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Review Article

The Use of Barbed Suture for Laparoscopic Hysterectomy and Myomectomy: A Systematic Review and Meta-analysis

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ABSTRACT We conducted a meta-analysis comparing the efficacy of laparoscopic suturing with or without barbed suture for myomectomy or hysterectomy. We used a systematic electronic search strategy of published literature using the following databases: Cochrane Database of Systematic Reviews, MEDLINE, Embase, and OVID MEDLINE In-Process & Other Non-Indexed Citations databases. The following medical subject heading terms, key words, and their combinations were used: laparoscopy, myomectomy, hysterectomy, and barbed suture. Studies in which women undergoing laparoscopic myomectomy or hysterectomy using barbed suture or conventional suture were selected. The main outcome measures chosen for the current meta-analysis were operative time, suturing time, estimated blood loss or change in hemoglobin level, and degree of suturing difficulty. The results of the meta-analysis studies were expressed as the standardized mean difference (SMD) with 95% confidence intervals (CIs). Compared with the use of conventional suture, the total operative time of laparoscopic myomectomy (SMD = −0.58; 95% CI, −0.88 to −0.28) and the suturing time to close the uterine incision (SMD = −1.38; 95% CI, −1.86 to −0.90) were significantly reduced with the use of barbed suture. Meta-analysis on laparoscopic hysterectomy shows that the time to suture the vaginal vault, the total operative time, and the estimated blood loss were comparable with or without the use of barbed suture. The degree of suturing difficulty was reported in 2 randomized trials. Compared with the use of conventional suture, the degree of suturing difficulty was lower with the use of barbed suture (SMD = −1.39; 95% CI, −1.83 to −0.95). The use of barbed suture facilitates laparoscopic suturing of myomectomy incision and closure of the vaginal vault. Its use is associated with a reduced operative time of laparoscopic myomectomy. Journal of Minimally Invasive Gynecology (2014) 21, 210–216 © 2014 AAGL. All rights reserved.

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Barbed suture is a relatively new type of suture that has been widely used by plastic surgeons for cosmetic surgery. It consists of standard monofilament suture with tiny barbs cut into the length of the suture in a helical array set facing in opposite directions. Because of the presence of barbs on the suture, it approximates the tissue without the need of a surgical knot. Approved by the Food and Drug Administration, it has been commercially available in the United States since 2007. In gynecology, it has been used since 2008 for laparoscopic myomectomy and hysterectomy [1].

Currently, there are 2 types of barbed sutures: bidirectional (Quill Self Retaining System; Angiotech Pharmaceuticals, Inc., Vancouver, British Columbia, Canada) and unidirectional sutures (V-Loc suture; Covidien, Mansfield, MA). The bidirectional suture has 2 needles, and suturing has to be started at the middle of the incision in 1 direction with 1 needle and another direction with another. The unidirectional suture consists of a surgical needle at 1 end and a loop at the other end for securing the suture (Fig. 1). After the first bite to the tissue, the suture is inserted into the

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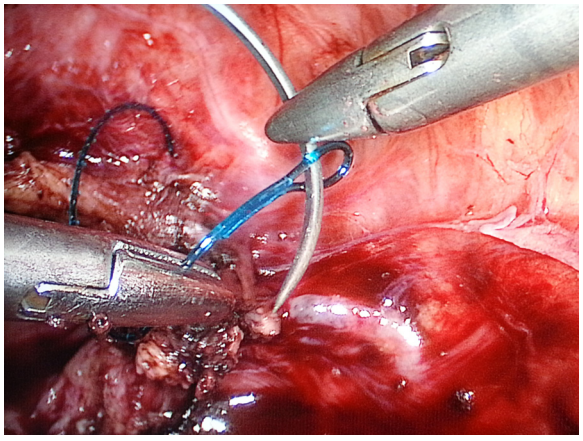
Fig. 1

The insertion of a unidirectional barbed suture into the suture loop at the angle of vaginal vault.



loop, and suturing is continued. Without the need of knot tying, its use facilitates laparoscopic suturing.

The tensile strength of both types of barbed sutures is practically similar [2,3]. The newest type of barbed suture has barbs that change direction midway down the suture (Stratafix; Ethicon Inc, Somerville, NJ). It has yet to be evaluated clinically. To date, there is still a paucity of information about the use of barbed suture in gynecology. We conducted a meta-analysis comparing the efficacy of laparoscopic suturing with barbed suture or conventional suture for myomectomy or hysterectomy.

Materials and Methods

Search Strategy

We used a systematic electronic search strategy of published literature using the following databases: Cochrane Database of Systematic Reviews, MEDLINE, Embase, and Ovid MEDLINE In-Process & Other Non-Indexed Citations databases. The following medical subject heading terms, key words, and their combinations were used: laparoscopy, myomectomy, hysterectomy, and barbed suture. The electronic search was limited to studies in humans published in English after 1979. We manually searched the reference lists of identified studies.

Study Selection

Studies in which women undergoing laparoscopic myomectomy or hysterectomy using barbed suture or conventional suture were selected (Tables 1 and 2). Barbed sutures could be unidirectional or bidirectional sutures. Cohort studies that did not use any comparison with conventional suture were excluded. We also excluded studies in which the myomectomy or hysterectomy was performed with robotic assistance. Although such studies were excluded from the quantitative meta-analysis, their results were included in the discussion.

Summary Measures and Quantitative Data Synthesis

The main outcome measures chosen for the current meta-analysis were operative time, suturing time, estimated blood loss or change in hemoglobin level, and degree of suturing difficulty. The degree of difficulty was measured using a range from 1 for low difficulty and 10 for high difficulty. The results of the meta-analysis studies were expressed as the standardized mean difference, which is the difference in means of 2 arms divided by the pooled standard deviation with 95% confidence intervals. Because outcomes reported from different studies might not be on the same scale and to create a comparable scale across studies, we reported the standardized mean difference instead of the mean difference.

Results

The literature search identified 101 citations of barbed suture. Of these, 9 citations were related to hysterectomy and 8 others to myomectomy. Studies that did not include a control group were excluded. Ultimately, 3 citations related to myomectomy [4–6] and another 4 citations related to hysterectomy [3,7–9] were evaluated. There were 2 randomized studies in the hysterectomy citations [7,8] and only 1 in the myomectomy citations [4]. Relevant characteristics of included trials are summarized in Tables 1 and 2.

Table 1

Comparative studies of laparoscopic myomectomy with or without barbed suture

Authors	Design	Study arm	Control arm
Alessandri et al, 2010 [4]	Single-center RCT	Unidirectional barbed suture (n = 22)	Polyglactin sutures intracorporeal knots (n = 22)
Einarsson et al, 2011 [5]	Retrospective	Bidirectional barbed suture (n = 107)	Polydioxanone sutures intracorporeal knots (n = 31)
Angioli et al, 2012 [6]	Prospective study with a historic control	Bidirectional barbed suture (n = 19)	Polyglactin sutures intracorporeal knots (n = 20)

RCT = randomized controlled trial.