Maylard Incision in Gynecologic Surgery: 4-Year Experience in Thammasat University Hospital

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Objective: *To present the results of Maylard incision for gynecologic surgery in Thammasat University Hospital during the past four years.*

Material and Method: *A retrospective study of gynecologic surgery performed via the Maylard muscle cutting incision compare to Pfannenstiel muscle splitting and midline incision. Data came from subjects who underwent gynecologic surgery at Thammasat University Hospital, Pathumthani, Thailand from January 2010 to December 2013.*

Results: *In the period of 4 years, there were 283 cases of elective surgery that performed via Maylard, Pfannenstiel and midline incision by the single experience gynecologic surgeon team. One hundred and six cases were performed via Maylard incision technique. The remaining 59 and 118 cases were performed via Pfannenstiel and midline incision technique, respectively. Two-thirds and one-thirds of cases underwent hysterectomy and conservative surgery, respectively. Benign conditions were the major indication for surgery at the percentage of 83.4. Operative results were not significantly different from well-known midline and Pfannenstiel incision in terms of blood loss, time to first meal and postoperative pain. Operative time in Maylard incision was longer than in Pfannenstiel incision. Length of stay in Maylard incision was longer than Pfannenstiel but shorter than midline incision. Overall complications (reoperation, bowel injuries, urinary bladder injuries and blood transfusion rate) were not significantly different.*

Conclusion: *Maylard incision provides similar operative results with midline and Pfannenstiel technique. Even though it takes more time for abdominal entry but it gives more operative exposure than Pfannenstiel incision. In the woman with previous low transverse scar and gynaecologic surgery is needed, Maylard incision could be an optional technique that provides cosmetic and successful results. Hand on training for Maylard incision from their mentors should be encouraged to more practice.*

Keywords: *Maylard, Midline, Pfannenstiel, Incision*

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Standard pelvic incisions used in gynecologic pelvic surgery are either transverse or low midline. Low midline incision gives rapid pelvic entry, good exposure and further extension capacity as needed. Transverse incision give good early postoperative period such as pain, burst abdomen, pulmonary morbidity and lower rate of incisional hernia compare to vertical incision[1]. The two popular transverse operations are Pfannenstiel and Maylard. Majority of transverse abdominal incision is Pfannenstiel. It provides cosmetic skin incision scar, less postoperative pain and earlier ambulation[2]. Most gynecologist in Thailand favors Pfannenstiel incision because they received hands-on training from their mentors despite its limited field exposure. Pfannenstiel incision is a muscle splitting technique while Maylard incision is a true transverse incision (muscle cutting). Maylard incision gives good exposure for surgery, good cosmetic result and it is currently the incision of choice for very obese patients[3-5].

Choice of gynecologic incision varies in different practices. It depends on the disease, tumor size, previous surgery and surgeon experience. Pfannenstiel incision is usually performed in cesarean section cases, easy to operate cases and benign

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conditions. Midline incision is normally considered for emergency condition, difficult cases, malignancy and uncertain preoperative diagnosis. Good surgical incision should provide good exposure for surgery, extension capacity as indicated, cosmetic result and feasible operation on previous incision scar if possible[6].

Thammasat University Hospital is a tertiary health care provider and residency-training center located in the northern Bangkok area. The hospital received women with indication for surgery from gynecologic clinic and affiliated healthcare providers in central Thailand. The choice of incision making depends on surgeon's experience, pervious scar, advance of disease and patient characteristics.

The present study investigated the operative outcome between midline and transverse operations performed in Thammasat University Hospital. The authors also investigated to see if Maylard incision has any operative advantage over Pfannenstiel incision in the current population.

Material and Method

This was a retrospective study conducted from January 2010 to December 2013 at Gynecologic In Patient Department (IPD), Thammasat University Hospital, Thailand. Patients with indication for exploratory laparotomy were recruited. This study was approved by Human Research Ethics Committee of Thammasat University (No. 1: Faculty of Medicine).

Two hundred and eighty-three women who had indication for gynecologic surgery were recruited. All cases were attended and underwent surgery per standard protocol. The surgeon team composed of well experience (>15 years) and certificated gynecologists. The patients received standard treatment including pre-operative evaluation, surgical treatment, postoperative care and further management as indicated for diagnosis and treatment. Demographic data and operative results were collected.

The technique of Maylard incision was done by making transverse incision above pubic symphysis. Anterior rectus sheath and rectus abdominis muscle were cut transversely without dissection of the muscle from sheath. Deep inferior epigastric arteries were usually ligated before approaching to abdominal cavity.

Inclusion criteria were the women that underwent gynecologic surgery by standard gynecologic indication who attended IPD at Thammasat University Hospital.

Exclusion criteria were the women with life-threatening conditions, less experienced surgeon and in emergency surgical cases.

Postoperative pain was routinely assessed by using the visual analogue scale (VAS). The scale ranges from 0 (no pain) to 10 (unbearable pain). The score was routinely assessed once a day in the morning from the first to the third postoperative day.

Results

Two hundred and eighty-three cases were recruited during the study period. Patient characteristics are shown in Table 1. Average age of all cases was 42.7 years (range 16-89). Patients of Maylard cases were older and heavier than Pfannenstiel cases. Body mass index (BMI) of all groups were not statistically different. Forty-seven cases (16.6%) underwent surgery due to malignant indications while the remaining 236 cases (83.4%) were benign condition.

Operative characteristics of Maylard, Pfannenstiel and midline incision are shown in Table 2. Operative time of Pfannenstiel was shorter than Maylard incision while Maylard and midline incision had similar operative time. Hysterectomy and conservative surgery were performed at 67.8 and 32.2 percent respectively. Maylard, Pfannenstiel and midline incisions were performed in 106, 59 and 118 cases. The anesthetic method in all types of incision were not significantly different.

Half of patients, who required vacuum drainage usage, belonged to Maylard group. Estimated blood loss (EBL) of all groups was not statistically different. Length of stay (LOS) of Maylard group was shorter than midline group, but slightly longer than Pfannenstiel group. Time for first meal (TFM) was not statistically different among the groups.

The time to first dose analgesia (TFA) was measured from time of finished surgery to time for first analgesia requirement. TFA of Maylard group was shorter than midline but longer than Pfannenstiel group. Postoperative pain scores in first three days from surgery were not statistically different except in the second day postoperative pain of midline group that was greater than Maylard group.

Complications from surgery, namely reoperation rate, blood transfusion, bowel and urinary bladder injuries were not significantly different in all groups.

Discussion

Midline incision is the standard incision for gynecologic operations. It gives good exposure and

Table 1. Patient characteristics

	Incision			*p*-value	
	Maylard (Ma)	Pfannenstiel (Pf)	Midline (Mi)	Ma/Pf	Ma/Mi
No. of patients	106	59	118		
Age (year)	46.5±11.2	38.7±8.1	41.1±14.4	<0.01*	0.01*
BMI (kg/m^2)	25.1±4.3	23.8±4.6	23.9±5.0	0.13	0.10
Weight (kg)	61.0±10.5	56.9±11.5	58.1±11.7	0.04*	0.07
Height (cm)	155.7±5.6	157.0±5.2	157.2±5.9	0.27	0.12
Indication (%, n)					
Benign	83 (88)	98.3 (58)	76.3 (90)	<0.01*	<0.01*
Malignant	17 (18)	1.7 (1)	23.7 (28)	<0.01*	<0.01*

* Statistical difference; BMI = body mass index

Table 2. Operative characteristics

	Incision			*p*-value	
	Maylard (Ma)	Pfannenstiel (Pf)	Midline (Mi)	Ma/Pf	Ma/Mi
No. of patients	106	59	118		
Operative time (min)	107.3±39.8	88.4±39.1	105.3±48.5	<0.01*	0.75
Operative procedure (%, n)					
Conservative	15.1 (16)	50.8 (30)	38.1 (45)	<0.01*	<0.01*
Hysterectomy	84.9 (90)	49.2 (29)	61.9 (73)	<0.01*	<0.01*
Anesthesia (%, n)					
GA	88.7 (94)	83 (49)	87.4 (103)	0.57	0.85
RA	8.5 (9)	11.9 (7)	8.4 (10)	0.57	0.85
Combined	2.8 (3)	5.1 (3)	2.2 (5)	0.57	0.85
Vacuum drainage (%, n)	43.4 (46)	13.6 (8)	29.7 (35)	<0.01*	0.03*
EBL (ml)	318.7±293.4	338.3±378.1	393.6±362.4	0.71	0.11
LOS (day)	4.7±1.1	4.4±0.7	5.2±1.5	0.05*	<0.01*
TFM (hr)	23.9±10.5	21.2±3.5	26.4±20.6	0.17	0.32
TFA (hr)	5.5±2.3	4.6±1.2	6.2±3.5	0.02*	0.01*
Pain (VAS: 0-10)					
Day 1st	4.8±1.6	5.0±1.5	5.1±1.5	0.62	0.25
Day 2nd	3.8±1.2	3.8±1.1	4.2±1.1	0.94	0.01*
Day 3rd	3.0±1.0	2.9±0.8	3.3±0.9	0.54	0.07
Complications (%, n)					
Reoperation	0	0	1.6 (2)		0.50
Bladder injury	0.9 (1)	0	0	1.00	0.47
Small bowel injury	0.9 (1)	0	0.8 (1)	1.00	1.00
Large bowel injury	0.9 (1)	0	2.5 (3)	1.00	0.62
Blood transfusion	12.3 (13)	6.8 (4)	15.3 (18)	0.30	0.52

GA = general anesthesia; RA = regional anesthesia; Combined = concurrent general and regional anesthesia; EBL = estimate blood loss; LOS = length of stay; TFM = time to first meal; TFA = time to first dose analgesia; Pain = postoperative pain score; VAS = visual analogue scale
* Statistical difference

extended capacity if needed but the cosmetic result is not satisfactory. Nowadays, it is a method of choice for cancer surgery, emergency conditions and operation with questionable diagnosis. Transverse incision is a

preferred method for its cosmetic outcome. When transverse incision is chosen, most gynecologists prefer familiar Pfannenstiel incision even though it has limitations for surgery.

This is a retrospective study that originated from the question: "Is Maylard or Pfannenstiel incision better?" Our findings showed that the outcome of Maylard incision was not significantly different from midline and Pfannenstiel incision. The patients in Maylard group were older than other groups. BMI was not different in the three groups but the body weight in Maylard group was more than in Pfannenstiel group. Maylard method was reported to be a preference among slightly overweight patients because it allows a better operative field.

The operative time in Maylard incision was longer than Pfannenstiel group but not statistically different from midline incision. The technique to perform Maylard incision is more sophisticated than other incisions because it requires cutting of rectus abdominis muscle and ligation of inferior epigastric artery vessels. The longer operative time gives no disadvantage considering a wider field advantage in slightly overweight patients.

Postoperative complication was not statistically significant among the three groups except for more vacuum drainage usage in Maylard group. This result may be from the more concern of surgeon of pelvic fluid collection prevention. TFA in Maylard group was significantly shorter than in midline group and longer than in Pfannenstiel group. Pain score on the second postoperative day was significantly less in Maylard group than in midline group but not different from Pfannenstiel group. Ghanbari et al founded that hysterectomy via Maylard incision needed less additional postoperative analgesia than Pfannenstiel[7].

The number of malignant cases in the midline group was highest (23.7%). This supports the common trend that midline is the incision of choice in cancerous cases. Among transverse incision patients, the percentage of malignant cases in Maylard incision was higher than in Pfannenstiel cases (17% and 1% respectively).

Hysterectomy was more performed in Maylard group (84.9%) than in midline group (61.9%) and Pfannenstiel group (49.2%). Hysterectomy usually requires longer operative time than the conservative operation. The length of stay in Pfannenstiel incision patients was the shortest compared to other technique that correlated to the number of malignant cases.

There was a report of a rising trend in cesarean sections with Pfannenstiel incision[8,9]. As a result, there is an increased number of gynecologic patient who need pelvic surgery and carry previous scars. The limited approach on patients with previous Pfannenstiel scars can be counteracted by the use of Maylard incision.

Even in the malignant cases such as cervical or ovarian cancer, Maylard incision can be applied without any difference in postoperative result. In the study of Orr et al, the duration of surgery in cervical cancer patients was a little bit longer in Maylard than with Pfannenstiel incisions but no difference was found in perioperative complications[10]. Fanning et al also presented the data that the Maylard incision provided adequate exposure to perform ovarian cytoreductive surgery and the abdominal adhesion after surgery was minimal[11]. Our results showed similar findings.

This study utilized a rather large number of Maylard incision cases and the same experienced surgeon team operated all patients. As a result, the operative experience among the patients was homogeneous. Limitations of this study were a retrospective study. A history of skin incision scars was not sufficiently recorded and available in detail.

What is already known on this topic?

Standard pelvic incisions used in gynecologic pelvic surgery are either transverse or low midline. Low midline gives rapid pelvic entry, good exposure and further extension capacity as needed. A majority of transverse abdominal incisions is Pfannenstiel. It provides cosmetic skin incision scars, less postoperative pain and earlier ambulation[4]. The two popular transverse operations are Pfannenstiel and Maylard. The Pfannenstiel incision is a muscle splitting technique, while Maylard incision is a true transverse incision (muscle cutting). Maylard incisions give both good exposure for surgery and cosmetic result.

What this study adds?

Maylard incision provides similar operative results with midline and Pfannenstiel techniques. Even though it takes more time for abdominal entry, it provides more operative exposure. Maylard incision should be an optional technique that provides cosmetic and successful results. Hands-on training for Maylard incisions from their mentors should be encouraged for more practice[6].

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Potential conflicts of interest

None.

References

1. Grantcharov TP, Rosenberg J. Vertical compared with transverse incisions in abdominal surgery. Eur J Surg 2001; 167: 260-7.
2. Pfannenstiel J. On the advantages of a transverse cut of the fascia above the symphysis for gynecological laparotomies, and advice on surgical methods and indications. Samml Klin Vortr Gynakol 1897; 68-98.
3. Maylard AE. Direction of abdominal incision. Br Med J 1907; 2: 895-901.
4. Suwannarurk K, Manusook S, Pongrojpaw D. Current Abdominal Incision for Obstetrics and Gynecologic Surgery. Thammasat Medical Journal 2012; 12: 547-60. [in Thai]
5. Suwannarurk K, Manusook S, Pongrojpaw D. The Maylard technique: a neglected incision. Royal Thai Air Force Med Gaz 2012; 58: 96-101. [in Thai]
6. Burke JJ, GallupDG. Incisions for gynecologic surgery. In: Rock JA, Howard WJ, editors. Te Linde's operative gynecology. 10th ed. Philadelphia: Lippincott William & Wilkins; 2008: 246-79.
7. Ghanbari Z, Baratali BH, Foroughifar T, Pesikhani MD, Shariat M. Pfannenstiel versus Maylard incision for gynecologic surgery: a randomized, double-blind controlled trial. Taiwan J Obstet Gynecol 2009; 48: 120-3.
8. Chanthasenanont A, Pongrojpaw D, Nanthakomon T, Somprasit C, Kamudhamas A, Suwannarurk K. Indications for cesarean section at Thammasat University Hospital. J Med Assoc Thai 2007; 90: 1733-7.
9. Lurie S, Glezerman M. The history of cesarean technique. Am J Obstet Gynecol 2003; 189: 1803-6.
10. Orr JW Jr, Orr PJ, Bolen DD, Holimon JL. Radical hysterectomy: does the type of incision matter? Am J Obstet Gynecol 1995; 173: 399-405.
11. Fanning J, Pruett A, Flora RF. Feasibility of the Maylard transverse incision for ovarian cancer cytoreductive surgery. J Minim Invasive Gynecol 2007; 14: 352-5.

การผ่าตัดทางนรีเวชโดยใช้การลงมีดผ่าตัดแบบ Maylard ประสบการณ์ 4 ปี ในโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ

สกล มนูสุข, คมสันติ์ สุวรรณฤกษ์, เด่นศักดิ์ พงศ์โรจน์เผ่า, กรณ์กาญจน์ ภมรประวัติธนะ

วัตถุประสงค์: เพื่อศึกษาผลของการลงมีดผ่าตัดแบบ Maylard สำหรับการผ่าตัดทางนรีเวชในโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติในระยะเวลา 4 ปีที่ผ่านมา

วัสดุและวิธีการ: เป็นการศึกษาย้อนหลังในการผ่าตัดทางนรีเวชโดยใช้การลงมีดผ่าตัดแบบ Maylard เปรียบเทียบกับการลงมีดแบบ Pfannenstiel และ Midline โดยศึกษาในผู้ป่วยที่เข้ารับการผ่าตัดทางนรีเวชในโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติตั้งแต่ เดือนมกราคม พ.ศ. 2553 ถึง เดือนธันวาคม พ.ศ. 2556

ผลการศึกษา: ในช่วงระยะเวลา 4 ปีที่ศึกษา มีผู้มารับการผ่าตัดทางนรีเวชจำนวน 283 ราย และได้รับการลงมีดผ่าตัดแบบ Maylard, Pfannenstiel และ Midline โดยทั้งหมดได้รับการผ่าตัดจากทีมแพทย์เดียวกัน มีจำนวน 106 ราย ได้รับการลงมีดผ่าตัดแบบ Maylard จำนวน 59 และ 118 ราย ได้รับการลงมีดผ่าตัดแบบ Pfannenstiel และ Midline ตามลำดับ ประมาณสองส่วนสามของผู้ป่วยเป็นการตัดมดลูกที่เหลือเป็นการผ่าตัดด้านอื่น ๆ ร้อยละ 83.4 เป็นการผ่าตัดที่ไม่ใช่ผู้ป่วยที่เป็นมะเร็งทางนรีเวช ผลการผ่าตัดโดยการลงมีดแบบ Maylard ไม่พบความแตกต่างอย่างมีนัยสำคัญทางสถิติเมื่อเปรียบเทียบกับการลงมีดผ่าตัดแบบอื่นในด้านการเสียเลือดขณะผ่าตัด ระยะเวลาหลังผ่าตัดจนเริ่มกินอาหาร และอาการปวดหลังผ่าตัด การลงมีดผ่าตัดแบบ Maylard มีระยะเวลาในการผ่าตัดนานกว่าแบบ Pfannenstiel และจำนวนวันนอนพักในโรงพยาบาลนานกว่าแบบ Pfannenstiel แต่สั้นกว่าแบบ Midline ส่วนภาวะแทรกซ้อนต่าง ๆ เช่น การต้องผ่าตัดซ้ำ การมีอันตรายต่อลำไส้ กระเพาะปัสสาวะและการให้เลือดไม่แตกต่างกันอย่างมีนัยสำคัญทางสถิติ

สรุป: การลงมีดผ่าตัดแบบ Maylard ให้ผลการผ่าตัดไม่แตกต่างจากวิธี Midline และ Pfannenstiel แม้ว่าจะใช้เวลาในการเข้าสู่ช่องท้องนานกว่า แต่สามารถทำการผ่าตัดโดยเห็นขอบเขตการผ่าตัดที่กว้างขวางกว่าวิธี Pfannenstiel ในกรณีที่จะต้องทำการผ่าตัดในผู้ป่วยที่มีแผลผ่าตัดเก่าในแนวนอนอยู่ การลงมีดแบบ Maylard เป็นทางเลือกหนึ่งที่สามารถทำให้ได้ผลการผ่าตัดที่ดีและมีแผลผ่าตัดที่สวยงาม ดังนั้นจึงควรมีการฝึกฝนการผ่าตัดแบบนี้ให้มากขึ้น