, no uterine anomalies, no prior uterine surgery other than caesarean sections, a preoperative hemoglobin level of at least 10 g/dl, and patients who requested myomectomy instead of hysterectomy in order to preserve their fertility.

Postoperative outcomes include vital signs, urine output, monitoring for vaginal bleeding, intraperitoneal drain output, and concentrations of hemoglobin and hematocrit.

When a patient's condition was stabilized, 48 hours of observation were followed by a discharge card that included all surgical data and scheduled a follow-up visit one week later to look for any abnormalities (such as wound gapping, deep vein thrombosis, puerperal sepsis, uterine wall necrosis, or vesicovaginal fistula).

Steps of the modified B-Lynch technique

Following a transverse suprapubic skin incision, the uterus was exteriorized, and the assistant extended the uterus upwards. Three warm, moist packs were used to pack the intestine, and a pericervical tourniquet was used.

After that, a myomectomy was performed by making a midline uterine incision, removing the fibroids, and then sealing the fibroid beds. Following this modification, the uterus was closed. First, a bite was made in the median raphe of the two uterosacral ligaments on the posterior aspect of the uterus, crossing over the fundus in the anterior wall of the uterus to take a bite 2 cm above the bladder reflection on either side, and then crossing over to the back again to tighten the stitches. This procedure was done using Vicryl (Ethicon) number 2. In all situations, an intraperitoneal drain was placed before the abdomen was closed in layers.

Statistical analysis

For data display and statistical analysis, SPSS for Windows version 15.0 and Microsoft Excel version 2007 were utilized.

Results

Two hundred and fifty patients scheduled for open myomectomy were split up as follows:

- Group I: A standard myomectomy was performed on 125 individuals;
- Group II: 125 patients had B-Lynch surgery after a standard myomectomy.

Every case was effectively resolved without requiring a hysterectomy. Regarding the demographic information, which included age, parity, weight, preoperative hemoglobin and hematocrit levels, uterine size, and the number of myomas determined by ultrasonography, there was no discernible difference between the two groups (Table 1).

There was a substantial difference in the mean intraoperative blood loss between groups I and II, with 562.6 ml in Group I and 311.3 ml in Group II. It was statistically significant that just two instances in Group II and nine cases in Group I required an intraoperative blood transfusion. The third-day hemoglobin and hematocrit readings showed a substantial difference between the two groups. Table 2 shows 9.1 g/dl or 31.2% in Group I and 9.8 g/dl or 32.4% in Group II, respectively.

A statistically significant difference was also observed in postoperative blood loss (205 ±82 ml in Group I and 117 ±41 ml in Group II). However, there was no significant difference between the two groups in terms of hospital stay (2 days ±0.3 in Group I and 2 days ±0.6 in Group II), postoperative complications such as fever (12 cases in Group I and 11 cases in Group II), or superficial wound infection (6 in Group I and 7 in Group II) (Table 3).

Discussion

When a woman requests to maintain her fertility, the more conservative myomectomy surgery is usually used as the primary therapy for symptomatic fibroids [9]. Hysterectomy is also a common surgical option for this condition.

Myomectomy can be performed as an abdominal operation, *via* laparoscopy, or by hysteroscopy. Intraoperative bleeding is a clinical risk during open myomectomy, potentially resulting in the patient losing their fertility and having to undergo a hysterectomy [10].

Preoperative GnRH agonists are recommended because controlling intraoperative bleeding is a significant surgical challenge. These agents reduce the size and vascularity of the tumor, but they may also change the myoma-myometrium interface, which may cause small fibroids to disappear and complicate tumor enucleation.

Although transient uterine tourniquets are an option, they run the risk of causing embolic events and irreparable uterine injury [11–13].

Table 1. Comparison of demographic information for groups I (single routine myomectomy) and II (single routine myomectomy with B-Lynch suture)

Parameters	Group I (N = 125)	Group II (N = 125)	p-value
Age (years)	32.8 ±6.3	32.4 ±6.5	> 0.05
Parity	1.8 ±0.3	1.6 ±0.4	> 0.05
Weight	82.3 ±11.6	83.1 ±11.3	> 0.05
Hb (preoperative)	10.1 ±0.2	10.2 ±0.6	> 0.05
Hematocrit (preoperative)	33.2 ±0.4	33.1 ±0.7	> 0.05
Uterine size	16.6 ±1.3	16.3 ±1.7	> 0.05
Number of myomas	3.2 ±0.7	3.6 ±0.3	> 0.05

Table 2. Comparison of surgical data from groups I (single routine myomectomy) and II (single routine myomectomy with B-Lynch suture)

Parameters	Group I	Group II	p-value
Hb (postoperative)	9.1 ±0.3	9.8 ±0.5	< 0.05
Hematocrit (postoperative)	31.2 ±0.5	32.4 ±0.8	< 0.05
Estimated blood loss (intraoperative)	562.6 ±0.8	311.3 ±0.7	< 0.05
Operation time	48.2 ±5.4	59.3 ±7.8	< 0.05
Bleeding from multiple bites	13	19	> 0.05
Blood transfusion	9	2	< 0.05

Table 3. Comparison of postoperative parameters of groups I (single routine myomectomy) and II (single routine myomectomy with B-Lynch suture)

Parameters	Group I	Group II	p-value
Postoperative blood loss	205 ±82	117 ±41	< 0.05
Hospital stay	2 ±0.3	2 ±0.6	> 0.05
Fever	12	11	> 0.05
Wound infection	6	7	> 0.05

It has been demonstrated that these sutures are useful in reducing bleeding after open myomectomy, even though uterine atony is the primary sign of utilization of uterine compressing sutures to reduce bleeding from the placental location [8].

Group II in the current study saw a statistically significant decrease in intraoperative blood loss compared to Group I. In Group I, the mean intraoperative blood loss was 562.6 ml, whereas in Group II it was 311.3 ml.

This is consistent with a related study [14] which found that there was a substantial difference in blood loss between the brace suture group (250 ±75 ml) and the control group (600 ±120 ml). This was in contrast to another study that found no differences between the two groups; the reason for this might be attributed to the use of different methodologies for measuring

blood loss and a smaller sample size [12]. A review of abdominal myomectomies for uterine diameters larger than 14 weeks, which found that the average intraoperative blood loss was 450 ml [13], corroborated the findings of the current investigation.

Furthermore, on the third postoperative day, Group I had a significantly lower hemoglobin level and hematocrit value (mean 9.1 g/dl and 31.2%, respectively) than Group II (mean 9.8 g/dl and 32.4%, respectively), with a significant difference between the two groups. This is positive and indicates that the bracing sutures can lessen the amount of blood lost before and after surgery.

The two groups' operating times differed significantly (Group I's mean duration was 48.2 ±5.4 min, whereas Group II's mean length was 59.3 ±7.8 min). The results contradict those of a related study that found no significant difference ($p = 0.173$) in the average operating duration between the two groups (60 ±7.9 min for the control group and 65 ±5.2 min for the test group). This disparity may decrease in the future because there was no increase in blood loss and there was more experience with the B-Lynch suture surgical technique [14].

There was no difference between the two groups in terms of bleeding from the myoma beds or from B-Lynch bites (13 cases in Group I and 19 cases in Group II).

Regarding the requirement for blood transfusions, there was a very significant difference between the two groups (9 cases in Group I and 2 instances in Group II). Previously, non-mechanical techniques to reduce intraoperative blood loss were the subject of a Cochrane Library review, which found that 31% of cases in the UK required blood transfusions even when one or more techniques to reduce blood loss during open myomectomy had been used [15].

The current research's findings were consistent with a related study [14], which found that all instances of abdominal myomectomy were successfully completed without the need for blood transfusions when the B-Lynch technique was performed.

As measured by intraperitoneal drains, there was a significantly significant difference in postoperative blood loss. In Group I, the mean blood loss after surgery was 205 ±82 ml, whereas in Group II, it was 117 ±41 ml. A different study revealed very similar results and found that the mean postoperative blood loss in myomectomy cases was 250 ±75 ml, whereas the mean postoperative blood loss in cases operated on by the Lynch technique was 75 ±15 ml, with a highly significant difference between the two groups [14].

The length of hospital stay did not significantly differ between the two groups. In Group I, the average length of hospital stay was 2 ±0.3 days, whereas in Group II, it was 2 ±0.6 days. This contradicts a study that found a substantial difference between the test group (3 ±1 days) and control group (4 ±1.5 days) [14].

Between the two groups, there was no discernible difference in wound infection or postoperative fever. Twelve patients in Group I experienced postoperative fever and six patients had wound infection; in Group II, eleven patients experienced postoperative fever and seven patients had superficial wound infection.

Conclusions

Using a modified B-Lynch suture during an open myomectomy clearly reduced blood loss both during and after the procedure, as evidenced by higher postoperative hemoglobin and hematocrit readings. Therefore, it is advised to be done on a regular basis if the uterus is big and has many fibroids.

Disclosure

The authors report no conflict of interest.

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