Use of Compression Sutures to Decrease Blood Loss in Myomectomy

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Abstract

Objective: To evaluate the haemostatic efficacy of compression sutures in open myomectomy.

Methods: This observational study was carried out in Abbasi Shaheed Hospital from February 2012 to October 2013. Twenty six women with uterine fibroids undergoing open myomectomy were included in the study. Uterine size was equivalent to 16-20 weeks size. Compression sutures were applied in 13 cases (group A) to control bleeding during myomectomy. In another 13 patients, controls, (group B) compression sutures were not applied. Outcome measures were operative time, blood loss, transfusion, intraoperative and postoperative complications, and length of hospitalization.

Results: The average blood loss during surgery was 250 ± 75 ml for group A and 600 ± 120 ml for the control group B. Postoperative blood loss was 75 ± 15 ml for the group A and 250 ± 75 ml for the control group B. Length of the postoperative hospital stay was 3 ± 1 days for group A and 4 ± 1.5 for the control group B ($p<0.05$).

Conclusion: Compression Sutures are effective in reducing blood loss in patients undergoing myomectomy.

Keywords: Fibroid, myomectomy, compression sutures. (AASH & KMDC 18(1):1;2013)

Introduction

Ultrasound data suggest a cumulative incidence of uterine leiomyoma, at least 70% for a woman aged 50 years[1]. The standard treatment of symptomatic leiomyomas is hysterectomy for women who have completed childbearing and myomectomy for women who wish to preserve fertility[2]. Despite the introduction of non-surgical techniques, where fertility is to be preserved, open myomectomy remains the most common treatment option[3].

Open myomectomy is a major surgical procedure and is associated with considerable morbidity, in particular, operative[4].Massive blood loss after dissection of huge fibroids, renders myomectomy a more technically challenging procedure than hysterectomy. One study, for instance, reported that 23% patients lost over 1000 ml of blood[5]. Other series reported transfusion rates between 18% and 24%, and in 2% of cases there is need for conversion of myomectomy to hysterectomy[3].

A number of interventions have been introduced to reduce bleeding during myomectomy[6].Three categories of interventions can be identified: (A) interventions on uterine arteries such as pericervical mechanical tourniquet[7], and vasoconstriction by vasopressin and (B) uterotonics such as ergometrine, oxytocin, misoprostol, and (C) myoma dissection techniques, which include the use of laser and chemical dissectors such as sodium-2mercaptoethanesulfonate (mesna). Despite these procedures excessive haemorrhage during myomectomy remains a major challenge to gynaecologic surgeons[6].

In 1997, B-Lynch et al described the use of uterine compression sutures to control uterine bleeding in five cases of massive obstetric haemorrhage[8]. This innovative technique was to treat uterine atony where a continuous suture was used to envelop and mechanically compress the uterus in an attempt to avoid hysterectomy[9]. The objective of this technique is to compress the uterus without occluding either the uterine arteries or the uterine cavity. It can stop postpartum haemorrhage (PPH) and potentially preserve fertility[10].

Hayman suture, the modification of B-Lynch suture, offers the potential advantage that it can be

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applied faster and easier, avoiding the performance of a lower segment hysterotomy, when PPH follows a vaginal delivery[11]. This procedure can control operative blood loss without affecting the uterine blood supply.

However, little is known about its use in myoma surgery. Many centers use vasopressin to control bleeding from myoma but this is costly and currently it is not used in our centre. This study evaluated the haemostatic efficacy of compression sutures (Hayman suture) to control bleeding in myomectomy, as it is already in use for postpartum haemorrhage (PPH).

Patients and Methods

This descriptive study was carried out in Abbasi Shaheed Hospital, from February 2012 through October 2013, 26 patients were enrolled in this study.

Informed consent was obtained in all cases. The mean age of all patients was 32±5 years (range 24-38 years). Inclusion criteria were symptomatic fibroids with a uterine size equivalent to 16 weeks of gestation, and a request to retain their uterus. Exclusion criteria were a history of a bleeding disorder, concurrent anticoagulant therapy and a haemoglobin level of <10 g/dl at the time of surgery. In all cases, the diagnosis of uterine fibroids was based on clinical examination and ultrasound scan.

The study protocol was approved by the Ethical & Scientific Review Committee Karachi Medical & Dental College.

All patients underwent routine open myomectomy. Out of the 26 patients compression sutures were applied in 13 patients of group A whereas in the other 13 patients of control group B no sutures were applied. The skin incision was transverse suprapubic. The uterus was exteriorized, and the bowels packed away with use of two large wet swabs. Pericervical tourniquet was applied to minimize blood loss[7]. The operative technique comprised the transverse incision on the most prominent part of the myoma to avoid the arcuate vessels, the use of a hooked clamp to hold the tumor, and a knife to peel it, without removing the apparent excess of myometrium or serosa. Once the fibroid was removed and dead space closed, compression sutures applied in 13 patients of group A by a number 2 poly-glactin suture (Vicryl; Ethicon Inc., USA). A straight needle was used to transfix the uterus from front to back, just above the reflection of the bladder, and was then tied above the fundus of the uterus. One suture on each side of the uterus applied. Drain (no 18) retained in pouch of Douglas for 48 hours. Abdomen closed in layers.

Intraoperative blood loss was estimated by calculating the blood volume of the suction machine and the weight change of gauze used during surgery. Postoperative blood loss was assessed by surgical drains and changes in haemoglobin level and blood transfusion rates.

Data were analyzed with use of the Student's t-test (paired) and Fisher exact test. Data were presented as the mean ± SD. A $p < 0.05$ was considered statistically significant. All analysis were performed using statistical package for social sciences version (SPSS)[20].

Results

Myomectomies were completed successfully in all 26 patients. The two groups A and B were similar in baseline characteristics, including preoperative uterine size (Table 1). The average blood loss during surgery was 250 ± 75 ml (range 100-450 ml) for the group A and 600 ± 120 ml (range 250-950 ml) for the control group B ($p<0.005$) (Table 2). Intraoperative blood transfusion was considered necessary in three (23%) patients from the control group B and none in the group A, which was statistically significant ($p=0.0001$). Average postoperative blood loss assessed by surgical drains at 48 hours was 75 ± 15 ml (range 15-120 ml) for the group A and 250 ± 75 ml (range 75-450 ml) for the control group B ($p<0.005$) (Table 2).

Postoperative fall in haemoglobin level at day 2 was 0.5 ± 0.2 g/dl (range 0-1.2 g/dl) for the com-

pression sutures group and 2.8 ± 0.9 g/dl (range 0.8-4.9 g/dl) for the control group which was statistically significant (p<0.005) (Table 2). Average operating time was 65 ± 5 minutes (range 45-95 minutes) for the compression sutures group and 60 ± 8 minutes (range 40-100 minutes) for the control group. These differences were not statistically significant (p>0.05).

Average length of the postoperative hospital stay was statistically significant in the two groups (p<0.05), 3 ± 1 days (range 2-4 days) for the group A and 4 ± 1.5 days (range 2-7 days) for the group B (Table 2). All surgeries were done in the morning. No delay in discharge due to logistic reasons or weekend etc. No major immediate or delayed complications like bowel obstruction, wound infection, wound haemorrhage, chest infection and venous thromboembolism were observed in either group of patients.

Table 1. Comparison of demo s) and group B (without compression sutures) patients with successful myomectomies.

	Group A (n=13)	Group B (n=13)	p value
Mean age (y)	31.9 ± 5.6	32.1 ± 4.9	0.851
Menorrhagia (%)	78	77	0.785
Pelvic pain (%)	41	39	0.769
Bladder or bowel dysfunction(%)	12	16	0.359
Uterine size (wk)	18.2 ± 1.7	17.9 ± 1.4	0.711

Table 2. Comparison of surgical parameters of group A (with compression sutures) and group B (without compression sutures) after myomectomy.

Surgical parameters	Group A	Group B	p value
Operating time (min)	65 ± 5.2	60 ± 7.9	0.173
No of myomas per patient	3.2 ± 1.2	3.1 ± 1.6	0.335
Intraoperative blood loss (ml)	250 ± 75	600 ± 120	0.001
Blood transfusion (%)	0	20	<.001
Post operative blood loss (ml)	75 ± 15	250 ± 75	0.001
Post operative Hb fall (gm/dL)	0.5 ± 0.2	2.8 ± 0.9	0.005
Hospital stay (day)	3 ± 1	4 ± 1.5	0.005

Discussion

Excision of fibroids from the uterus, repair of the uterine incision and control of operative blood loss during removal of large fibroids are major concerns[12-17].Control of operative blood loss might be the most critical consideration to the success of patient recovery. The most serious complication during removal of large fibroids is severe intra-operative haemorrhage and subsequent blood transfusion[18].Most intraoperative conversions to hystrectomy reported in the literature have been because of intraoperative bleeding.As the size of fibroids increases, it is necessary to develop a management strategy to circumvent surgical problems related to large fibroids.

Pretreatment with GnRH agonist can shrink the fibroids. However, GnRH agonist therapy may alter the myoma-myometrium interface and induce the disappearance of small fibroids; therefore, it may increase the difficulty of fibroid enucleation and the incidence of recurrent fibroids. In addition, GnRH agonist therapy provides only a slight benefit in reducing blood loss. A Cochrane Library review evaluated the role of pretreatment with GnRH agonists before myomectomy.

Criticisms of the transient blocking uterine perfusion procedure are that the average 2 hour occlusion time might induce irreversible damage in the uterine myometrium and cause embolic events and pulmonary emboli after release of the clips. Traditional uterine tourniquets usually require only an hour[19]. A review of the literature showed no reports of embolic phenomena after detorsion[20]. Chemical tourniquets using vasopressin have also been described.

Although uterine atony is often the indication for the use of the compression sutures, it has been shown in many case reports that the suture is also useful in controlling bleeding in cases of placenta previa and placenta accrete[21]. Study by Fatima et al 2010 from Pakistan for effectiveness of combine B-Lynch brace suture cases reported zero infection rate[22]. One more study from Pakistan also showed failure rate of 6.6% (1 out of 15 needing hysterectomy) with B-Lynch suture technique[23].

Our study evaluated compression suture against a control group. In the future, it would be in-

teresting to evaluate compression suture against the use of other methods.

Our results in the control group were considerably in excess of what we expected based on a review of the literature, showing mean blood loss for the no-tourniquet group (756.4 ± 285.7) and the tourniquet group(515.7 ± 292.8)[5]. One explanation could be the use of different methods of blood loss collection and estimation. Another reason for this discrepancy might be differences in the amount of fibroid tissue removed. Previously published series do not include data on the weight of fibroids removed, and yet it is known that estimation of uterine size is only a rough estimate of uterine weight and therefore fibroid weight. One study, for instance, found that a uterus, which on bimanual examination feels equivalent to 20 weeks of gestation, has an average weight of about 1000 g, but with a standard deviation of over 500 g. As intra-operative bleeding is proportional to the amount of fibroid tissue removed, differences in fibroid weight can account for major differences in blood loss data.

Previously, non mechanical techniques to reduce blood loss during abdominal myomectomy were the subject of a Cochrane Library review. However, despite the use of one or more of these non mechanical techniques to reduce blood loss during abdominal myomectomy, up to 31% of United Kingdom gynaecologists reported the regular need for blood transfusions during myomectomy[17]. Results of the present study, where abdominal myomectomies were accomplished in all cases, showed no blood transfusions in group A. An average intraoperative blood loss of 540 ml was reported in a review of abdominal myomectomies for uterine sizes exceeding 14 weeks gestation despite the use of different non mechanical techniques to reduce blood loss during surgery[16]. This is similar to the blood loss in our control group. However, the group A presented a significant reduction in the perioperative bleeding. Furthermore, the intraoperative blood transfusion rate and the postoperative blood loss were also significantly reduced in the group A. Moreover, the average length of postoperative hospital stay was also significantly reduced in the group A.

Reductions in haemorrhage in women undergoing myomectomy in group A are encouraging and provide evidence for the ability of compression suture to reduce blood loss when applied to a bleeding uterus. The limitation of this study include that out of 26 total women, only 17 were traced up to 6 weeks. Thus loss to follow up was quite high and their outcome pertaining to long term complications like infection, pyometra, adhesions and fertility could not be traced. We are planning another multicentre, study with a larger sample size and follow up of the patients for complications.

Conclusion

Our results demonstrate the effectiveness of compression suture. It controls blood loss and decreases the need for hysterectomy. However, larger studies to investigate the feasibility and effectiveness of this procedure are crucial before definite conclusions can be drawn.

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