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ORIGINAL ARTICLE

Is Elective Induction Safe? A Prospective Analysis

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Abstract
Objectives To identify whether electively induced labor places the mother or her fetus at an increased risk as compared to her spontaneous labor cohort. To quantify the risk of cesarean section in the induced group.
Methods A prospective analysis comparing 200 electively induced parturients with 200 matched controls who labored spontaneously, in 1 year from April 2007 to April 2008. The parturients were between 37 and 41 weeks of gestation and had no complications necessitating induction.
Results Induction per se was not associated with a statistically significant increase in cesarean section rates. Only when associated with nulliparity, low bishop score, and birth weight >3.5 kg, the risk of cesarean increases.
Conclusion Elective induction does not appear to pose an increased risk to the mother or her fetus in a carefully selected patient population. However, when associated with risk factors the cesarean rate increases. Hence informed consent should be taken before induction.

Keywords Elective induction · Cesarean section rates

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Introduction

Elective induction of labor is defined as initiation of a term labor without a medical or obstetric indication. With more pregnant women being either employed or more responsible outside the home, advance arrangements for work, travel and home are desirable. Hence the rationale for it is patient and physician convenience. However, opinions differ. Proponents say that induction avoids potential adverse outcomes associated with impending post term, IUD of unknown cause. It allows day time delivery with a better perinatal medical care, better planning by the physician, patient and families.

Opponents say that it is an unnatural process, once the physician has initiated one form of intervention then there may be a tendency to more readily accept further interventions in the form of operative and assisted deliveries.

Methods

The study population consists of 200 patients in induction (study) group and 200 patients in the spontaneous (control) group between 37 and 41 weeks of gestational age. The control case was selected by choosing the next case who labored spontaneously. Inclusion criteria were impending post term pregnancy, psychosocial reasons, clinically suspected decreased amniotic fluid but AFI > 5, suspected macrosomia (but USG documented estimated weight <4 kg), patients complaining of decreased movements but

NST reactive. Exclusion criteria were non cephalic presentations and high risk pregnancies. Out of 200 women induced, 187 were with prostaglandins and oxytocin and 13 were induced with ARM and oxytocin. Statistical analysis was done using χ^2 test, Mann–Whitney U test.

Results

The risk of cesarean section in the nulliparous induced women is statistically significant depicted in Table 1.

Cesarean delivery rates are significantly higher in nulliparous women in the induced group with poor Bishop score (Table 2).

Among induction group, patients with Bishop score <5 are associated with a statistically significant (29%) risk of cesarean section when compared to those who had a Bishop score >5 (7.14%).This significance is seen only in nulliparous women (Table 3).

In the present study birth weight of >3.5 kg were associated with statistically significant increase in cesarean section rates [54.16% ($P = 0.0003$ VHS)] (Table 4).

There is a statistically significant increase in duration of both first and second stages of labor in nulliparous induced women as compared with her control 8.7 h versus 7.18 h ($P < 0.001$). In multipara the duration of first stage of labor is prolonged 7.8 h versus 4.9 h ($P < 0.001$ VHS).

Further the study and control groups in the nulliparous women were analysed by comparing the risk of cesarean section in women with bishop score <5 after excluding the birth weight >3.5 kg and maternal age >30 years. The cesarean rates in the induced group was not statistically higher ($P > 0.05$) than the spontaneous group proving that induction per se is not associated with increased cesarean rates. Only when associated with other risk factors the risk of cesarean increases (Table 5).

The most common indication for cesarean section in present study was fetal distress in the induced group and meconium stained liquor in the spontaneous group. 51% of women in the induced group delivered in day time as compared to 31% of spontaneous group women.

Maternal and neonatal complications are given in Table 6.

Table 1

Parameter	Induced group	Spontaneous group	Significance
Nullipara			
No. of cases	150	150	
Cesarean section	44 (29.3%)	21 (14%)	$P < 0.001$ VHS
Instrumental delivery	4 (2.6%)	2 (1.3%)	NS
Multipara			
No. of cases	50	50	
Cesarean section	5 (10%)	2 (4%)	NS
Instrumental delivery	1 (2%)	0	NS

Table 2

Parity	Induction group Bishop score <5 $N = 158$	Induction group Bishop score ≥5 $N = 42$	Significance
Nulliparous	41/119 (34.45%)	3/31 (9.6%)	$P = 0.016$ SIG
Multiparous	5/39 (12%)	0/11	$P = 0.54$ NS
Total	46 (29%)	3 (7.14%)	$P = 0.0033$ SIG

Table 3

Birth weight	N	LSCS (%)	Vaginal delivery
2–2.5 kg	96	6 (6.25)	90
2.6–3 kg	147	27 (18.36)	120
3.1–3.5 kg	133	24 (18.04)	109
3.5 kg	24	**13 (54.16)**	11
Total	400	70	330

Table 4

Parameters	Induced	Spontaneous
First stage		
Nullipara	8.7 h	7.18 h $P < 0.001$ VHS
Multipara	7.8 h	4.9 h $P < 0.001$ VHS
Second stage		
Nullipara	49 min	33 min $P = 0.013$ SIG
Multipara	23.3 min	26 min NS

Table 5

Indication	Induced group	Spontaneous group
Fetal distress	**17**	4
Arrest of dilatation	11	2
Arrest of descent	4	4
Meconium stained liquor	11	14
Failed induction	8	0

Discussion

In the present study there is no difference in cesarean rates in multiparous women between both the groups. But the risk of cesarean in nulliparous induced women is statistically high 29.3%. Macer et al. [1], Vrouenraets et al. [2] also reported increased rate in induced nulliparous women. There is no significant increase in instrumental deliveries,

Table 6

Parameters	Induced group	Spontaneous group
Fetal outcome		
Birth weight	2.8 kg	2.8 kg
Apgar score <7 at 1 min	10	10
FHR abnormalities	17	14
Cord prolapse	0	0
Meconium	25	27
NICU admission	8	7 ($P = 0.79$ NS)
Maternal outcome		
Intrapartum fever	3	2
PPH	2	4
Shoulder dystocia	1	0
Perineal tear	6	4
Cervical tear	1	0

neonatal complications and maternal complications between both groups. This is comparable with Macer et al., Prysak and Castronova [3], Smith et al. [4] study. However, in the present study there is statistically significant prolongation of first and second stage of labor in the induced group. This is similar to Vaharatian et al. [5] study but contradictory to Macer et al. study who found no difference in the duration of labor between both groups and in fact the duration of labor in multiparous induced women is less than her spontaneous cohort. Birth weight >3.5 kg and a poor Bishop score has a statistically significant increase in cesarean rates. This is similar to Macer et al., Vrouenraets et al., Prysak and Castronova study. However, in the present study the risk factors for cesarean section were analysed using χ^2 test and found that induction per se is not associated with increased cesarean rates. This is similar to the study done by Prysak and Castronova who concluded that increase in cesarean was because the population had significant risk factors (nulliparity, poor bishop score, gestational age >287 days, birth weight >3.5 kg) for cesarean delivery that nullified the risk of elective induction itself. However, it is contradictory to Maslow and Sweeny [6] study, who concluded following logistic regression analysis that induction remained a significant risk factor for cesarean section.

Conclusion

Elective induction does not appear to pose an increased risk to the mother or her fetus in a carefully selected patient population. However, when associated with nulliparity, poor Bishop score, and estimated fetal weight of >3.5 kg, it has a statistically significant increase in cesarean rate. Hence, informed consent should be taken before induction.

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