Pregnancy Outcomes of Multiple Repeated Cesarean Sections in King Chulalongkorn Memorial Hospital

Piyawadee Wuttikonsammakit MD*,
Nares Sukcharoen MD*

** Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongrkorn University*

Objectives: *To determine the incidence of maternal and neonatal morbidity and mortality in women with history of at least one previous cesarean section and to compare the pregnancy outcome of the women with the history of one previous cesarean section to the women with the history of two or more previous cesarean section.*

Material and Method: *We performed a retrospective study of 458 patients undergoing repeated cesarean section from 1998 to 2005. Various factors that may be associated with repeated cesarean sections and pregnancy outcomes were assessed and analyzed.*

Results: *Maternal morbidity rate was 18.6%, including operative complications (17.5%) and post operative complications (1.7%). The operative complications included intraperitoneal adhesion 45 cases (9.8%), excessive blood loss (>1000 ml) 29 cases (6.3%), placenta previa 5 cases (1.1%), placenta adherens 6 cases (1.3%) and requirement of blood transfusion 10 cases (2.2%). Postoperative complications included postpartum hemorrhage 4 cases (0.9%). No maternal mortality was found in this study. Neonatal morbidity rate was 20.5%, including neonatal jaundice 33 case (7.2%), large for gestational age 37 cases (8.1%), and preterm babies 20 cases (4.4%). There were no statistically significant differences of maternal morbidity and neonatal morbidity between the pregnant women with the history of one previous cesarean section and the women with the history of two or more previous cesarean section.*

Conclusions: *Maternal and neonatal morbidity in repeated cesarean section were low.*

Keywords: *Pregnancy outcome, Multiple repeated cesarean section, Maternal morbidity, Neonatal morbidity*

J Med Assoc Thai 2006; 89 (Suppl 4): S81-6
Full text. e-Journal: *http://www.medassocthai.org/journal*

The evolution of cesarean delivery as a safe procedure with low maternal and neonatal morbidity and mortality rate has been one of the most important development in modern obstetric care. Improvement in surgical care such as lower segment cesarean section, aseptic technique, safe anesthesia, antibiotics prophylaxis have decreased maternal morbidity associated with the surgical procedure. Recently, cesarean births have increased dramatically in many countries over the past 10 years, also lead to increased rate of repeated cesarean section, and debatable its risk and benefit. Available data show that repeated cesarean section is associated with many complications, especially intraperitoneal adhesion[1], placenta previa[1,2], uterine rupture[3] and cesarean hysterectomy[4]. In addition, postoperative complication was increased in repeated cesarean section such as endometritis[5]. However, several studies found no association between repeated cesarean delivery and maternal complications[6,7]. However, there was limited published data about the pregnancy outcomes of multiple repeated cesarean sections in Thailand. The purpose of our study was to determine the incidence of pregnancy outcomes of repeated cesarean section in women with one or more previous section, and to compare the incidence of maternal and neonatal morbidity and mortality between the pregnant women with the history of one previous cesarean section and the pregnant women with the history of two or more previous cesarean section.

Correspondence to : Wuttikonsammakit P, Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongrkorn University, Bangkok 10330, Thailand.

Material and Method

Medical records of all 8,896 women who underwent a cesarean section because of one or more cesarean section histories from 1998-2005 at King Chulalongkorn Memorial Hospital, were randomly recruited from the computer using ICD-10 code "O820" and "O342", and ICD 9 CM code "74" for individual chart review. The inclusion criterion was the repeated cesarean section performed at 28 weeks of gestation or later. The 479 cases were selected for review. After initial review, 21 cases with uncertain number of prior cesarean section were excluded from the study. The remaining 458 medical cords were assessed and analyzed for the following parameters:

(a) Demographic and clinical features, including age and parity of the patient, the length of gestation, the mode of operation whether elective or not, type of anesthesia used and whether tubal ligation was performed at the time of caesarean section or not.

(b) Perinatal features including birth weight, number below 10th birthweight centile, Apgar score at 5 minutes, preterm birth below 37 weeks of gestation, and number of admissions into neonatal intensive care unit (NICU). Neonatal morbidity including Apgar score < 7 at 5 minutes, NICU admission, preterm baby, small or large for gestational age, neonatal jaundice, hypoglycemia, sepsis, and pneumonia

(c) Operative and post-operative course, including duration of operation, estimated blood loss during surgery, the severity of adhesions, incidence of placental abnormalities, rupture of scar, incidence of caesarean hysterectomy, bladder and bowel injury, blood transfusion, admission to the intensive care unit (ICU), fall in hemoglobin, incidence of wound infection, urinary tract infection, chest infection, pyrexia and length of hospital stay. Maternal morbidity including operative and postoperative complication such as uterine laceration, placenta previa, blood transfusion, cesarean hysterectomy, postpartum hemorrhage, postoperative infection.

Statistical analysis

Data entry and analysis were performed with SPSS (Chicago, Ill) version 10.0. Demographic data were summarized using descriptive statistics (mean, standard deviation, range and percentage). Clinical data were compared by using unpaired t test for normally distributed continuous variables, $\chi^2$and Fisher's exact test for categorical variables where appropriate and Mann-Whitney test for nonparametric statistical analysis. Statistical significance was considered when $p < 0.05$.

Results

The total number of cases eligible for the study was 479. After individual chart review, 21 cases were excluded due to uncertain number of prior cesarean section. Therefore, the remaining 458 cases were included for analysis. Of these, 319 (67.5%) had one prior cesarean section, 122 (28.5%) had two prior cesarean section, 18 (3.7%) had three prior cesarean section.

The demographic characteristics were shown in Table 1. We also found placenta previa 5 cases (1.1%), and placenta adherens 6 cases (1.3%).

Antenatal complications found in this study included diabetes (gestational DM and overt DM) 14 cases (3.06%), hypertension (gestational hypertension, mild preeclampsia, severe preeclampsia, and chronic hypertension) 13 cases (2.84%), elderly gravida 163 cases (35.6%), preterm labor 35 cases (7.6%), premature rupture of membrane 17 cases (3.7%), grand multiparity 5 cases (1.1%) and breech presentation 16 cases (3.5%).

There were elective cesarean section 226 cases (49.3%) and emergency cesarean section 232 cases (50.7%). The indications of emergency cesarean section were in labor 207 cases (45.2%), and PROM 15 cases (3.3%).

The operation performed consisted of cesarean section with TR 333 cases (72.7%) cesarean section alone 19 cases (26%), and cesarean section with

Table 1. Demographic characteristics (n = 458)

Age (years)	32.5 $\pm$ 4.8	(range 21-46)
Length of stay (days)	5.6 $\pm$ 1.7	(range 2-23)
Gestational ages (weeks)	37.9 $\pm$ 0.9	(range 33-41)
Gravidity	median = 3	(range 2-9)
Parity	median = 1	(range 1-6)
Operative times (minutes)	48.3 $\pm$ 16.5	(range 25-120)
Estimated blood loss (ml)	median = 500	(range 100-3,200)
Birth weight (grams)	3,138.6 $\pm$ 430.8	(range 1,420-5,160)

appendectomy 6 cases (1.3%). The abdominal incisions were low midline incision 247 cases (53.9%) and Pfannensteil incision 209 cases (45.6%).

Anesthesia used for the operation included subarachnoid block (SAB) 436 cases (95.2%), general anesthesia (GA) 10 cases (2.2%), and epidural block (EB) 12 cases (2.6%).

There were maternal morbidity in 85 cases (18.6%), including operative complications 80 cases (94.1%) and postoperative complications 8 cases (9.4%). There was neonatal morbidity in 94 cases (20.5%). (Table 2) No maternal mortality was found in this study. There was only one stillbirth at GA 36 wk with unknown etiology, undergo cesarean section due to previous cesarean section.

The major causes excessive blood loss were placenta previa and placenta adherens 5 cases, uterine atony due to myoma 1 case and twin 1 case, intraperitoneal adhesions 2 cases and uterine laceration 1 case. However, there was no cesarean hysterectomy.

Table 2. Maternal and neonatal morbidity

Maternal morbidity		Neonatal morbidity	
Operative complications		Preterm babies	20 (4.4%)
Intraperitoneal adhesion	45 (9.8%)	LGA	37 (8.1%)
Uterine laceration	1 (0.2%)	SGA	5 (1.1%)
Bladder injury	1 (0.2%)	NICU admission	3 (0.6%)
Bowel injury	1 (0.2%)	Neonatal jaundice	33 (7.2%)
EBL more than 1000 ml.	29 (6.3%)	Hypoglycemia	9 (2.0%)
Blood transfusion	10 (2.2%)	Sepsis	1 (0.2%)
		Pneumonia	1 (0.2%)
Postoperative complications			
Postpartum hemorrhage	4 (0.9%)		
Endometritis	2 (0.4%)		
Wound infection	1 (0.2%)		
Wound dehiscence	1 (0.2%)		

EBL = estimated blood loss, LGA = Large for gestational age, SGA = Small for gestational age, NICU = Neonatal intensive care unit

Table 3. Comparative data between one prior cesarean section and two or more times prior cesarean section

Variables	Previous C/S = 1 (n = 318)	Previous C/S $\geq$ 2 (n = 140)	p-value
Age (years)	32.1 $\pm$ 4.8	33.4 $\pm$ 4.7	0.01
Length of stay (days)	5.6 $\pm$ 1.6	5.64 $\pm$ 0.9	0.648
Operative time (minutes)	48.1 $\pm$ 17.1	48.7 $\pm$ 15.4	0.732
Anesthesia	SAB 300 (94.3%)	SAB 136 (97.1%)	
	GA 8 (2.5%)	GA 2 (1.4%)	
	EB 10 (3.1%)	EB 2 (1.4%)	
Estimated blood loss (ml) [median (range)]	500 (100-3200)	500 (150-2300)	0.068
Infant weight (gm)	3114.5 $\pm$ 410.6	3191.9 $\pm$ 470.4	0.077
APGAR score < 7 at 5 minutes	2 (0.6%)	0	0.482
Maternal morbidity	54 (17%)	31 (22.1%)	0.239
- Operative complications	49 (15.5%)	31 (22.3%)	0.105
- Intraperitoneal adhesion	26 (8.3%)	19 (13.7%)	0.108
- Postoperative complications	7 (2.2%)	1 (0.7%)	0.242
Neonatal morbidity	63 (19.8%)	31 (22.1%)	0.657
Stillbirth (case)	1 (0.3%)	0	0.694

SAB = Subarachnoid block, GA = General anesthesia, EB = Epidural block

The comparative data between previous one cesarean section and previous two or more cesarean section, showed no significant differences in length of stay, operative time, maternal morbidity, and infant morbidity between two groups. Differences of operative complication between two groups were observed, but did not reach statistical significance (Table 3).

Discussion

As the operation of cesarean section has become safer, the incidence of cesarean section has increased. For many years, allowing labor after a previous cesarean section was thought to be dangerous, and any women who have had a cesarean section should deliver all subsequent babies by cesarean section. In attempt to reduce rate of cesarean section, obstetricians now offer a trial of labor to women who have had a previous cesarean section. Although overall rate of maternal complication did not differs significantly between the women who trial of labor and who elected cesarean section, major complication were nearly twice as likely among women undergoing a trial of labor[8].

The rate of primary and repeated cesarean delivery continues to rise around the world. Repeated cesarean section is routinely performed in most parts of Thailand. In Chulalongkorn Memorial Hospital, nearly all pregnant women who have had cesarean section, always undergo elected cesarean section. This lead to increased prevalence of cesarean section due to previous cesarean section from 29.1% to 36.7% compared to 10 years ago. Our study found low maternal morbidity rate in repeated cesarean section cases.

In literature review, repeated cesarean sections associated with many major operative complications such as scar pains, intraperitoneal adhesion that risk for bowel and bladder injuries, massive blood loss, placenta previa, placenta adherens, emergency hysterectomy, longer operative time, scar dehiscence[1-3,5].

In this study, increased intraperitoneal adhesions was observed in the women with the history of two or more previous cesarean section (13.7%) when compared with the women with the history of one previous cesarean section (8.3%). In previous studies, intraperitoneal adhesion increased after 4-10 repeated cesarean section (18.2%) when compared with control (2.7%)[1]. This may be due to surgical technique in the previous surgery. Adhesions prolonged operating time with a corresponding need for blood transfusion. Injury to adjacent organs may relate to increased intraperitoneal adhesion from multiple repeated cesarean sections.

The incidence of placenta previa and placenta adherens in this study was higher than the general population. In the previous study, the risk of placenta previa increased with parity and number of cesarean section. The adjusted odd ratio for primiparous with one cesarean delivery was 1.28, for women parity greater than four and greater than four cesarean deliveries was 8.76[2]. These findings indicated that the women with multiple cesarean sections had increased risk of placenta previa and placenta adherens. Preventive management should be focused toward minimizing complications by improved antenatal imaging with ultrasound or other imaging to increase diagnostic accuracy for placenta previa and accreta. Appropriate preoperative care with adequate blood for transfusion should be prepared for the high risk cases and cesarean section should be done by experienced surgeons.

Causes of excessive blood loss (> 1000ml) in this study were due to placenta previa and uterine atony. However, excess blood loss and blood transfusion requirement were not statistically significant different between two groups which were similar to the previous studies[1,7].

In this study, the incidence of emergency cesarean section was higher than elective cesarean section due to in labor or ruptured of fetal membranes (emergency : elective 50.7% VS 49.3%) which was similar to the previous study[9]. In the previous studies, emergency cesarean section increased the incidence of many complications such as wound infection, hemorrhage, and blood transfusion requirement[8-10]. However, in our study, there was no significant difference of operative and postoperative complications between both groups.

Our results demonstrated that with appropriate prenatal care, adequate preoperative cares, meticulous surgical techniques and careful postoperative care, multiple repeated cesarean sections were safe. All cesarean sections were performed in the University hospital (tertiary center) which has highly experienced surgeon and standard equipped place. This may be different in other circumstances, especially in the rural area or in hospital that lack some facilities. There were no statistically significant differences in maternal and neonatal morbidity between the pregnancy outcome between the women with the history of one previous cesarean section and the women with the history of two or more previous cesarean sections. This may be from insufficient sample size required for statistical significant to compare all complications. Therefore, further, larger comparative study is needed.

Conclusion

Maternal morbidity with repeated cesarean section is low. There were no statistically significant differences in maternal and neonatal morbidity and mortality between the pregnancy outcome between the women with the history of one previous cesarean section and the women with the history of two or more previous cesarean sections.

References

1. Juntanen K, Makarainen L, Kirkinen P. Outcome after a high number (4-10) of repeated cesarean sections. BJOG 2004; 111: 561-3.
2. Gilliam M, Rosenberb D, Davis F. The likelihood of placenta previa with greater number of cesarean deliveries and higher parity. Obstet Gynecol 2002; 99: 967-8.
3. Ali AM, Abu-Heija AT. Obstetric and perinatal outcome of women para > or = 5 including one lower segment cesarean section. J Obstet Gynecol Res 2002; 28: 163-5.
4. Kirkinen P. Multiple cesarean sections : outcomes and complications. Br J Obstet Gynaecol 1988; 95:778-82.
5. Burrows LJ, Meyn LA, Weber AM. Maternal morbidity associated with vaginal versus cesarean delivery. Obstet Gynecol 2004;103: 907-12.
6. Lynch CM, Kearney R, Turner MJ. Maternal morbidity after elective repeat cesarean section after two or more previous procedures. Eur J Obstet Gynecol Reprod Biol 2003; 106:10-3.
7. Rashid M, Rahid RS. High order repeat cesarean sections : how safe are five or more? BJOG 2004; 111: 1090-4.
8. McMahon MJ, Luther ER, Bowes WA Jr, Olshan AF. Comparison of a trial of labor with an elective second cesarean section. N Engl J Med 1996; 335: 689-95.
9. Nielsen TF, Hokegard KH. Cesarean section and intraoperative surgical complications. Acta Obstet Gynecol Scand 1984;63:103-8.
10. Khawaja NP, Yousaf T, Tayyeb R. Analysis of cesarean delivery at a tertiary care hospital in Pakistan. J Obstet Gynecol 2004; 24: 139-41.

การศึกษาผลของการตั้งครรภ์ในภาวะผ่าตัดคลอดทางหน้าท้องซ้ำ

ปิยวดี วุฒิกรสัมมากิจ, นเรศร สุขเจริญ

วัตถุประสงค์: *เพื่อศึกษาอุบัติการณ์ของการบาดเจ็บและการตายของมารดาและทารกที่คลอดโดยการผ่าตัดคลอดทางหน้าท้องซ้ำอย่างน้อย 1 ครั้ง และศึกษาเปรียบเทียบผลของการตั้งครรภ์ในมารดาที่เคยมีประวัติผ่าท้องคลอด 1 ครั้ง เปรียบเทียบกับที่เคยมีประวัติผ่าท้องคลอดตั้งแต่ 2 ครั้งขึ้นไป*

วัสดุและวิธีการ: *ทำการศึกษาย้อนหลังในหญิงตั้งครรภ์ที่มาคลอดโดยการผ่าคลอดซ้ำในโรงพยาบาลจุฬาลงกรณ์ ตั้งแต่เดือนกุมภาพันธ์ พ.ศ. 2540 ถึงธันวาคม พ.ศ. 2548 รวมผู้ป่วยที่นำมาวิเคราะห์ 458 ราย ที่ได้ทำการเก็บข้อมูลทั่วไปของผู้ป่วย ภาวะต่างๆของมารดา รายละเอียดการผ่าตัด ผลลัพธ์ที่เกิดขึ้นทั้งในมารดาและทารก รวมถึงภาวะแทรกซ้อนที่เกิดขึ้นทั้งในขณะผ่าตัดและหลังผ่าตัด*

ผลการศึกษา: *อัตราการเจ็บป่วยของมารดาเป็น 18.6% ประกอบด้วย ภาวะแทรกซ้อนขณะการผ่าตัด 17.5% และภาวะแทรกซ้อนภายหลังการผ่าตัด ภาวะแทรกซ้อนขณะผ่าตัด ได้แก่ พังผืดในช่องท้อง 45 ราย (9.8%), การเสียเลือดมาก (> 1,000 มล.) 29 ราย (6.3%), รกเกาะต่ำ 5 ราย (1.1%), รกเกาะติดแน่น 6 ราย (1.3%), และผู้ป่วยที่ได้รับเลือด 10 ราย (2.2%) ส่วนภาวะแทรกซ้อนภายหลังการผ่าตัด ได้แก่ การตกเลือดหลังคลอด 4 ราย (0.9%) ไม่พบการตายของมารดาในการศึกษานี้ มีอัตราการเจ็บป่วยของทารก 20.5% ประกอบด้วย ภาวะตัวเหลืองตาเหลืองในทารกแรกเกิด 33 ราย (7.2%), ทารกมีขนาดใหญ่กว่าอายุครรภ์ 37 ราย (8.1%) และทารกคลอดก่อนกำหนด 20 ราย (4.4%) เมื่อเปรียบเทียบผู้ป่วยระหว่างเคยผ่าท้องคลอด 1 ครั้งกับตั้งแต่ 2 ครั้งขึ้นไปพบว่าไม่มีความแตกต่างอย่างมีนัยสำคัญระหว่างอัตราการเจ็บป่วยของมารดา (17% และ 22.1% ตามลำดับ) และอัตราการเจ็บป่วยของทารก (19.8% และ 22.1% ตามลำดับ)*

สรุป: *การผ่าตัดคลอดทางหน้าท้องซ้ำมีอัตราการเกิดภาวะแทรกซ้อนต่อมารดาและทารกต่ำ*