

Original Article

Delivery after Prior Cesarean Section in Kuwait

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ABSTRACT

Introduction: There has been a dramatic increase in rates of cesarean section (CS) worldwide. Vaginal delivery after prior CS is one of the strategies to reduce the high CS rate.

Objective: To evaluate the mode of delivery after prior CS over a 14 year period from 1992 to 2005

Study Design: Retrospective Clinical Study

Setting: Maternity Hospital, Kuwait

Subjects and Methods: The socio-demographic characteristics and the mode of delivery after prior CS of 12,725 eligible women were extracted from the annual reports, perinatal and maternal committee records, patient files and the central CS registers for validation.

Results: Out of 12,725 women with prior CS, 7655 (60%) achieved vaginal delivery (spontaneous vaginal delivery 86% and instrumental vaginal delivery 14%). In 8%

women, elective CS was carried out mainly for abnormal presentation, medical disorders, macrosomia and multiple pregnancies. There was a downward trend in the vaginal delivery rate from 65.7% in 1992 to 51.3% in 2005. Infertility / IVF and multiple pregnancies increased three-fold as indications for repeat emergency CS between 1992-1995 and 2000-2005 periods. CS rate after induction of labor was 52% whereas 48% had vaginal delivery.

Conclusion: After a prior CS, vaginal delivery was achieved in 60% of the women with few complications. With appropriate selection of patients, vaginal delivery is safe. Active management of labor and involvement of senior staff in the decision to perform repeat CS is advocated.

KEYWORDS: indications, prior CS, vaginal delivery

INTRODUCTION

There has been a marked increase in the rate of cesarean section (CS) worldwide^[1,2]. To lessen this high rate and decrease the health care costs associated with CS, deliberate efforts were made to re-examine the practice of elective CS^[3-5]. Routine elective CS for a second delivery for women with prior lower segment CS results in an excess of maternal morbidity and mortality and a high cost to medical resources and the medical team^[6-8]. Complications related to further cesarean deliveries include placenta previa, accreta and hysterectomies. There are now many reports of significant reduction of CS rates, while maintaining or even improving perinatal outcome^[9]. Vaginal birth after cesarean delivery has therefore been advocated as a safe and practical means of reducing the overall CS rate. However, the proportion of women who attempt vaginal delivery after prior CS has decreased largely because of concern about increased maternal and perinatal morbidity^[10]. In some centers, only one third of patients with lower segment CS will require the procedure again if allowed a trial of labor^[11].

Concerns have been raised by many about the overall risk of uterine rupture for women with a prior cesarean delivery undergoing a subsequent trial of labor. The risk has been estimated to be between 0.2 and 1.0 percent^[12,13]. McMahon *et al*^[14] directly addressed the issue of maternal and perinatal morbidity and mortality associated with trial of labor in 3249 women with previous CS as compared to 2889 women who chose to have a repeat CS. There were no differences in perinatal outcomes, number of maternal deaths nor mild maternal morbidity and mortality. The likelihood of major complications however, was almost double in women undergoing trial with a scar. There have also been strong arguments that elective CS will prevent long term consequences of pregnancy, labor and delivery such as urinary and anal incontinence and utero-vaginal prolapse as a result of vaginal birth^[6]. A contrary view suggests that the etiology of incontinence is multi-factorial with many risk factors other than vaginal delivery^[7]. The reproductive consequences of multiple CSs should always be considered when making policy decisions regarding risk-benefit

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analysis of vaginal delivery^[15]. In Kuwaiti society where members prefer large families, the decision for a repeat CS after prior CS should be taken carefully so as not to limit the family size of the woman.

The objective of this study was to evaluate the mode of delivery after prior CS over a 14 year period (from 1992-2005) at the Maternity hospital, Kuwait.

SUBJECTS AND METHODS

Maternity Hospital supervises more than 40 percent of all deliveries in the State of Kuwait, with about 14,000 deliveries annually. All women who delivered in the hospital after one previous lower segment CS between 1992 and 2005 form the subjects of this study. All patients included belonged to the Maternity Hospital catchment area.

Data regarding the study subjects was collected from four related sources:

1. The perinatal committee reports: This committee is made up of obstetricians, neonatologists, nurses and other health workers in the hospital. The committee meets monthly to consider all perinatal deaths and review data on maternal background and characteristics of the pregnancy.

2. Annual Reports: These are compiled as annual audit reports.

3. Patient files: The socio-demographic characteristics of the patients were documented from the files, including the age, parity, intra-partum events and details of operative deliveries, gestation at delivery, birth-weight and maternal and perinatal outcome.

4. CS registers: Indications for primary CS and the mode of delivery after prior CS were extracted from the central CS registers for validation.

Statistical Analysis: Percentages and mean values plus standard deviations were calculated for comparison using Student t test to compare paired variables and Mann-Whitney test was used for continuous variables. For evaluation of trend over the years, logistic regression analysis was carried out with adjustment for age, parity and gestation. The level of significance was accepted as a p value 0.05.

RESULTS

Delivery after a prior CS was evaluated in 12,725 women as shown in Table 1. Their mean age was 28 ± 9 years (range = 18 to 45 years) and mean parity was 3.2 ± 0.9 . Elective CS, defined as planned with the patient admitted a night before the operation, was the mode of delivery in 1023 (8%) or 20.3 percent all those that eventually had a repeat CS. Of the 11,702 women with prior cesarean that started labor, 4047 (34.6%) were delivered by emergency CS, while 7655 (65.4%) were delivered *per vaginam*.

Table 1: Characteristics of women with prior CS

Characteristics	No. of Women with Previous one CS	Per cent
Age (years)		
< 20	534	4.2
21-24	3741	29.4
25-29	4263	33.5
30-34	2367	18.6
35-39	1387	10.9
> 40	433	3.4
Parity		
1	3792	29.8
2	2596	20.4
3	2291	18.0
4	2621	20.6
> 5	1425	11.2

Vaginal delivery after CS:

The overall vaginal delivery rate after prior CS was 60.2 percent between 1992 and 2005. Table 2 summarizes the trend in vaginal delivery between 1992 and 2005, showing an overall vaginal delivery rate of 60 percent with a rate of 66 percent in the first quarter (1992-1995) and dropping significantly to 51 percent in the last quarter (2003 - 2005) of the study ($p < 0.02$). Spontaneous vaginal delivery was the main mode of delivery in 85.9 percent of women that delivered vaginally, 10.4 percent had vacuum extraction and 3.4 percent had forceps delivery. Although breech presentation in the presence of a previous CS was usually an indication for elective CS in the hospital, 0.2 percent of all women that delivered vaginally, were delivered either by spontaneous vaginal breech delivery or by assisted breech delivery probably after late arrival to the labor room in advanced second stage of labor.

Indications for CS after prior cesarean delivery:

Analysis of the indications for elective and emergency CS is shown in Table 3 in order to explain the reasons for the decrease in the vaginal delivery rate. There was no significant difference in the elective CS rate of about 20 percent (18 - 23%) during the study period, nor with known and common indications like abnormal presentation, medical disorders, macrosomia and previous vaginal operations. However, there was significant increase in CS among women with antepartum hemorrhage ($p < 0.05$) and a two-fold increase for multiple pregnancy ($p < 0.01$) between the first and second halves of the study. Similarly, there was no significant change in the emergency CS rate, especially in such indications as prolonged labor and failure to progress, fetal distress, cephalopelvic disproportion and failed induction of labor. Two indications for repeat CS revealed almost a

Table 2: Mode of vaginal delivery after prior CS

	1980-84 n (%)	1985-89 n (%)	1992-95 n (%)	1996-99 n (%)	Total
Previous CS	3996 (68.9)	4302 (65.2)	2151 (60.3)	2276 (55.1)*	12725
Vaginal delivery*	2625 (65.7)	2633 (61.2)	1229 (54.6)	1168 (51.3)	7655 (60.2)
Spontaneous vaginal delivery	2256 (86.0)	2262 (85.9)	1045 (85.0)	1016 (87)	6579 (85.9)
Vacuum extraction	273 (10.4)	276 (10.5)	133 (10.8)	113 (9.7)	795 (10.4)
Forceps delivery	87 (3.3)	90 (3.4)	47 (3.9)	39 (3.3)	263 (3.4)
Breech delivery	9 (0.3)	5 (0.2)	47 (3.9)	-	18 (0.2)

* Significant decrease between 1980 and 1999: $p < 0.01$

Table 4: Effects of the indications of prior CS on mode of delivery during current pregnancy

Indications for prior CS	Vaginal delivery after prior CS n (%)	Emergency CS after prior CS n (%)	Elective CS after prior CS n (%)	Total
Failure to progress in labor	2311(74.4)	536 (17.3)	258 (8.3)	3105 (24.4)
Cephalo-pelvic Disproportion	616 (20.5)	2087 (69.4)	302 (10.1)	3003 (23.6)
Fetal distress	2014 (81.6)	279 (11.3)	176 (7.1)	2469 (19.4)
Abnormal presentation	1447 (60.8)	888 (38.4)	158 (7.1)	2379 (18.7)
Failed induction	152 (47.8)	148 (46.7)	17 (5.3)	318 (2.5)
Others	965 (65.5)	488 (43.3)	98 (8.7)	1451 (11.4)
Total	7655 (60.2)	4047 (31.8)	1023 (8.0)	12,725

three-fold increase in the second half of the study. These include infertility/IVF-ET ($p < 0.001$) and multiple pregnancies ($p < 0.001$). These two factors cannot fully account for the downward trends in vaginal delivery rates.

Effects of the indications in patients with prior CS:

Analysis of the indications in patients with prior CS is shown in Table 4. The odds ratio of achieving vaginal delivery after prior CS was highest for fetal distress (OR = 4.8, 95% CI 3.4, 6.2), failure to progress (OR = 3.8, 95% CI 3.0, 5.6) and abnormal presentation (OR = 3.2, 95% CI 2.2, 2.6) whereas it was lowest for cephalo - pelvic disproportion (OR = 0.8, 95% CI - 0.4,1.2) and was associated with the lowest vaginal delivery rate of 20.5 percent.

Effects of the mode of delivery on perinatal and maternal outcome:

There were significantly more preterm deliveries by elective CS and emergency CS than by vaginal delivery (15.3% and 12.4% versus 6.5%; $p < 0.05$) as shown in Table 5. Elective CS delivered fewer women after 40 weeks of gestation than by vaginal delivery (2.8 versus 5.8%; $p < 0.05$) and emergency CS (2.8 versus 14.6%; $p < 0.01$). The high proportion of emergency CS after 40 weeks of gestation had a major contribution from induction of labor. Out of the 11,702 women that had some form of labor, 748 (6.4%) had induction of labor

Table 3: Indications of CS after prior CS

	1992-95	1996-99	2000-02	1996-99 2003-05	Total
Total number of CSs	1371	1640	922	1102	5070(39.8)
Indications for Elective C.S.	259(18.2)	316(19.3)	212(23)	251(22.8)	1023(20.2)
Abnormal presentation	68(26.2)	80(25.4)	50(23.4)	58(23.2)	256(24.7)
Medical disorders	44(16.8)	54(17.2)	32(15.2)	38(15.0)	168(16.2)
Macrosomia	37(14.4)	46(14.6)	28(13.0)	32(12.8)	143(13.8)
Previous operation	33(12.8)	42(13.4)	31(14.4)	35(14.1)	141(13.6)
Antepartum haemorrhage*	21(8.2)	28(9.0)	25(12.0)	31(12.4)	105(10.1)
Multiple pregnancy**	17(6.4)	18(5.8)	24(11.4)	30(12.0)	89(8.6)
Others	39(15.2)	46(14.6)	22(10.6)	34(13.5)	141(13.5)
Indication for Emergency C.S.	1112(81.8)	1324(80.7)	710(77)	951(77.2)	4047(79.8)
Failure to progress in labor	276(24.8)	320(24.2)	160(22.6)	215(22.6)	971(23.7)
Fetal distress	202(18.2)	246(18.6)	86(12.1)	123(12.9)	657(16.0)
Abnormal presentation	178(16.0)	221(16.7)	85(12.0)	107(11.3)	591(14.4)
Cephalo-Pelvic Disproportion	171(15.4)	214(16.2)	108(15.2)	140(14.7)	633(15.5)
Failed Induction	160(14.4)	196(14.8)	102(14.4)	136(14.3)	594(14.5)
IVF/Infertility	31(2.8)	42(3.2)	70(9.8)	95(10.1)	238(5.8)
Multiple pregnancy	29(2.6)	40(3.0)	62(8.8)	83(8.7)	214(5.2)
Intrauterine growth restriction	24(2.2)	24(1.8)	24(3.4)	33(3.5)	105(5.7)
Others	40(3.6)	33(2.5)	12(1.7)	33(3.5)	118(2.9)

Significant increase as indication for repeat CS

* $p < 0.05$, ** $p < 0.01$, $p < 0.001$, $p < 0.001$

mainly from postdates (i.e. after 40 weeks of gestation) and medical disorders like diabetes mellitus and hypertension. The emergency CS rate was 52%, mainly from failure to progress, fetal distress and failed induction. A similar trend was observed with low birthweight, which occurred in 7.2% in babies delivered vaginally compared to a two - fold increase to 13.2% in emergency CS ($p < 0.05$), and 15.3% in elective CS ($p < 0.05$). A greater proportion of babies weighing 4.0 kg or more, were delivered by elective and emergency CS than by vaginal delivery (11.6 versus 5.6%; $p < 0.05$). There was obvious natural selection bias because low birthweight and macrosomic babies were preferably delivered by CS. Of the 185 perinatal deaths, 49 (26.5%) were stillbirths and 136 (73.5%) were early neonatal deaths of which 78 (57.4%) were preterm, 32 (23.5%) were congenital anomalies and 15 (11%) were deaths from hypoxia. Most of the stillbirths (44) were delivered vaginally, except five that presented with transverse lie (2), macrosomia (2) and big breech (1). The perinatal mortality rate of 1.3% with vaginal delivery was lower than 1.7% for emergency CS ($p < 0.05$) and 1.8% in elective CS ($p < 0.05$). The CS was more likely to be used to salvage pregnancies with prenatal and intrapartum complications.

In the evaluation of maternal morbidity, postpartum hemorrhage (PPH) and rupture uterus were prominent causes. PPH was more common in women delivered by elective CS and emergency CS than those with vaginal delivery (3.9 and 2.0% compared to 1.4%; $p < 0.01$). Uterine rupture occurred in 0.7 per 1000 for vaginal delivery and 1.0

Table 5: Outcome of delivery after prior CS according to the mode of delivery

	Vaginal delivery % n = 7655	Emergency CS % n = 4047	Elective CS % n = 1023
Gestational age at delivery			
<37 weeks	6.8	12.4	15.7
38-40 weeks	88.4	73.0	81.5
>40 weeks	5.8	14.6	2.8
Birthweight			
< 2.5 Kg	7.2	13.2	15.3
2.5-4.0 Kg	87.2	75.2	73.1
>4.0 kg	5.6	11.6	11.6
Perinatal mortality	97 (1.3%)	69 (1.7%)	19 (1.8%)
Maternal Morbidity	11 (1.4 per 1000)	8 (2.0 per 1000)	4 (3.9 per 1000)
Postpartum hemorrhage			
Ruptured uterus	5 (0.7 per 1000)	4 (1.0 per 1000)	-
Retained placenta	7	-	-
Placenta accreta	2 (0.3 per 1000)	3 (0.74 per 1000)	3 (2.9 per 1000)

per 1000 in women delivered by emergency CS. Suspicion or impending rupture of the uterus was usually an indication for emergency CS. Ruptured uterus had no effect on perinatal mortality (no perinatal death) but in three women, cesarean hysterectomy was carried out because of severe postpartum hemorrhage from major placenta previa and placenta accreta.

DISCUSSION

The present study has demonstrated that a trial of labor after prior CS is safe in about 60 percent of women in Kuwait but only 48 percent after induction of labor. The crude perinatal mortality in the present study was 14.5 per 1000. If the extreme preterm births and congenital anomalies incompatible with life were excluded, the perinatal mortality among women with vaginal delivery after prior cesarean section could be comparable with the general maternity population perinatal mortality rate of 9 -10 per 1000. The outcome of the present study is similar to the outcomes of previous studies in which vaginal delivery occurred in 50 - 80 percent cases following a prior CS^[5,14,16]. In a recent study in which a trial of labor was carried out in 17, 613 women with previous CS, the success rate was 73.7% (65.6% after induction of labor)^[17]. Like in the present study, there were few complications. The downward trend of vaginal delivery after prior CS with decline of 22 percent (65% in 1980 - 84 to 51% in 1995 - 99) is of great concern. This is due to the three main indications, viz antepartum haemorrhage, successful infertility management with in-vitro fertilization and consequent multiple pregnancies. This was the official policy of the Assisted Reproductive Technology team then and the anxiety of the patients. These factors cannot fully account for the drop in vaginal delivery rates. The present study

has also shown that history of previous CS is an important factor in the outcome in a subsequent pregnancy. This is consistent with a recent report by Bujold *et al*^[18]. When the indication for a prior CS was cephalo-pelvic disproportion, the rate of vaginal delivery was lower than when the indication was not a recurrent cause. The main concern for vaginal delivery after prior CS is that of uterine rupture^[19]. In the present study, the incidence of uterine rupture was 0.7 per 1000 for vaginal delivery and 1.0 per 1000 for emergency CS. This is much lower than an overall risk of uterine rupture for women with a prior cesarean delivery undergoing subsequent trial labor which is reported to be between 0.2 and 1 percent^[20] and 0.4 to 8.0 percent in patients undergoing oxytocin augmentation^[21,22]. This risk can be further reduced by appropriate selection of patients, method of induction and adequate monitoring during labor. It must be pointed out however that a symptomatic uterine dehiscence of 0.5 to 2% after vaginal delivery is associated with minimal morbidity and it is hardly identified.

Socol *et al*^[3] have successfully introduced guidelines promoting vaginal birth after CS through active management of labor and circulation of CS rates of attending obstetricians. This has significantly led to reduction of CS rates. Myers and Gleischer^[5] took similar steps, for management of fetal distress and breech presentation, in which it was mandatory to take a second opinion before performing a non-emergency CS.

As part of the decision making process, information and counseling should aim to estimate specific risks and probability of successful vaginal delivery or risk factors for failure of trial of labor after prior CS^[23,24]. Every hospital should therefore establish practice guidelines on the management of patients with prior CS. For example, after Medline database analysis of articles published from January 1, 1995 to February 28, 2004, on vaginal delivery after CS, a Canadian group developed guidelines on the management of delivery after prior CS^[25]. The highlight of these guidelines included the need for informed consent, conducting the delivery in a hospital with resources and availability of operating-room staff and continuous electronic monitoring.

CONCLUSION

In well selected women, vaginal delivery after prior CS carries a low risk. There is a need to review the liberal policy of operative delivery following successful assisted reproductive technology. The trend towards fewer vaginal deliveries after prior CS can be halted and reduced through active

management of labor and involvement of senior staff in the decision making process of repeat CS in patients with history of prior CS.

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REFERENCES

1. Notzon FC, Cnattingius S, Bergsjo P, Cole S Taffel S, Irgen I, Dattveit AK. CS delivery in the 1980's: International comparison by indication. *Am J Obstet Gynecol* 1994; 170:495-504.
2. Wilkinson C, McIlwaine G, Boulton-Jones C, Cole S. Is a rising CS rate inevitable? *Brit J Obstet Gynaecol* 1998; 105:45-52.
3. Socol ML, Gancia PM, Paeceman AM, Dooley SL. Reducing cesarean births in a primarily private university hospital. *Am J Obstet Gynaecol* 1993; 168:1748-1754.
4. Cowan RK, Kinch RAH, Ellis B, Anderson R. Trial of labor following CS. *Obstet Gynecol* 1994; 83:933-936.
5. Miller DA, Fidelia GD, Paul RH. Vaginal Birth after Caesarean Section. *N Engl J Med* 1996; 335:689-695.
6. Wall LL. Cost effectiveness of elective CS after one prior low transverse cesarean. *Obstet Gynecol* 2000; 96:482.
7. Grobman WA, Peaceman AM, Socol ML. Cost-effectiveness of elective cesarean delivery after one prior low transverse cesarean. *Obstet Gynecol* 2000; 95:745-751.
8. Walker R, Golois E, Turnbull D, Wilkinson C. Why choose CS. *Lancet* 2001; 357: 635-636.
9. Myers SA, Gleischer N. A successful programme to lower CS rates. *N Eng J Med* 1998; 319:1511-1516.
10. Landon MB, Hauth JC, Leveno KJ, et al. Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery *N Engl J Med* 2005; 352:1718-1720.
11. Lopez-Zeno JA, Peaceman AM, Adashek JA, Socol ML. A controlled trial of program for active management of labor. *N Engl J Med* 1992; 326:450-454.
12. Chazotte C, Cohen WR. Catastrophic complications of previous CS. *Am J Obstet Gynecol* 1990; 163:738-742.
13. Caughey AB, Shipp T D, Repke JT, Zelop CM, Cohen A, Lierberman E. Rate of uterine rupture during trial of labor in women with one or two prior cesarean deliveries. *Am J Obstet Gynecol* 1999; 181:872-876.
14. McMahon MJ, Luther ER, Bowes WA, Olshan AF. Comparison of a trial of labor with an elective second CS. *N Engl J Med* 1996; 335:689-695.
15. Pare E, Quinones JN, Macones GA. Vaginal birth after CS versus elective repeat CS: assessment of maternal downstream health outcomes. *BJOG* 2006; 113:75-78.
16. Phelan JP, Clark SL, Diaz FP. *Am J Obstet Gynecol* 1987; 157:1510-1515.
17. Rageth I.C, Fuz,G Grossenbacher H. For the Swiss working Group of Obstetric and Gynecologic Institutions. *Obstet Gynecol* 1999; 93:332-337.
18. Bujold E, Gauthier RJ. Should we allow a trial of labor after a previous Cesarean for dystocia in the second stage of labor? *Obstet Gynecol* 2001; 98:652-655.
19. Smith GCS, White IR, Pell JP, Dobbie R. Predicting Cesarean and Uterine Rupture among women Attempting Vaginal Birth after Prior CS. *PLos Med* 2: e 252
20. Lagrew DC Jr, Morgan MA. Decreasing the caesarean section rate in a private hospital: Success without mandated clinical changes. *Am J Obstet Gynecol* 1996; 174:184-191.
21. Davies GAL, Hatin PM, McGrath MJ. Vaginal Birth after Caesarean. Physician's perception and practice. *J Reprod Med* 1996; 41:515-520.
22. Hibbard JU, Ismail MA, Wang Y, Te C, Karrison T, Ismail MA. Failed vaginal birth after a CS: how risky is it? *Am J Obstet Gynecol* 2001; 184:1365-1371.
23. Rozenberg P. The counselling of patient with prior C-section. *Gynecol Obstet Fertil* 2005; 33:1003-1008.
24. Smith GC. Outcome Associated with a trial of Labor after Prior Cesarean Delivery. *N Engl J Med* 2005; 352:1718-1720.
25. Martel MJ, MacKinnon CJ. Guidelines for vaginal birth after previous Cesarean birth. *J Obstet Gynaecol Can* 2005; 27:164-188.