

Comparison of Pfannenstiel and Maylard incisions for total abdominal hysterectomies in large uterus

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Summary

Purpose: To compare transverse muscle cutting Maylard incision and the Pfannenstiel incision in hysterectomies for large uterus. **Materials and Methods:** Ninety-five patients who underwent hysterectomy for myomatous uteri, larger than 14 weeks of gestation were included in the study. **Results:** The average intraoperative blood loss was lower in the Maylard group compared to Pfannenstiel group (114.65 cc and 129.04 cc $p < 0.001$, respectively). The mean operative time was shorter in the Maylard group with 73.9 minutes comparing to the Pfannenstiel group with 81.9 minutes ($p < 0.001$). There were no differences in postoperative additional analgesic requirements and postoperative 24-hour VAS scores in two groups ($p = 0.8$ and $p = 0.231$, respectively). **Conclusion:** The Maylard incision may be preferred in the patients whose uterus is larger than 14 weeks. Maylard incision may provide better pelvic view and shorter operative time in these patients. Although blood loss during surgery was less in the Maylard group, the authors believe that this amount of difference is not clinically important.

Key Words: Abdominal hysterectomy; Large uterus; Maylard; Pfannenstiel.

Introduction

Hysterectomy is the most frequently performed gynecological surgical procedure for benign indications, and the most common indication for hysterectomy is uterine leiomyoma [1, 2]. Abdominal access and pelvic exposure are important to a successful operation, especially in patients who have an enlarged uterus caused by a leiomyoma [3].

Although different incision types are available in open gynecological surgery, transverse supra-pubic incision is frequently preferred [4]. The most commonly used techniques for transverse supra-pubic incisions are Pfannenstiel, Cherney, and Maylard incisions. The main difference of the Maylard incision is the transverse dissection of rectus abdominis muscle. To minimize the risk of retraction, rectus muscle usually is not separated from anterior rectus sheath and fixed to this fascia. Isolation and ligation of the deep inferior epigastric arteries are important before transection of the muscle. Maylard incision is mostly used in cases like ovarian cancer requiring pelvic lymphadenectomy or endometriosis extending to the pelvic sidewalls where better pelvic exposure is necessary [5]. Myomatous uterus may reach 20 weeks in size. Pelvic exposure and manipulation during surgery become difficult in these cases.

In this study the authors aimed to compare Maylard and Pfannenstiel incisions for total abdominal hysterectomy, in terms of operation time, intraoperative blood loss, postop-

erative pain scores, and analgesic requirements in patients with myomatous uterus larger than 14 weeks.

Materials and Methods

Medical records of patients

Ninety-five patients who underwent hysterectomy in the Department of Obstetrics and Gynecology of Ankara Training and Research Hospital, between 2010 and 2014 were included in this study. The medical records of the patients were reviewed retrospectively. Patients were divided into two groups (Maylard and Pfannenstiel) according to the incision type. All of the hysterectomies performed by the same gynecologist. The followings were evaluated: age, body mass index (BMI), operative time, intraoperative blood loss, hemoglobin level changes, time to return of bowel sounds, additional analgesic requirements, and visual analogue scale (VAS) scores.

All hysterectomies enrolled in this study were performed for leiomyoma. The following cases were excluded from the study: hysterectomies for other indications, uterus smaller than 14 weeks size, and hysterectomies performed by other physicians.

Surgical technique and postoperative care

Preoperative surgical preparation phase was the same in all patients. All surgeries were performed under general anesthesia and conducted by the same surgeon. The transverse skin incision was made about two- to three-cm above the symphysis pubis. After a transverse fascia incision, the deep inferior epigastric vessels were identified and ligated lateral to the borders of the rectus muscles in the Maylard group. The surgeon's fingers were used to tease the overlying rectus muscle from the peritoneum. For better approximation of the muscles during closure, the underlying muscle

Table 1. — The demographic and preoperative data of the groups*.

	Maylard	Pfannenstiel	<i>p</i>
Age* (years)	48.5±5.22	49.2±5.05	0.513
BMI* (kg/m ²)	32.06±4.3	33.24±3.41	0.190
Gravidity*	3.94±2.63	4.35±2.44	0.435
Parity*	2.67±1.47	2.91±1.54	0.102
Uterus size* (weeks)	17.1±2.20	17.3±1.82	0.663
Resected uterus weight* (grams)	1331.1±327	1323±161	0.811
Endometrial Biopsy (n, %)			0.762
Progesterone effect	17 (34.7%)	20 (43.5%)	
Proliferative phase	19 (38.8%)	17 (37%)	
Simple hyperplasia	4 (8.2%)	2 (4.3%)	
Atypical simple	2 (4.1%)	1 (2.2%)	
Complex hyperplasia	0	1 (2.2%)	
Inadequate	7 (14.3%)	5 (10.9%)	
CVS (n,%)			0.397
Normal	39 (79.6%)	36 (78.3%)	
Atrophy	3 (6.1%)	6 (13%)	
Inflammation	7 (14.3%)	4 (8.7%)	
Systemic diseases (n, %)			0.784
No	18 (36.7%)	19 (41.3%)	
DM	14 (28.6%)	10 (21.7%)	
HT	9 (18.4%)	7 (15.2%)	
Other	8 (16.3%)	10 (21.7%)	

*All values are given as mean ± standard deviation (SD).

CVS= cervicovaginal smear, DM = diabetes mellitus, HT = hypertension.

was sutured to the overlying fascia. Rectus abdominis muscle was dissected with electrocautery. The parietal peritoneum was then incised transversely. In the postoperative period, two doses of (at 0th and 6th hours) intramuscular (i.m.) diclofenac sodium (3 ml, 75 mg) were used for postoperative pain control. Dexketoprofen trometamol (2 ml) was used (i.m.) in the patients who required additional analgesic. The VAS scores were assessed at 6th and 24th hour after operation. Postoperative mobilization, fluid, and food intake protocols were the same in both groups.

Statistical analysis

The Statistical Package for Social Sciences (version 17.0) was used for analysis. Distribution of the continuous variables was checked by using the Kolmogorov-Smirnov test. Student *t*-test was used for variables with normal distribution. The χ^2 test and Fisher's exact test were used to analyze nominal variables. Continuous variables were expressed as mean ± SD. A *p* < 0.05 was considered statistically significant.

Results

Ninety-five patients who underwent hysterectomy between January 2010 and July 2014 were included in the study. Patients were divided into two groups: Maylard (n=49) and Pfannenstiel (n=46). Mean age, BMI, preoperative clinical uterus size, and postoperative resected uterus weight were similar in two groups (*p* > 0.05). Demographic and preoperative findings are summarized in Table 1.

Intraoperative blood loss was lower in the Maylard group and the difference was statistically significant (*p* < 0.001)

Table 2. — Intraoperative and postoperative properties of the patients*.

	Maylard	Pfannenstiel	<i>p</i>
Hb difference* (g/dl)	1.07±0.64	1.26±0.73	0.184
Hospitalization time* (days)	4.37±1.70	4.46±1.36	0.780
Operation time* (minutes)	73.98±8.95	81.96±12.49	0.001
VAS score* (6 th hour) (mm)	53.67±6.90	53.37±6.58	0.827
VAS score* (24 th hour) (mm)	30.51±8.30	28.47±8.08	0.231
Intraoperative blood loss* (cc)	114.65±8.07	129.04±7.27	0.001
Return of bowel sound* (hours)	8.47±1.64	9.15±1.97	0.07
Additional analgesic requirement (n, %)			0.811
No	38 (77.6%)	34 (73.9%)	
Yes	11 (22.4%)	12 (26.1%)	

* All values are given as mean ± SD. Hb = hemoglobin.

(Maylard: 114.65 cc and Pfannenstiel: 129.04 cc, respectively). Mean operation time was 73.9 minutes in Maylard and 81.9 minutes in Pfannenstiel groups (*p* < 0.001). The VAS scores evaluated at 6th and 24th hour postoperatively were similarly in both groups (*p* = 0.827 and *p* = 0.231, respectively). Additional analgesic requirements were similar in both groups (*p* = 0.8). Comparisons of intraoperative and postoperative findings are summarized in Table 2.

Discussion

The route of hysterectomy for myoma uteri depends on many factors such as surgeon's experience, patient's preference, previous surgeries, concomitant diseases, uterine size, and uterine mobility. A Cochrane review recommends vaginal hysterectomy whenever possible [6]. However it is difficult to perform vaginal hysterectomy for a uterus larger than 12 weeks size. Laparoscopic hysterectomy for large uterus may necessitate the use of morcellators, but there are debates on the safety of morcellation [7].

Preferred abdominal incision type in gynecologic surgery depends on many factors. Nature and the extent of the disease, need for rapid entry, body habitus, previous scars, cosmetic results, and bleeding risk have direct effect on the surgeon's choice. If there is no urgency, most gynecologists prefer transverse abdominal incisions for benign gynecologic diseases. Transverse abdominal incisions provide limited but generally adequate exposure, with good cosmetics results, less postoperative pain, less incisional hernia risk, and less abdominal adhesions [8]. Pfannenstiel incision is the most commonly preferred transverse incision in gynecologic surgery. Cosmetic results are good. Pelvic exposure is usually sufficient for diseases confined to pelvis. If there is a need for extended exposure, it may also modified to Cherney incision. Maylard incision is another transverse incision including transection of the rectus abdominis muscle. At first sight it seems quite aggressive and disrespectful to the tissues. However, there are studies comparing Maylard incision with other abdominal incisions and reporting

similar intraoperative and postoperative results [5, 9]. The most important advantage of Maylard incision is the extent of pelvic exposure [9, 10]. It was assumed that Maylard incision also provides an important range of abdominal exposure in addition to pelvic exposure. So it can be used even for cytoreductive surgery in ovarian cancer [11] and cause minimal postoperative abdominal adhesions [5, 8]. If the disease is beyond the pelvic borders, increased pelvic exposure will be needed. Hysterectomy for large myomatous uterus may be very difficult particularly, if the uterus is filling the pelvis completely.

Studies comparing Maylard and Pfannenstiel incisions are limited in the literature. Ghanbari *et al.* reported that for benign gynecologic diseases, postoperative analgesic use was lesser in Maylard incision group. Otherwise VAS scores, intraoperative blood loss, and the hospitalization duration were similar in the both groups [9].

The most important difference of the Maylard incision compared to the Pfannenstiel incision is the transection of the rectus abdominis. Naturally this may create a concern about abdominal wall stability and muscle strength. However, Giacalone *et al.* reported that there was no difference of abdominal muscle strength between the Maylard and the Pfannenstiel incisions [12].

In the present study the authors observed that the total abdominal hysterectomies can be performed more rapidly and with less intraoperative blood loss through the Maylard incision. Although there are statistically significant differences for both operative time and blood loss, the present authors believe that these findings were not clinically important. Postoperative duration of hospitalization, analgesic requirements, and VAS scores were found similar in both groups. They regard these findings important because transection of muscles in Maylard incision may cause anxiety about increased postoperative pain and abdominal wall anatomy. There are limitations to the present study inherent to its retrospective design.

In conclusion, route of hysterectomy for myoma uteri depends on many factors. Today, laparoscopy is one of the most commonly preferred treatment option. However, Maylard incision may be an option especially when the uterus is larger than 14 weeks' gestational size.

References

- [1] Farquhar C.M., Steiner C.A.: "Hysterectomy rates in the United States 1990–1997". *Obstet. Gynecol.*, 2002, 99, 229.
- [2] Carlson K.J., Nichols D.H., Schiff I.: "Indications for hysterectomy". *N. Engl. J. Med.*, 1993, 328, 856.
- [3] Chang F.H., Soong Y.K., Cheng P.J., Lee C.L., Lai Y.M., Wang H.S., Chou H.H.: "Laparoscopic myomectomy of large symptomatic leiomyoma using airlift gasless laparoscopy: a preliminary report". *Hum. Reprod.*, 1996, 11, 1427.
- [4] Ozkaya E., Korkmaz V., Kucukozkan T.: "Clamping compared to cauterization for subcutaneous hemostasis in Pfannenstiel incision". *Acta Obstet. Gynecol. Scand.*, 2011, 90, 405.
- [5] Manusook S., Suwannarurk K., Pongrojapaw D., Bhamarapratana K.: "Maylard incision in gynecologic surgery: 4-year experience in Thammasat University Hospital". *J. Med. Assoc. Thai.*, 2014, 97, S102.
- [6] Johnson N., Barlow D., Lethaby A., Tavender E., Curr E., Garry R.: "Surgical approach to hysterectomy for benign gynaecological disease". *Cochrane Database Syst. Rev.*, 2006, CD003677.
- [7] U.S. Food and Drug Administration: "Laparoscopic Uterine Power Morcellation in Hysterectomy and Myomectomy: FDA Safety Communication". Available at: <http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm393576.htm>
- [8] Bickenbach K.A., Karanickolas P.J., Ammori J.B., Jayaraman S., Winter J.M., Fields R.C., *et al.*: "Up and down or side to side? A systematic review and meta-analysis examining the impact of incision on outcomes after abdominal surgery". *Am. J. Surg.*, 2013, 206, 400.
- [9] Ghanbari Z., Baratali B.H., Foroughifar T., Pesikhani M.D., Shariat M.: "Pfannenstiel versus Maylard incision for gynecologic surgery: a randomized, double-blind controlled trial". *Taiwan J. Obstet. Gynecol.*, 2009, 48, 120.
- [10] Helmkamp B.F., Krebs H.B.: "The Maylard incision in gynecologic surgery". *Am. J. Obstet. Gynecol.*, 1990, 163, 1554.
- [11] Fanning J., Pruett A., Flora R.F.: "Feasibility of the Maylard transverse incision for ovarian cancer cytoreductive surgery". *J. Minim. Invasive Gynecol.*, 2007, 14, 352.
- [12] Giacalone P.L., Daures J.P., Vignal J., Herisson C., Hedon B., Lafargue F.: "Pfannenstiel versus Maylard incision for cesarean delivery: A randomized controlled trial". *Obstet. Gynecol.*, 2002, 99, 745.

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