Panniculectomy at the Time of Gynecologic Procedures: A Comparison of Subcutaneous Closure Techniques on Wound Complications

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Abstract

Objective: The primary objective of this study was to determine if there was a difference in wound complication rates when comparing interrupted versus running suture techniques to close the subcutaneous tissue when panniculectomy is performed at the time of gynecologic procedure. The secondary objective was to determine if there was a significant time difference between the two techniques.

Methods: Patients undergoing panniculectomy at the time of their gynecologic operation were randomized with one half of the subcutaneous tissue layer closed in two rows of interrupted sutures and the other half closed with two rows of running sutures. The subcuticular layer was closed in a uniform fashion using interrupted sutures; the skin was closed with staples. All patients had two Jackson-Pratt drains placed in the subcutaneous tissue and received IV antibiotics for 24 hours postoperatively. The incision was examined daily by the resident and attending physicians for the duration of their hospitalization, as well as at the time of staple removal and postoperative visit. Factors evaluated in the comparison of the interrupted and running suture closure sites were incidence of wound separation, erythema, drainage, and major complications. In addition, the needs for additional antibiotics, comparison of time of subcutaneous closure between the two techniques, panniculus weight and size, and reason for surgery were evaluated.

Results: A total of 20 patients were evaluated for wound complications when comparing running to interrupted sutures. Compared with the wound closed by an interrupted technique, a wound closed by a running technique was 0.7 times as likely to separate [OR=0.71; 95% CI = 0.14 to 3.66; p=1.000]; 1.4 times as likely to have drainage [OR=1.42; 95% CI = 0.27 to 7.34; p=1.000]; and half as likely to have erythema [OR=0.52; 95% CI = 0.14 to 1.92; p=0.514]. Five patients were readmitted, two for pulmonary issues and three were for wound complications. Of the three wound complications two were considered major wound complications. One occurred on postoperative day 23 in a patient with a large diverticular abscess which was discovered intraoperatively, and required debridement of subcutaneous tissue on the interrupted technique half, additional IV antibiotics and placement of a wound vacuum. The other major complication was a large opening of the subcutaneous tissue on the running suture half which was treated with readmission for wound vacuum placement. The difference in closure time between the side was closed by the interrupted stitches and the running stitches was 1.8 min (95% CI = -2.59 min to 6.19 min) (p=0.402). 40% (8/20) received an additional course of outpatient antibiotics.

Conclusions: Panniculectomy at the time of gynecologic surgery is a safe and effective option in morbidly obese patients. Superficial wound complications, including wound separation, drainage and erythema can often times be treated with additional outpatient antibiotics. Both running and interrupted suturing techniques are acceptable options for closure of the subcutaneous tissue, with no apparent difference in wound complication rate or difference in operative time.

Synopsis of conclusion: There is no significant difference in wound complication rate or surgical time when interrupted or running suture techniques are used to close the subcutaneous tissue when a panniculectomy is performed at the time of gynecologic surgery.

INTRODUCTION

Obesity is an ever increasing problem in the United States. The obesity rate among women >20 years old is estimated to be 33%, and in 14 women a BMI of >40 or class III obesity [1]. Co-morbidities such as diabetes, hypertension, peripheral vascular disease, and a poor wound environment all increase the risk for post-operative wound complications in the obese patient [2-4]. With surgical site infection of increased concern in the obese population there is need for improved surgical techniques in order to decrease wound complications.

Panniculectomy at the time of gynecologic surgery has been found to be advantageous by increasing exposure to the pelvis with minimal increase in surgical time and blood loss [3-6]. Additional measures such as closure of the subcutaneous tissue and subcutaneous drain placement have been shown to decrease the rate of wound disruption and seroma formation [7,8].
use of extended antibiotic prophylaxis has been reported to reduce surgical site infection after combined hysterectomy and panniculectomy [9]. Despite these measures, surgical site infection remains a common problem after panniculectomy and ranges from 2.3-33.3% [4,6,10-23].

Multiple studies of panniculectomy at the time of gynecologic surgery have been performed with a single technique performed for closure of the subcutaneous tissue [3,5,11]. At this time there is no ideal closure method of the subcutaneous tissue and no head-to-head comparison of suture techniques for subcutaneous tissue closure at the time of panniculectomy. In this prospective study, we compared outcomes and between when running and interrupted suture techniques were used for subcutaneous tissue closure in the same patient at the time of panniculectomy.

MATERIALS AND METHODS

This prospective study was approved by the institutional review board. Written consent was obtained from each participant at their preoperative visit. Participants were obtained from a gynecologic oncology office and an obstetrics-gynecology resident clinic during the study period of 1 April 2013 to 1 April 2014. Any woman >18 years old who required a panniculectomy at the time of gynecologic surgery was invited to participate; 22 women met the inclusion criteria for the study and 20 consented to participate.

All operations were performed with the same attending physician and any two residents as assistants. The interrupted suturing technique for closure of the subcutaneous tissue was considered the control technique. The running suture technique was considered the experimental technique. The interrupted suturing technique and the running suture technique were both used in the same patient; one half was closed with the interrupted suturing technique and the other half was closed with the running suture technique. The suture technique used to close was randomly assigned to eliminate surgeon specific skill due to different levels of training with the assisting residents. The randomization was performed in blocks of 4 patients to improve equality between the two techniques given the anticipated limited number of participants.

During the procedure the patient was placed in the dorsal supine position and the site of panniculus removal was outlined with a surgical marker. The panniculus was removed to the level of the rectus fascia using Bovie electrocautery with larger vessels being clamped and tied. The exposed tissue was covered in Bacitracin soaked laparotomy sponges during the intra abdominal procedure. A vertical midline incision was made on the fascia and the remainder of the surgery was performed. During closure, the peritoneum was closed with inclusion of the posterior fascia using 0-PDS, and the rectus fascia was closed using looped 1-PDS in a running fashion. When necessary the patient was then placed in a flexed position and the oblique fascia was plicated using 0-PDS. Jackson-Pratt drains were placed above the fascia and below the subcutaneous closure on each side of the patient. The subcutaneous tissue was re approximated in two layers with one side being closed in two layers of 2-0 Vicryl interrupted sutures and the other side closed in two layers of 2-0 Vicryl running sutures. The subcuticular layer was re approximated using 3-0 Vicryl mattress sutures. The skin was closed with staples and the incision was covered with a pressure dressing which remained in place for at least 24 hours.

Postoperatively the patient remained in a flexed position for 24 hours and IV antibiotics were given for 24 hours. An abdominal binder was used until the patients were seen for their staple removal appointment at 14 days. Patients were examined daily by the residents during their postoperative inpatient course with documentation of incision site complications such as wound separation or infection and on which side they occurred. Patients’ incisions were also seen at the time of staple removal and at their 4 weeks postoperative visit. Additional office visits, ER visits and readmissions were reviewed. Wound complications were documented in the patients hospital record or office chart, including the type of wound complication, intervention used and side on which it occurred.

Intra operative data collected included time for removal of the panniculus, panniculus weight, length and height, which side of the patient was closed with running and interrupted sutures, total time of subcutaneous tissue closure for each side, level of training for the residents participating and their side of closure, estimated blood loss, type of surgery performed. Postoperative data included postoperative IV antibiotics received, need for additional outpatient antibiotics, and presence of wound erythema, separation or drainage and on which side of the incision it occurred, need for readmission or wound vacuum placement. If a wound complication was noted in the midline, the complication was considered to be on the side for which the majority of the complication occurred, per the evaluating physicians’ discretion, or on both sides if extensive enough.

Research Randomizer (http://www.randomizer.org/form.htm) was used to generate the randomization scheme. SYSTAT 13 (Chicago, IL) was used for data analysis. Continuous data are presented as X̄ (95% CI). Differences between the two suture techniques were analyzed using a paired t-test. Categorical data were analyzed with Chi-squared. Fisher’s Exact Test was used to calculate p-values. The α-level was set at 0.05.

RESULTS

From 1 April 2013 to 1 April 2014, 22 women underwent panniculectomy at the time of gynecologic surgery, of which 20 consented to participation and were included for analysis. One patient had an umbilical hernia repair only and nineteen had a total abdominal hysterectomy with bilateral salpingo- oophorectomy; fifteen had surgery for a gynecologic malignancy; eleven had pelvic lymph node dissection; four had hernia repairs; and one required a bowel resection.

Intra operative data are presented in Table 1. A paired t-test revealed the closure times for the two suturing techniques were not different (t=0.858; df=19; p=0.402). Compared to the side closed by the interrupted technique (Table 2), the side closed by the running technique was 0.7 times as likely to separate; 1.4 times as likely to exhibit drainage; and 0.5 times as likely to show evidence of erythema.

Eight of 20 (40 %) participants received an additional one week course of antibiotics as an outpatient. Five of the 20
patients were readmitted; however, only three of 20 (15%) were readmitted for wound complications. Three of 20 (15%) required a wound vacuum placement. One patient was found to have an unanticipated large diverticular abscess at the time of surgery which contributed to her complication, not believed to be due to the panniculectomy itself. This patient required a subsequent bedside wound debridement and additional IV antibiotics during her initial postoperative course. She was also readmitted and required wound vacuum placement. Excluding this patient with another significant reason for wound complication, the readmission rate would have been 10.5%, which is consistent with previous studies [9].

There was not found to be a significant difference in wound complication rates such as drainage, erythema or separation based on whether a running suture or interrupted suture technique was employed. This is not unexpected given the relatively small sample size, and a larger study size may reveal a significant outcome. When determining the side on which the wound complication occurred the physician would inspect the incision site. If a complication was noted in the midline the physician used their best judgment to assign a side, or if the complication was extensive enough it was assigned as a complication on both sides. Fortunately there were no subjective midline wound complications observed during the study.

**DISCUSSION**

This is the first comparison of suture techniques for subcutaneous tissue closure at the time of panniculectomy. With each participant acting as both the case and control we were able to increase the number of cases and controls in the study as well as minimizing the number of variables.

Our hypothesis was that there would be no significant difference in wound complication rates based on suturing techniques, but that the running suture technique would be significantly faster. Previous studies comparing the two techniques have been performed at the time of cesarean section, which have shown running sutures to be significantly faster; however in this study we saw no significant time difference [24]. More importantly there was also no significant difference in wound complications between the two techniques. The lack of significance may have been due to a small sample size. Running versus interrupted suture technique was randomized in order to prevent senior residents from always performing the same suture technique, and to minimize surgeon specific skill.

Both running and interrupted suturing techniques are acceptable options for closure of the subcutaneous tissue, with no apparent difference in wound complication rate. The overall minor versus major complications compare favorably to our previous reports.

**REFERENCES**


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