



Research Article

BIDIRECTIONAL BARBED VERSUS CONVENTIONAL SUTURE IN LAPAROSCOPIC MYOMECTOMY: A PROSPECTIVE OBSERVATIONAL COMPARATIVE SINGLE-CENTRE STUDY

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ABSTRACT

Background: Uterine myomas/leiomyomas are very common in women of childbearing age. Intramural myomas are the most frequent (58 -79%) amongst all observable uterine myomas. Several studies have established the advantages of Lap. Myomectomy. But controversies exist when it comes to operate multiple myomas laparoscopically concerning excessive blood loss, prolonged operation time & hospital stay, postoperative complications. Many new methods have already come up to prevent intraoperative blood loss in Lap. Myomectomy like Uterine artery ligation, usage of oxytocin, vasopressin etc.

Objectives: To compare Bidirectional Barbed sutures with Conventional sutures in Lap. Myomectomy with respect to surgical outcomes in patients. Study design: Sixty Eight patients with one to three symptomatic myomas were divided into two groups. Myoma bed was sutured either with bidirectional barbed sutures or continuous conventional sutures (Vicryl). The surgeon assessed the degree of suturing difficulty using a visual analog scale ranging from 1 (least difficult suturing) to 10 (most difficult suturing).

Results: Suturing with barbed suture was easier than suturing with conventional suture. Suturing time of the myoma bed was significantly shorter in the barbed suture group (15.09+/- 4.8 VS 28.07+/- 6.02; P Value 0.038). Operative time was comparable between both groups (69.15+/-12.78 VS 80.21+/-15.68; P Value 0.021). The mean intraoperative blood loss was significantly higher in conventional suture group (100.09 +/- 200+/- 90.56 P Value 0.011) **Conclusion:** The bidirectional barbed suture facilitates suturing of the myoma bed during laparoscopic myomectomy. Compared with conventional suture, bidirectional barbed suture reduces the operation time, suturing the myoma bed time and the intraoperative blood loss.

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INTRODUCTION

Uterine leiomyoma is the commonest tumor of the female genital system, especially in women of childbearing age. Approximately 20-40% of women with fibroids experience significant symptoms and consult gynaecologic care with symptoms of heavy or prolonged menstrual bleeding, infertility, habitual abortion, abdominal pain and pelvic pressure symptoms. Surgery is the treatment of choice for symptomatic uterine fibroids. (1) Hysterectomy is usually indicated in patients who do not desire fertility and myomectomy is the typical management for patients who desire future fertility or decline hysterectomy. Laparotomy has been the traditional route for myomectomy. During the past two decades, laparoscopic, hysteroscopic, and robotic myomectomy have largely replaced open myomectomy. During laparoscopic myomectomy, suturing of uterine defect after enucleation of the myoma is the most challenging and time consuming step of the procedure. Suturing & knot tying

are challenging procedure which requires extensive training in laparoscopy. (2) Bidirectional barbs are self anchoring for even 1mm of tissue, no knots needed, re-approximate tissues in less time. Very less Indian studies are there which have demonstrated, the efficacy and safety of barbed sutures. Difficulties are usually encountered during knot tying and during applying tension on continuous suture. These difficulties limit the widespread use of laparoscopic myomectomy by the gynecologists.

Barbed sutures are new class of sutures that were recently used in different surgical specialties to facilitate laparoscopic suturing. (3) Barbed sutures have barbs on the surface of suture thread that prevent backwards slippage of the thread through tissues and therefore can suture the tissues without knot tying on either end of suture line and without the need to apply tension on the thread during suturing. Till now, only three small randomized controlled studies compared the surgical outcomes after laparoscopic myomectomy using conventional or barbed

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sutures.(4) Whereas, the three studies reported that the use of barbed sutures is associated with a reduction in suturing time and intraoperative blood loss, only one study revealed that the use of barbed sutures is associated with a reduction in operative time. The aim of this study was to assess the differences in surgical outcomes between bidirectional barbed suture and conventional suture for myoma bed closure during laparoscopic myomectomy.(5)

MATERIALS AND METHODS

This prospective observational comparative single-centric study was carried out during the period between January 2022 and Dec 2023. The study included 68 patients with intramural uterine fibroid presenting with hypomenorrhea and dysmenorrhea, attending Centre for Advanced Laparoscopic surgeries, Kolkata. Written informed consent was obtained from the patients before participation in the study. Our inclusion criteria had patients with a diagnosis of intramural myomas, suffering from hypomenorrhea and dysmenorrhea. The largest diameter of myomas were between 5 to 14cm and less than three myoma nodes were included. We excluded patients who did not want to be a part of our study, who had uterine size of more than 16 weeks, any submucosal or subserosal pedunculated fibroids, solitary fibroid of more than 10cm diameter, more than 3 fibroids and total combined diameter of >15cm, any patients with inherited bleeding disorder.

Sixty eight patients who underwent laparoscopic myomectomy were enrolled in the study. Patients were divided into two groups according to the sutures used in lap. myomectomy; the bidirectional barbed suture group had 38 patients and conventional suture group had 30 patients. All the procedures were performed during the proliferative phase of the menstrual cycle. Laparoscopic myomectomy was performed by using 10-mm scope with primary port and three secondary ports. Diluted vasopressin (20 U in 200 ml of normal saline) 10 units was maximally injected at a time. Circumferential incision was given over the fibroids using monopolar hook. After the identification of the cleavage plane, the fibroid was enucleated by means of adequate traction with a strong grasper and counter traction maneuvers with another grasping forceps. Bipolar forceps was used to coagulate bleeding points. In bidirectional barbed suture group, two layers of continuous barbed sutures were used to close myoma bed. The ends of the barbed sutures were cut flushed with uterine surface. In the conventional suture group, the myoma bed was closed by two layers of continuous conventional suture with intracorporeal knot tying [2-0 polyglactin 910 suture (VICRYL). The fibroids were removed with a power morcellator. Surgically removed myomas were sent for pathological examination. The surgeon assessed the degree of suturing difficulty after the end of the operation using a visual analog scale (VAS) ranging from 1(least difficult suturing) to 10 (most difficult suturing). The patients were asked to attend the follow up visits every 2 months till the end of the first year after the operation. Data collected from the single centre database included age, BMI, Previous surgeries, preoperative symptoms, operation time, bloodloss, length of hospital stay, follow up. Postoperative HPE reports confirmed the diagnosis if Intramural myomas in all cases.

The primary outcome was the operative time (from the insertion of Veress needle till desufflation) and the secondary outcomes were suturing difficulty, suturing time of myoma

bed, blood loss during the procedure, the decline in hemoglobin percent (difference between Hb% measured one week before the procedure and Hb% measured 24h after the procedure).

STATISTICAL METHODS

The data were compared between two groups using student t tests. P-value of less than 0.05 was considered statistically significant. Statistical analysis was performed using SPSS statistical software, version 21 (SPSS, Inc., Chicago, IL, USA). The largest randomized controlled trial comparing laparoscopic myomectomy using conventional suture with open myomectomy was used for sample size calculation. (6)Power calculation indicated that a sample size of 40 patients was needed in each group to detect more than 10 % decrease in operative time in laparoscopic myomectomy using barbed suture group with an alpha error level of 5% and a beta error of 95%. Chi square (χ^2) test was used to compare categorical variables and Student's t was used to compare continuous variables.

RESULTS

During the study period, 130 consecutive patients with symptomatic myomas were assessed for eligibility. Fourtypatients did not meet the inclusion criteria and ten patients declined to participate in the study. The flow of the patients through the study is shown in Fig 1.

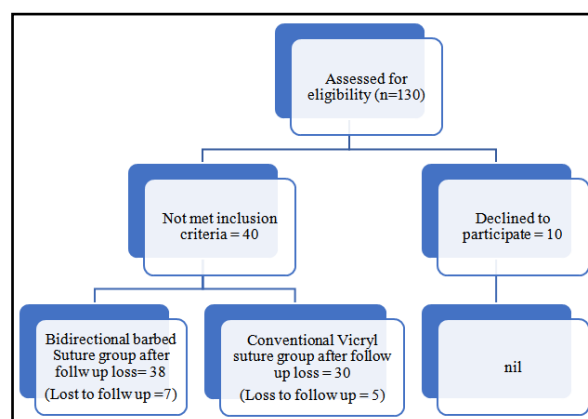


Fig. 1 Flowchart

A total of 68 patients who underwent LM for intramural myomas during the study period were finally included after meeting all the inclusion criteria. No significant differences in age (39 ± 4 , group 1 vs. 42 ± 3 , group 2, $P=0.578$), BMI (21.8 ± 1.9 group 1 vs. 24.1 ± 3.3 , group 2, $P=0.094$), the number of myomas (2 ± 1.38 group 1 vs. 1 ± 1.5 , group 2, $P = 0.853$), and maximum myoma size (8.5 ± 2.5 , group 1 vs. 9.8 ± 2.8 , group 2, $P = 0.467$) were noted between the 2 groups (group 1; barbed suture vs. group 2; conventional suture). The mean operation time was significantly less in group 1 barbed suture group (69.15 ± 12.78 group 1 vs 80.21 ± 15.68 group 2; p value 0.021). The suturing time was significantly less in group 1 barbed suture group (15.09 ± 4.8) when compared with group 2 conventional suture group (28.07 ± 6.02) (p value 0.038). Blood loss when compared between the two groups, was found to be significantly less in group 1 than group 2 (100.09 ± 50.07 group 1 vs 200 ± 90.56 group 2; p value 0.011). Suturing difficulty when measured on a visual analog scale with a score ranging from 1 to 10; from least

Table No Intraoperative and Postoperative findings.

Variables	Group 1(Bidirectional barbed suture) (Mean+/-SD)	Group 2(Conventional Vicryl) (Mean +/- SD)	P Value
Operative Time(mins)	69.15+/- 12.78	80.21+/- 15.68	0.021
Suturing Time(mins)	15.09 +/- 4.8	28.07+/- 6.02	0.038
Blood Loss(ml)	100.09+/- 50.07	200 +/- 90.56	0.011
Suturing Difficulty(VAS Scale 1-10)	2.04+/- 1.48	5.11+/- 1.11	0.001
Haemoglobin on POD 1(gm/dl)	11.13+/- 0.53	10.82+/- 0.44	0.003
Discharge Time(hours)	49.04+/- 4.95	50.09+/- 6.84	0.502

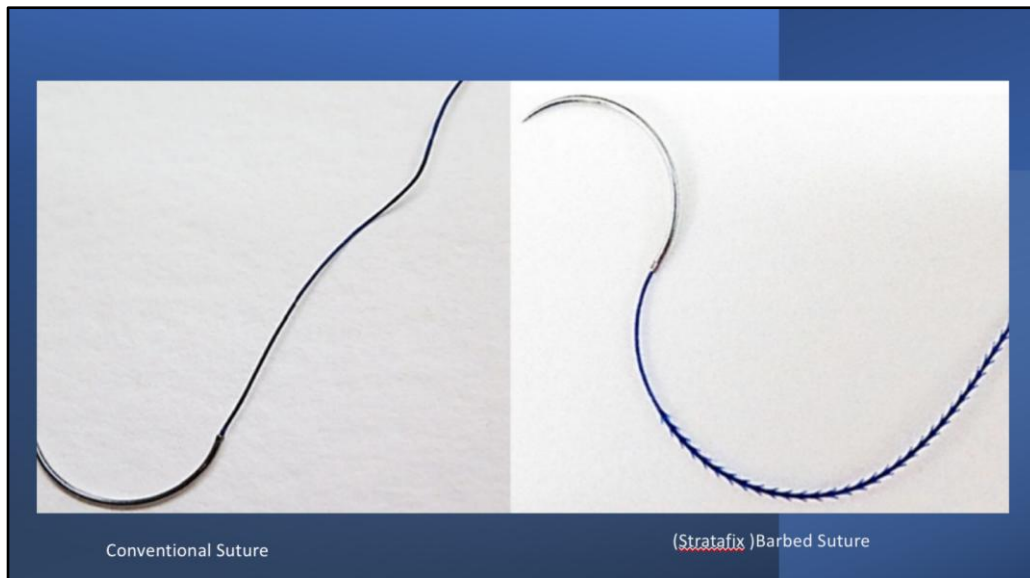


Fig.3 Images of conventional suture (vicryl) and Barbed suture (Stratafix)

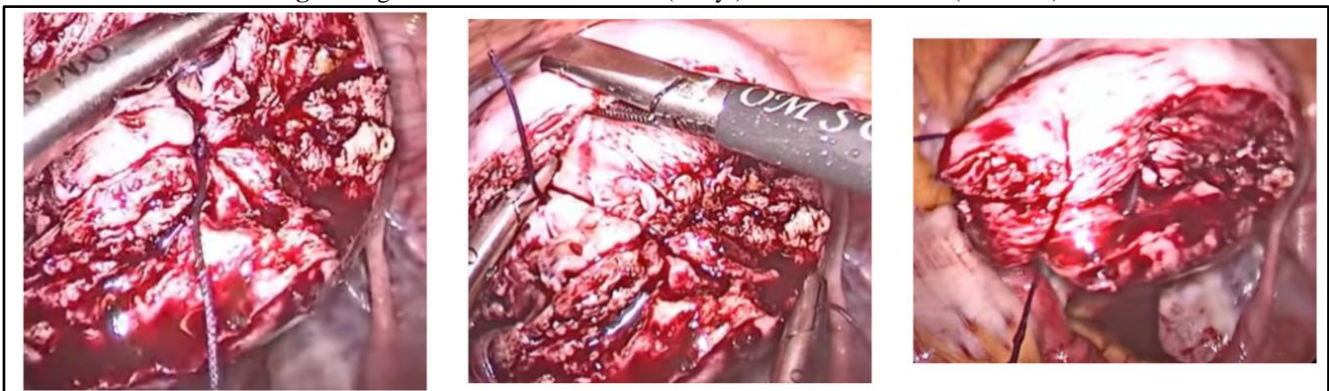


Fig.4 Showing pictures of Laparoscopic myomectomy done using No 1 vicryl

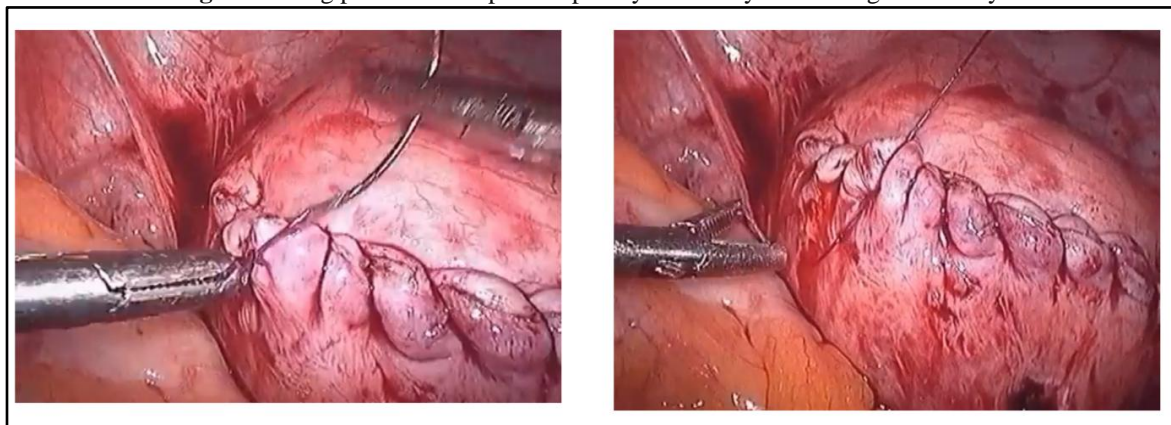


Fig.5 Showing pictures of Laparoscopic Myomectomy done using No 1 Barbed Suture

difficult to being most difficult; was found to be significantly less in group 1 (2.04± 1.48 group 1 vs 5.11±1.11, p value 0.001). Haemoglobin when measure on post operative day 1 (gm/dl) was found to be lesser in group 1 when compared with group 2 (11.13± 0.53 group 1 vs 10.82± 0.44 group 2; p value 0.003). No significant differences were seen between the two groups when discharge time was compared between the two groups (49.04± 4.95 group 1 vs 50.09 ± 6.84 group 2, p value 0.502). Figure 2 shows the statistical significant differences between the barbed suture group and conventional vicryl group.

DISCUSSION

Laparoscopic Myomectomy (LM) is one of the most accepted and preferred methods for the treatment of intramural myoma, especially in patients who desire to continue their fertility or intend to preserve their uterus. (7) LM is a controversial procedure, although it is now considered feasible. The technique is reported to be difficult, time consuming, and has a high risk when large fibroids are involved due to increased intraoperative blood loss during dissection. (8) Over the past few years, several new methods have been introduced to minimize bleeding during myomectomy like oxytocin, vasopressin and bilateral internal iliac ligation during the OT. (9) Skillful as well as fast laparoscopic suturing is also a significant factor that influences intraoperative uterine bleeding. (10)

In recent years, a self-anchoring, bidirectional barbed suture that does not require knot-tying was developed for laparoscopic surgery. (11) The bidirectional barbed suture without knot-tying has changed the laparoscopic suturing procedure and reduced operation time. (12) Our study showed that a significantly lower operation time as well as blood loss was observed with the bidirectional barbed suture during LM than with conventional suture. Total suturing time and suturing difficulties during LM was also found to be less with bidirectional barbed suture when compared with conventional suture vicryl. The suturing technique utilizing bidirectional barbed sutures was found to reduce operation time by approximately 41% and blood loss by 65% when compared to conventional suturing. Pierluigi *et al* found that operation time decreased by 9.5% and blood loss by 10.7% with bidirectional barbed suture compared to Vicryl suture. Several studies, including a randomized trial using unidirectional barbed suture versus continuous suture on the effectiveness of barbed suture have concluded that barbed sutures decrease operation time and intraoperative bleeding. (13,14). A multicenter retrospective study including 720 patients with symptomatic uterine fibroid compared the surgical outcome after laparoscopic myomectomy using conventional interrupted suture or continuous barbed suture. The study revealed that the operative time, drop in Hb% and blood loss were significantly lower in continuous barbed suture group (52 ± 19 Vs 67 ± 21 min, P = 0.001, 1.2 ± 0.2 Vs 2.1 ± 0.3 g/dl, P = 0.003 and 135 ± 35 Vs 215 ± 55 ml, P = 0.006 respectively) (15,16). A possible reason for the reduced operation time using a barbed suture is that because of the barbs, once the suture has been pulled taut, the points of commissure will not loosen even if the assistant loosens tension on the other end of the thread. (17)

Animal studies comparing adhesion formation rate following uterine incision closure using barbed or conventional sutures have controversial results. Einarsson *et al* reported that the closure of uterine incision in a sheep model with barbed suture was not associated with an increase in the severity of adhesions formation as compared with conventional suture (19). Api *et al*, compared the use of barbed suture with conventional suture for uterine incision closure in a rat model. The authors found that adhesions scores and inflammatory cell scores were significantly higher in the barbed suture group. (18,19).

Our study included a small number of patients in each group, some patients were lost in follow up in both the groups. It was a prospective observational comparative study in a single centre, so it's difficult to extrapolate the findings to the population. Therefore, further investigation with a larger study population is recommended. Consequently, further randomized control trials are necessary.

Our study demonstrated that the use of bidirectional barbed suture for LM significantly reduces operation time, suturing time, and the total blood loss during surgery.

CONCLUSION

A bidirectional barbed suture, can shorten operation time, suturing time and blood loss during LM. This new suture has barbs that maintain tensile strength evenly along the total length of the wound without knots. (20,21) Therefore, continuous suturing becomes simple and maintaining hemostasis is easy. Moreover, gynecological surgeons who are not well versed with the technique of suturing can easily perform LM by applying this technique. On the basis of this report, bidirectional barbed sutures could be recommended to be an optimal and efficient alternative to conventional sutures in future to assist gynecological surgeons in performing LM. (22) The knotless barbed suture facilitates suturing of the myoma bed during laparoscopic myomectomy. (23) Compared with conventional suture, barbed suture not only reduces the time needed to suture the myoma bed and the intraoperative blood loss but also reduces the total operation time with the suturing difficulties as well as keeps the haemoglobin level on post operative day 1 better, when compared with conventional suture vicryl group.

Conflict of interest

There is no conflict of interests

Abbreviations

BMI: Body mass index; LM: Laparoscopic myomectomy

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No funding was received.

Ethics approval and consent to participate

Both were taken

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