

Research Article

Comparison between the effects of bilateral uterine artery ligation and tourniquet method on the intra-operative and post-operative hemorrhage in abdominal myomectomy

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Abstract

Background: Fibroids are benign tumors characterized by the proliferation of uterine muscle cells and the production of a collagenous matrix. Myomectomy can be accomplished by laparotomy, laparoscopy or hysteroscopy. Substantial blood loss associated with the dissection of huge fibroids renders myomectomy a more technically challenging procedure. It was reported in abdominal myomectomy that up to 20% of patients need blood transfusion and up to 2% might need hysterectomy. **Methods:** Forty patient were recruited to this study from the outpatient clinic in Minia university hospital requiring abdominal myomectomy for symptomatic leiomyomas. The patients classified randomly in to 2 groups: Group (I): including 20 patients undergo bilateral uterine artery ligation (ligation group), Group (II) including patients 20 undergo tourniquet method intra-operative tourniquet group). **Results:** the study resulted in: there is no statistically significant difference between the 2 groups regarding age, parity and body wight. Blood Loss (ml) was 336.0 ± 81 , 547.5 ± 188.1 in group 1, 2 respectively. Post-operative Hb (gm/dl) was 9.97 ± 0.95 , 9.03 ± 1.05 in group 1, 2 respectively. The Number of patients needed blood transfusion was 1(5%), 4 (20%) in group 1, 2 respectively. **Conclusion:** It could be concluded that intraoperative bilateral uterine artery ligation could be a effective, efficient and reliable methods in reducing blood loss with subsequent reduction in need for blood transfusion associated with minimal drug related adverse effects than the use of tourniquet method intra-operative without increasing the operative time

Key words: tourniquet method, myomectomy, uterine artery ligation.

Introduction

Uterine fibroids (also termed leiomyomas or myomas) are the most common tumors of the female repro uterine fibroids may be diagnosed by pelvic clinical examination and ultrasound. Sometimes it is not possible clinically to accurately determine whether a pelvic mass involves the uterus or not, but ultrasound is a simple way to confirm this. In doubtful cases, magnetic resonance (MR) imaging or computed tomography may help (Shwayder et al., 2014).

The traditional management of symptomatic fibroids has been surgery (hysterectomy or myomectomy). However, some women do not want invasive surgery and wish to retain their uterus and fertility. Fortunately in this respect, during the last few years new medical and surgical

uterine-conserving alternatives have become available as technological advances have been made. Pharmacological management of symptomatic uterine fibroids has benefited from the introduction of new compounds, although the indications and treatment duration are limited by their side-effects (Borah et al., 2013).

Myomectomy can be accomplished by laparotomy, laparoscopy or hysteroscopy. Substantial blood loss associated with the dissection of huge fibroids renders myomectomy a more technically challenging procedure. It was reported in abdominal myomectomy that up to 20% of patients need blood transfusion and up to 2% might need hysterectomy (Lethaby et al., 2004). Number of interventions have been introduced to reduce bleeding during

myomectomy. Despite these actions, prevention of excessive hemorrhage during myomectomy remains a major task for surgeons (Morita et al., 2004).

It is well known that prostaglandins such as misoprostol or prostaglandin E2 analog, not only increases myometrial contractions but also reduces uterine artery blood flow and may decrease intra-operative hemorrhage in myomectomies (Rossetti et al., 1999). While they may be asymptomatic they can cause abnormal bleeding, pelvic pressure symptoms and infertility. Fibroid growth and regression vary throughout life. Thus, they tend to grow during the patient's reproductive years and regress after the menopause. They affect millions of women and are the leading cause of hysterectomy (Bulun, 2013)

Aim of the work

The present study was designed to evaluate the use of intraoperative bilateral uterine artery ligation versus tourniquet method on the intra-operative and post-operative in reducing blood loss during abdominal myomectomy in Minia University hospital.

Patients and Methods

Setting

This study was conducted prospectively in the department of Obstetrics & Gynecology, El-Minia University Hospital during period from January. to September 2014. El-Minia University Hospital is a tertiary hospital in Upper Egypt attended by most complicated cases.

Ethics

The study protocol was approved by the clinical research ethics committee of faculty of medicine, El-Minia University.

Recruitment & Consent:

Forty patients were recruited to this study from the outpatient clinic in Minia university hospital requiring abdominal myomectomy for symptomatic leiomyomas , written informed consent were taken from patients after full explanation of the procedure .

Inclusion criteria

Patients undergoing abdominal myomectomy with the following conditions:

- Anterior wall myoma
- Intra mural myoma
- Single myoma
- Multiple myomas provided that removal will be through one incision line
- Comparable size of myoma in all patients

Exclusion criteria

- Known allergy to prostaglandin.
- Known history of pelvic/ovarian endometriosis.
- Known history of medical disease (hypertension, cardiac, pulmonary disease, chronic endocrine or metabolic diseases such as diabetes) ..
- Blood diseases affecting coagulation profile.
- Anemic patients (less than 10gm/dl)

History Taking

All women, were included into the study, were subjected to medical history taking including; name, age, education level, residence, history of medications.

Past history of chronic medical disorders as (anemia, hemorrhagic diseases, cardiac diseases, sever chronic allergic conditions, hepatic or renal) was also taken.

Menstrual history including: age of menarche, menstrual cycle, duration, dysmenorrhea, intermenstrual spotting or discharge & last menstruation.

Obstetric history including, parity, past obstetric history, including the mode of delivery in the previous pregnancies, either spontaneous or instrument-assisted or by cesarean section, also history of previous laparotomy were taken.

Examination

General examination; vital signs were carefully measured intra-operative and every 30 min post-operative for 2 hours;they include four main items., pulse (P) measured from radial artery, blood pressure (BP), body temperature (T) was measured axillary & respiratory rate.

Also pallor, signs of haemostatic disorders, chest and heart were clinically evaluated during operation.

Abdominal Examination; to determine uterine size (in weeks), number of myoma & size of largest one if multiple myoma.

Local examination; for vaginal bleeding or any local gynecological lesions

*Bimanual examination; to detect any other lesions than myoma

Investigations

All women included in the study had a real time ultrasound by using (TOSHIBA SSA-340A diagnostic ultrasound equipment) to determine size, site (anterior or posterior wall), number of myomas & size of largest one if multiple myoma.

In addition to the ultrasonographic examination done with admission, some laboratory investigations were performed including.

Haemoglobin (Hb) concentration, pre-operative Hb was detected as a routine investigation of admission and post-operative Hb was also detected by drawing another sample 12 hours after surgery, difference between two samples was calculated.

Coagulation profile: which include prothrombin time (PT) prothrombin concentration (PC), and platelets count.

Study design:

This study included 40 patients which were randomly allocated into two groups, nearly equal in number of participants, each group included 20 patients

Group (I) including patients do bilateral uterine artery ligation alone (ligation group)
Group (II): including patients that undergo tourniquet method intra-operative (tourniquet group)

Procedure

Patients were admitted before the operation by three days. Blood pressure, pulse rate and temperature were recorded at the time of admission and investigations were done in the following days including ultrasound examination and complete blood picture.

Abdominal myomectomy was performed by the usual standard surgical technique through a transverse suprapubic incision and intraoperative bilateral uterine artery ligation was done to all patients of group I and group II undergo tourniquet method intra-operative

Data Collection

The total volume of intraoperative blood loss was estimated by measuring the amount of blood accumulated in the aspiration equipment.

Postoperative hemoglobin was measured 12 h after the operation. Any intraoperative and postoperative transfusion was recorded. The patient was discharged from hospital according to the clinical situation, and was scheduled to return for a follow-up assessment 6 weeks after the surgery, or earlier if medically indicated.

Study outcome

Primary outcome

Visually estimated amount of blood loss

Secondary outcome

1. Drop in Hb level
2. Need for blood transfusion
3. Operative time
4. Post-operative stay
5. Occurrence of side effects

Statistical analysis

The results were recorded, tabulated and statistically analyzed. The data of all patients were fed into an IBM- compatible personal computer and analyzed using SPSS (version 16.0.0, California, USA).

Continuous and ordinal data were established as mean \pm standard deviation (SE) and other data as nominal scale (present 1; absent 0). Chi-square (Fischer's exact test) was used for ordinal and continuous data and the Mann-Whitney U test for continuous data in the comparison between groups. $P \leq .05$ was considered statistically significant. In repeated measurements, Friedman variance analysis was employed; on finding $P \leq .05$, a double measurement was made with Wilcoxon Rank test and $P \leq .05$ was considered statistically significant.

Results**Table (1): Patients characteristics in the studied groups**

Variables (MEAN+/-SD)	Group I (Ligation Group) (N = 20)	Group II (Tourniquet Group) (N = 20)	P-VALUE
Age (years)	37.0 ± 2.8	36.3 ± 3.2	0.77
Body wt. (Kgs)	81.8 ± 6.1	83.5 ± 10.9	0.85
Parity			0.91
0	8 (40%)	6 (30%)	
1	7 (35%)	10 (50%)	
2	5 (25%)	4 (20%)	
Previous Laparotomy	7(35%)	5 (25%)	0.79

* Significant.

Table (2): Features of myoma in the studied groups

Variables (mean+/-SD)	Group I (Ligation group) (n = 20)	Group II (Tourniquet group) (n = 20)	P-value
Uterine Size (weeks)	13.7 ± 2.2	14.4 ± 2.11	0.53
No. of Myomas	2.65 ± 0.91	2.95 ± 0.94	0.28
Largest Myoma (cms)	8.1 ± 1.6	7.8 ± 1.4	0.62

Table (5): Mean values of pre-operative Hb among the studied groups

Variables (mean+/-SD)	Group I (ligation group) (n = 20)	Group II (torniquet group) (n = 20)	P-value
Pre-operative Hb (gm/dl)	10.89 ± 0.4	10.73 ± 0.78	0.33

Table (6): Mean values of Post-operative Hb for the studied groups

Variables (mean+/-SD)	Group I (ligation group) (n = 20)	Group II (torniquet group) (n = 20)	P-value
Post-operative Hb (gm/dl)	9.97 ± 0.95	9.03 ± 1.05	0.005*

* Significant.

Table (7): Mean values of blood loss among the studied groups.

Variables (mean+/-SD)	Group I (ligation group) (n = 20)	Group II (torniquet group) (n = 20)	P-value
Blood Loss (ml)	336.0 ± 81.5	472.5 ± 188.1	<0.001*

* Significant.

Table (8): Need for blood transfusion among the studied groups

Variables	Group I (ligation group) (n = 20)	Group II (tourniquet group) (n = 20)	P-value
Number of patients needed blood transfusion	1 (5%)	4 (20%)	0.026*

Table (9): Post-operative stay for the studied groups.

Variables	Group I (ligation group) (n = 20)	Group II (tourniquet group) (n = 20)	P-value
Post-operative Stay	1.80 ± 0.61	1.75 ± 0.63	0.78

Table (10): Frequency of side effects among the studied groups.

Variables	Group I (ligation group) (n = 20)	Group II (tourniquet tgroup) (n = 20)	P-value	Variables (mean+/-SD)
No side effects	13 (65%)	7 (35%)	13.06	0.001*
Nausea,Vomiting	1 (5%)	2 (10%)	0.54	0.76
Fever	3 (15%)	5 (25%)	3.14	0.20
Abd pain	2 (10%)	4 (20%)	4.44	0.10
Diarrhea	1 (5%)	2 (10%)	2.11	0.34

* Significant.

Discussion

This current research, including 40 patients, divided into 2 groups (twenty patients in each group) compares the use of preoperative Misoprostol and intraoperative bilateral uterine artery ligation versus tourniquet method intra-operative in reducing blood loss during abdominal myomectomy

▪ As regard mean blood loss:

It was significantly greater in tourniquet method intra-operative group than in ligation group and was respectively 527.5±85ml vs. 336±81.5 ml (p value <0.001).

Mean blood loss was significantly greater in tourniquet group than ligation group (p value 0.001).

Husnu celik et al., 2003; in a study included 26 patients divided into 2 groups requiring abdominal myomectomy in university of Firat, Turkey.

Misoprostol group (thirteen patients) received 400microgram vaginal tablet 1 hour before abdominal myomectomy while control group (thirteen patients) received placebo.

Mean blood loss in misoprostol group was 472±77ml (p value < 0.05) which is consistent with our study.

Kongnyuy et al., 2014; in a Conchare review that included 18 RCTs studies were performed on 1250 women to assess the effectiveness, safety, tolerability and costs of interventions to reduce blood loss during myomectomy. Kongnyuy et al., 2007; in a Conchare review that included 17 RCTs studies with 371 patients , two RCTs assessed the role of vaginal misoprostol in 58 patient and showed significant decrease in blood loss compared to placebo with MD-149 ml .

▪ As regards postoperative haemoglobin:

Post-operative haemoglobin was significantly greater in ligation group than

tourniquet group and were respectively 9.97 ± 0.95 g/dl, 9.03 ± 1.05 g/dl, 9.02 ± 1.01 g/dl (p value 0.005).

Shokeir et al., 2012; reported that there was no statistically significant difference in post-operative haemoglobin in the ligation group when compared to the tourniquet group that were respectively (9.5 ± 1.2 g/dl vs. 9.4 ± 1.4 g/dl) (p value 0.7) which is consistent with our study.

Kongnyuy et al., 2014; also reported statistically significant difference between misoprostol group and ligation group in post-operative haemoglobin which were respectively (9.85 ± 0.6 g/dl vs. 9.2 ± 0.7 g/dl) (P value < 0.05) which is consistent with our study.

▪ **As regards operative time :**

There was no statistically significant difference in operative time among the 2 groups with reduced time in ligation group in comparison with tourniquet group., 90.5 ± 9.85 min, 91.25 ± 8.25 min (p value 0.001).

Shokeir et al., 2012; reported no statistically significant difference between tourniquet group and ligation regarding operative time (82.8 ± 30 min vs. 85.4 ± 20) (p value 0.2) which is consistent with our study.

▪ **As regards need for blood transfusion:**

It was found that ligation group had less blood transfusion rate than tourniquet group which were respectively 1(5%), 7(35%) (p value 0.026) **As regards post-operative stay:**

▪ **As regards side effects:**

There was no statistically significant difference between the three groups regarding the occurrence of side effects in the 2 groups had fewer incidences of side effects.

Husnu celik et al., 2003; reported no statistically significant side effects in tourniquet group and ligation group (p value 0.4).

Conclusion

It could be concluded that intraoperative bilateral uterine artery ligation could be an effective, efficient and reliable method in reducing blood loss with subsequent reduction in need for blood transfusion

associated with minimal drug related adverse effects than the use of tourniquet method intra-operative without increasing the operative time

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