

# The Use of Barbed Suture for Vaginal Cuff Closure in Total Laparoscopic Hysterectomy

**Research Article**

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**Abstract**

**Objective:** The aim of this work is to evaluate the safety and efficacy of the barbed unidirectional suture in a total laparoscopic hysterectomy.

**Materials and Methods:** A retrospective and descriptive study was conducted, which included all of the patients that have undergone laparoscopic hysterectomy and closure of the vaginal cuff, using barbed sutures (V-loc™90 Device, Covidien™), during the period between May 2011 and December 2014. We have analyzed the general characteristics, indications, history of previous surgery and the presence of fever or surgical re-intervention due to pelvic abscesses. The appearance of a vaginal cuff hematoma, active bleeding and vaginal cuff dehiscence were also taken into account.

**Results:** A hundred and twenty-one laparoscopic hysterectomies with vaginal cuff closure, using barbed sutures, were performed. There was a report of one case of bladder lesion and another case of ureter lesion. Of all patients, four (3.3%) of them presented fever while one (0.8%) presented paralytic ileus. Three (2.4%) patients suffered active vaginal bleeding, and one presented a partial dehiscence of the vaginal cuff. And finally, two (1.6%) cases of vaginal cuff hematomas were observed and in one (0.8%) of the cases, a pelvic abscess was detected.

**Conclusion:** The use of a unidirectional barbed suture is a safe technique for vaginal cuff closure in laparoscopic total hysterectomies.

**Keywords:** Barbed suture; Laparoscopic hysterectomy; Laparoscopic suturing; Vaginal cuff closure

**Introduction**

The Hysterectomy procedure is the most frequently performed gynecological surgery in the world [1]. This procedure can be carried out using an abdominal, vaginal, and laparoscopic approach. The percentage of hysterectomies performed via laparoscopy varies. For instance, 12% of the hysterectomies performed in the USA are performed laparoscopically [2], while 15% of the hysterectomies in the UK are performed via laparoscopy [3]. In our center, at the Castellon General University Hospital, the percentage of laparoscopic hysterectomies is 34%. In the scientific literature, the rate of complications of vaginal cuff closure post laparoscopic hysterectomy ranges from 0 to 5% [4,5], the most common complications being: vaginal bleeding, dehiscence of the vaginal cuff and infection. Numerous strategies were undertaken in order to decrease such complications [6,7]. One solution has been the introduction of the unidirectional barbed suture for vaginal cuff closure. The latter has demonstrated a lower technical difficulty [8-10] as well as a decrease in the surgical time, intraoperative complications and a lower incidence of suture dehiscence [9,11]. The use of the barbed suture has been described in multiple gynecological procedures, such as the hysterectomy, myomectomy and colposacropexy [12-14]. The favorable results obtained in several studies suggest that the suture material has the potential to become an asset in gynecological surgery. The aim of this work is to evaluate the safety and efficacy of the barbed unidirectional suture in a total laparoscopic hysterectomy.

**Materials and Methods**

A retrospective and descriptive study was conducted at the Castellon General University Hospital, which included all of the patients that have undergone laparoscopic hysterectomy and closure of the vaginal cuff, using barbed sutures (V-loc™90 Device, Covidien™), during the period between May 2011 and December 2014. Our surgical protocol for laparoscopic hysterectomy includes a pre-surgical phase, where the patient receives mechanical bowel preparation as well as thromboprophylaxis using low molecular weight heparin. Two grams of amoxicillin-clavulanic acid are administered intravenously, as antibiotic prophylaxis, during the induction of anesthesia. We generally use the Clermont-Ferrand uterine manipulator. As for the laparoscopic technique, a 12 mm Hasson trocar is introduced, followed by three accessory ports: a 10 mm suprapubic trocar and two 5 mm trocars in both iliac fossa. After carrying out the laparoscopic hysterectomy according to our surgical protocol, the colpotomy is performed, using the coagulation of the monopolar electrode at a power setting of 40W, pressing against the colpotomizer of the uterine manipulator. The surgical specimen is extracted through the vagina. Vaginal cuff hemostasis is ensured using the bipolar forceps, if necessary, at a power setting of 30W.

We generally use 3/0 barbed monofilament suture (V-loc™90 Device, Covidien™) or 2/0 vicryl suture for the vaginal cuff closure. The vaginal cuff may be left unsutured in very few cases. We usually perform a transverse closure of the vaginal cuff, always initiating the suturing process at the right angle of the vagina, fixing the uterosacral ligaments to the vaginal cuff. All the cases

presented here were conducted or supervised by the main author (JLH). Both demographic and surgical variables were recorded in every patient file. The demographic variables included: age, body mass index (BMI), parity, surgical indication and the history of previous surgeries. As for the surgical variables, the following were documented: Surgery duration, blood loss, intraoperative complications, the presence of fever, hospitalization days and hospital readmission or surgical re-intervention due to pelvic abscesses. The appearance of a vaginal cuff hematoma, active bleeding and vaginal cuff dehiscence were also taken into account.

## Results

During the period between May 2011 and December 2014, a hundred and fifty-seven laparoscopic hysterectomies were performed in the Castellon University General Hospital. The vaginal cuff was left open and unsutured in 5 (3.2%) patients, 31 (19.7%) vaginal cuffs were closed using Vicryl, and 121 (77.1%) cuff closures were performed using reabsorbable barbed suture (V-loc™ 90 Device, Covidien™). In our study we have only taken into account the patients who have had their vaginal cuff closed with barbed suture. The demographic characteristics of the patients are summarized in Table 1.

**Table 1:** General Characteristics of the Patients Studied.

Characteristics	Average or Percentage
BMI	27.6 (18.6-40)
Age	54.08(23-94)
Parity	2.1(0-5)
<b>Previous Surgeries</b>	
Cesarean	14.9%
Vaginal plastias	2.7%
Adnexectomy	6%
Conization	2.5%
Myomectomy	1.7%
Appendicectomy	4.1%
<b>Surgical Indication</b>	
Myoma	30.8%
Hypermenorrea	5.0%
Hyperplasia without Atypia	0.8%
Hyperplasia with Atypia	5.8 %
Cervical Cancer	7.5%
Endometrial Cancer	35.0%
Ovarian Cancer	8.3%
Endometriosis	4.2%
Others	2.5%

The average surgery duration was 112.08 minutes (60-240), with an estimated hematic loss of 269 ml (50-600). The average number of days of hospitalization was 3.75 days (2-10). As for the intraoperative complications, we report one case of bladder lesion (0.8%) and another case of ureter lesion (0.8%), while there were no cases on intestinal lesion. Of all patients, four (3.3%) presented fever while one (0.8%) presented aparyalytic ileus during the postoperative period. Three (2.4%) patients suffered active

vaginal bleeding, and one (0.8%) presented a partial dehiscence of the vaginal cuff. And finally, two (1.6%) cases of vaginal cuff hematomas were observed and in one (0.8%) of the cases, a pelvic abscess was detected. Of the previously mentioned complications, only one patient has needed reintervention due to a vaginal cuff hematoma, which was resolved by laparoscopy. During the postoperative period, nine patients visited the emergency room, and their chief complaint included: vaginal bleeding (22%), fever (11%), abdominal pain (22%), abdominal distention (11%), and urinary symptoms (11%).

## Discussion

Our surgical team has adopted the use of new techniques and materials to ensure a minimally invasive approach in gynecological surgery. One such technique is the use of the barbed suture for vaginal cuff closure during laparoscopic hysterectomies. This asset is used in our center since 2011, which allows us to analyze its results.

The use of barbed suture for the vaginal cuff closure is technically easier to achieve, compared to vaginal cuff closure using Vicryl. The barbed suture allows a better distribution of the tension throughout the suture and, additionally, does not require knots. This allows us to reduce the surgical time in the last step of the laparoscopic hysterectomy. This can be a helpful tool for the surgeon, especially in long interventions in which the closure of the vaginal cuff is performed when the latter is already exhausted, thus avoiding possible complications. As for the surgical duration, various scientific research papers presented better results associated with barbed suture compared to Vicryl or other types of sutures [1]. In our case, we cannot affirm that there is a notable reduction in surgical duration, as this is not a comparative study; however, our results are similar to those published in other series [1,9].

The barbed monofilament suture has a similar bacterial adherence as the standard monofilament, but has a lower bacterial adherence compared to other types of suture material [15]. We only report a case of vaginal cuff abscess in our series, which was resolved satisfactorily by draining it, by interventional radiology, and antibiotherapy.

The dehiscence of the vaginal cuff is a complication that occurs most frequently after a total laparoscopic hysterectomy, and is less likely to happen after abdominal or vaginal hysterectomy. Such an adverse effect mainly depends on the closing technique used on the vaginal cuff [16,17], the suture material used [17,18], and finally, the type of energy used for the colpotomy and the hemostasis of the vaginal cuff [19-22]. Blikkendaal [7] published a retrospective study in which he describes the incidence of vaginal cuff dehiscence in patients after a total laparoscopic hysterectomy. He also compares the vaginal cuff closure transvaginally with a laparoscopic approach, using Vicryl interrupted sutures and continuous barbed sutures. The same author describes a vaginal cuff dehiscence rate of 1.3% in the first group, 3.3% in the second one, and 2.4% in the third group. The incidence rate of dehiscence in our case is 0.8%.

Regarding the influence of the energy used for the colpotomy on the incidence of vaginal cuff dehiscence, Gruber [21] describes a major tissue lesion with a possible increase in dehiscence when bipolar energy is used. We generally use monopolar energy for the colpotomy, as is indicated by our protocol, and we reserve the

use of bipolar energy only for arterial bleedings. A hemorrhage originating from a venous territory is generally controlled using sutures. This recommendation is based on the low incidence of dehiscence reported after abdominal hysterectomies, in which the vaginal cuff is sutured normally without having to use energy for hemostasis [23].

Studies with a greater number of patients, comparing the use of different techniques and suture materials, are needed to affirm that the laparoscopic closure of the vaginal cuff using barbed sutures is superior to the others previously described.

## Conclusion

This study has demonstrated that the unidirectional monofilament barbed suture (V-loc™90 Device, Covidien™) can be safely used and is effective for vaginal cuff closure after having performed total laparoscopic hysterectomies. In our experience, we believe that this technique should be considered and included as one of the steps of the laparoscopic total hysterectomy.

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