

The gestational age and maternal and neonatal outcome of elective term delivery

By

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Abstract

Background: By this 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 of importance. **objective:** To ascertain the adverse neonatal and maternal outcomes associated with elective term delivery between (37-42) weeks gestation. **patients and methods:** A total of 452 pregnant women were enrolled in the study. throughout the years 2009-2010.They were divided into three groups:The first group included 212 pregnant women, who had elective repeated caesarean section. The second group included 109 pregnant women who had elective primary caesarean section, while the third group included 131 pregnant women who had induction of labour for obstetrical indications and whom we regarded as a control group. **Results:**73.1% of intrapartum caesarean sections among the induction of labour were due to fetal distress. This type of caesarean sections were increase with decrease cervical dilatation, increase the parity ($p < 0.001$), also it increase with birth weight $< 3\text{Kg}$ & $> 4\text{Kg}$, $p = 0.009$. The incidence of intrapartum caesarean section was not influenced by the gestational age, $p = 0.47$ [NS].The incidence of Neonatal Care Unit admission was not influenced by the parity; $p = 0.46-0.83$ [NS]. This incidence was lower in (group 3, 39-40 weeks gestation, 3-4 Kg birth weight) so they were regarded as reference groups. The incidence of adverse maternal outcomes were increased in (multipara 3&more; $p = 0.018$, in group 1; $p = 0.007$ and birth weight $> 4\text{Kg}$; $p = 0.004$).he adverse maternal outcome was not influenced by the gestational age, nor the outcome of induction of labour as caesarean section. **Conclusion:** In spite of our small sample size, but our conclusion that we need to follow the general evidence based trend of performing elective termination of pregnancy between the 39 - 40 weeks of gestation, since we got the best neonatal outcome without increment in maternal adverse outcome.

keywords: gestational age; maternal and neonatal outcome; elective term delivery

Introduction

Delivery of the infants who are physiologically mature and capable of successful transition to the extrauterine environment is an important priority for obstetrician and practitioners. A corollary of this goal is to avoid iatrogenic complications of prematurity and maternal complications from delivery. ⁽¹⁾

delivery before 37 completed weeks of gestation has traditionally been defined as preterm labour, that between 37 & 42 weeks as term, and that at 42 weeks & beyond as post-term ^(1, 2). Much has been written regarding potential adverse newborn effects of preterm and post-term birth, but little attention has been given to differential neonatal outcomes of infants delivered within the 37 – 42 weeks interval ^(2,3)

In any large database, the distribution of the length of pregnancy is skewed because babies are more likely to be born preterm than post-term and a wider range of gestations into the early preterm period ⁽⁴⁾

The typical length of pregnancy is 280 days or 40 weeks; term is conventionally denoted as 37-42 weeks ^(2,3). Accurate dating of pregnancy is important for a number of reasons, each of them constituting milestones which are more important than the prediction of the actual EDD itself: Antenatal screening, values for serum test for chromosomal abnormalities (as Down syndrome).so estimating fetal viability at extreme prematurity. Between 23 and 28 weeks where the chance of a baby's survival is heavily dependent on the gestational age and inaccurate dates may lead to wrong advice to the parents and inappropriate management. Also Post-term pregnancy: prolonged gestation is associated with a rise in perinatal morbidity and mortality, the reasons for this are not well understood, but it has become established practice to do induction of labour in pregnancies that go beyond 290-294 days ⁽⁴⁾

Several studies have documented the high incidence of respiratory morbidity & NICU admission in infants born by cesarean delivery before the onset of spontaneous labor. ^(2,3) However, the incidence of birth asphyxia, trauma and meconium aspiration is lower, and these advantages of elective cesarean delivery have been reviewed. A significant no. of term infants delivered by ECS are admitted to NICU each year in the US ⁽⁶⁾ with diagnosis of transient tachypnea of newborn (TTN), RDS & severe persistent pulmonary hypertension (PPHN), hypoxic respiratory failure. ⁽⁶⁾ Some of these reports also show higher rate of mechanical ventilation, oxygen therapy, extracorporeal membrane oxygenation (ECMO) and death. ⁽⁷⁾ Since ECS is commonly performed between 37 & 40 weeks gestation ⁽⁸⁾, it was believed that at least some of the respiratory morbidity in newborns delivered by ECS was secondary to Iatrogenic prematurity ⁽⁹⁾ and surfactant deficiency in these patients. ⁽¹⁰⁾

In an era when gestational age was based usually on last menstrual period alone, little attention has been given to differential neonatal outcomes of infant delivered within the 37-41 week interval, while at our time in which gestational age is generally confirmed by first - or second trimester ultrasound and elective term delivery became increasingly common ; maternal and neonatal outcome become an important issue to be studied especially that some of the obstetrician in Iraq still performing elective delivery at an early term gestational , therefore the aim of study :

- 1- To determine the frequency of neonatal morbidity following elective delivery at term & to identify prognostic factors for this morbidity.
- 2- To determine the effect of the gestational weeks on neonatal admission to NCU.

patients and methods:

This study is an analytic cross sectional study , Between 24th of April 2009 and 2nd of August 2010 . The study protocol was approved by the Obstetrics & Gynecology Committee of the Iraqi Board for Medical Specialization & Al Elwiyah Maternity Teaching hospital administration. This data include 452 term pregnant women & it was part of a quality improvement project directed at determining the extent, if any, to which the gestational age at elective term delivery contributed to newborn & maternal morbidity in the department of obstetrics & gynecology at Al-Elwiyah Maternity Teaching Hospital. Elective term delivery was defined as a delivery occurring at or beyond 37 weeks & 0 days till 42 week by the best clinical estimated in women who did not present in labour. The study samples consist of 452 pregnant women & divided into three groups: ***First Group (repeated CS):*** Consists of 212 pregnant women who were not in labour who had one previous CS or more.

Second Group (primary CS): Consists of 109 pregnant women who were not in labour and had previous normal vaginal delivery or primigravida and there is an obstetrical indication for termination of pregnancy by CS. ***Third Group (induction of labour):*** Regarded as a control group, it consists of 131 pregnant women who had previous vaginal delivery or

primigravida with favorable cervix for induction with no uterine contractions and had an obstetrical indications for induction of labour.

Statistical analysis: Data were translated into a computerized database structure. An expert statistical advice was sought for. Statistical analyses were computer assisted using SPSS version 13 (Statistical Package for Social Sciences). P value less than the 0.05 level of significance was considered statistically significant⁽¹¹⁾.

Results:

The result of our study include 452 term pregnant mothers delivered electively by elective CS or induction of labour who ended by either vaginal delivery or emergency CS. The patients divided into 3 groups as shown in table 1.

Table (1): Study groups of elective term delivery

Study group	N	%
Repeated CS	212	46.9
Primary CS	109	24.1
Induction of labor	131	29
Total	452	100

Group 3 (induction of labour group) will be regarded as a control group since they had the best maternal and neonatal outcome.

Table 2, shows the outcome of induction of labour, were vaginal delivery is more common than CS and was around 69 %; the indications of CS were mainly due to fetal distress in around 73%, while the others were due to dystocia.

Table (2): The outcome of induction of labour

Outcome of induction	N	%
Vaginal delivery	90	68.7
CS	41	31.3
Total	131	100
Fetal distress	30	73.1
dystocia	11	26.9

Total	41	100
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In table 3; the study groups were further classified according to the gestational age at the time delivery (in weeks) into 4 groups. The largest group included those who were delivered at 39-40 weeks which is around 39.8 % while the smallest group was those who delivered at 37 weeks which is 16.8%.

Also in this table the study groups were further classified according to the birth weight in (Kg) into 3 groups. Were the largest group included those who their babies were weighted between 3-4 Kg, who were account for 79.4%.

Table (3): Study groups according to the gestational age in weeks & birth weight in kg.

Study group	N	%
Gestational age (weeks)		
37	76	16.8
38	116	25.7
39-40	180	39.8
41-42	80	17.7
Total	452	100
Birth weight (Kg)-categories		
<3	60	13.3
(3-4)	359	79.4
>4	33	7.3
Total	452	100

Table 4 Shows the Initial cervical dilatation at the onset of labour and its relation with the fate of labour as there was increase in the incidence of CS with the decrease in cervical dilatation, whatever the indication of CS.

Table (4): The relationship between cervical dilatation and outcome of induction of labour.

Cervical dilatation (cm)	Outcome of induction					
	Vaginal delivery		CS		Total	
	N	%	N	%	N	%
0	1	100	0	0	1	100
1	12	44.4	15	55.6	27	100
2	24	55.8	19	44.2	43	100
3	32	82.1	7	17.9	39	100

4	21	100	0	0	21	100
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P (Chi-square) < 0.001

Table 5 Shows the relation between the maternal parity, gestational age and birth weight with the outcome of induction of labour. The parity had highly significant effect on the mode of delivery and fetal birth weight also had significant effect on the mode of delivery but to lesser extent, while the gestational age had no statistical significant relation with the mode of delivery.

Table (5): The relationship of the parity, gestational age, birth weight, with outcome of induction

Parity groups	OUTCOME OF INDUCTION					
	Vaginal delivery		CS		Total	
	N	%	N	%	N	%
Nullipara	25	50	25	50	50	100
(1-2)	31	72.1	12	27.9	43	100
Multipara 3+	34	89.5	4	10.5	38	100
P (Chi-square) < 0.001						
Gestational age (weeks)						
37	8	80	2	20	10	100
38	6	66.7	3	33.3	9	100
39-40	40	74.1	14	25.9	54	100
41-42	36	62.1	22	37.9	58	100
P (Chi-square) = 0.47[NS]						
Birth weight (Kg)-categories						
<3	2	25	6	75	8	100
(3-4)	84	73	31	27	115	100
>4	4	50	4	50	8	100

						0
P (Chi-square) = 0.009						

Table 6 show the indication of admission to the NCU for the newborn of the study groups. 15.7% was the admission percentage and the most common cause was TTN which account for 29.6% followed by hypoglycemia which account for 25.4%.

Table (6): The indications for NCU admission for the newborns of the study groups :

Admission to NCU	N	%
Negative	381	84.3
Positive	71	15.7
Total	452	100
Indication for admission to NCU		
TTN	21	29.6
Hypoglycemia	18	25.4
Asphyxia	10	14.1
Meconium aspiration	8	11.3
Others	6	8.5
RDS	5	7
Post-maturity	3	4.2
Total	71	100

Table 7 show the indications for termination of pregnancy in the study groups; in general whether they were terminated by CS or by vaginal delivery. Repeated CS was the most common cause followed by those who were 41 weeks and more and those with abnormal antipartum fetal testing.

Table (7): The indications for termination of pregnancy of study groups.

Indication for termination of pregnancy	N	%
Repeated CS	207	45.8
41 weeks gestation and more	73	16.2
Abnormal antipartum test	50	11.1
Others	37	8.2
Hypertension	31	6.9
Oligohydramnios	25	5.5
Malpresentation	9	2

Big baby	6	1.3
DM	6	1.3
Prelabour rupture of membrane	4	0.9
Multiple pregnancy	2	0.4
Placenta previa	2	0.4
Total	452	100

Discussion :

The neonates born by elective repeated CS have increased rates of admission to the NICU compared with the neonates born by vaginal delivery, and the adverse maternal outcome is higher in women delivered by elective repeated CS compared with women delivered vaginally. During the study period, 46.9 % of our sample of elective deliveries was delivered by elective repeated CS, which is account to around 50% of elective deliveries which seems to be high percentage this result goes with the result of ACOG about increases number of CS, 2006, about 31% ⁽⁵⁾.

The rate of CS among the induction of labour group was 31.3 %, this result is high compared with study of Aaron; who shows that the incidence of such CS was 7% only ⁽¹²⁾. 73.1 % of those CS was due to fetal distress, while 26.9% of CS was due to dystocia. The higher rate of CS due to fetal distress may be due to the lack of sophisticated intrapartum assessment techniques which is the case in most of the labour wards in Iraq; as documented CTG record, fetal scalp blood sampling and fetal pulse oximetry.

The second most common indication for termination of pregnancy after repeated CS is 41 weeks gestation and more. The rate was 16.2% in our study which goes with the result of Bennett & associates where the incidence was the same which is around 16.3% but it reduced in their study to 6.7% after combination of 1st and 2nd US examination for pregnancy dating ⁽⁵⁾. For that combining 1st and 2nd US for dating may be of value for reducing the incidence of termination of pregnancy for those who advance beyond 41 weeks.

The incidence of CS among induction of labour mothers increased with decreased cervical dilatation, $p < 0.001$, this result was proved by Gifford and colleagues and it use to be a fact ⁽⁵⁾.

Also the incidence of CS in the induction of labour group was increased with decreased parity, this result was proved also by Luthy and colleagues ⁽⁵⁾. The birth weight of neonate influence the incidence of CS among induction of labour group; as there was higher incidence of CS with birth weight above 4 Kg and below 3 Kg, the same result was also shown by Barbara J.Stoll ⁽¹³⁾.

Although the incidence of successful vaginal delivery among the induction of labour group was not influenced significantly by gestational age, $p = 0.47$ [NS]; but the incidence was relatively high in those who delivered at 39-40 weeks which is 73.1 % and this may be another advantage of not performing elective induction of labour at an early term gestation. This may be explained by increase in the response of myometrial receptors to oxytocin with advanced gestation ⁽⁵⁾.

Conclusions

- 1- Repeated CS significantly increase the risk of NCU admission by 2.8 and risk of maternal adverse outcome by 5.5 times compared to Induction of labor.
- 2- Primary CS significantly increase the risk of NCU admission by 2.6 and the risk of adverse maternal outcome by 2 times compared to Induction of labor
- 3- The 37- and 38-weeks gestational age category significantly increased the risk of NCU admission by 2.6 times compared to optimum gestational age category (39-40 weeks).

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