

ORIGINAL ARTICLE

Relationship of Stage of Labour at Time of C-Section and Subsequent Preterm Delivery in Females Presenting With Singleton Pregnancy

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ABSTRACT

Background: Preterm birth remains a large public health concern and contributor to neonatal morbidity. The effect of a cesarean in different stages of labor on spontaneous preterm birth (sPTB) in a subsequent pregnancy has not been extensively studied.

Aim: To assess the association of subsequent preterm delivery with second stage of labour at time of cesarean delivery in previous pregnancy in females presenting with singleton pregnancy.

Study design: Cohort study

Place and duration of study: Unit IV, Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore from August 2017 to February 2018.

Methodology: A total of 180 patients who was fulfill the selection criteria included in the study. Females were asked for stage of labour at time of cesarean section in previous pregnancy and two groups were formed. Group I females with C-section at first stage and group II females with C-section at second stage. Then all patients were followed-up in OPD till delivery of index pregnancy. Statistical analysis was done using SPSS version 20.

Results: The mean age in all cases was 30.95±5.55 years with minimum and maximum age as 20 and 40 years. The mean age in group-I was 31.09±5.71 years and the mean age in group-II was 30.81±5.40 years. The mean parity in group-I and group-II was 2.78±0.92 and 2.82±0.84. The mean gestational age in group-I and group-II was 39.04±1.94 weeks and 38.22±3.05 weeks respectively. In group-I 4(4.4%) cases and in group-II 15(16.7%) cases had preterm birth, the preterm birth was higher in group-II as compared to unexposed group-I, pvalue <0.05. The RR = 0.267 shows protective effect on PTB in group-I.

Conclusion: Through the findings of this study we found significant association of subsequent preterm delivery with second stage of labour at time of cesarean delivery in previous pregnancy in females presenting with singleton pregnancy. So females with previous LSCS must be screened timely to prevent subsequent preterm birth. By minimizing subsequent preterm birth we can reduce related neonatal mortality.

Keywords: Cesarean delivery, Preterm birth, Second stage of labor.

INTRODUCTION

Although the rate of preterm birth (PTB) has decreased since 2006, the decline has been marginal¹⁻³. Preterm birth remains a large public health concern and contributor to neonatal morbidity. The overall PTB rate in the United States is currently 11.7% with a spontaneous PTB (sPTB) rate of 7-8%.¹⁻⁵ There are many known risks for PTB; however, the majority of women present without an identified risk factors^{2,4,6,7}.

One possible risk factors that has not been extensively studied is the effect of a prior cesarean delivery in the second stage of labor. The cervical trauma from a prolonged second stage, as well as injury of the cervix during a cesarean, are events that could alter the cervical integrity, placing women at risk for PTB in a subsequent pregnancy. For example, unintentionally incising the cervix during uterine incision or cervical extensions and lacerations during delivery may disrupt cervical integrity and compromise the cervical function for future pregnancies. This theory has been suggested by expert opinion and described in case reports; however, the effect of a second stage cesarean delivery on PTB has not been scientifically evaluated⁸⁻¹⁰.

It has been reported that out of 129 females who underwent C-section at first-stage, PTB in subsequent pregnancy was 2.3% and 37 females who underwent C-section at second-stage, PTB was 13.5%¹¹.

The rationale of this study is to assess the association of subsequent preterm delivery with second stage of labour at time of cesarean delivery in previous pregnancy in females presenting with singleton pregnancy.

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MATERIAL AND METHODS

This Cohort study was carried out in the Department of Obstetrics & Gynecology Unit-IV at Sir Ganga Ram Hospital, Lahore from August 2017 to February 2018. A total of 180 females; 90 females in each group were who fulfilled the selection criteria was included in the study from labor room. After taking informed consent, demographic details (name, age, gestational age, parity) were obtained. Females were asked for stage of labour at time of cesarean section in previous pregnancy and two groups were formed. Group I females with C-section at first stage and group II females with C-section at second stage. Then all patients were followed-up in OPD till delivery of index pregnancy. If delivery occurred <38 weeks of gestation (on LMP), then preterm delivery was noted. Quantitative data i.e., age and gestational age was presented as mean and standard deviation. Qualitative data like parity and preterm delivery was presented as frequency and percentage. Relative risk was calculated to measure the association between stage of labour at time of C-section and subsequent preterm delivery. RR>1 was considered as significant. Data was stratified for age, parity and BMI. Post-stratification, adjusted RR was calculated with a RR>1 taken as significant. Chi-square test was applied with p≤ 0.05 considered as statistically significant.

RESULTS

The mean age in all cases was 30.95±5.55 years. The mean age in group-I was 31.09±5.71 years and the mean age in group-II was 30.81±5.40 years. In group-I, 42(46.7%) cases were 20-29 years and 48(53.3%) were 30-40 years old while in group-II there were 35(38.9%) cases whose age was 20-29 years and 55(61.1%) cases were 30-40 years old (Table 1). The mean parity in group-I

and group-II was 2.78 ± 0.92 and 2.82 ± 0.84 with minimum and maximum parity in both groups as 2 and 4 (Table 2). In group-I there were 60(66.7%) with parity 2-3 and 30(33.33%) had parity 4. In group-II there 65(72.2%) had parity and 25(27.8%) cases had parity 4 (Table 3).

The mean gestational age at time of delivery in group-I and group-II was 39.04 ± 1.94 weeks and 38.22 ± 3.05 weeks respectively (Table 4). Among PTB there were 15(78.9%) exposed and 4(21.1%) cases were un-exposed while in full term birth (FTB) cases there were 75(46.6%) exposed and 86(53.4%) cases were un-exposed. PTB was significantly higher in exposed group as compared to unexposed group, $p < 0.05$ with $RR > 1$ i.e. 3.75 (Table 5). Preterm birth was significantly higher in exposed versus un-exposed females having 2-3 parity (81.2% versus 18.8%) and preterm birth were statistically same in both study groups in parity of 4 years (66.7% versus 33.3%) (Table 6). Preterm birth was significantly higher in exposed versus unexposed obese females (90% versus 10%) and preterm birth was statistically same in both study groups of non-obese (66.7% vs. 33.3%) (Table 7).

Table 1: Frequency distribution of age (years) in both groups (n=180)

Age group (years)	Group I	Group II
20-29	42(46.7%)	35(38.9%)
30-40	48(53.3%)	55(61.1%)
Mean \pm SD	31.09 \pm 5.71	30.81 \pm 5.40

Table 2: Descriptive statistics of Parity in both groups (n=180)

Parity	Mean	Minimum	Maximum
Group-I	2.78 \pm 0.92	2.00	4.00
Group-II	2.82 \pm 0.84	2.00	4.00
Total	2.80 \pm 0.87	2.00	4.00

Table 3: Frequency of Parity in both groups (n=180)

Parity	Group I	Group II	Total
2-3	60(66.7%)	65(72.2%)	125(69.4%)
4	30(33.3%)	25(27.8%)	55(30.6%)

Table 4: Descriptive statistics of Gestational age (weeks) at time of delivery in both groups (n=180)

Gestational age (weeks)	Mean	Minimum	Maximum
Group-I	39.04 \pm 1.94	30	41
Group-II	38.22 \pm 3.05	29	42
Total	38.63 \pm 2.58	29	42

Table 5: Comparison of preterm birth in both groups (n=180)

Study groups	Preterm Birth		Total
	Yes	No	
Exposed	15(78.9%)	75(46.6%)	90(50%)
Unexposed	4(21.1%)	86(53.4%)	90(50%)
Total	19(100%)	161(100%)	180(100%)

Chi-square = 7.12, Pvalue = 0.008, RR = 3.75

Table 6: Comparison of preterm birth in both groups in different age groups

Age (years)	Study groups	Preterm Birth		PR	P value
		Yes	No		
20-29	Exposed	11(84.6%)	24(37.5%)	6.60	0.002
	Unexposed	2(15.4%)	40(62.5%)		
30-40	Exposed	4(66.7%)	51(52.6%)	1.74	0.502
	Unexposed	2(33.3%)	46(47.4%)		

Table 7: Comparison of preterm birth in both groups in different BMI (n=180)

BMI	Study groups	Preterm Birth		PR	P value
		Yes	No		
Obese	Exposed	9(90%)	20(51.3%)	6.21	0.026
	Unexposed	1(10%)	19(48.7%)		
Non obese	Exposed	6(66.7%)	55(45/1%)	2.29	0.210
	Unexposed	3(33.3%)	67(54.9%)		

DISCUSSION

Preterm birth (PTB) prior to 37 weeks' gestation complicates approximately 12% of pregnancies in the USA and is a leading cause of infant morbidity and mortality. Obstetric history is often

used to guide subsequent pregnancy management because a prior PTB is the strongest risk factor for subsequent PTB. Other risk factors, such as African American race, low socio-economic status and cervical conisation have also been associated with an increased risk of PTB, albeit to a lesser degree. However, even some seemingly 'low risk' women will have a PTB¹². Esplin et al, reported that 6.5% of pregnancies following a first term delivery deliver preterm and 5.8% of pregnancies following two consecutive term deliveries are preterm¹³.

During the course of a woman's reproductive life, she may acquire new risk factors that increase her PTB risk. These acquired risk factors are primarily those associated with lifestyle and behaviour and may include marital status, insurance status, and substance abuse.¹⁴ A detrimental change in these factors between pregnancies may place seemingly low risk women at increased risk for PTB. Additionally, the circumstances surrounding delivery of the first infant may impact a woman's subsequent PTB. Previous investigators have proposed an association between a prolonged 2nd stage of labour or caesarean delivery and an increased future risk of PTB⁹.

Cesarean section rates are steadily increasing worldwide. One of the relatively new drivers of this phenomenon is the increased use of caesarean section, instead of forceps and vacuum deliveries, for fetal distress and arrest disorders in the second stage of labor.¹⁵ However, caesarean section in the second stage of labor is not without risk, often due to the difficulty with delivering a deeply impacted fetal head. Several cohort studies have documented increased risk of extensions of the uterine incision, bladder injury and postpartum hemorrhage in these deliveries¹⁶.

Among PTB there were 15(78.9%) exposed and 4(21.1%) cases were un-exposed while in full term birth (FTB) cases there were 75(46.6%) exposed and 86(53.4%) cases were un-exposed. PTB was significantly higher in exposed group as compared to unexposed group, $p < 0.05$ with $RR > 1$ i.e. 3.75. Recently a retrospective cohort study was designed to determine if caesarean section in the late first stage of labor or in the second stage of labor increases the risk of a subsequent spontaneous preterm birth. The study result has showed that in total, 189021 paired first and second births were identified. The risk of spontaneous preterm delivery less than 37 and 32 weeks of gestation in the second birth was increased when the first birth was by caesarean section in the 2nd stage of labor, Relative Risk 1.57 95% CI (1.43, 1.73) and Relative Risk 2.12 95% CI (1.67, 2.68) respectively.¹⁷ We also found similar association between C-section and with C-section at first stage. Moreover another study was conducted by Watson et al to provide insight into the risk to subsequent pregnancies, this cohort study compares the outcomes of pregnant women with a previous preterm birth associated with either a prior caesarean section. The result of the study has showed that 66 women were identified who had a term-delivery followed by a late miscarriage or sPTB, and a subsequent pregnancy. Recurrent sPTB <30 weeks was more common in cases than in controls (12/29, vs. 5/37, $p = 0.02$, Fisher's exact test, $RR 3.06$, 95% CI 1.22-7.71).¹⁸ Similarly Wong et al has done a casecontrol study to assess the presence of newly acquired preterm birth (PTB) risk factors among primiparous women with no prior history of PTB. The result of the study has demonstrated that about 38215 women met inclusion criteria; 1353 (3.8%) were term-preterm cases. Cases and controls were similar with regard to race/ethnicity and maternal age at the time of the first and second deliveries. Cases delivered their second pregnancy approximately 3 weeks earlier (35.7 versus 39.1, $P < 0.001$). In multivariable models accounting for known PTB risk factors women with a caesarean delivery in the first.¹⁹

CONCLUSION

Through the findings of this study we found significant association of subsequent preterm delivery with second stage of labour at time of cesarean delivery in previous pregnancy in females presenting

with singleton pregnancy. So females with must be screened timely to prevent subsequent preterm birth. By minimizing subsequent preterm birth we can reduce related neonatal mortality.

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