



**RESEARCH ARTICLE**

**MATERNAL MORBIDITY IN LOW RISK NULLIPAROUS MOTHER ASSOCIATED WITH CESAREAN DELIVERY BEFORE LABOR AND FOLLOWING INDUCTION OF LABOR**

**Jayanta Kumar Nandi<sup>1</sup>, Diptaprasun Saha<sup>2</sup>, Anirban Mitra<sup>3</sup> and Sangita Pal<sup>4</sup>**

<sup>1</sup>\*RMO-Cum-Clinical Tutor, Department of Obstetrics and Gynecology. Murshidabad Medical College, Berhampur, Murshidabad

<sup>2,3</sup>Department of Obstetrics and Gynecology, North Bengal Medical College, Sushrutnagar Darjeeling

<sup>4</sup>Medical Officer, Nadia District Hospital

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**ABSTRACT**

**Objectives:** To compare maternal morbidity associated with cesarean section following induction of labor with cesarean section before labor. **Methodology:** It was a cohort study, longitudinal in design; conducted at North Bengal Medical College, Darjeeling, during January 2013 to December 2014. We included low risk nulliparous term pregnancies in our study. We excluded pregnancies complicated with medical or pregnancy related complications from our study. We divided them into two groups. Group-A comprises mothers in whom induction of labor was done but subsequently cesarean section was needed; group-B comprises of mothers in whom cesarean section was done before onset of labor and without induction of labor. We analyzed maternal morbidities in both the groups. Statistical calculation was done using MedCalc statistical software and GraphPad statistical software. Significance level was considered at  $p < 0.05$ . **Result:** Out of 627 mothers 239 mothers (group-A) underwent cesarean section after induction of labor and 388 mothers (group-B) underwent cesarean section without induction of labor as well as before onset of labor. Rate of PPH and Wound infection were significantly higher in the group of mothers who underwent cesarean section following induction of labor ( $p < 0.05$ ). **Conclusion:** The rate of maternal morbidities was higher in mothers with elective obstetric intervention particularly in mothers whom induction of labor done.

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**INTRODUCTION**

With improved anesthesia and surgical technique rate of cesarean section has increased worldwide<sup>1</sup>. The rate of institutional delivery under supervision of trained midwife and skilled obstetrician has increased in our country. This improved health care scenario has also increased the overall rate of cesarean section rate. Now a days there is a perception among laymen as well as obstetricians that cesarean section is safer than vaginal delivery<sup>2</sup>. There is a widespread belief that cesarean delivery in healthy women carries very low risk making it an alternative elective option for child birth<sup>2</sup>. Incidence of cesarean delivery without any medical indication is rising dramatically. Cesarean delivery on maternal request is an indication for cesarean delivery in present day obstetric practice. So, at present, there is a pressing need to assess risk of complication in cesarean delivery in healthy women<sup>3</sup>. The increased risk of cesarean delivery without medical indication should be considered by mother and their attending physician. Induction of labor is the process by which labor is initiated before its spontaneous onset. It is indicated when termination

of pregnancy is more beneficial than continuation of pregnancy.

The rate of induction of labor has increased from 9.6% to 23.8% from 1990 through 2010. The rate of induction of labor in 2012 was 23.3%<sup>4</sup>

Over the past two decades availability of newer inducing agents, better understanding of mechanism of labor and ability to detect maternal and fetal complications has resulted increased rate of induction of labor. Common indications of induction of labor are pre labor rupture of membrane, postdated pregnancy, fetal growth restriction, diabetes, hypertension, isoimmunisation etc. At present day obstetric practice the number of induction of labor without any medical indication is increasing even more rapidly than over all induction of labor<sup>5,6,7</sup>. This situation might lead to unnecessary cesarean section which in turn is a high risk factor for complications of maternal<sup>3,8</sup> and fetal<sup>9,10</sup> outcome.

Maternal morbidity associated with cesarean section are intra operative complications like laceration of uterine artery,

\*Corresponding author: **Jayanta Kumar Nandi**

RMO-Cum-Clinical Tutor, Department of Obstetrics and Gynecology. Murshidabad Medical College, Berhampur, Murshidabad

extension of angle, PPH, rectus sheath hematoma, requirement for blood transfusion and puerperal pyrexia, wound infection, venous thrombo embolism. The rate of severe maternal morbidity ranged from 0.07% - 8.23%<sup>11</sup>.

We have conducted this study to evaluate the complications of elective obstetric interventions and to give insight into maternal and neonatal risks associated with elective obstetric interventions such as elective induction and elective cesarean delivery.

## METHODOLOGY

It was a cohort study, longitudinal in design; conducted at North Bengal Medical College, Darjeeling, during January 2013 to December 2014. The study population included low risk term nulliparous mothers admitted in our obstetric ward with singleton live baby with or without labor. Pregnancies complicated with medical disorders like hypertension, diabetes, thyroid disorders were excluded from our study. Those pregnancies complicated with gestational diabetes, hypertensive disorders of pregnancy, intra uterine growth restriction were also excluded from our study. We divided all mothers in our study into two groups. Group A comprising of low risk nulliparous mothers who undergone cesarean section after induction of labor. Group-B comprising of low risk nulliparous mothers having elective cesarean delivery.

After inclusion in our study as per inclusion and exclusion criteria we had taken informed consent and took detailed history and performed clinical examination. Social and demographic status were recorded, medical and gynecological history was taken and current pregnancy events were recorded. We collected data regarding age of the mother, gestational age, birth weight of baby and membrane status. Individual interviews were taken at the time of admission, 2<sup>nd</sup> to 4<sup>th</sup> day of delivery and at the time of discharge. Continuous electronic fetal monitoring was used in all cases of induction of labor. Antetepartum, intrapartum and post partum events were recorded by the attending obstetrician.

In this study induction of labor was performed by using intra cervical prostaglandin (E<sub>2</sub>) gel. Indications of induction were pre-labor rupture of membrane, post dated (>41weeks) pregnancy or elective induction. Elective induction was defined as induction on demand of mother for some nonmedical reason. In this study maximum two doses of prostaglandin gel was used. Women selected for cesarean section following induction because of induction failure, fetal distress, failure to progress in active stage of labor or arrest in 2<sup>nd</sup> stage of labor. The second group, cesarean section without induction, included those mothers who undergone cesarean delivery with the indication of term pregnancy with breech, transverse lie and less fetal movement before the onset of labor. Cesarean section done on maternal demand without any maternal indication before onset of labor was also included in the second group.

Maternal outcomes included in our study were wound infection; puerperal febrile morbidity; rectus sheath hematoma; early PPH; intra operative complications like laceration of

uterine artery, injury of bowel and bladder, extension of uterine incision; venous thrombo embolism; need for blood transfusion; stay in hospital; need for readmission; near miss maternal mortality (transfer to CCU). Composite morbidity was defined as multiple morbidities in one mother. Statistical calculation was done using MedCalc statistical software and GraphPad statistical software. Significance level was considered at  $p < 0.05$ .

## RESULT

The study was conducted at North Bengal Medical College, Darjeeling, where over 10,000 deliveries take place annually. Total numbers of deliveries during the two years study period were 19238, total live births were 18923.

In our study induction of labor was performed in 857 mothers out of whom 239 mothers required cesarean section. These mothers were allotted in Group A. In Group B we included 388 mothers who undergone cesarean section before labor without induction. In both the groups all the women were nulliparous at term without any medical or obstetrical complication

**Table 1** shows comparison of age, weight of mother, gestational age, and birth weight of both the groups.

	Group A n=239	Group B n=388	P Value
Age (years)	21.73±2.21	21.63±2.34	0.63
Maternal weight (kg)	53.36±2.12	53.64±2.19	0.11
Gestational age(weeks)	39.34±1.09	39.26±0.92	0.32
Birth weight (g)	2786±271.40	2806±261.75	0.35

Data presented as mean±SD unpaired t- test; statistical calculation done using GraphPad software.

The above table shows that there is no statistically significant difference between the two groups.

In our study, induction was done most commonly due to prelabor rupture of membrane 419(48.9%). Other indications for induction were post dated pregnancy 289(33.7%) and elective induction 149(17.4%) on patient's choice.

In this group (group-A) cesarean section was performed due to fetal distress 87(36.4%), induction failure 66(27.6%) failure to progress in active stage of labor 58(24.2%), arrest in second stage of labor 11(4.6%) and due to other causes in 17(7.1%).

**Table 2** shows maternal morbidities in both the groups

Maternal morbidity	Group-A (n=239)	Group-B (n=388)	*p-Value
Intra operative complications	9(3.7%)	7(1.8%)	
a)tear of uterine artery	6(2.5%)	5(1.3%)	0.1904
b)severe extension of angle	3(1.2%)	2(0.5%)	
Blood transfusion	3(1.2%)	3(0.7%)	0.6790h
Early PPH	11(4.6%)	5(1.3%)	0.0165
Puerperal pyrexia	4(1.6%)	3(0.7%)	0.4363
Wound infection	11(4.6%)	6(1.5%)	0.0393
Rectus sheath hematoma	2(0.8%)	1(0.2%)	0.5611
Venous thromboembolism	0(0%)	0(0%)	
Transfer to CCU	0(0%)	0(0%)	
**Composite morbidity	7(2.9%)	4(1.0%)	0.1146

Data presented as n(%). \* Fisher's exact test 2 tailed. Statistical significance,  $p < 0.05$   
 \*\*Composite morbidity – when more than one of the above complications occurred in a single patient

Indications for cesarean section in Group B were breech presentation in 98 (25.2%), transverse lie in 18(4.6%), PLROM in 76(19.6%), bad obstetric history in 63(16.2%) ,postdated pregnancy in 9(2.3%) and cesarean on maternal demand in 124(31,9%)

Table 2 shows that 11(4.6%) patients in group-A and 5(1.3%) patients in group-B suffered from early post partum hemorrhage. This difference was statistically significant ( $p=0.0165$ ). The rate of wound infection in group-A and group-B was 11(4.6%) and 6(1.5%) respectively and this difference was statistically significant ( $p=0.0393$ ). The rate of other maternal morbidities were different in both groups but were not statistically significant.

## DISCUSSION

Some studies have shown maternal age is an independent risk factor<sup>12,13</sup>. In our study we have adjusted age as well as weight, gestational age and birth weight of baby.

The overall cesarean section rate after induction of labor was 27.8% in our study. Stacy T Seyb *et al*<sup>14</sup> has shown in their study that cesarean section rate in nulliparous mother is 7.8% with spontaneous onset of labor and 17.5% with induction of labor.

The rate of surgical complications in our study were higher in mother with cesarean section after induction of labor (3.7% vs. 1.8%). Bergholt *et al*<sup>15</sup> in a retrospective study concluded that chance of surgical complication was higher in emergency cesarean than elective cesarean (14.5% vs. 6.8%).

The need for blood transfusion was 1.2% in group-A, in group-B it was 0.7%. The difference was not statistically significant. Previous studies<sup>16</sup> showed increased rate of blood transfusion when cesarean section was done on emergency basis.

In our study PPH was more common in mothers with cesarean section after induction of labor (4.6%) than mothers with elective cesarean section (1.3%). The difference was statistically significant ( $p=0.0165$ ). Allen *et al*<sup>17</sup> revealed in their study that PPH is less common in mothers in whom cesarean section was performed before onset of labor than those following induction of labor (RR=0.61, 95% CI= 0.42-0.88).

Wound infection rate in our study was significantly higher in mothers with cesarean section following induction of labor than mothers with elective cesarean section ( $p=0.0393$ ). Other studies<sup>18,19</sup> showed significantly higher rate of wound infection and febrile morbidity when cesarean section done in labor. Another study<sup>17</sup> found no difference in the rate of wound infection, febrile morbidity and rectus sheath hematoma.

Our study<sup>17</sup> shows less composite morbidity in group-A than Group-B but the difference was not statistically significant ( $p=0.1146$ ). Alexander *et al*<sup>19</sup> showed in their study that composite morbidity was increased in women undergoing cesarean delivery in second stage of labor primarily due to

uterine atony, uterine incision extension and accidental cystosmy.

In our study no patient suffered from venous thromboembolism, nobody was admitted in CCU and nobody was readmitted after discharged.

The limitation of our study was that surgical complications might have been affected by expertise of different surgeon.

## CONCLUSION

Attending physician must be aware of risks to the mother and to the fetus of elective obstetric intervention. A choice should be given to the patient and her family after proper counseling and giving information about risks and benefits of elective cesarean section and emergency cesarean section following induction of labor.

**Competing interest / Conflict of interest:** The author(s) have no competing interests for financial support, publication of this research, patents and royalties through this collaborative research. All authors were equally involved in discussed research work. There is no financial conflict with the subject matter discussed in the manuscript.

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