

## Vaginal birth following two cesarean deliveries—are the risks exaggerated?

Vibha Kailash Garg\* Dip. Obs., FRCOG and E. N. Ekuma-Nkama, DORCPI., FRCOG

**Background:** Prior to 1996, most women who had undergone two previous cesarean deliveries were offered only cesarean delivery at Al-Hasa Health Centre. A policy of trial of labor was instituted in 1996. We compared the outcome of trial of labor versus cesarean delivery in women with a history of two previous cesarean deliveries who delivered between 1997 and 2002.

**Patients and Methods:** All patients with a history of two previous lower segment cesarean deliveries were included in the study. Those considered suitable were permitted a trial of labor that was neither induced nor augmented at any stage.

**Results:** Of the 205 patients in the study, 66 delivered vaginally (32.2%), 68 had an emergency cesarean delivery (33.2%), and 71 an elective cesarean delivery (34.6%). No scar dehiscence was observed, nor was hysterectomy performed in either group. The rate of complications was lower in the vaginal delivery group (4.5%) than in the cesarean delivery group (19.4%).

**Conclusion:** Trial of labor in women with a history of two cesarean deliveries is a reasonable consideration, and when carried out without the use of oxytocics or prostaglandins, is associated with reduced maternal morbidity with no difference in perinatal morbidity.

**Key words:** Cesarean delivery, vaginal delivery, trial of labor, trial of scar, oxytocics, prostaglandins

*From the Department of Obstetrics & Gynecology, Al Hasa Health Center (Saudi Aramco Medical Services Organization), Saudi Aramco, Al Hasa, Saudi Arabia*

*Correspondence to:  
Dr. Vibha K. Garg  
Dept. of Obstetrics & Gynecology  
Al Hasa Health Center Saudi Aramco  
Al Hasa  
Saudi Arabia  
E-mail: gargvk@aramco.com*

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The incidence of cesarean deliveries has escalated in recent years. This increase is due to a perception of increased fetal safety, perception of low maternal risk, medico-legal concerns, established clinical patterns, more patients undergoing primary cesarean deliveries, and slow acceptance of vaginal birth after cesarean delivery (VBAC). Delivery by cesarean delivery is associated with increased maternal mortality<sup>1-3</sup> and morbidity, particularly wound infection, and it is not associated with improved perinatal mortality. Performing a cesarean delivery is more expensive than vaginal birth and the length of stay in the hospital is longer.<sup>4</sup>

Although neither a repeat cesarean delivery nor labor after previous cesarean delivery is without risk, it has been demonstrated that a trial of labor is successful in 60% to 80% of patients who had low transverse uterine incision for one previous delivery<sup>5,6</sup> and the success rate is 63% to 70% in women for whom the indication was “cephalopelvic disproportion.”<sup>7,8</sup> It has been suggested in several reports that women who have had more than one prior cesarean delivery may safely undergo a trial of labor<sup>9</sup> and the maternal and fetal risks for these women do not seem to be greater than those for women who have undergone only one cesarean delivery. It is recommended that a woman who has had two or more previous cesarean deliveries with lower uterine segment incisions, and who wishes to attempt vaginal birth,

should not be discouraged from doing so in the absence of contraindications. The data are insufficient to predict success rates in this patient population.<sup>10</sup>

Prior to 1996, most women who had undergone two previous cesarean deliveries were offered only cesarean delivery at Al-Hasa Health Centre. A policy of offering a trial of labor was instituted at our hospital in 1996.

### Patients and Methods

All patients who attended our prenatal clinic with a history of two previous transverse lower uterine segment cesarean deliveries were included in this study. During the first prenatal visit, a plan for the mode of delivery, i.e., cesarean delivery versus vaginal delivery, was discussed with the patients. They were informed about current evidence of a 60% success rate and a 2% risk of previous uterine scar rupture and associated complications with trial of labor. An information sheet was prepared based on the ACOG Committee Opinion Number 143<sup>10</sup> and presented to the patients. It included information on the individual appropriateness of VBAC, the possibility of VBAC, the success of VBAC, the low complications of VBAC, the complications of cesarean delivery, and the possible need for cesarean delivery during trial of VBAC.

Patients were asked to consider the options carefully and communicate their decision to the obstetrician at their

**Table 1.** Indications for emergency cesarean delivery.

Indication	No.	%
Failure to progress	23	33.8
Fetal malpresentation	12	17.6
Non-reassuring NST	9	13.2
Pre-labor rupture of membranes	9	13.2
Reduced fetal movements	2	2.9
Impending rupture of scar	2	2.9
Ante-partum hemorrhage	4	5.9
Patient request	5	7.4
Pregnancy-induced hypertension	1	1.5
Previous inverted 'T' incision	1	1.5

subsequent clinic visit. The plan was reassessed as required and reinforced through the prenatal care. Considering their cultural background and desire to have large families, most women opted for a trial of labor. Some patients who had previously had two cesarean deliveries for cephalopelvic disproportion but no vaginal deliveries insisted on having a trial of labor. These patients were warned that a cesarean delivery would be performed at any time the obstetrician felt it necessary, and the risks associated with trial of labor were explained again at the time they presented in labor.

Prenatal care was as usual. Elective cesarean delivery was performed if any of the following applied: previous classical or low vertical cesarean delivery, hysterotomy, or myomectomy, non-vertex presentation, placenta previa, multiple gestation, induction of labor was indicated for any reason, or patient preference.

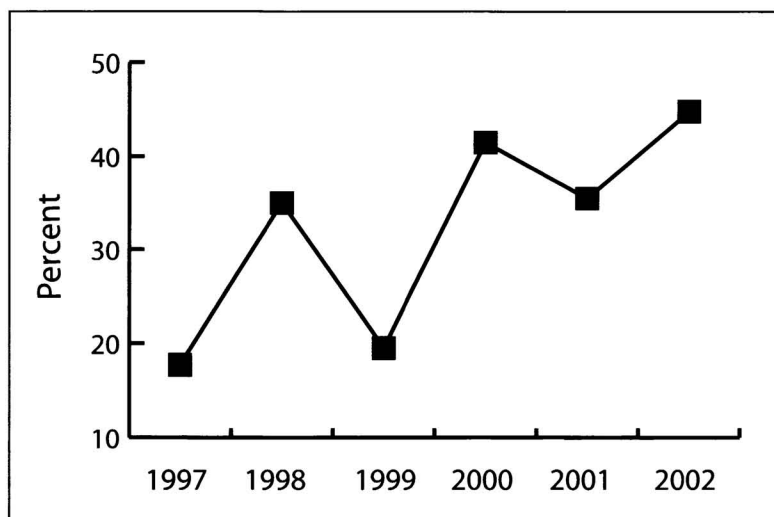
None of our patients underwent induction of labor with either prostaglandins or oxytocin, and when the patients failed to progress in labor due to inadequate uterine activity, cesarean delivery was performed instead of augmentation with oxytocin. During labor, the fetal heart rate was monitored continuously either by an external monitor or a fetal scalp electrode. Uterine activity was monitored using an external pressure transducer. Pethidine or nitrous oxide inhalation was used for analgesia since epidural analgesia was not available in our hospital.

### Results

Two hundred and five patients with a history of two previous cesarean deliveries were delivered between 1997 and 2002 in Al-Hasa Health Center. Of these, 66 delivered vaginally (32.2%), 68 underwent emergency cesarean delivery (33.2%) (Table 1), and 71 had elective cesarean delivery (34.6%). Since our hospital has a policy against the use of prostaglandin or oxytocin in women with two previ-

**Table 2.** Comparison of outcome of vaginal delivery versus Cesarean delivery (1997 to 2002).

	Cesarean delivery (n=139)	Normal spontaneous delivery(n=66)	P value
Complications	27 (19.40%)	3 (4.50%)	0.05
Intra- and post-op hemorrhage	8 (EBL>1000ml)	3 (EBL> 500 ml)	
Puerperal pyrexia	3		
Complete wound dehiscence	1		
Partial wound dehiscence	5		
Wound hematoma	1		
Wound infection	4		
Intra-operative bladder injury	1		
Intra-operative bowel injury	1		
Urinary tract infection	1		
Acute tubular necrosis	1		
Supraventricular tachycardia	1		
Blood loss	300ml-2700 ml (mean=680 ml)	100 ml- 600 ml (mean=265 ml)	<0.00001
Blood transfusion	8	1 (hemolytic anemia)	
Hospital stay	5-16 days (mean =6 days)	1-11 days (mean =2 days)	<0.00001
APGAR score <5 @ 1 minute	7.9	8.3	0.17
<7 @ 5 minutes	9.1	9.3	0.63
Birth weight	1.5 - 5.185 kg (mean = 3.28 kg)	1.4 -4.077 kg (mean = 3.01kg)	0.07
Parity	2-15 (mean =5.45)	2-10 (mean =5.38)	0.85
Gestation	32-42 weeks (mean =38.8 )	29-41 weeks (mean = 38.1)	0.22



**Figure 1.** Trend in vaginal births (normal spontaneous delivery) after two previous cesarean deliveries at Al Hasa Health Center (1997-2002).

ous cesarean deliveries, labor was not induced in patients who had non-reassuring NST (non-stress test), pre-labor rupture of membranes, reduced fetal movements, or pregnancy induced hypertension. Five patients changed their mind and opted for cesarean delivery, and hence a trial of labor was abandoned. One patient had a ventouse delivery and one an assisted breech delivery. There was no scar dehiscence in either the vaginal delivery group or the cesarean delivery group and none of our patients required a cesarean hysterectomy (Table 2).

The complication rate in the vaginal delivery group was lower 4.5% (95% CI, 0-9.5%) compared to 19.5% in the cesarean delivery group (95% CI = 12.8-26%). This difference was statistically significant ( $P=0.05$ ). Among the women who had a vaginal delivery, the estimated blood loss ranged from 100 ml to 600 ml (mean $\pm$ SD, 265 ml $\pm$ 112 ml). Three patients had an estimated blood loss of 600 ml, which was managed conservatively, and none required blood transfusion. One patient underwent examination under anesthesia when no evidence of retained products or scar dehiscence was noted. In the cesarean delivery group, the estimated blood loss ranged from 300 ml to 2700 ml (mean $\pm$ SD, 680 ml(300ml)). Eight patients required blood transfusion for intra-operative hemorrhage. The difference in the estimated blood loss in the two groups was statistically significant ( $P<0.00001$ ). Post-operatively, the following complications were noted:

- 3 cases of puerperal pyrexia
- 1 wound hematoma
- 5 cases of partial abdominal wound dehiscence
- 1 case of complete abdominal wound dehiscence
- 4 abdominal wound infections

- 1 intra-operative bladder injury
- 1 intra-operative bowel injury
- 1 urinary tract infection

One patient in the cesarean delivery group developed severe pre-eclampsia followed by acute tubular necrosis, but recovered without any sequelae.

The duration of hospital stay was significantly longer in the cesarean delivery group, ranging from 5 to 16 days (mean = 5.45 days) as compared to the vaginal delivery group, in which patients stayed in the hospital for 1 to 11 days (mean, 2 days) ( $P<0.00001$ ). Hospital stay was prolonged in the vaginal delivery group due to prematurity, low birth weight or transient tachypnea rather than maternal complications. Fetal outcome was comparable in both groups. Of the four patients who delivered stillbirths, all had intrauterine fetal death prior to onset of labor. There was one neonatal death in the vaginal delivery group due to multiple congenital abnormalities. The fetal weight in the vaginal delivery group and cesarean group ranged from 1.4 kg to 4.077 kg (mean, 3.01 kg) and 1.5 kg to 5.185 kg (mean, 3.28 kg), respectively ( $P=0.07$ ). There was no difference in the mean gestational age and parity in the two groups. The mean gestation was 38.1 weeks in the vaginal delivery group and 38.5 weeks in Cesarean group ( $P=0.22$ ) and the mean parity was 5.38 and 5.45, respectively ( $P=0.85$ ). Similarly, there was no statistical difference in the APGAR scores in both groups. Of the 66 patients who delivered vaginally, 8 patients had no prior vaginal delivery, while two of the patients in this latter group had undergone both cesarean deliveries for possible cephalopelvic disproportion. They were offered elective cesarean delivery but insisted on having a trial of scar.

Prior to 1996, most women who had previously undergone two cesarean deliveries were offered only cesarean delivery deliveries at Al-Hasa Health Center. A policy of offering trial of labor was instituted in the same year. The rate of vaginal delivery showed a gradual improvement from 1997 to 2002 (17.7% in 1997 to 44.8% in 2002). (Figure 1) This reflects an increasing level of confidence in both obstetricians and patients with regard to the safety of trial of vaginal delivery after two previous cesarean deliveries. Interestingly, a trend was also noted in physicians' response; the vaginal delivery rate for some physicians was as high as 69% compared to some who had a vaginal delivery rate of only 10%.

### Discussion

A trial of labor in patients who have undergone two previous cesarean deliveries appears to be a reasonable consideration. The possible association of oxytocin with uterine rupture in women undergoing a trial of labor has been evaluated in several studies. In a study by Rageth et al,<sup>11</sup> women in the uterine rupture group had increased rates of induced labor (24%) compared to the non-rupture group (13.9%). Leung et al reported a three-fold increase in the risk of uterine rupture in women who received oxytocin.<sup>12</sup> Zelop et al reported a uterine rupture rate of 0.7% among women attempting vaginal delivery with spontaneous labor compared to 2% among women induced with oxytocin. Oxytocin use for induction and augmentation of labor was associated with a 4.6-fold and 2.3-fold increase in the incidence of uterine rupture respectively.<sup>13</sup>

The use of prostaglandins in women who have had previous cesarean delivery is associated with a clear increase in incidence of uterine rupture. There is a reported incidence rate of 3.9% of uterine rupture in women who received prostaglandin E2 for cervical ripening compared to 0.9% among those who did not receive prostaglandin E2.<sup>13</sup> Lydon-Rochelle et al noted a significant increase in

the incidence of uterine rupture in women who underwent vaginal delivery after induction with prostaglandin.<sup>14</sup>

The number of studies in which trial of labor after two cesarean deliveries has been evaluated is few. Taking into consideration the above findings, we decided to conduct a trial of labor in a selected group of patients, whilst avoiding the use of oxytocin or prostaglandin E2. There was not a single case of uterine rupture, scar dehiscence, or a hysterectomy in either the cesarean delivery group or the vaginal delivery group. The maternal morbidity rate was higher in the cesarean group rather than in the vaginal delivery group with no difference in the parity and gestation in the two groups. If, however, we had used oxytocin or prostaglandin for induction of labor, or oxytocin for augmentation of labor, we may have had a higher vaginal delivery rate but it may have also increased the rate of uterine rupture, which itself has severe consequences for both the fetus and the mother.

In Saudi Arabian culture, large families are very desirable. Since repeat elective cesarean deliveries will limit the ultimate size of a family, it is important to keep the primary cesarean delivery rate low and to allow a trial of scar in subsequent pregnancies. Here, we have shown that a trial of scar in women who have had two previous cesarean deliveries can be successful, with minimal major complications, if patient selection is judicious and labor is managed appropriately with avoidance of the use of prostaglandins and oxytocic drugs. Vaginal delivery is associated with lower maternal morbidity; and reduced hospital stay makes it more cost-effective.

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