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A comparison of closed and open vaginal vault closure during abdominal hysterectomy

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Abstract

Introduction: Hysterectomy is one of the most frequently performed major surgical procedures. Majority of the hysterectomies are still done by the means of abdominal route. Despite its common performance, there is no grade A recommendations or guidelines regarding the closure of the vaginal vault after hysterectomy, either closing or opening the vaginal vault.

Method: This was a retrospective study done at Patan Hospital involving patients with total abdominal hysterectomy from January 2018 to December 2020. Data were collected from medical record. Data were compared for duration of hospital stay, febrile morbidity, vault hematoma, vaginal bleeding, relaparotomy between two groups of patients with either closed or open vaginal vault after abdominal hysterectomy. Ethical approval was obtained. The independents sample t-test was used and Chi-square tests were used. A p value of <0.05 considered statistically significant.

Result: Of the 280 patients, 205(73.2%) had closed vaginal vault whereas 75(26.8%) had vault open. Mean hospital stay was 7.93±3.108 d. Closed and open vaginal vault techniques did not differ in terms of length of hospital stay (7.83 vs. 8.19 days; p=0.40), febrile morbidity (54.6% vs. 52%; p=0.695). Pelvic hematoma with vaginal spotting was noticed in two (0.71%) cases of closed vaginal vault.

Conclusion: Both techniques of closed vs. open vaginal vault after hysterectomy gave similar outcomes regarding length of hospital stay, and postoperative complications.

Keywords: hysterectomy, closed vaginal vault closure, open vaginal vault closure

Introduction

Hysterectomy is the most common gynecological procedure.¹ The ease and convenience offered by a large abdominal incision and better operative field vision have led to a preference for the abdominal route.² Despite its common performance, there are no standard recommendations or guidelines regarding the closure of the vaginal vault.³

Two surgical techniques have been described for vaginal vault closure during abdominal hysterectomy.⁴ Starting in 1926, there was a description in the literature about the closure of the vaginal vault from the abdominal approach, which essentially is a front-to-back closure.⁵ Using two separate running and interlocking absorbable monofilament sutures, the technique keeps the vagina closed at all times, avoids blood loss and spillage of vaginal contents into the peritoneal cavity.⁶ Some surgeons do not close the vaginal vault but let it granulate to an end.⁵ An open vaginal vault may provide drainage and potentially prevents infective morbidity.⁷

In our institution, the technique of abdominal hysterectomy was the same except for vaginal vault closure, closed by suturing the anterior and posterior edges or leaving a tract of about 1.5 cm open in the center. Extra-peritoneal drainage without a drain was the purpose of the open method.

This study aims to present proportions of two techniques of vaginal vault closure, closed and open vaginal vault hysterectomy, and compare the postoperative course of both techniques concerning the length of hospital stay, febrile morbidity, the incidence of vault hematoma, vaginal bleeding, spotting, and relaparotomy.

Method

This is a retrospective analysis. This study included the patients who underwent total abdominal hysterectomy with or without unilateral or bilateral salpingo-oophorectomy

from January 2018 to December 2020 in the Department of Obstetrics and Gynecology, Patan Hospital, Patan Academy of Health Sciences, Nepal. Patients were selected with the common criteria of benign gynecological disorders for total abdominal hysterectomy. The patients with suspicion of the malignant process, gestational trophoblastic disease, peripartum hysterectomy, and total abdominal hysterectomy with other surgical procedures were excluded. The techniques of operation were the same in all operations except vault closure was different. In one arm, the anterior and posterior margins of the vagina were completely sutured together (closed method of vaginal vault closure) whereas in the other arm circumference of the margins was sutured leaving an open tract (open vaginal vault closure).

All the data of the patients with total abdominal hysterectomy were collected from the medical record and divided into two groups closed vaginal vault and open vaginal vault depending on vaginal closure during total abdominal hysterectomy. These two groups were compared in terms of length of hospital stay, postoperative complications like febrile morbidity (postoperative febrile morbidity is defined as a temperature more or equal to 38°C recorded on two occasions at least 6 h apart in 24 h following the surgical procedure), vault hematoma (diagnosed clinically or by ultrasound), postoperative vaginal bleeding, spotting, and relaparotomy.

Ethical approval for the study was obtained from the institutional review Committee of the Patan Academy of health sciences (PAHS).

Data were statistically analyzed using IBM statistical package for social sciences (SPSS) software and descriptive analysis were performed. Continuous data were expressed as the mean±standard deviation and percentage. The independent sample t-test was used to compare differences between continuous variables namely length of hospital stay. Fisher's exact test was used for the intergroup comparisons of parameters without normal distribution. The Chi-square

test was used for comparison of qualitative data like febrile morbidity. The statistical significance level of the data obtained from the study was interpreted with a p-value and $p < 0.05$ was considered to be statistically significant.

Result

This study included a total number of 280 patients who had undergone total abdominal hysterectomy with or without unilateral or bilateral salpingo-oophorectomy limited to benign conditions in three years between January 2018 and December 2020.

Out of the 280 patients, 205(73.2%) had a closed vaginal vault and 75(26.8%) had an open vaginal vault.

During data collection, 10 patients were initially excluded from the study as these were the cases of staging laparotomy with omentectomy with pelvic lymph node resection done for suspicion of malignancy, staging laparotomy with posterior colpoperineorrhaphy, peripartum hysterectomy with conservation of ovaries for postpartum hemorrhage, abdominal hysterectomy with the repair of serosal tear of sigmoid colon, abdominal hysterectomy with bowel injury repair, abdominal hysterectomy with laparoscopic cholecystectomy, abdominal hysterectomy with right hemicolectomy.

The mean duration of hospital stays for a total of 280 patients was 7.93 ± 3.108 , a variance of 9.658. Among 280 patients, 156(56%) of total patients stayed for less than a w, 115(41%) for

2w, and 6(2%) stayed for a longer period of 4w due to postoperative medical complications and ICU stay and 3(1%) for 3w. T-test was applied to find the mean differences in length of stay at the hospital between closed and open procedures (7.83 vs. 8.19d) with a p-value of 0.40 [95% CI (-0.47-1.17)] which was insignificant. Patients with closed vaginal vault and open vaginal vault were divided into two groups depending upon the duration of hospital stay: one group stayed at the hospital for less or equal to 7d and another group stayed for more or equal to 8d. In both cases of closed versus open vaginal vault closure maximum of patients stayed for 7d postoperatively, Table 1. Fisher's exact test was applied with a p-value of 0.34 [OR 1.31,95% CI (0.76-2.2)] which was not significant.

One hundred fifty-one (53.9%) of total patients developed a fever. Febrile morbidity was similar in both cases of the closed vaginal vault and open vaginal vault 112(54.6%) vs 39(52%) with a p-value of 0.695 by Chi-square test which was not significant, Table 2.

Two patients (0.71%) of the total developed pelvic hematoma postoperatively with a closed vaginal vault. Both patients with hematoma had fever along with vaginal bleeding and pain abdomen on the 2nd postoperative day. Ultrasound revealed mixed echoic collection which was managed conservatively. A repeat ultrasound was done after five days and showed no collection. In terms of vaginal bleeding, there was no significant difference between the two groups of closed and open vault closure. There were no cases of relaparotomy.

Table 1. Comparison of closed and open vaginal vault closure in terms of length of hospital stay (N=280)

	≤7d	≥8d	p-value
Closed vaginal vault (N=205; 73.2%)	112(54.6%)	93(45.4%)	0.34
Open vaginal vault (N=75; 26.8%)	46(61.3%)	29(38.7%)	
Total (N=280)	158(56.4%)	122(43.6%)	

Table 2. Comparison of febrile morbidity for closed versus open vaginal vault closure (N=280)

	Fever, yes	Fever, no	p-value
Closed vaginal vault (205)	112(54.6%)	93(45.4%)	0.695
Open vaginal vault (75)	39(52%)	36(48%)	
Total (280)	151(53.9%)	129(46.1%)	

Discussion

Our study did not show a significant difference between the two techniques of closed and open vaginal vault procedures during abdominal hysterectomy in terms of their advantages and disadvantages. In our study, the mean length of hospital stay was 7.93d (7.83d vs. 8.19d; $p=0.40$) on closed and open vaginal vault techniques.

In terms of length of hospital stay, a randomized controlled trial involving patients undergoing elective total abdominal hysterectomy for benign disease reported an average length of hospital stay of about 4 d (4.67 vs. 4.54d; $p=0.64$) on open and closed vaginal cuff technique, respectively.³ In their study, the two groups were similar in age and to variables related to the surgical procedure and thus were considered suitable for comparison.³

Hysterectomy is well-known as one of the most frequently performed of all major surgical operations and is of great economic, medical and social importance.⁸ Though the uterus can be removed vaginally, or with laparoscopy, the most common route is with open abdominal hysterectomy. There are several approaches to closing the vaginal vault in abdominal hysterectomy, each using different techniques and sutures. Different techniques are used to minimize the development of vault hematoma and granulation tissue.⁹

In Nepal, though there are no national statistics for hysterectomy, it is the most common gynecologic procedure done as well and there are no available researches that compared these two surgical techniques. Most surgeons performing abdominal hysterectomy use the closed vaginal vault closure method. Comparing the closed vaginal

technique with the open vaginal technique, the postoperative granulation, and the vaginal discharge were less with a closed vault.¹⁰ In other studies, the pelvic fluid collection was significantly higher after the closed vaginal vault hysterectomy.¹¹ Whether vaginal vault closure reduces postoperative infectious morbidity remains unresolved.

Four RCTs ($n = 612$) were published between 1992 and 1998.¹⁰⁻¹² Though they differed in how they closed the cuff and the primary outcomes, two of three RCTs noted a significant decrease in the operative time when the cuff was closed, possibly due to the hemostasis at the vaginal cuff obtained during the closure with staples or sutures.^{10,11} Compared to when the cuff is open, the amount of fluid in the pelvis with a closed cuff is significantly higher on a postoperative day 5.¹¹ This, however, was not associated with improved febrile morbidity (recommendations- C; certainty- moderate).¹¹

In a prospective study, comparing an operative and postoperative course of open vaginal cuff hysterectomy and closed vaginal cuff hysterectomy, the incidence and size of pelvic fluid collections were significantly higher after the closed vaginal cuff hysterectomy than after the open technique ($p<0.01$, t-test).¹¹ However, the postoperative length of stay, febrile morbidity, and the rate of complications was similar in both group,¹¹ which was comparable with our study.

Vault hematoma is a common finding in the first week following hysterectomy and has no significant correlation with surgical technique or surgical blood loss. Although large hematomas are associated with febrile morbidity, most hematomas are small and self-resolving.¹³ In our study, there were two incidences (0.71%) of pelvic hematoma with per vaginal bleeding in closed vaginal vault

closure detected by ultrasound on 2nd postoperative day. A study reported a pelvic hematoma developed in two patients of each group ($p=0.66$).¹² Similar to our study, ultrasound was a useful tool for the detection of vault hematoma on 3rd postoperative day.¹⁴ In their study, 25% of patients underwent colpotomy for drainage of hematoma,¹⁴ whereas, ours was managed conservatively.

During an open cuff technique employed in 2421 consecutive patients with total abdominal hysterectomy, the two most serious complications were postoperative hemorrhage (7 cases, 0.28%) and intestinal obstruction (6 cases, 0.24 percent). The morbidity rate was 20.8%.¹⁵ In our study, febrile morbidity was 52% and no other morbidities were detected in the open vaginal vault technique.

Closure of the vaginal cuff and use of prophylactic antibiotics at total abdominal hysterectomy was associated with decreased infectious morbidity in a high-risk population.¹⁶ Infectious morbidities after total abdominal hysterectomy included fever (31%).¹⁶ In another study, 34% of the patients fulfilled this criterion.¹⁷ In our study, 151(53.9%) had a fever and both techniques had a similar outcome of febrile morbidity, (54.6% vs 52%; $p=0.695$) among closed and open vaginal vaults. In another study, the vaginal vault was left open in 72 patients and closed in 65 patients in the control groups. No significant difference in postoperative febrile morbidity was noticed in the two groups which were true in our study.¹⁸

In a prospective study of evaluation of closure versus non-closure of the vaginal vault after non-descent vaginal hysterectomy, outcomes were almost similar in both procedures as in our study.¹⁹ A significant reduction in the incidence of infected pelvic hematoma following vaginal hysterectomy was noted using an open surgical technique that allows for drainage of blood and debris through the vaginal cuff (3.8% vs. 13.5%, $p<0.0001$).²⁰

Conclusion

Both techniques of the closed and open vaginal vault after hysterectomy produced a similar postoperative course. However, there were more cases of the closed vaginal vault where two cases of pelvic hematoma were managed conservatively.

Conflict of Interest

None

Funding

None

Author Contribution

Concept, design, planning: APM, PS; Literature review: APM, BP, PS; Data collection: APM, BP; Data analysis: APM, BP, PS, BT; Draft manuscript: APM; Revision of draft: APM, BP, PS, BT; Final manuscript: APM; Accountability of the work: APM, BP, PS, BT.

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