ORIGINAL ARTICLE

TOURNIQUET USE OR NOT USE IN MYOMECTOMY: AN EXPERIENCE AT SAHIWAL TEACHING HOSPITAL, A RETROSPECTIVE CROSS SECTIONAL STUDY

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ABSTRACT

Objectives: To evaluate the effectiveness of Tornique use or not use in open Myomectomy and Its Complications
Methods: This is a retrospective, single centred cross-sectional study, a retrospective review of cases of abdominal myomectomy between June 2018 and June 2024. Data were obtained from ward and operating theatre case records. Records of 172 Patients were reviewed and separated in two groups on the basis of tourniquet use or not use. In Group A, 76 patients, a Foley catheter was used as a tourniquet to temporarily limit blood flow from the uterine vessels. The tourniquet was not released intermittently as it was applied at the uterine artery level and was removed after the procedure. In Group B, 96 patients, myomectomies were performed without a tourniquet. Blood loss estimation and intraoperative blood transfusion recorded. In all cases, the histological diagnosis was a leiomyoma. Age in years, BMI, duration of symptoms, size of largest Myoma. Number of Myomas Complications like intraoperative blood loss, postpartum pyrexia, urinary tract infection, wound infection and injury to gut and urinary bladder between the two groups.
Results: Total records of172 patients were selected. In 76 patients, Torniquet was used, in 96 Torniquet was not used. Most patients in the dataset were around 30 years old, with their symptoms lasting approximately 8.8 months. The average size of the leiomyomas was around 6.7 cm, with patients typically having around 2 leiomyomas. On average, patients have a BMI of 26.36, indicating an overweight population. The majority of patients do not have hypertension or diabetes. Significant difference p value <0.05 in intraoperative blood loss and intrauterine blood transfusion between two groups (p = 0.005), less blood loss when the tourniquet is used. Independent T test was used to compare differences in the duration of surgery in minutes and hospital stay in days between the two groups. The use of a tourniquet significantly reduced the length of surgery by an average of 7.03 minutes (p = .000). Patients who had a tourniquet used had a significantly shorter hospital stay, averaging 0.91 days less (p = .000). No significant differences for urinary tract infection, wound infection, postop pyrexia or injury to the gut/urinary bladder between the groups. p value >0.05.
Conclusion: Fibroids can occur any time in the reproductive age group with more BMIs, sizes and numbers. Tourniquet use is significantly associated with less intraoperative blood loss and blood transfusion, with no significant differences for urinary tract infection, wound infection, or injury to the gut/urinary bladder between the two groups. This analysis indicates that the use of a tourniquet during surgery is associated with shorter surgery durations and hospital stays.

Keywords: Uterine myomectomy; laparotomy; blood loss; tourniquets; urinary tract infection; postop pyrexia

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INTRODUCTION

Uterine Fibroids are the predominant benign pelvic neoplasms in females affecting over 60% of individuals within the age range of 30 to 44 years. In a significant proportion of instances, uterine fibroids are devoid of symptoms and may be discovered incidentally through

the utilization of transvaginal ultrasound or magnetic resonance imaging.[1] According to an estimate, approximately 80% of reproductive age group women of Caribbean region are affected by uterine fibroids, with roughly one-third of them exhibit symptoms that necessitate therapeutic intervention.[2] Although uterine leiomyomas may respond to pharmacological management, a large number of patients ultimately necessitate some kind of surgical procedures like uterine myomectomy, uterine artery embolization, or hysterectomy. For women seeking to preserve their reproductive capabilities and/or their uterus, uterine myomectomy, a method of surgical removal of uterine fibroids, is the preferred surgical option.[3]

It is a frequently executed intervention for women aiming to conserve both their uterus and reproductive capabilities.[4] Uterine fibroids also known as leiomyomas, are benign tumours that originate from the myometrium and can manifest clinical symptoms, ranging from excessive menstrual bleeding, pelvic heaviness, and subfertility.[5] The choice of myomectomy or hysterectomy, which entails the total removal of the uterus, relies upon several factors, which include dimensions, quantity, and positioning of the leiomyomas in the uterus. It also depends upon the patient's wish to retain fertility.[6]

Myomectomy can be carried out by numerous surgical modalities, encompassing abdominal, laparoscopic, and hysteroscopy techniques. Although myomectomy is predominantly regarded as a safe and efficacious therapeutic surgical intervention, it is not devoid of side effects. Excessive intraoperative blood loss is of paramount significance, as it can precipitate extended surgical hours, necessitating blood transfusions, and potential enduring consequences [6, 7] and in extreme instances, hysterectomy.[8] Another possible complication associated with myomectomy is the occurrence of uterine scarring and adhesion formation, which may result in infertility, chronic pelvic pain, and need for more surgical procedures in later life.[9]

The application of a tourniquet during the surgical procedure has earned considerable attention. It may decrease intraoperative haemorrhage, decreased necessity for blood transfusions and boost surgical outcomes. It curtails blood loss by a mechanism which leads to temporary occlusion of the uterine arteries. The tourniquet technique enables the surgeon to assess the haemostatic status and make provisions for supplementary interventions, such as uterine artery embolization, if warranted. [7] But the long-term ramifications of this practice have to be explored.[10] So, some studies have articulated apprehensions regarding the potential hazards linked with tourniquet application, including uterine ischemia, necrosis, and postoperative complications.[6, 11] So, the application of a tourniquet in the context of myomectomy has been a focal point of extensive scholarly inquiry and discourse. [12] Nonetheless, the potential adverse effects associated with myomectomy, irrespective of tourniquet application, warrant thorough examination.[13]

Altogether, the judgment to perform myomectomy and the application of a tourniquet during this surgery necessitate a thorough evaluation of the potential risks and advantages pertinent to each individual patient. Diligent patient selection, precise surgical methodology, and vigilant postoperative surveillance are imperative to enhance the outcomes of myomectomy and mitigate the likelihood of complications.[6, 8, 14, 15, 16]

As myomectomy is a commonly performed procedure in reproductive age group to preserve fertility. So, to comprehensively elucidate the function of tourniquet application in myomectomy and its concomitant complications, further empirical investigation is necessitated. No such study of comparison of use or not use of tourniquet was published in the literature in our country to our knowledge although many gynaecologists claim to apply tourniquet in myomectomy. To fill the gap in the literature, I want to publish this study. This type of analysis could be relevant for improving surgical practices in Pakistan, especially in rural areas where blood transfusion services may be limited.

OBJECTIVES

To evaluate the effectiveness of Tourniquet, use or not use in open myomectomy on intraoperative blood loss and blood transfusion.

METHODS

This is a retrospective, single centred cross-sectional study. The study was approved by the local institutional review board (Application No.145/08-2024).

This is a review of cases of abdominal myomectomy carried out at the Department of Obstetrics and Gynaecology at Sahiwal teaching hospital, Sahiwal medical college Sahiwal. Data was obtained from ward and operating theatre case records. In all cases, the histological diagnosis was a leiomyoma. The study enrolled 172 women who had abdominal myomectomy between between August 2018 and June 2024. The data was collected using a semi-structured proforma. The study involved reviewing files for patients undergoing a myomectomy procedure for fibroid excision. Patient files were separated in two groups. In Group A, where a Foley catheter was used as a tourniquet to temporarily limit blood flow from the uterine vessels. The tourniquet was not released intermittently as it was applied at the uterine artery level and was removed after the procedure. In Group B, patients had myomectomies performed without a tourniquet. Blood loss estimation was mentioned at the end of the procedure which was

carried out using suction techniques to eliminate blood from the surgical area

Pre-operative variables like age, BMI, parity, symptoms, documented in the files were recorded. Operation notes reviewed. Myomectomy was performed under general or spinal anaesthesia, with the use of Pfannenstiel or lower midline incisions. The resection of all leiomyomas was done through single or multiple incisions in the anterior or posterior aspect of the uterine body. Electrocoagulation was used in all patients. Myoma beds were sutured using either interrupted or continuous Vicryl number1, sutures. The closure of the myometrium was done in one or two layers to enhance haemostatic efficacy and reduce the risk of hematoma development. Duration of surgery, intraoperative blood loss and transfusion was noted from the record. Size and number of leiomyomas removed recorded. Intraoperative ureter or gut injury was also checked from the record. Postoperative fever, urinary tract infection or wound infection was checked from the record. The patients with missed records and with concurrent anticoagulant therapy, bleeding tendencies and premalignant or malignant endometrial, myometrial pathology were excluded from the study. Preoperative treatment with GnRHa were also not included. Data was analysed using SPSS version 26.0 with a 95% confidence interval. Statistical significance level was set at 0.05.

STATISTICAL ANALYSIS

Data was checked for descriptive analysis to provide a snapshot of the patients' characteristics, offering insights into their age, symptom duration, leiomyoma size and number, BMI, and presence of hypertension and diabetes.

Students t test was used to check the differences in the duration of procedure and length of hospital stay to test group differences. The threshold for statistical significance was $p < 0.05$. To examine group differences in the intraoperative blood loss, blood transfusion, urinary tract or gut injury, postoperative pyrexia and wound infection Chi-square and Fisher exact tests were used. The threshold for statistical significance was $p < 0.05$.

RESULTS

Our patients presented with variety of the symptoms lie 47 % patients presented with HMB, 31.98 % with HMB infertility and pain plus pressure, 11% with infertility and 9% with only pain and pressure in our study.

To evaluate whether there is a statistically significant association between tourniquet use and intraoperative blood loss and need of blood transfusion is present or not the Chi-Square test was used. Tourniquet use resulted in significantly lower blood loss during surgery. 91.9% of patients using a tourniquet had less than 500 mL blood loss, while only 7.3% of patients without a tourniquet experienced such low blood loss. The p-value from the Chi-Square test (0.000) confirms that the difference in blood loss between those who used a tourniquet and those who didn't is statistically significant. Patients with a tourniquet were much more likely to experience lower blood loss than those without it. Out of 76 patients who used a tourniquet, 4 needed a blood transfusion (5.4%), and 72 did not (94.6%). 4% of patients who received a transfusion used a tourniquet, while 98.6% of those who did not need a transfusion used one. This p-value is highly significant (0.000), indicating a strong association between **tourniquet use** and the need for a blood transfusion.

Table 1: Demographic variables between the two groups

Variable	Tourniquet Used (N=74)	Tourniquet Not Used (N=96)	Total (N=170)
Age (years)	Mean: 30.15 (SD: 5.317)	Mean: 30.74 (SD: 5.196)	Mean: 30.48 (SD: 5.241)
Number of Children (N)	Mean: 1.0676 (SD: 0.79950)	Mean: 1.2292 (SD: 0.85198)	Mean: 1.1588 (SD: 0.83102)
Size of Leiomyoma (cm)	Mean: 6.9459 (SD: 1.93661)	Mean: 6.7396 (SD: 1.87642)	Mean: 6.8294 (SD: 1.89994)
Number of Leiomyomas (N)	Mean: 3.3108 (SD: 3.25166)	Mean: 4.3437 (SD: 2.84264)	Mean: 3.8941 (SD: 3.06159)
BMI (KG/m2)	Mean: 26.7973 (SD: 2.89061)	Mean: 26.0208 (SD: 3.01218)	Mean: 26.3588 (SD: 2.97635)
Symptom Duration (months)	Mean: 9.3919 (SD: 5.51913)	Mean: 9.1979 (SD: 5.11678)	Mean: 9.2824 (SD: 5.28056)

TABLE: 2

	Postoperative Pyrexia		Total
	YES	NO	
Torniquet Use or Not	2	74	76
	2	94	96
Total	4	168	172
Pearson Chi-Square	.056[a]	1	.813

TABLE: 3

	Wound Infection Postop		Total
	YES	NO	
Torniquet Use or Not	5	71	76
	5	91	96
Total	10	162	172
Pearson Chi-Square	.146[a]	1	.703

Table: 4 Differences in hospital stay and duration of surgery in two groups

Variable	Tourniquet Use (N = 76)	No Tourniquet Use (N = 96)	Mean Difference	t	p-value	Levine's Test (F, Sig.)
Hospital Stay (Days)	2.22 ± 0.56	3.14 ± 0.47	-0.912	-11.614	0.000	0.656, 0.419
Length of Surgery (Mints)	73.49 ± 13.17	80.21 ± 11.12	-6.721	-3.628	0.000	3.191, 0.076

Independent T test was used to compare differences in the duration of surgery in minutes and hospital stay in days between the two groups. The use of a tourniquet significantly reduced the length of surgery by an average of 7.03 minutes (p = .000). Patients who had a tourniquet used had a significantly shorter hospital stay, averaging 0.91 days less (p = .000). This analysis indicates that the use of a tourniquet during surgery is associated with shorter surgery durations and hospital stays. In our study, no patient ended up in hysterectomy.

DISCUSSION

Our study shows a highly significant association between tourniquet use and the reduced likelihood of requiring a blood transfusion, supported by strong results across statistical tests like Chi-Square. There is a **highly significant association** between the use of a tourniquet during surgery and the likelihood of needing a blood transfusion. This suggests that tourniquet use plays a crucial role in controlling intraoperative blood loss, making it a vital tool for reducing the need for transfusions during surgery.

In our record single uterine artery tourniquet was used but in a study by Bahall V, et, the Hangman's Tourniquet which is the combined uterine artery and infundibulopelvic ligament tourniquet, in reducing intraoperative blood loss during abdominal myomectomy, thereby reducing the need for blood products.[16]

Fletcher et al. (1996) found that vasopressin is more effective than tourniquet in minimizing blood loss during myomectomy. But these are very old studies and vasopressin is not freely available in Pakistan. Nonetheless, the administration of vasopressin may demonstrate superiority over the use of a tourniquet in certain circumstances. The selection of an operative technique is likely contingent upon the specific clinical context and the preferences of the surgeon. Additional randomized controlled trials that compare various haemostatic strategies would be advantageous in determining the most effective methodologies.[17]

In another study, they found similar results in terms of intraoperative blood loss, operation duration, and febrile morbidity between two groups. A significant positive correlation was found between myomectomy duration and blood loss. However, this study found no significant difference in blood loss between triple and single uterine tourniquets.[18]

Numerous methods have been investigated to minimize blood loss during myomectomy, a typical therapy for uterine fibroids. It has been demonstrated that using a tourniquet dramatically reduces blood loss and transfusion rates when compared to not using one.[19] Recent research has addressed concerns regarding the tourniquet's effect on fertility. Tourniquet use did not significantly correlate with pregnancy rates, live birth rates, or time to conception following myomectomy, according to two different analyses.[20] According to these results, applying a tourniquet during a myomectomy might be a secure and efficient way to stop blood loss without affecting the outcome of fertility. To validate these findings, more prospective studies with bigger sample numbers are necessary

In our study tourniquet use was associated with reduced length of surgery and hospital stay which is also showed by some other studies as well. Interestingly, some studies showed benefits of tourniquet use. A retrospective study found that pericervical tourniquet using a Foley catheter significantly reduced intraoperative blood loss (286.4 mL vs 673.8 mL) and postoperative haemoglobin fall compared to no tourniquet [22] Similarly, temporary uterine tourniquet use was associated with reduced haemoglobin /haematocrit drop, transfusion needs, operation times and hospital stays in patients with >3 myomas removed. [23]

Although the findings are heterogeneous, a number of investigations suggest that the application of a tourniquet during myomectomy can be efficacious in minimizing haemorrhage, particularly in cases involving multiple or sizable fibroids.

There are a number of possible advantages to using a tourniquet during myomectomy treatments. According to the results of this study, the use of tourniquets is linked to shorter hospital stays and shorter surgical times. These benefits might be explained by the tourniquet's capacity to create a bloodless operating area, which can enhance sight and enable more accurate surgical methods.[25] Shorter recovery periods and fewer postoperative complications could also result from the decreased blood loss linked to tourniquet use. When choosing the best surgical strategy for each patient having a myomectomy, medical professionals should carefully weigh these possible advantages.[25]

According to the research, there may be advantages and disadvantages to using a tourniquet during myomectomy procedures.[25] According to the results of one analysis by Gingold JA laparoscopic myomectomy analysis, the use of tourniquets was linked to fewer leiomyomas being removed, shorter hospital stays, and shorter surgical times. [26] However, it does not appear to

significantly impact the duration of symptoms experienced by patients [25,27,28]

Importantly, the analysis by same researchers found no statistically significant difference in postoperative wound infection rates between the tourniquet and non-tourniquet groups. Both groups exhibited similar rates of postoperative wound infections and pyrexia. [25, 27]

Our data shows that most patients are in their early 30s, have few children, and suffer from multiple symptoms. The average duration of symptoms is about 9.5 months, and many have multiple leiomyomas of moderate size. A majority of the patients are overweight, with a significant portion suffering from hypertension and diabetes. The data suggests minimal differences in demographics and clinical variables between patients who had a tourniquet used during surgery versus those who did not. While some differences exist in the size and number of leiomyomas, the overall patient characteristics, including age and BMI, are relatively consistent across both groups. In another study by Gupta S, Jose J, similar presentation was noticed.[29]

In our study, there was no difference in urinary tract infection, gut injury and postoperative pyrexia between the two groups. In a study by Kunde K, Cortes E, Seed P Intraoperative haemorrhage was the most common complication in multiple myomectomy (15.29%) compared to single myomectomy (8.16%). Postoperatively, pyrexia was the most common, occurring in 36.9% of multiple myomectomies and 22.5% of single myomectomies. Postoperative complications included midline incisions, hysterectomies, conversion to hysterectomy, and sepsis. [30] In our records, no patient ended up in hysterectomy that was planned for myomectomy.

According to these results, applying a tourniquet during a myomectomy might be a secure and efficient way to stop blood loss without increasing complication rate. The data shows a **highly significant association** between tourniquet use and the reduced likelihood of requiring a blood transfusion, supported by strong results across statistical tests.

CONCLUSION

Myomectomy represents a prevalent therapeutic intervention for uterine fibroids, and numerous methodologies have been investigated to minimize haemorrhage during the surgical process. While the results are mixed, several studies indicate tourniquet use during myomectomy can be effective in reducing blood loss, especially for cases with multiple or large fibroids. However, vasopressin injection may be superior to tourniquet in some instances. The choice of technique likely depends on the specific clinical scenario and surgeon preference.

Our results imply that the application of a tourniquet during myomectomy may represent a secure and efficacious approach in mitigating blood loss while preserving fertility outcomes. This type of analysis could be relevant for improving surgical practices in Pakistan, especially in rural areas where blood transfusion services may be limited. Reducing blood loss with tourniquets could enhance outcomes in surgeries and potentially reduce the burden on healthcare facilities.

This suggests that tourniquet use plays a crucial role in controlling intraoperative blood loss, making it a vital tool for reducing the need for transfusions during surgery.

To validate these findings, more prospective studies with bigger sample numbers are necessary. Further randomized controlled trials comparing different haemostatic techniques would be beneficial to establish optimal approaches.

ETHICAL APPROVAL

Ethical approval was granted by the Institution Review Board (IRB) of Sahiwal Medical College, STH & Allied Teaching Hospitals, Sahiwal vide reference No 145/IRB/SLMC/SWL dated: 29/08/2024

CONFLICT OF INTEREST:

Authors declare no conflict of interest.

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AUTHOR'S CONTRIBUTIONS

SB: Concept design, data analysis and manuscript writing
SZ: Critical Review, manuscript writing
ALL AUTHORS: Approval of the final version of the manuscript to be published

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