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REVIEW ARTICLE

Barbed Sutures in Laparoscopic Myomectomy—Realistic Expectations: A Critical Review

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ABSTRACT

The purpose of this review is to critically analyze the effectiveness of self-retaining barbed sutures in intracorporeal suturing in terms of tissue approximation, intraoperative blood loss, reduction in operative time, duration of hospital stay and postoperative adhesions.

Materials and methods: We analyzed 9 published articles to critically look at the effectiveness of self-retaining barbed suture in laparoscopic myomectomy. A literature research was performed using internet.

Discussion: Barbed suture seems to be a reasonably good option for intracorporeal suturing in laparoscopic myomectomy. The time required for intracorporeal suturing was significantly less with barbed suturing (11.5 min/9.9 min/126s) when compared to the conventional suturing (17.4 min/15.8 min/272.6s). The total operative time required with barbed sutures (118 min/51 min) was found to be significantly reduced in comparison with conventional sutures (162 min/ 58 min). The intraoperative blood loss was found to be significantly reduced in 2 of the 3 studies with the use of barbed sutures. Fall in hemoglobin and duration of hospital stay also seems to be reduced with the self-retaining sutures.

Conclusion: The self-retaining barbed suture seems to be an effective option for intracorporeal suturing in laparoscopic myomectomy with numerous benefits.

Keywords: Laparoscopic myomectomy, Barbed sutures in laparoscopic myomectomy, Self-retaining sutures in laparoscopic myomectomy, Scar integrity with barbed sutures, Complications of laparoscopic myomectomy.

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INTRODUCTION

Fibroid uterus is one of the commonest pathology affecting up to 30% of women in reproductive age group. It can present with a wide spectrum of symptoms including pelvic pain, abnormal uterine bleeding, pressure symptoms, pelvic mass and infertility. The current scenario of delayed marriages and delayed conception after marriage can aggravate the impact of such hormone responsive uterine pathologies. Despite this trend, there is an increasing desire for fertility preservation, thus creating a renewed interest in conservative uterine surgeries in comparison to hysterectomies.

Laparoscopic myomectomy, in its early years (1970's) was meant exclusively for subserous myomas.[1] From the beginning of the 1990s, techniques were developed to tackle the intramural myoma too by the laparoscopic route.[2] Today, laparoscopic myomectomy is on its way to attaining the status of a superior approach for women because of the proven advantages with respect to postoperative pain, shorter hospitalization and convalescence, and for the obvious cosmetic reasons, in comparison to the open approach. However, laparoscopic myomectomy has always been subjected to considerable debate. In particular, for intramural myoma, the technique is reputed to be technically difficult, of longer duration, with more blood loss. The quality of the uterine scar obtained by this technique is also questionable, to withstand a subsequent pregnancy.[3]

The purpose of this review is to critically analyze the effectiveness of self-retaining barbed sutures in intracorporeal suturing in terms of tissue approximation, intraoperative blood loss, reduction in operative time, duration of hospital stay and postoperative adhesions.

Bidirectional barbed suture is a new design that incorporates tiny barbs spaced evenly along the length of the suture cut facing in opposite directions from the midpoint.[5,7] Unlike the smooth-textured traditional suture, the bidirectional barbs on this new product introduce a new paradigm in which wound tension is evenly distributed across the length of the suture line rather than at the knotted end.[8,10] No knots are required with bidirectional barbed suture.[9]

MATERIALS AND METHODS

A literature search was performed using Google, Yahoo, Springerlink and Highwire Press. The following search terms were used: laparoscopic myomectomy, barbed sutures in laparoscopic myomectomy, self-retaining sutures in laparoscopic myomectomy, scar integrity with barbed sutures, complications of laparoscopic myomectomy.

Considering the fact that this suture is a relatively newer entry in this field, 9 of the available published articles were chosen for this review.

The criteria of selection were:

- *Type of operative procedure:* Laparoscopic myomectomy with intracorporeal suturing with barbed sutures or conventional suturing with knotting.
- The institution where the procedure was practiced (preference for those specialized for laparoscopic surgery).

Laparoscopic pelvic myomectomy procedures practiced:

- The uterus was always cannulated to allow the correct exposure of myomas.

- To reduce vascularization and blood loss, the myomas were injected with diluted vasopressin.
- For subserous and intramural myomas, myomectomy was carried out the with a serosal incision vertically over the convex surface of the myoma using a monopolar hook.
- After exposure of the myoma pseudocapsule, grasping forceps were positioned to apply traction to the myoma and expose the cleavage plane.
- Enucleation was carried out by traction on the fibroid and by division with a unipolar hook or mechanical cleavage.
- Hemostasis during dissection was achieved by bipolar coagulation. Suturing was usually done along one or two layers depending on the depth of incision with barbed sutures or conventional vicryl sutures.
- *Removal of myoma:* Larger myoma were removed through posterior colpotomy. Medium and large size fibroid is morcellated using a morcellator or scissors. For infected and suspected carcinoma, tissue retrieval bag should be used.

DISCUSSION

Time Required for Intracorporeal Suturing (Table 1)

In the study done by Franco Alessandri et al 2010, it was found that the time required to suture the uterine wall defect was significantly lower in group using barbed sutures (11.5 ± 4.1 minutes) than in the group using conventional sutures (17.4 ± 3.8 minutes; $p < 0.001$).[4]

In the other study done on animal model by JI Einarsson et al 2011 myometrial closure was found to be significantly faster using barbed suture (126.5 seconds) when compared to traditional suture (272.6 seconds; $p < 0.001$).[12]

In yet another study done by Roberto Angioli et al 2012 it was found that suturing time was found to be significantly lower in the V-Loc (Barbed suture) than in the control (9.9 ± 4.3 *vs* 15.8 ± 4.7 minutes; $p = 0.0004$) group.[6]

TOTAL DURATION OF SURGERY (TABLE 2)

In the study done by Franco Alessandri et al 2010 it was found that there was no significant difference in the operative time between group using barbed sutures and the group using conventional sutures.[4]

In another study done by JI Einarsson et al 2011, it was found that use of bidirectional barbed suture was found to significantly shorten the mean (SD) duration of surgery [118 (53) minutes *vs* 162 (69) minutes; $p < 0.05$] when compared to conventional suturing.[12]

In a study conducted by JI Einarsson et al 2011 in animal model it was found that the mean total procedure time was 13.3 minutes.[11]

In yet another study done by Roberto Angioli et al 2012 it was found that the mean operative time was shorter in the V-Loc (51 ± 18.1 minutes) than in the control (58 ± 17.8 minutes) group.[6]

INTRAOPERATIVE BLOOD LOSS

In the study done by Franco Alessandri et al 2010 it was found that the intraoperative blood loss was significantly lower in group using barbed sutures than the group using conventional sutures ($p = 0.004$).[4]

In another study done by JI Einarsson et al 2011 it was found that there were no significant differences with respect to the intraoperative blood loss between barbed and conventional sutures.[12]

In yet another study done by Roberto Angioli et al 2012 intraoperative bleeding was found to be significantly lower in the V-Loc group ($p = 0.0076$).[6]

In the study done by JI Einarsson et al 2010 in an animal model found that the mean blood loss was 159 ml.[11]

FALL IN HEMOGLOBIN LEVELS

In a study done by Roberto Angioli et al 2012, drop in hemoglobin was found to be significantly lower in the V-Loc group ($p = 0.0176$).[6]

Table 1: Time needed for intracorporeal suturing

Study	*Barbed sutures*	*Conventional sutures*	*p-value*
Franco Alessandri et al 2010	11.5 ± 4.1 mins	17.4 ± 3.8 mins	<0.001
JI Einarsson et al 2011	126.5 seconds	272.6 seconds	<0.001
Roberto Angioli et al 2012	9.9 ± 4.3 mins	15.8 ± 4.7 mins	= 0.0004

Table 2: Total duration of surgery

Study	*Barbed sutures*	*Conventional sutures*	*p-value*
Franco Alessandri et al 2010			No significance difference
JI Einarsson et al 2011	118 minutes	162 minutes	<0.05
Roberto Angioli et al 2012	51 ± 18.1 mins	58 ± 17.8 mins	NA

None of the other studies specifically looked at a fall in hemoglobin levels between the barbed and conventional suture groups.

DURATION OF HOSPITAL STAY

In a study done by JI Einarsson et al 2011 it was found that the use of barbed sutures reduced the duration of hospital stay [0.58 (0.46) days *vs* 0.97 (0.45) days; $p < 0.05$].[12]

None of the other studies specifically compared the duration of hospital stay between the barbed and conventional suture groups.

POSTOPERATIVE ADHESIONS

In the study done on animal model by JI Einarsson et al. 2011 the mean (SD) adhesion score was not significantly different between the barbed suture group [3.78 (3.92)] *vs* the Vicryl group [3.04 (3.75)].[11]

None of the other studies specifically compared the adhesion scores between the barbed and conventional suture groups.

CONCLUSION

A laparoscopic approach to myomectomy may be safely chosen for patients to be proposed for surgical treatment of subserous and intramural myomata of average size and few in number. The use of barbed sutures appears to significantly reduce the myoma bed suturing time as well as the mean operation time, when compared to the conventional intracorporeal suturing with knotting. Intracorporeal suturing with barbed sutures was also seen to reduce the intraoperative blood loss and fall in hemoglobin levels when compared to the conventional suturing. Myomectomy scars after laparoscopy is a debatable issue but the studies reviewed here seems to present a picture of comparable healing rates and strength when compared to conventional suturing. Further studies with longer follow-up would be needed to present a clearer picture on scar integrity with use of barbed sutures. Most importantly, the use of barbed sutures can help to popularize laparoscopic myomectomy even among those surgeons who have been unable to master laparoscopic knotting skills.

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