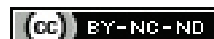


Vaginal Cuff Closure by Endosuturing in Total Laparoscopic Hysterectomy as Compared to Transvaginal Route of Suturing

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ABSTRACT

Introduction: In present times, Total Laparoscopic Hysterectomy (TLH) is one of the commonly performed gynaecological procedure. Vaginal vault or cuff closure is crucial and critical in performance of TLH. During TLH, vaginal vault or cuff closure is done using a variety of available sutures. The techniques of suturing and approaches, either endoscopic or transvaginal, can vary. The skill, experience and preference of the surgeon counts in the final outcome of the surgery.

Aim: To compare and study the frequency of minor and major complication rates of intracorporeal (endosuturing) cuff closure technique and routinely used transvaginal route of suturing vaginal vault in TLH.

Materials and Methods: This prospective cohort research was conducted in the GCS Medical College and Hospital, Ahmedabad, India, from May 2018 to December 2019. A total of 102 TLH were studied. In 51 cases (50%), vault was sutured endoscopically and

in other 51 cases (50%), vault was sutured transvaginal, using single continuous interlocking suturing of vaginal vault with Vicryl 1-0 in all cases. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS) software version 24.0.

Results: In the follow-up of three months period, there were no cases of Vaginal Cuff Dehiscence (VCD). In present study, 21 cases (20.6%) out of 102 presented with vaginal cuff complications. A 15.7% cases with minor vaginal cuff complications were noted in laparoscopic endosuturing group and 25.5% cases of vaginal suturing group presented with minor vaginal cuff complications.

Conclusion: Both the techniques of suturing the vaginal vault following laparoscopic hysterectomy delivered the desired results. The laparoscopic route of suturing vaginal cuff following TLH had lesser complication rate though not statistically significant over vaginal route and none of the two groups had any major complication (VCD).

Keywords: Endometrial hyperplasia, Minimally invasive gynaecologic surgeries, Vaginal vault or cuff dehiscence

INTRODUCTION

In National Family Health Survey-IV (2015–2016) of India, the prevalence of hysterectomy ranged between 3–7% in majority of the districts [1]. Hysterectomy meaning 'surgical removal of uterus' is being performed since long through different routes i.e., abdominal, vaginal and laparoscopic for all benign, premalignant and malignant indications. With an inclination towards minimal invasive procedures, laparoscopic route for hysterectomy is being preferred by both the patients and surgeons [2]. In this era of minimal access surgeries, laparoscopy is the most important tool. In gynaecology, hysterectomy is the most common surgical procedure performed and TLH are being preferred over other routes of hysterectomies, with the readily available minimally invasive techniques [2].

Laparoscopy has a long learning curve as compared to abdominal or vaginal route of surgery, owing to its complexities of using endoscopic instruments and performing surgery over a virtual screen. The task becomes more tough with the endosuturing of vault after removal of hysterectomy specimen. Suturing laparoscopically is even more challenging compared to conventional transvaginal suturing of vault or cuff, which the gynaecologist is well versed with [3]. In TLH, vaginal vault can be closed using different approaches, either laparoscopically or vaginally. Various suture materials can be used in different techniques of vault closure either continuous or interrupted sutures, with or without knotting and in single or more layers [4,5]. The main advantage of transvaginal suturing is its ease and less operating time as compared to endosuturing which is time consuming and technically demanding. The advantage of endosuturing is that the vaginal edges are inverted after suturing associated with lesser infection rate [4].

With this background, present study aimed at comparing whether laparoscopic endosuturing techniques have an edge over conventional transvaginal route of vault suturing in cases of TLH. Of all the complications, VCD remains the dreaded complication of hysterectomy operation. Present study also aimed at evaluating frequency of vaginal cuff complications including VCD. There is an ongoing need to study the superiority of one vaginal vault suturing technique over another as the available data is limited.

MATERIALS AND METHODS

This prospective cohort study was conducted in the GCS Medical College and Hospital, Ahmedabad, Gujarat, India, from May 2018 to December 2019 after Ethical Committee (EC) approval (GCSMC/EC/TRIAL/APPROVE/2018/1090) and informed consent of the patients for the same.

Inclusion criteria: Patients with benign indications for TLH, which includes uterine fibroid, adenomyosis, dysfunctional uterine bleeding including endometrial hyperplasia.

Exclusion criteria: Laparoscopic hysterectomies for malignant indications or those having suspicion of malignancy and those who are unfit for pneumo peritoneum or trendelenberg position.

Sample size calculation: The sample size was calculated using Cochran's formula (95% CI) and total 102 cases (51 cases of endosuturing group and 51 cases of transvaginal suturing group) were enrolled in present study with similar demographic and clinical factors.

Study Procedure

Total laparoscopic hysterectomy was performed in all cases. Monopolar energy using 60 W was used to perform colpotomy in

all cases. The suturing of vaginal vault or cuff was performed with single continuous interlocking manner using Vicryl 1-0 suture, half of the cases undergoing endosuturing with intracorporeal knots and half undergoing transvaginal suturing of vaginal vault in 1:1 ratio. Intraoperatively, the time consumed from starting the first stitch and ending of last stitch of vault was noted. The performing surgeons were equally experienced in laparoscopic surgeries and used the same endoscopic instruments over the period of study. Preoperative and postoperative broadspectrum antibiotics are administered round the clock to take care of infections. All cases were followed at three weeks and three months after surgery.

Vaginal vault or cuff complications, which included minor complications like vaginal spotting or bleeding, vaginal discharge, vault granulation tissue and major complications like vault haematoma, cuff cellulitis and VCD were studied, compared and statistically analysed.

STATISTICAL ANALYSIS

The statistical analysis was done using SPSS software (version 24.0.) to compare the effectiveness between endosuturing and vaginal suturing of vaginal cuff following TLH. The statistical tests, Chi-square test, Yates correction were used and the value of $p < 0.05$ was considered significant.

RESULTS

Total 102 cases were studied, 51 cases (50%) underwent laparoscopic endosuturing of vaginal (cuff) vault and rest 51 cases (50%) underwent transvaginal suturing of vaginal vault.

The [Table/Fig-1] shows demographic and clinical characteristics in both the groups. Out of the total 102 studied cases, most common medical co-morbidity noted was hypertension (17 cases), followed by diabetes (4 cases) and hypothyroidism (4 cases).

Parameters	Endosuturing group (n=51)	Transvaginal suturing group (n=51)
Mean age (years) (M±SD)	42.78±3.69	43.45±3.86
Mean BMI (kg/m ²) (M±SD)	26.42±0.63	26.57±0.57
Associated co-morbidities (n, %)	12 (23.5)	13 (25.5)

[Table/Fig-1]: Demographic and clinical data.

The commonest indication for TLH in the present study was uterine fibroids in both the groups (47% vs 49%), followed by adenomyosis accounting for 31.4% of the cases [Table/Fig-2].

Indication	Endosuturing group n (%)	Transvaginal suturing group n (%)
Dysfunctional uterine bleeding	8 (15.7)	7 (13.7)
Fibroid	24 (47)	25 (49)
Adenomyosis	16 (31.4)	16 (31.4)
Endometrial hyperplasia	3 (5.9)	3 (5.9)

[Table/Fig-2]: Indications for TLH.

This study revealed that in laparoscopic endosuturing of vaginal cuff, average suturing time was 21.2±4.08 minutes. In transvaginal vault suturing approach, average suturing time was 12.7±1.79 minutes. On statistical analysis using Chi-square test with Yates correction, p -value=0.0007 which indicates that comparison is statistically significant.

Out of 102 total cases, 21 (20.6%) cases presented with vaginal cuff complications [Table/Fig-3]. A total of 8 (15.7%) cases with minor vaginal cuff complications were noted in laparoscopic endosuturing group and 13 (25.5%) cases of vaginal suturing group presented with minor vaginal cuff complications. No statistical significance was noted between the two groups in terms of vaginal cuff complications.

Vaginal cuff complications	Endosuturing n (%)	Transvaginal suturing n (%)
Minor		
Vaginal spotting/bleeding	3 (5.88)	5 (9.80)
Vaginal discharge	4 (7.84)	7 (13.72)
Vault granulation tissue	1 (1.96)	1 (1.96)
Major		
Cuff cellulitis	0 (0)	0 (0)
Vault haematoma	0 (0)	0 (0)
Vaginal cuff dehiscence	0 (0)	0 (0)
Total	8 (15.68)	13 (25.49)

$\chi^2=1.627$
 p -value=0.950*
 Yates $\chi^2=1.186$
 Yates $p=0.977^*$

[Table/Fig-3]: Vaginal cuff complications.

*Statistically not significant

DISCUSSION

Laparoscopic hysterectomy is the preferred route of hysterectomy in recent times because of its inherent advantages of cosmesis, short hospital stay and quicker return to routine activities, despite having a long learning graph [6]. In present study, mean age in laparoscopic endosuturing group was 42.78±3.69 years and in transvaginal suturing group, 43.45±3.86 years. Also, mean BMI was 26.42±0.63 kg/m² in endosuturing group and 26.57±0.57 kg/m² in transvaginal suturing group. Uterine fibroids formed the commonest indication for TLH followed by adenomyosis in both the groups. Aydogmus H et al., study showed average age was 48.1 years and average parity being 2.6. TLH was performed mostly for abnormal uterine bleeding and symptomatic leiomyoma. The mean time of closing cuff vaginally was 6 (minimum 2- maximum 17) minutes. There were no cases of VCD reported in follow-up period [7].

In the present study, though vaginal cuff complications were slightly higher in transvaginal suturing group but not statistically significant. There was not a single case of VCD noted in present study in either groups. Hwang JH et al., observed the same findings in his study that there was no difference in the vaginal cuff complications in laparoscopic or vaginal approach [8]. Hur HC et al., noted the rise in VCD cases after TLH in the 10 year study period. [9]. Uccella S et al., reported a three-fold increase in VCD cases following endosuturing of vault in TLH as compared to transvaginal route based on their own study data and a review of literature [10]. Uccella S et al., in their randomised controlled trial, suggested lower rates of vaginal cuff complications following endosuturing of vault in TLH. There was increased incidence of VCD in TLH cases closed vaginally [11]. In the present study, laparoscopic route of suturing vaginal cuff following TLH had lesser complication rate though not statistically significant over vaginal route and none of the two groups had any major complication (VCD). Though, the laparoscopic route took a little longer suturing time as compared to transvaginal route, but this can be attributed to the skill of the individual surgeons involved in the study. Fanning J et al., suggested that the incidence of VCD was higher in TLH who underwent endosuturing as compared to laparoscopic assisted vaginal hysterectomy group [12]. Bastu E et al., reported that cuff closure done transvaginally, finished in significantly shorter time as compared to laparoscopic closure. But, postoperative vaginal length was longer in laparoscopic closure group [13].

Many gynaecologists prefer transvaginal suturing approach as it is technically easier to perform and has a shorter learning curve as compared to laparoscopic endosuturing approach, which is technically challenging and requires extensive training to become competent [3]. In the present study, suturing time was relatively less in transvaginal group as compared to endosuturing group. Intracorporeal knot-tying is considered as the most difficult, challenging and time consuming laparoscopic skill even for expert laparoscopists [14]. A good bite of the tissue including serosal

layer needs to be grabbed with proper technique while suturing the vaginal cuff after laparoscopic hysterectomy [15]. O'Hanlan KA et al., standardised the technique of laparoscopic vault closure and found a low rate of vaginal cuff complications of 2.29% [16].

Limitation(s)

In this research, multiple surgeons were involved having different levels of expertise in suturing. In the present study, colpotomy was limited to monopolar energy using 60 W. Other sources of energy being used for colpotomy were not studied. Also, hysterectomies are usually elective procedures, which were the scenario in this study as well, and performed mostly when the patient is clear of active infections including vaginal infections along with pre and postoperative antibiotic administration, which explains less complication rate.

CONCLUSION(S)

The study concluded that both the suturing techniques in TLH had comparable outcomes. The minor vaginal cuff complications were slightly more with transvaginal route of suturing but statistically non significant as compared to endosuturing technique. Either of the vaginal cuff closure technique, be it endosuturing or transvaginal, can be used following TLH depending on surgeon's experience and adaptability to a specific technique.

The future research needs to focus on the use of various energies used for colpotomy step in TLH as the efficacy of vaginal vault closure depends not only on the suturing route and technique but also on the effect of electrocoagulation.

REFERENCES

- [1] International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), 2015-16: India;153-154.

- [2] Clayton RD. Hysterectomy. *Best Pract Res Clin Obstet Gynaecol.* 2006;20(1):73-87.
- [3] Lim S, Ghosh S, Niklewski P, Roy S. Laparoscopic suturing as a barrier to broader adoption of laparoscopic surgery. *JSLs.* 2017;21(3):e2017.00021.
- [4] Moustafa M, Elnasharty M. Issues around vaginal vault closure. *Obstetric Gynaecology.* 2019;21(3):203-08.
- [5] Blikkendaal MD, Twijnstra AR, Pacquee SC, Rhemrev JP, Smeets MJ, de Kroon CD, et al. Vaginal cuff dehiscence in laparoscopic hysterectomy: Influence of various suturing methods of the vaginal vault. *Gynecol Surg.* 2012;9(4):393-400.
- [6] Einarsson JI, Suzuki Y. Total laparoscopic hysterectomy: 10 steps toward a successful procedure. *Rev Obstet Gynecol.* 2009;2(1):57-64.
- [7] Aydogmus H, Aydogmus S, Gençdal S, Kelekçi S. Cuff closure by vaginal route in TLH: Case series and review of literature. *J Clin Diagn Res.* 2017;11(3):QD01-03.
- [8] Hwang JH, Lee JK, Lee NW, Lee KW. Vaginal cuff closure: A comparison between the vaginal route and laparoscopic suture in patients undergoing total laparoscopic hysterectomy. *Gynecol Obstet Invest.* 2011;71(3):163-69.
- [9] Hur HC, Donnellan N, Mansuria S, Barber RE, Guido R, Lee T. Vaginal cuff dehiscence after different modes of hysterectomy. *Obstet Gynecol.* 2011;118(4):794-801.
- [10] Uccella S, Ghezzi F, Mariani A, Cromi A, Bogani G, Serati M, et al. Vaginal cuff closure after minimally invasive hysterectomy: Our experience and systematic review of the literature. *Am J Obstet Gynecol.* 2011;205(2):119.e1-12.
- [11] Uccella S, Malzoni M, Cromi A, Seracchioli R, Ciravolo G, Fanfani F, et al. Laparoscopic vs transvaginal cuff closure after total laparoscopic hysterectomy: A randomised trial by the Italian Society of Gynecologic Endoscopy. *Am J Obstet Gynecol.* 2018;218(5):500.e1-e13.
- [12] Fanning J, Kesterson J, Davies M, Green J, Penezic L, Vargas R, et al. Effects of electrosurgery and vaginal closure technique on postoperative vaginal cuff dehiscence. *JSLs.* 2013;17(3):414-17.
- [13] Bastu E, Yasa C, Dural O, Ozgor BY, Yilmaz G, Gungor Ugurlucan F, et al. Comparison of 2 methods of vaginal cuff closure at laparoscopic hysterectomy and their effect on female sexual function and vaginal length: A randomised clinical study. *J Minim Invasive Gynecol.* 2016;23(6):986-93.
- [14] Croce E, Olmi S. Intracorporeal knot-tying and suturing techniques in laparoscopic surgery: technical details. *JSLs.* 2000;4:17-22.
- [15] Smith K, Caceres A. Vaginal cuff closure in minimally invasive hysterectomy: A review of training, techniques, and materials. *Cureus.* 2017;9(10):e1766.
- [16] O'Hanlan KA, Emenev PL, Peters A, Sten MS, McCutcheon SP, Struck DM, et al. Analysis of a standardised technique for laparoscopic cuff closure following 1924 total laparoscopic hysterectomies. *Minim Invasive Surg.* 2016;2016:1372685.

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