Original Article

Comparison of Neonatal Outcomes at Different Timing of Repeat Elective Caesarean Delivery

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Abstract

Objective: To compare neonatal outcomes in women undergoing elective cesarean section at 37 weeks versus 40 weeks of gestation.

Methodology: The randomized clinical trial study was conducted at Jinnah postgraduate Medical Centre from January 2017 to December 2019. A randomized was performed into two groups by using lottery methods; group A and B. Patients were selected through non probability consecutive Technique. Patients in Group A underwent elective C section at 37 weeks of gestation and in Group B underwent C section at 40 weeks of gestations. The baby was examined and advised for admission to NICU when it was necessary. The outcome variables were meconium stained liquor and admission to NICU were noted along with age, parity, educational status, and family monthly income.

Results: Mean age of the patients was 31.2 ±4.86 years. Out of 310 patients, most of the patients I84 (59.4%) were multipara (P1-4). Most of the patients were found to have education up to Matric 90(29%). The majority of patients193 (62.3%) belong to the monthly income group of the middle class (monthly income 25,000-50,000 RS). The comparison of mean birth weight of the baby in grams was 3376±450 vs. 3560±467. 116(74.8%) babies had belonged to the category <2500 g in 40 weeks of gestation group while95 (30.6%) in 37weeks of gestation respectively. Admission to the NICU was found in 26(16.7%) and 11(7.09%) women who underwent C section at 37 and 40 completed weeks of gestation respectively. Meconium staining was found in 6(1.9%) in the A group while 16 (5.2%) women underwent C sections in the B group.

Conclusion: In conclusion, elective Cesarean section performed earlier than 38 weeks of gestation should be avoided to minimize neonatal risks and complications. This approach will also reduce the medical expenses associated with NICU admissions and avoid separating mothers from their newborns.

Keywords: Cesarean delivery, Meconium Stain, Morbidity; Mortality Neonatal, NICU, Respiratory morbidity.

Cite this article as: Shams S, Naseeb S, Ali BB. Comparison of Neonatal Outcomes at Different Timing of Repeat Elective Caesarean Delivery. J Soc Obstet Gynaecol Pak. 2021; 11(2):61-65

Introduction

Caesarean Deliveries is increased in both developed and developing countries. Latin America and the Caribbean region have the highest CS rates (40.5%).[1]

Initially, Caesarean section was rare mode of delivery and had only been carried out for obstetrical indications and serious maternal health problems. With the passage of time with the advancement of surgical Technique and improve anesthetic care risk associated with Caesarean section has decreased and which further contributed to increased rate. Elective caesarean section because of previous caesarean section, the breech presentation may have added to modify obstetric practice and patient choice.[2] Thus increased rates of elective caesarean section in the absence of apparently and commonly accepted medical and obstetrical reasons have been reported to add further to the increasing rate of elective caesarean sections.[3] If there is no justified indication is present evidence based knowledge about risks and benefits for mothers as well as newborns becomes all the more valuable for adequate counselling.[4] The National Institute of Clinical Excellence (NICE) Clinical Guideline, Caesarean Section recommended that

Authorship Contribution: [1]Participated in the acquisition and data analysis [2]Drafting the work or revising it critically for important intellectual content, Final approval of the version to be published, [3] Active Participation in active methodology

Funding Source: none
Conflict of Interest: none

Received: Nov 29, 2020
Accepted: April 05, 2021

planned caesarean section should not be routinely carried out before 39 completed weeks of gestation.[5]

Almost the same recommendations have been included in guidance from other countries,[6] and many recent publications have contributed further evidence on the relationship between the timing of an elective caesarean section and neonatal respiratory problems.[7-9] Infants born before 39 weeks of gestation are at increased risk for neonatal adverse respiratory problems, and the risk is inversely proportional to gestational age, with reducing gestational age risk will be more.[10] Thus, prelabor elective delivery (delivery in the absence of a specific maternal or fetal indication) is advised before 39 weeks unless fetal lung maturity has been demonstrated.[11] Despite these recommendations we reported delivery before 39 weeks in over a third of pre-labor elective repeat cesareans in a US multicenter cohort.[12] Concern that delivery at 39 weeks compared to earlier delivery may be associated with adverse maternal outcomes particularly among women with a prior cesarean has been suggested as one reason for elective delivery before 39 weeks.[13] In a local study among 44 babies delivered by C-sections at 37weeks 7 babies (15.9%) were shifted to nursery. Out of the 47 babies delivered by C-section at 38 weeks 3 babies (6.3%) were shifted to nursery and none of the babies delivered at 39 weeks were shifted to the nursery. Breathing problems were seen in 5 babies (11.3%) and hypoglycemia in 3 babies (6.8%) born at 37 weeks. Amongst the babies delivered at 38 weeks, 2 neonates (4.2%) had respiratory problems and 2 (4.2%) had hypoglycemia. None of the babies (0%) delivered at 39 weeks had respiratory problems and hypoglycaemia.[14]

Meconium staining was found in 4 (2.25%), 6 (0.62%), 9 (2.51%), 26 (9.49%) in women underwent C section at 37, 38, 39 and ≥40 completed weeks of gestation respectively.[15] Admission to the NICU was found in 12.8% and 4.8% in women who underwent C section at 37 and 40 completed weeks of gestation respectively.[12]

The rationale of the study is to enhance ongoing initiatives to delay elective delivery until 39 or more weeks for neonatal benefit. There is scarce data on this topic locally and the only study found had an inappropriate sample size of 100 divided into three groups of women who underwent C section at 37, 38 and 39 weeks of gestation, hence it cannot be applied to the general population. This study will find the actual magnitude of the outcome of interest. The outcome of this study will lead to devise policy to perform elective C section at appropriate time, so to decrease the morbidity.

Methodology

Permission for this study was taken from the ethical review committee of the institute and Informed consent was taken from the eligible women after explaining the pros and cons, purpose and the procedure of the study. Women with age range of 25-35 years, having singleton pregnancy with gestation age of 37and 40 weeks undergoing elective two or more cesarean section attending antenatal clinic were enrolled in the study. Women with congenital anomalies, IUGR, macrosomia in their babies and with disorders of oligo and polyhydromnios were excluded from the study.

Patients were randomized in to two groups by using lottery methods and selected through non probability consecutive Technique group in A and B. Sample size was calculated with the help of WHO sample size calculator using a significance level of 5%, Power of Study 80%, admission to NICU was 12.8% in elective C section done at 37 completed weeks of gestations12, admission to NICU was 4.8% in elective C section done at 40 completed weeks of gestations12, total sample size 310 women undergoing elective C section, that is 155 women in each group. Non probability consecutive sampling technique was used for data collection. Patients in Group A underwent elective C section at 37 weeks of gestation and in group B at 40 weeks of gestations. C sections were performed by consultant having more than 5 years of post fellowship experience. A pediatrician having more than 2 years of post fellowship experience examined the baby and advised for admission to NICU when it was necessary. The outcome variables meconium stained liquor and admission to NICU were noted along with age, parity, educational status and family monthly income.

Data was entered and analyzed on SPSS version 17.0. Mean ±SD was presented for age, gestational age and birth weight of the baby in the two groups. Frequency and percentages were calculated for parity, admission to NICU, Meconium stained liquor, educational status and family monthly income category in the two groups. Two groups were compared in terms of meconium stained liquor and admission to NICU by applying Chi square test. Effect modifiers/confounders like age, parity, educational status and family monthly income were controlled through stratification, chi square test were applied, p value less than or equal to 0.05 was taken as significant.

Results

The mean age of the patients was 31.2 ±4.86 years. Most of the women age were followed between 29-31 Years 86(27.7%) in 37 weeks of gestational& 77(24.8%) belong to 40 weeks of gestation respectively. The distribution of mean age of the patient was observed in both groups 37 weeks of gestational vs. 40 weeks of gestation are 31.4 ±4.4 vs. 29.6±5.4 respectively. (Table I). Majority of patients belong to the multipara (P_{1-4})95(30.6%) in A group and184 (59.4%) in B group (Table I). Out of 310 patients37 (11.9%) were Illiterate, 64(21%) were in Middle education, 90(29%), were Matric, 58(18.7%) were intermediate and 61 (20%) took Graduate or more (Table I). The distribution of monthly income as shown in (Table I) 71(22.9%) belong to low class (monthly income <25,000 RS.), 193(62.3%) belong to the middle class (monthly income 25,000-50,000 RS.) and only 46(14.8%) belong to upper class (monthly income >50,000 RS.).

Table I: Association of Demographic features of patients in 37 weeks of gestational vs 40 weeks of gestation

Age	Group: 37 weeks of gestational	Group: 40 weeks of gestation	Total	P-value
25-28 Years	38 (12.3%)	41 (13.2%)	79 (25.5%)	0.565
29-31 Years	86 (27.7%)	77 (24.8%)	163 (52.6%)	
>31 Years	31 (10%)	37 (11.9%)	68 (21.9%)	
Total	155 (50%)	155 (50%)	310 (100%)	
Parity				
Primary Para	46 (14.8%)	55 (17.7%)	101 (32.6%)	0.507
Multi Para	95 (30.6%)	89 (28.7%)	184 (59.4%)	
Grand Multi Para	14 (4.5%)	11 (3.5%)	25 (8.1%)	
Total	155 (50%)	155 (50%)	310 (100%)	
Education Status				
Llliterate	21 (6.8%)	16 (5.2%)	37 (11.9%)	0.052
Middle	29 (9.4%)	35 (11.3%)	64 (20.6%)	
Matric	46 (14.8%)	44 (14.2%)	90 (29%)	
Intermediate	21 (6.8%)	37 (11.9%)	58 (18.7%)	
Graduate or more	38 (12.3%)	23 (7.4%)	61 (19.7%)	
Total	155 (50%)	155 (50%)	310 (100%)	
Monthly Income in Rupees				
Rs. Less than 25,000	36 (11.6%)	35 (11.3%)	71 (22.9%)	0.271
Rs. 25,000 to 50,000	101 (32.6%)	92 (29.7%)	193 (62.3%)	
Rs. >50,000	18 (5.8%)	28 (9%)	46 (14.8%)	
Total	155 (50%)	155 (50%)	310 (100%)	

The comparison of mean birth weight of the baby in g was 3376±450 vs. 3560±467. 116(37.4%) in group A and B. Baby belonged to category <2500 g in B group while 95 (30.6%) in A group (Table II). Admission to the NICU was found in 26(8.4%) and 11(3.5%) in women underwent C section in A and B group respectively (Table II). Meconium staining was found in 6(1.9%), 16(5.2%) in women who underwent C section at in A and B group respectively. (Table II)

Comparison within the group (37 weeks of gestational vs. 40 weeks of gestation) is shown in tables 1 and 2. A significant association was observed in Admission at NICU, Meconium stained, Education level & birth weight in women patients undergoing elective cesarean section. (Table I & II)

Table II: Association of Neonatal outcome in 37 weeks of gestational vs.40 weeks of gestation

Birth Weight	Group: 37 weeks of gestational	Group: 40 weeks of gestation	Total	P-value
<2500 g — no. (%)	95 (30.6%)	116 (37.4%)	211 (68.1%)	0.011*
>2500 g — no. (%)	60 (19.4%)	39 (12.6%)	99 (31.9%)	
Total	155 (50%)	155 (50%)	310 (100%)	
Meconium				
Yes	6 (1.9%)	16 (5.2%)	22 (7.1%)	0.027 *
No	149 (48.1%)	139 (44.8%)	288 (92.9%)	
Total	155 (50%)	155 (50%)	310 (100%)	
Admission at NICU				
Yes	26 (8.4%)	11 (3.5%)	37 (11.9%)	0.027*
No	129 (41.6%)	144 (46.5%)	273 (88.1%)	
Total	155 (50%)	155 (50%)	310 (100%)	

Discussion

Delivery before 37 completed weeks of gestation has generally been defined as preterm, that between 37 and 41 completed weeks as term, and that at 42 weeks and beyond as postterm[16] Much has Many studies have proven that there is relation between preterm and post Term deliveries with adverse neonatal but there is a deficient data regarding neonatal outcome between 37 to 40 weeks.[17,18] Several factors may have contributed to this lack of investigation. First, in a period when gestational age was often calculated mistakenly from the last menstrual period alone, such difference had little meaning. Second, most infants delivered within this age range remain healthy, and very large populations would be needed to find out obvious differences in newborn outcome. However, at a time in which gestational age is generally confirmed by first- or second-trimester ultrasound and elective term delivery is increasingly common, an examination of neonatal and maternal outcomes between 37 and 41 weeks may be valueable.[19,20] the rate of cesarean delivery in the United States has risen from 1996.[21] In the United States the rate of C-section is around 33%, varying from 23% to 40% depending on the state.[22] a most common cause for this increase is the reduction in the rate of attempted vaginal birth after cesarean delivery.[12]

In my study, the Admission to the NICU was found in 26(8.4%) and 11(3.5%) in women underwent C section at 37 and 40 completed weeks of gestation respectively similarly the second outcome of the study Meconium staining was found in 6(11.9%), 16(5.2) in women underwent cesarean section at 37 and 38 weeks of gestation respectively.

These results were compared Meconium staining was found in 4 (2.25%), 6 (0.62%), 9 (2.51%), 26 (9.49%) in women who underwent C section at 37, 38, 39 and ≥40 completed weeks of gestation respectively.[14] Admission to the NICU was found in 12.8% and 4.8% in women who underwent C section at 37 and 40 completed weeks of gestation respectively.[12] We report here novel data showing that the timing of elective Cesarean section (37 vs. 40 weeks of gestation) can result in distinct differences in neonatal risk: newborns delivered at 37 weeks of gestation had a higher rate of NICU admission, low birth weight, respiratory complications compared to newborns delivered at 40 weeks of gestation. Although it is already known that delivery by Cesarean section performed earlier than 39 weeks of gestation increases the risks of several neonatal complications (Tita et al. 2009; Nir et al. 2012),[12,23] we observed that the risk of neonatal complications differs between newborns delivered at 37 weeks of gestation and those delivered at 38 weeks. The guidelines published by the American College of Obstetricians and Gynecologists (2007) recommend that repeat elective Cesarean sections should be performed at or after 39 weeks of gestation to prevent neonatal respiratory complications. However, the rate of elective Cesarean sections performed between 37 and 38 weeks of gestation is still as high as 35.8-56.7% (Tita et al. 2009; Nir et al. 2012)[12] with the highest rate reported in Japan, at 91.8% (Chang et al. 2009).[24] In conclusion, elective Cesarean section performed earlier than 38 weeks of gestation should be avoided to minimize neonatal risks and complications. This approach will also reduce the medical expenses associated with NICU admissions and avoid separating mothers from their newborns.

Conclusion

Elective repeat cesarean delivery before 39 weeks of gestation is common and is associated with respiratory and other adverse neonatal outcome. In conclusion, elective Cesarean section performed earlier than 38 weeks of gestation should be avoided to minimize neonatal risks and complications. This approach will also reduce the medical expenses associated with NICU admissions and avoid separating mothers from their newborns.

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