

# The effect of uterine blood supply cutoff during myomectomy

Abdulaziz Alobaid,<sup>ab</sup> Tarek Alqadri,<sup>a</sup> Fatema Serat,<sup>b</sup> Muhammad Riaz,<sup>a</sup> Solaiman Alobaid,<sup>a</sup> Lateefa Aldakhil<sup>b</sup>

From the <sup>a</sup>Women's Specialized Hospital, King Fahad Medical City, Riyadh; <sup>b</sup>Department of Obstetrics and Gynecology, King Khaled University Hospital, Riyadh, Saudi Arabia

Correspondence: Dr. Abdulaziz S. Alobaid · King Fahad Medical City, PO Box 59046, Riyadh 11525, Saudi Arabia · T: +966 (1)2889999 ext. 7020 · draalobaid@hotmail.com · Accepted: December 2010

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**BACKGROUND AND OBJECTIVE:** Myomectomy is considered a highly morbid procedure due to the risk of high intraoperative blood loss. Meticulous surgical techniques can reduce operative morbidity. Our aim was to evaluate and compare the intraoperative blood loss between two surgical techniques: 1) the uterine vascular cutoff technique and 2) the classical technique.

**DESIGN AND SETTING:** Retrospective chart review conducted between 1 July 2008 until 30 June 2010 in a tertiary care referral center to compare surgical outcomes of two groups.

**PATIENTS AND METHODS:** The sample included 136 patients: 30 patients had their surgeries performed with the uterine vascular cutoff technique, and the remainder (106 patients) had myomectomies performed with the classical technique. The uterine vascular cutoff technique was performed by the same surgeon for all 30 patients, whereas myomectomy with the classical technique was performed by several gynecologists.

**RESULTS:** There was no significant difference between the two groups in parity and operation time; however, patients in the first group had a statistically significant higher mean age (39.1 [7.6] vs 35.8 [6.9] years;  $P=.025$ ) and, on average, bigger fibroid size by gestational week (20.1 [7.3] vs 17 [5.2] weeks;  $P=.0094$ ), with standard deviation shown in parentheses. There was a statistically significant lesser drop in hemoglobin concentration among patients in the first group (1.23 [1.2] vs 2.25 [1.4] g/dL;  $P=.0003$ ), and the postoperative hemoglobin was significantly higher in the first group (10.5 [1.6] vs 9.7 [1.7] g/dL;  $P=.036$ ). The hospital stay was shorter for patients in the first group (5.8 [1.7] vs 7.1 [2.9] days;  $P=.031$ ).

**CONCLUSION:** The vascular cutoff technique leads to less intraoperative blood loss without increasing the operative time, patients tolerate this technique very well, and the technique is associated with shorter hospital stay, all of which could contribute to less postoperative morbidity.

Uterine myomas have been reported in 20% to 25% of women over the age of 35 years. Symptoms are seen in up to 50% of these patients.<sup>1</sup> The cumulative incidence may reach up to 70% of women at the age of 50 years.<sup>2</sup>

Myomectomy is a common surgical treatment option for patients with symptomatic leiomyomas who wish to preserve their fertility. The most serious complication during abdominal myomectomy is severe intraoperative bleeding, which may lead to hysterectomy. A recent study reported that 23% of patients lost over 1000 mL of blood.<sup>3</sup> The transfusion rate has been shown to be 18% to 24% in some reports.<sup>4-6</sup> There are many intraoperative interventions that reduce intraoperative blood loss.

Reducing the blood supply to the uterus to allow careful surgical techniques has been described.<sup>7-9</sup> However, these techniques have not been universally adopted.

In this study, our aim was to evaluate and compare the intraoperative blood loss between two surgical techniques: 1) the uterine vascular cutoff technique and 2) the classical technique.

## PATIENTS AND METHODS

This study was approved by the institutional review committee at King Fahad Medical City. We conducted a retrospective chart review to compare the surgical outcomes between the uterine vascular cutoff technique and the classical technique.

The uterine vascular cutoff technique that was used was a technique modified from the one described by Boyd in 1986.<sup>10</sup> First, the bladder is dissected from the lower uterine segment; then a perforation is made through the posterior leaf of the broad ligament at the level of the internal os. A tourniquet (using 16-inch Foley catheter) is then passed through the perforation, encircling the uterine arteries bilaterally and pulled up tight and grasped with a Kocher clamp. The ovarian vessels are then clamped with Satinsky vascular clamps, and the Sampson artery is clamped with a hemostat. The uterine blood supply would thus be completely occluded. The uterine vascular cutoff technique was performed by the same surgeon (A.A.) in all patients in our study.

Chi-square or the Fisher exact test were used to investigate bivariate associations of all categorical variables, as well as variables indexing the two types of surgical techniques (uterine vascular cutoff technique and classical technique). Normality of the quantitative variables was assessed using either Shapiro-Wilks or Kolmogorov-Smirnov test along with graphical display of the data by histograms and normality plots. Two-sample *t* test was used to compare the quantitative variables between the two groups (uterine vascular cutoff vs classical) if the variable was normally distributed; otherwise, the nonparametric Mann-Whitney U test was used for the comparison. The matched-pairs *t* test was used to confirm statistically significant difference between preoperative and postoperative hemoglobin measures. A drop in hemoglobin was computed from the preoperative and postoperative hemoglobin measures and was compared between the two groups using two-sample *t* tests. Postoperative hemoglobin measure was also compared between the two groups using two-sample *t* test. All statistical analyses were performed using SPSS 17 and Stata10.

For our study, the planned sample size was 98 sub-

jects, with unequal assignment to each of the two study groups (25, uterine vascular cutoff; 73, classical). We anticipated a three times smaller sample size for the first group, as the use of classical technique of myomectomy is very common among gynecologists. We estimated that this sample size would have 90% power to detect 50% less blood loss in the uterine vascular cutoff technique, measured by hemoglobin (g/dL) drop using two-sample *t* test (two-sided) with a significance level of 5%. Our final statistical analyses was performed with 136 patients (30, vascular cutoff; 106, classical).

## RESULTS

Our study included 136 patients: 30 patients had their surgeries performed using the vascular cutoff technique, and the remaining patients had myomectomies performed by their gynecologists using the classical technique.

The characteristics of the patients are summarized in **Table 1**. Patients in the first group were older than those in the second group (39.1 vs 35.8 years;  $P=.025$ ). There was no difference in parity between both groups (1.2 vs 1.4;  $P=.490$ ). There was no difference in the preoperative use of gonadotropin-releasing hormone analogue (3.3% vs 13.2%;  $P=.190$ ). The number of patients who had previous surgeries performed in both groups was not significantly different (20% vs 14.2%;  $P=.434$ ). Patients in the first group had a bigger fibroid size, which was statistically significant (20.1 vs 17 weeks;  $P=.0094$ ).

The operative details are summarized in **Table 2**. In both groups, most patients had transverse incisions (93.3% vs 82.1%;  $P=.162$ ). There was no statistically significant difference in the mean number of fibroids resected between the two groups (5.3 vs 3.2;  $P=.5$ ), as well as in the operative time (126 vs 114 minutes;  $P=.148$ ).

There was lesser drop in hemoglobin among pa-

**Table 1.** Characteristics of patients.

	Vascular cutoff technique (30 patients)	Classical technique (106 patients)	<i>P</i> value
Mean age (years)	39.1 (7.6)	35.8 (6.9)	.0250
Parity (range)	1.2 (2.4)	1.4 (2.1)	.490
Number of patients with preoperative gonadotropin-releasing hormone	1 (3.3%)	14 (13.2%)	.190
Number of patients with previous surgeries	6 (20%)	15 (14.2%)	.434
Fibroid size	20.1 (3.5)	17 (5.2)	.0094

**Table 2.** Operative details.

	Vascular cutoff technique	Classical technique	P value
Number of transverse incisions	28 (93.3%)	87 (82.1%)	.162
Number of fibroids removed	5.3 (8.7)	3.2 (4.1)	.504
Operative time (minutes)	124 (35)	116 (46.8)	.148
Preoperative hemoglobin (g/dL)	11.7 (1.4)	12 (1.4)	.31
Postoperative hemoglobin (g/dL)	10.5 (1.6)	9.7 (1.7)	.036
Drop in hemoglobin (g/dL)	1.23 (1.2)	2.25 (1.4)	.0003
Number of patients receiving blood transfusion	2 (6.7%)	21 (19.8%)	.105
Hospital stay (days)	5.8 (1.7)	7.1 (2.9)	.031

tients in the first group, which was statistically significant (1.23 vs 2.25 g/dL;  $P=.0003$ ), and the postoperative hemoglobin was significantly higher in the first group (10.5 vs 9.7 g/dL;  $P=.036$ ). Hospital stay was shorter for patients in the first group (5.8 vs 7.1 days;  $P=.031$ ).

## DISCUSSION

Many interventions are described in the literature to reduce intraoperative blood loss during myomectomy. These interventions may include intramyometrial vasopressin or administration of bupivacaine plus epinephrine, vaginal misoprostol, and oxytocin. A systemic review concluded that there is limited evidence that some interventions may reduce bleeding during myomectomy.<sup>11</sup> Surgical techniques to reduce the uterine blood flow and consequently reduce intraoperative bleeding have also been described with different outcomes and conclusions.<sup>10,12-15</sup>

Here, we have described a technique that completely cuts off uterine blood supply and compared this technique with the classical technique. To objectively evaluate the differences in blood loss, we chose the parameter "drop in hemoglobin" to estimate the difference in blood loss between the two groups, which eliminated the subjectivity of the surgeon's estimate of blood loss.

We found that, despite having a bigger uterine size, patients who had the uterine vascular cutoff technique had a lesser drop in hemoglobin and higher postoperative hemoglobin than patients who had surgery using the classical technique. The risk of having an intraoperative blood transfusion was three times higher in the classical group; however, this difference did not reach

a statistically significant level, as more patients are needed to study this aspect. However, although more patients received blood transfusion, they had lower postoperative hemoglobin.

In our study, patients who had the uterine vascular cutoff technique were older in age, as it is the belief of the surgeon (AA) that there is no age limit for myomectomy and the patient's desire should be taken into consideration. These patients also had a larger fibroid size and were usually referred to a surgeon by their general gynecologist since a difficult surgery was anticipated.

The new technique did not lead to a statistically significant longer operative time, and the hospital stay was shorter, probably indicating less postoperative morbidity. In both groups, most patients did not receive preoperative gonadotropin-releasing hormone analogues, as these medications are associated with a higher recurrence rate of fibroids and cause difficult dissection because of fibrosis between the tissue planes.<sup>16</sup>

Limitations of this study are that it was a retrospective analysis and the number of patients was small. However, a prospective randomized controlled study should be carried out to definitively confirm the benefit of the uterine vascular cutoff technique. This may require a multicentric involvement so that the study can be completed within a reasonable period.

In conclusion, the vascular cutoff technique leads to less intraoperative blood loss without increasing the operative time, patients tolerate this technique very well, and this technique is associated with a shorter hospital stay, which together could contribute to less postoperative morbidity.

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