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Original Research Article

Planned versus emergency cesarean delivery with previous one cesarean section: a prospective observational study

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ABSTRACT

Background: Women presents with previous history of cesarean section (CS) is a 'high risk pregnancy' and requires regular antenatal check-ups. Planned CS at term done for perinatal interest. Post cesarean pregnancy admitted through emergency required direct CS, for those not fit for vaginal birth as per different guidelines. Main objective of this study is to know neonatal and maternal outcome at term for planned versus emergency CS with previous one CS.

Methods: Planned or emergency CS were done in 1003 pregnant women at term with previous one CS and outcome of both neonatal and maternal were noted. Emergency CS done in failed VBAC women were excluded from the study.

Results: Planned CS before onset of labor were done in 22.93% and emergency CS in 77.07% in the present study. A significant number of women has undergone planned CS in cephalo-pelvic disproportion (45.21%), contracted pelvis (24.34%) and fetal growth restriction (6.95%) where $P=0.000$. Scar tenderness (20.18%), fetal distress (16.04%) and cephalo-pelvic disproportion (15.52%) were major indications for emergency CS. Maternal complications in the emergency CS group were pyrexia ($P=0.000$) and blood transfusion, required in 1.81% ($P=0.000$). There were two maternal death and hysterectomy required in 0.38% in the emergency CS compared to 1.30% in the planned CS ($P=0.274$). Neonatal complications were significant ($P=0.018$) in the emergency CS group. Common complications were jaundice (2.84% versus 1.73%, $P=0.489$), sepsis (0.25% versus 0.86%, $P=0.487$) and early neonatal death (2.97% versus 0.86%, $P=0.119$) in emergency CS compared to planned CS.

Conclusions: Neonatal morbidity and mortality were significant in the emergency CS, compared to planned CS. Pyrexia and blood transfusion were significant maternal morbidity in the emergency CS group.

Keywords: Neonatal and maternal outcome, Planned and emergency cesarean section

INTRODUCTION

Increasing rates of cesarean deliveries have received widespread attention in recent years and have increased widespread discussion in the public domain. For a woman with a previous cesarean birth, the decision regarding planned mode of birth in a subsequent pregnancy will be influenced by many factors, however, there are two options for her care in a subsequent

pregnancy, planned elective repeat cesarean or planned vaginal birth. Rossi AC et al recorded that maternal morbidity, uterine rupture or dehiscence, blood transfusion and hysterectomy were more common after failed trial of labor (17%, 4.4%, 3%, 0.5%) than after elective repeat caesarean delivery (4.3%, 0.4%, 1%, 0.3%).¹ Scar tenderness has been a major cause of repeat sections. In the recent years, there has been a rapid increase in cesarean section rate mainly due to fetal

indications because of an increased awareness about the perinatal health and early detection of ante-partum and intra-partum complication by improved obstetrical methods and sophisticated diagnostic tools like ultrasonography, cardiotocography and fetal scalp pH estimation. Increased risks persist even in infants who are delivered by elective cesarean section at full term.² Therefore main objective of this clinical study is to analyse maternal and neonatal risks at term associated with planned versus emergency cesarean section with previous one cesarean section.

METHODS

This prospective observational study was conducted in the department of obstetrics and gynaecology for a period of one year and six months in collaboration with department of neonatology and anaesthesia. Inclusion criteria were all women at term with one previous cesarean section admitted through OPD or emergency for planned or emergency cesarean section with written informed consent. Exclusion criteria were gestational age <37 weeks and ≥ 42 weeks, ≥ 2 previous cesarean section, VBAC trial women, ruptured uterus cases and those women who are not willing to participate in the study. After admission, detailed information regarding indication of previous cesarean section, type of cesarean section, size of the fetus, duration of labor were noted. Careful history of antenatal check-ups till admission of the present pregnancy was noted with age, parity, socio-economic status etc. Clinical examination including general, abdominal and pelvic examination were done with routine investigations like complete haemogram, ABO grouping and RH typing, blood sugar, VDRL, hepatitis B surface antigen, HIV rapid test, urine examination and ultrasonography for feto-placenta profile were noted. A total of 1003 pregnant women at term who fulfil the study criteria and gave consent were included in the study. Blood was arranged after proper grouping and cross matching. During post-partum period the condition of the mother and baby were observed. An ethical clearance has been taken from the institutional ethical committee. After completion of the study all the data were entered in MS Excel 2007 software and analysis was done for statistical purpose, where $p < 0.05$ was taken as statistically significant. In some cells, values are < 5 ; thus, yate's correction is done. Chi-squared test was used where it is appropriate.

RESULTS

A total of 8899 cesarean sections were done during the study period, out of them 1280 were post cesarean pregnancy at term with one previous cesarean section, of which 1003 women has undergone direct cesarean section after admission through OPD (planned cesarean) or emergency, excluding VBAC trial women. Planned cesarean section was done in 230 women at term and 773

women has undergone emergency cesarean section after admission. Of all post cesarean pregnancy 1.19% (12/1003) were ≤ 20 years age and 80.95% (812/1003) were 21 to 30 years age. 83.25% (835/1003) were para 1 and 16.75% (168/1003) were para 2 or above. 65.90% (661/1003) women were belonged to low socio-economic status in the present study. Out of 1003 women 71.09% (713/1003) were admitted after onset of labor pain, while 28.91% (290/1003) were not in labor. All (230/1003) planned cesarean women were booked, whereas 67.39% (521/773) emergency cesarean had irregular antenatal check-up.

Table 1 shows most frequent indications for previous cesarean section were fetal distress (19.74%), contracted pelvis (14.95%), cephalo pelvic disproportion (14.45%), prelabor rupture of the membranes (8.37%), breech (8.07%), oligohydramniotic (7.97%) and Pregnancy induced hypertension (6.77%).

Table 1: Previous cesarean section indications (n=1003).

Indications of previous cesarean section	No. of cases	Percentage
Fetal distress	198	19.74
Contracted pelvis	150	14.95
Cephalopelvic disproportion	145	14.45
Prelabor rupture of the membranes	84	8.37
Breech	81	8.07
Oligohydramniotic	80	7.97
Pregnancy induced hypertension	68	6.77
Oblique lie	32	3.19
Transverse lie	29	2.89
Obstructed labor	21	2.09
Fetal growth restriction	20	1.99
Antepartum hemorrhage	20	1.99
Post term	17	1.69
Cord prolapse	16	1.59
Elderly primigravidae	16	1.59
Twin pregnancy	14	1.39
Dystocia	12	1.19

A total of 230 women had planned cesarean section in the present study (Table 2), and common indications were cephalo pelvic disproportion (45.21%), contracted pelvis (24.34%), bad obstetric history (8.69%) and placenta previa (7.82%), whereas common indications of emergency cesarean sections were scar tenderness (20.18%), fetal distress (16.04%), cephalopelvic disproportion (15.52%), contracted pelvis (12.16%) and pregnancy induced hypertension (10.60%) as shown in the Table 2.

Planned cesarean done for fetal growth restriction showed significant difference ($P=0.000$).

Table 2: Present indications for cesarean delivery.

Present cesarean indications (n=1003)	Emergency CS (n=773)	Planned CS (n=230)	χ^2 value	P value
Cephalopelvic disproportion	120 (15.523%)	104 (45.21%)	90.104	0.000
Contracted pelvis	94 (12.16%)	56 (24.34%)	20.701	0.000
Bad obstetric history	58 (7.50%)	20 (8.69%)	0.351	0.553
Placenta preavia	36 (4.65%)	18 (7.82%)	3.494	0.062
Breech	48 (6.20%)	16 (6.95%)	0.166	0.684
Fetal growth restriction	14 (1.81%)	16 (6.95%)	16.174	0.000
Scar tenderness [#]	156 (20.18%)	0		
Fetal distress [#]	124 (16.04%)	0		
Pregnancy induced hypertension [#]	82 (10.60%)	0		
PROM [#]	17 (2.19%)	0		
Face presentation [#]	10 (1.29%)	0		
Oblique lie [#]	8 (1.03%)	0		
Transverse lie [#]	6 (0.77%)	0		

[#] χ^2 not valid

Table 3 shows interval between previous and present cesarean delivery in the present study.

Table 3: Interval between previous and present cesarean delivery.

Interval in months	No. of cases	Percentage
≤24	83	8.27
>24-48	780	77.76
>48	140	13.95

Table 4 shows maternal complications between emergency and planned cesarean section in the present study. Overall, maternal morbidities were more in the emergency cesarean section (82/773,10.60%) than

planned cesarean section (15/230,6.52%) and the P value is 0.066. Pyrexia and blood transfusion were significant (p=0.000) in the emergency CS group. Common maternal morbidities were pyrexia, adhesions, PPH, secondary suturing, abdominal distension, scar dehiscence, and 1.81% (14/773) women required blood transfusion in the emergency cesarean section group (Table 4). Pyrexia, adherent placenta and PPH were found in the planned cesarean group. Three women in each cesarean section group had undergone subtotal hysterectomy. In the planned cesarean section group three cases of subtotal hysterectomy done for morbid adherent placenta and in the emergency cesarean section group causes were broad ligament hematoma (n=2) and morbid adherent placenta (n=1).

Table 4: Maternal complications in both the cesarean section groups.

Morbidity*	Emergency CS (n=773)	Planned CS (n=230)	χ^2 value	P value
Post-partum hemorrhage	9 (1.16%)	1 (0.43%)	0.549	0.360
Scar dehiscence [#]	6 (0.77%)	0		
Pyrexia	14 (1.81%)	4 (1.73%)	1.000	0.000
Adherent placenta	3 (0.38%)	3 (1.30%)	1.19	0.274
Adhesions [#]	12 (1.55%)	0		
Broad ligament hematoma [#]	2 (0.25%)	0		
Chorioamnionitis [#]	3 (0.38%)	0		
Secondary suturing [#]	8 (1.03%)	0		
Abdominal distension [#]	8 (1.03%)	0		
Blood transfusion	14 (1.81%)	4 (1.73%)	1.000	0.000
Hysterectomy	3 (0.38%)	3 (1.30%)	1.199	0.274
Total	82 (10.60%)	15 (6.52%)	3.38	0.066

*Morbidity are not mutually exclusive, [#] χ^2 not valid

Of all live babies, 45.92% (457/995) had birth weight in the range of 2500-3000gms followed by 39.39%

(392/995) babies had birth weight >3000gms and 14.67% (146/995) had <2500gms in the present study.

Table 5 shows neonatal outcome in the present study. Jaundice and sepsis were common in both the groups. Early neonatal deaths were more following emergency cesarean than planned cesarean section (2.97% versus 0.86%, $p=0.119$) in the present study. All still births were

in the emergency CS group, admitted after the onset of labor in the present study. There were 8 still birth in the emergency CS group and they were associated with placenta previa (4), pregnancy induced hypertension (2) and scar dehiscence with meconium stained liquor (2).

Table 5: Neonatal outcome in present pregnancy.

Morbidity and mortality*	Emergency CS (n=773)	Planned CS (n=230)	χ^2 value	P value
Jaundice	22(2.84%)	4(1.73%)	0.478	0.489
Respiratory tract infection [#]	8(1.03%)	0		
Hypoxic ischemic	6(0.77%)	0		
Encephalopathy [#]		2(0.86%)		
Sepsis	2(0.25%)	0	0.482	0.487
Congenital anomaly [#]	1(0.12%)	2(0.86%)		
Early neonatal death	23(2.97%)	8(3.47%)	2.426	0.119
Total	62(8.02%)	2(0.86%)	5.63	0.018

*Morbidity and mortality are not mutually exclusive, [#] χ^2 not valid

DISCUSSION

Indications for previous cesarean section was one of the most important factors in deciding whether planned or emergency cesarean section is required in subsequent pregnancy. Planned cesarean section before onset of labor was done in 22.93% (230/1003) cases and emergency cesarean sections done in 77.07% (773/1003) cases in the present study. In a study by McCarthy FP et al, conducted in Australia in 2005, 35.8% were elective cesarean section and 64.14% were emergency caesarean sections.³ In another study by Soukayna B et al reported overall cesarean section delivery rate was 24.15% for elective cesarean sections and 75.85% for emergency cesarean sections giving an approximate ratio of 4:1 for emergency versus elective cesarean section which is almost similar to present study.⁴

In a study by Puri P et al, on 205 patients with previous one lower segment cesarean sections found that fetal distress was the most common indication for previous cesarean section (38.52%) followed by failed progress of labor in 23.90% cases.⁵ Present study also showed that (Table 1) most frequent indications for previous cesarean sections were fetal distress (19.74%) followed by contracted pelvis (14.95%) and cephalopelvic disproportion (14.45%), but the percentage varies may be because of more number (1003) of cases with different indications included in the present study.

The most frequent indications for emergency cesarean section were fetal distress (30.49%) and previous cesarean section in labour (29.82%) as reported by Soukayna B et al.⁴ In another study by Singh N et al found that foetal distress (48%) and meconium stained liquor (24%) were the most common indications of repeat caesarean section followed by scar tenderness and

dehiscence (11%) and cephalo-pelvic disproportion (11%).⁶ Lydon-Rochelle MT et al recorded that among 138 women with repeat cesarean delivery with labor, 60.1 percent had failure to progress, 24.6 percent a non-reassuring fetal heart rate, 8.0 percent cephalo-pelvic disproportion, and 7.2 percent maternal request during labor.⁷ But in present study scar tenderness (20.18%), fetal distress (16.04%), cephalo-pelvic disproportion (15.52%), contracted pelvis (12.16%) and pregnancy induced hypertension (10.60%) were common indications for emergency cesarean section.

In Elvedi-Gasparovic et al study, the commonest indication of elective cesarean section was previous cesarean section whereas the commonest indication of emergency cesarean section was pre-eclampsia and eclampsia.⁸

Repeat caesarean section was significantly more common in the women who had cephalo pelvic disproportion (20%) as the indications of previous cesarean.⁶ Elective repeat cesarean were done in placenta previa and contracted pelvis in their study.⁶ In the present study, total cephalo pelvic disproportion were 22.33% (224/1003) for which repeat cesarean sections done and the percentage was significantly more in the planned cesarean section group compared to emergency cesarean sections (Table 2).

In the present study planned CS was done after 38 completed weeks of pregnancy and all women were booked cases whereas amongst emergency CS cases 11.25% (87/773) were 37-38 weeks, 73.35% (567/773) belonged to >38-40 weeks and 15.39% (119/773) were >40 weeks pregnancy. Alan TN et al conducted a cohort study with live singleton pregnancy who has undergone planned repeat cesarean and found that majority (49.1%)

were delivered at 39 weeks followed by 29.5% at 38 weeks of pregnancy and 15.1% at 40 weeks or later.²

Maximum number of women (780/1003,77.76%) were belonged to an interval of >24-48 months between the last cesarean to present cesarean section followed by >48 months interval which was 13.95%, and 8.27% women had \leq 24 months interval between the last cesarean to present cesarean section as shown in the Table 3. Bujold E et al recorded a 2 to 3 fold increase in the risk of uterine rupture when inter-delivery interval is \leq 24 months gestation compared to >24 months of gestation.⁹ RCOG recommended, Green-top guideline no.45 October 2015 states that women delivering within 18 to 24 months of a caesarean section should be counselled about an increased risk of uterine rupture in labour.¹⁰ In another study by Singh N et al recorded, scar rupture of 0.77% and that of asymptomatic uterine dehiscence diagnosed per-operatively was 1.4%.⁶ Whereas in the present study (Table 4), authors found 0.2% scar rupture (broad ligament hematoma) and scar dehiscence in 0.77% (6/773), as authors considered cases of emergency cesarean section group only, excluding failed VBAC women leading to cesarean section.

Shiliang Liu et al reported that planned cesarean group had increased post-partum risk of cardiac arrest, wound hematoma, hysterectomy, major puerperal infection, anesthetic complications, venous thromboembolism and hemorrhage requiring hysterectomy.¹¹ In the present study (Table 4) adherent placenta was found in both the groups, required subtotal hysterectomy. In the planned CS group, morbid adherent placenta was more, for which hysterectomy required but other maternal complications like post-partum hemorrhage, pyrexia and blood transfusion were less compared to emergency CS.

Nuaim LA et al recorded that post op complications of fever, wound infection or both were higher in the emergency cesarean section cases compared to elective cesarean and the difference was statistically significant ($p < 0.001$).¹² Bailit et al reported the wound sepsis rate of 0.6% in patients having repeat caesarean and Durnwald et al reported the maternal sepsis rate of 0.1% with elective caesarean section.^{13,14}

In the emergency CS group scar dehiscence (n=6) was diagnosed at operations and two women developed broad ligament hematoma for which subtotal hysterectomy were done in the present study. Tita ATN et al, reported two maternal deaths and no cases of uterine rupture in the repeat planned cesarean section cases.¹⁵ Though overall, no significant difference of maternal morbidity was found in emergency CS than planned CS (10.60% versus 6.52%, $p = 0.066$), in the present study, two maternal death occurred in the emergency CS group.

Though there are concern and recommendations that elective delivery prior to 39 weeks is associated with an increased risk of respiratory morbidity in the newborn,

Tita ATN et al, recorded, delivery prior to 39 weeks in over a third of pre-labor elective repeat cesareans in a US multicenter cohort.^{2,15,16} In present study, overall neonatal morbidity and mortality was significant ($P = 0.018$) in the emergency cesarean group compared to elective cesarean as shown in the Table 5, may be because of poor antenatal check-up and indications for which emergency cesarean section were done. Common neonatal complications were jaundice (2.84%), respiratory tract infection (1.03%), hypoxic ischemic encephalopathy (0.77%) and sepsis (0.25%) in the emergency CS babies. Other studies recorded, neonatal sepsis of 2.2% and neonatal death of 0.3% in the emergency repeat caesarean sections.^{6,13}

De Luca et al found in their study that there was less fetal morbidity in elective cesarean group than in emergency cesarean group but perinatal mortality and respiratory morbidity were similar in both groups.¹⁷ In the present study also, all still births were in the emergency CS group, admitted after the onset of labor and the percentage of early neonatal death (2.97% versus 0.86%, $p = 0.119$) was not significant after emergency cesarean compared to planned cesarean section.

In the present study authors tried to find-out the scenario in the rural eastern part of India, where patients burden is more, with irregular antenatal checkup, presents in emergency conditions and therefore, authors cannot plan for routine admission at certain gestational age at term of all post cesarean pregnancy.

CONCLUSION

Neonatal morbidity and mortality were significant in the present study, for emergency cesarean section compared to planned cesarean, may be because of women were screened and selected during their antenatal check-ups in the planned cesarean section. A significant percentage of women with contracted pelvis, cephalo-pelvic disproportion and fetal growth restriction has undergone planned cesarean section. Maternal morbidities were also more in the emergency cesarean section. Pyrexia and blood transfusion were significant in the emergency cesarean section. Timely intervention of woman with previous cesarean section may reduce both maternal and neonatal complications.

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