
GYNAECOLOGY

The Incidence of Vaginal Vault Granulations after Vaginal Vault Closed by Polyglactin Compared with Chromic Catgut: A Randomized Controlled Trial

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ABSTRACT

Objective To compare the incidence of vaginal vault granulations after vaginal vault closure by No. 1 polyglactin with No. 1 chromic catgut.

Study designs A randomized controlled trial.

Setting Operating room and gynecological clinic, Department of Obstetrics and Gynecology, Faculty of Medicine, King Chulalongkorn Memorial Hospital, Chulalongkorn University.

Subjects and Methods Eighty eight women underwent total abdominal hysterectomy for myoma uteri were randomly divided into 2 groups; the study group (44 cases) and the control group (44 cases). Standard surgical technique of total abdominal hysterectomy was employed except for closure of the vaginal vault performed by interrupted figure-of-eight sutures using No. 1 polyglactin (the study group) or No. 1 chromic catgut (the control group). All patients were prospectively followed-up at 4 weeks and 8 weeks postoperatively and vaginal vault granulations were diagnosed as present or absent, where appropriate, treated with silver nitrate cauterization.

Results The overall incidence of vaginal vault granulation was 19.3 percent (17 cases), with an incidence of 31.8 percent (14 cases) where the vaginal vault was closed with No. 1 chromic catgut (the control group) and a significantly lower incidence of 6.8 percent (3 cases) where the vaginal vault was closed with No. 1 polyglactin (the study group) ($p < 0.05$).

Conclusion The widespread use of chromic catgut for vaginal vault closure following total abdominal hysterectomy revealed by our study is unacceptable; Polyglactin, a synthetic polymer, is associated with fewer vaginal vault granulations than chromic catgut.

Key words: Vaginal vault granulation, chromic catgut, polyglactin

Vaginal vault granulation is a commonly observed sequelae of abdominal hysterectomy. Although benign, and thought to regress spontaneously over a few months. They may cause a copious discharge, and alarm the patient if they bleed.^(1,2) They also often necessitate two or three

extra visits to the gynecologic-outpatient clinic for cauterization, and occasionally readmission for diathermy under anesthesia.^(4,8) The contributory factors for the development of granulation tissue are infection, surgical technique and type of suture material employed.^(3,5,9) In current practice, there are

two methods for dealing with the vaginal vault after total abdominal hysterectomy.^(1-2,8) The first method is to suture around the transected circumference of the vagina with a continuous locking suture and to leave the vault itself open, having closed the peritoneum above it. The second method, which most gynecological surgeons prefer, is to make a complete closure of the vaginal vault especially in the noninfective cases. This is due to the rational that complete vaginal vault closure would be associated with a higher incidence of primary healing and a lower incidence of granulation than where the vault is left open and covered only with peritoneum.^(1,2) Nevertheless, we thought the type of suture materials employed might be of greater importance. Currently at Chulalongkorn Hospital, we use chromic catgut No.1 which is absorbed by inflammatory process to close vaginal vault. From the previous study, Manyonda et al. found the incidence of vaginal vault granulation was 68% using No.1 chromic catgut for vaginal vault closure whereas 34% using No.1 Polyglactin.⁽⁴⁾ There are high incidences of vaginal vault granulation of 34 - 68 percent using No.1 chromic catgut for vaginal vault closure.^(1,2) Therefore, it would be a break-through if we could find another suture material that cause less vaginal vault granulation. In fact we have performed a descriptive study and found that the incidence of vaginal vault granulation after total abdominal hysterectomy using No. 1 polyglactin, which is a synthetic suture and absorbed by hydrolysis process, for vault closure was 10 percent.⁽⁷⁾ To our knowledge there has been no report of the comparison of polyglactin and chromic catgut for vaginal vault closure in Thailand.

The aim of this study to compare the incidence of vaginal vault granulations after vaginal vault closure by No. 1 polyglactin with No. 1 chromic catgut.

Materials and Methods

This study was performed at the Department of Obstetrics and Gynecology, Faculty of Medicine, King Chulalongkorn Memorial Hospital, Chulalongkorn University from 1st November 1999 - 30th June 2001.

Women who underwent total abdominal hysterectomy for benign conditions were computerized randomly (by CASIO fx 3800 randomized program) divided into 2 groups, the study group and the control group. All the hysterectomies were elective in nature. Exclusion criteria were malignant neoplasm, underlying diseases which may affect wound healing, eg. anemia, diabetes mellitus and pelvic inflammatory disease. Informed written consents were obtained in all cases. The operations were performed by the second year or the third year residents under supervision of the consultants. Prophylactic antibiotics (1 gram intravenous ampicillin before the operation) were given in all cases. Standard surgical technique of total abdominal hysterectomy was employed.⁽⁷⁾ After the uterus was removed the vaginal vault was painted with povidone-iodine soaked gauze which was then pushed down the vagina and later retrieved at the end of the operation. The vaginal vault was closed with interrupted figure-of-eight sutures, not more than 5 sutures, and inverted the vaginal mucosa inside, using No.1 polyglactin in the study group and using No. 1 chromic catgut in the control group. The pelvic peritoneum was closed in all cases. Postoperative morbidity was defined as a fever of 38.5°C on one or more occasions after the first 24 hours.

All the patients were seen at 4 weeks and 8 weeks postoperatively by one of the authors (YT and CN) without knowing of the suture materials employed and asked whether they had any problems or complaints such as vaginal discharge, vaginal bleeding or pelvic pain. They were then examined with a bivalve speculum in order to determine whether there was any vault granulation. Vaginal vault granulation was diagnosed when one or more small, visible, painless, red or pink, granular to polypoid lesions seen at the vaginal vault. Vaginal vault granulation was treated with topical silver nitrate weekly. This study was approved by the ethical committee of the institution.

The data were analyzed with a computerized statistical package (SPSS program V. 10). Analysis of variables was by Fisher exact test or unpaired t-test

where appropriate.

Results

Eighty eight patients were included into the study and randomly assigned into two groups. The indication for operations was myoma uteri. The vaginal vault was closed with interrupted figure-of-eight sutures using No.1 polyglactin in the study group (44 cases) and using No. 1 chromic catgut in the control group (44 cases). There was no statistically significant difference in age, parity, body mass index, operator nor operative time between the study group and the control group (Table 1). All cases had no

immediate postoperative complications. At fourth week we found vault granulation only 2 cases in controlled group ,that was no statistical significant whereas at the eighth postoperative week, vaginal vault granulations were demonstrated in 17 of 88 patients, giving the incidence of 19.3 percent. Comparing the study group and the control group, we found that the incidence of vaginal vault granulation in the study group (3 cases; 6.8 percent) was lower than in the control group (14 cases, 31.8 percent) with statistically significance ($p < 0.05$) as shown in Table 2. All cases with vaginal vault granulation had no symptoms and subsided after silver nitrate treatment.

Table 1. Age, parity, body mass index, operative time and grade of operator in the study group (Polyglactin) and the control group (chromic catgut)

	Polyglactin (N = 44)	Chromic catgut (N = 44)
Age (years)	42.23 (SD = 5.6, Range = 24)	42.50 (SD = 5.0, Range = 20)
Parity	2.07 (SD = 0.9, Range = 4)	2.27 (SD = 1.3, Range = 8)
Body mass index (kg/m ²)	25.04 (SD = 1.5, Range = 8)	24.95 (SD = 1.9, Range = 7)
Operative time (hr)	1.42 (SD = 0.1, Range = 0.9)	1.41 (SD = 5.2, Range = 0.3)
Operator (resident)		
2 nd year	1	3
3 rd year	43	41

Table 2. Incidence of vaginal vault granulations between the study group (Polyglactin) and the control group (chromic catgut)

	Polyglactin (N = 44)	Chromic catgut (N = 44)
Granulations	3 (6.8%)	14 (31.8%)
No granulation	41(93.1%)	30 (68.1%)
P = 0.003		

Discussion

Event though vaginal vault granulation is a common postoperative complication after total abdominal hysterectomy, little reports have been published and addressed the methods and suture materials used to reduce the incidence.^(1-5,8-9) There are two schools of thoughts as to the best method for dealing with the vaginal vault after total abdominal hysterectomy,^(1-2,8) the open vault and the close vault. Since the open vault must heal by secondary rather than primary intention this method cannot be expected to give a lower incidence of postoperative granulation.^(1-2,8) Most agreed that closing the vault is preferable to leaving it open. Different suture materials used have been reported to affect the incidence of postoperative vault granulation.^(1-5,8-9) The incidence of vault granulation using chromic catgut to close the vaginal vault was reported to be 34-53 percent.⁽¹⁻³⁾ Despite the fact that chromic catgut has been shown to cause the highest incidence of granulation tissue, in our institution, most gynecologists close the vaginal vault with interrupted figure-of-eight sutures using chromic catgut. The incidence of vault granulation using this method reported by Saropala and Ingsirorat was 34 percent.⁽⁸⁾ Therefore, synthetic polymer suture materials are definitely preferable to chromic catgut. Fairlie and Al-Hassani⁽³⁾ using the Lembert suture reported the incidence of 3 percent when polyglycolic acid was used. However, the Lembert suture requires skill to perform and it is more difficult to secure hemostasis.⁽³⁾ Therefore, it is generally not recommended.^(4,7,9) In addition, polyglycolic acid suture material may cut through the vaginal vault due to the sharpness of the material. In our study we used polyglactin which is compose of braided filament of a copolymer of lactic and glycolic acid.⁽⁹⁾ This suture is designed to be stronger, longer lasting, and less reactive than catgut.⁽⁶⁾ Breakdown is by hydrolysis rather than digestion by proteolytic enzymes.⁽⁶⁾ The result is minimal inflammatory reaction and less granulation tissue formation.⁽⁶⁾ However there is only one study performed by Manyonda et al⁽⁴⁾ who organized a prospective,

randomized trial involving women who underwent total abdominal hysterectomy for benign indications. No.1 polyglactin was used to compared with No. 1 chromic catgut. Overall, 32 percent of patients had vaginal vault granulation 6 weeks post-operatively. Chromic catgut had been used in 68 percent and polyglactin in the remaining 32 percent. In their study they did not give prophylactic antibiotics and the indications for the operation were not mentioned. In our study, the overall incidence of vaginal vault granulation was 19.3 percent, with an incidence of 31.8 percent where the vaginal vault was closed with No. 1 chromic catgut and a significantly lower incidence of 6.8 percent where the vaginal vault was closed with No. 1 polyglactin. The low incidence in our study may be due to the use of prophylactic antibiotics in all cases and no postoperative morbidity. The vagina normally harbours both nonpathogenic bacteria and occasionally pathogenic bacteria and it therefore seems reasonable to expect that any operation involving the vaginal mucosa would probably be followed by infection, even if only low grade virulence, which would involve healing and hence the formation of granulation tissue.⁽¹⁾

In conclusion, vaginal vault granulation tissue is a common complication in patients who have total abdominal hysterectomy. The results in our study show that the widespread use of chromic catgut for vaginal vault closure should be reconsidered due to higher incidence of vaginal vault granulation comparing with those using polyglactin.

References

1. Howkins J, William DK. Vault granulations after total abdominal hysterectomy. *J Obstet Gynaecol Br Commonw* 1968;75:84-6.
2. Greenhalf JO. Vaginal vault granulation tissue following total abdominal hysterectomy. *Br J Clin Pract* 1972;26:247-9.
3. Saropala N, Ingsirorat C. Conservative treatment of vaginal vault granulation tissue following total abdominal hysterectomy. *Int J Gynecol Obstet* 1998; 62: 55-8.
4. Manyonda IT, Welch CR, McWhinney NA, Ross LD. The influence of suture material on vaginal vault granulation after total abdominal hysterectomy. *Br J Obstet Gynaecol*

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- 1990;97: 608-12.
5. Fairlie EJ, AL- Hassani SSM. The Lembert suture in the prevention of vaginal vault granulation after total abdominal hysterectomy. *J Obstet Gynaecol Br Commonw* 1973;80: 839-43.
 6. Beresford JM, Moher D. A prospective comparison of abdominal hysterectomy using absorbable staples. *Surg Gynecol Obstet* 1993; 176:555-8.
 7. Tannirandom Y, Tuchinda K. Vaginal vault granulations after total abdominal hysterectomy using polyglactin for vault closure. *J Med Assoc Thai* 2001;84:693-6.
 8. Thompson JD, Warshaw J. Hysterectomy. In: Rock JA, Thompson JD, editors. *Te Linde's operative gynecology*. 8th ed. Philadelphia: Lippincott-Raven, 1997:771-854.
 9. Lipscomb GH, Ling FW. Wound healing, suture material, and surgical instrumentation. In: Rock JA, Thompson JD, editors. *Te Linde's operative gynecology*. 8th ed. Philadelphia:Lippincott-Raven, 1997:263-81.