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The Outcome of Combined Induction of Labor in Post Dated Pregnancy

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Abstract

Introduction: Postdated and prolonged pregnancy are accepted terms by WHO and the International Federation of Gynecology and Obstetrics to describe pregnancy beyond dates (expected date of delivery). It complicates up to 10% of all pregnancies and carries an increased risk to the mother and fetus. This study aimed to analyze the outcome of combined induction of labor in post-dated pregnancy. ***Methods:*** This prospective interventional study was conducted at the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Bangladesh, from March 2013 to August 2013. A total of 50 patients with post-dated pregnancies were selected as study subjects by purposive sampling technique. In this study, 34.0% of patients' labor induction was given by oxytocin drip followed by ARM, and 20.0% of patients' labor induction was given by ARM followed by oxytocin drip. In 46.0% of patients with an unfavorable cervix, prostaglandin was used followed by ARM. Collected data were analyzed using different methods of statistics. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 20.0 for Windows. ***Result:*** It was observed that intrapartum fetal distress occurred in a total of 12 babies. 10 babies needed resuscitation and 40 babies needed no resuscitation. In this series, among the healthy babies majority (20) were born at 40 completed weeks of gestation, 18 babies at 41 completed weeks, and 2 babies were born at 42 completed weeks of gestation. Among the asphyxiated baby 6 babies were borne at 42 completed weeks of gestation, no one at 41 completed weeks, and 2 asphyxiated babies were borne at 40 completed weeks of gestation. All babies with other complications like LBW, birth trauma, and post-maturity syndrome. ***Conclusion:*** This study concludes most frequent indication was fetal distress and unfavorable cervix in postdated pregnancy. Abnormal uterine action and asphyxiated baby were the more frequent maternal and fetal complications respectively. A small number of LBW, birth trauma, and post-maturity syndrome were observed but no maternal and fetal death was found in this study.

Keywords: Combined induction, Post-dated, Pregnancy, Asphyxia, Fetus.

INTRODUCTION

According to the definition provided by the World Health Organization and the International Federation of Obstetrics and Gynaecology, a prolonged pregnancy exceeds 294 days or 42 weeks from the first day of the last menstrual period. Considerable semantic confusion arises through the coincident use of terms such as 'post-term pregnancy'. [1] The incidence of postdated pregnancy ranges from 4% to 18% depending on the method used to determine gestational age. It complicates approximately 10% of all gestations. [2] Error in dating is the most frequent cause of a postdated pregnancy. The true etiology behind a postdated pregnancy, however, remains unknown. Several associations with postdated gestation have been identified. These include primiparity, prior postdated pregnancy (the risk of a postdated gestation is increased 2.1-fold in a subsequent pregnancy and the risk is even greater following two postdated pregnancies), male fetus, fetal anencephaly, adrenal insufficiency or hypoplasia and placental sulphatase deficiency and X-linked recessive disorder resulting in diminished oestriol production in a male fetus. [2] Outcomes of postdated birth may vary by fetal

size. Typically, postdated infants are larger than term infants and are therefore predisposed to complications associated with macrosomia, including cephalopelvic disproportion, shoulder dystocia, prolonged labor, increased maternal trauma, and postpartum hemorrhage. [3] The increased perinatal morbidity and mortality rate may be a result of uteroplacental insufficiency manifested in the form of oligohydramnios, meconium staining of liquor, possible growth restriction, and asphyxia. At 40 weeks, 5.6% of the fetuses have complications and 10.4% of them are macrosomic. Both fetal complications and macrosomia increase to 20% at 41 weeks. By 42 weeks, 28.5% of the fetuses have complications and 34.0% are macrosomic. Because of these findings, it is clear that fetal assessment should start at 40 weeks and continue as long as the patient remains undelivered. [2] Approximately 5% to 10% of fetuses undelivered after their EDD show wasting of their subcutaneous fat, characteristic of intrauterine malnutrition. Most of them are affected by inadequate nutrition and poor growth since early gestation. [4] At 42 weeks the stillbirth rate is twice that at term. This increases nearly six-fold at 43 weeks' gestation. Similarly, the perinatal mortality rate is doubled at 42 weeks (4-7 in 1000 deliveries) compared to that at term (2-3 in 1000). At 43 weeks the perinatal mortality rate increases six-fold or even greater. [5] In Pakistan, Iqbal (2004) showed 9 perinatal deaths in postdated pregnancy. In another study in India Alash [6] identified 13.7% meconium staining of liquor, 8.2% fetal distress (late decelerations), 1.4% spontaneous rupture of fetal membranes with a prolapsed cord, 8.2% malposition of the fetal head including brow presentation. RCTs have reported a significant reduction in the number of women not in labor 72 hours following nipple stimulation. However, this is true only in women who had a favorable cervix before nipple stimulation. [7] Acupuncture and homeopathy seem to be gaining popularity with women to induce labor in certain parts of the world. There is no evidence to encourage or discourage such practices. There is clinical uncertainty over the appropriate management of pregnancies that extend beyond 40 weeks. Current management strategies for postdated pregnancy include labor induction seven or more days beyond the EDD or repeated monitoring of fetal wellbeing with the delivery of those pregnancies in which there is a concern before spontaneous labor. [8]

OBJECTIVE

General Objective

- To determine the outcomes of combined induction of labor in post-dated pregnancy

Specific Objectives

- To find out the fetal morbidity and mortality of post-dated pregnancy.
- To determine the maternal morbidity and mortality of post-dated pregnancy.
- To find out the socio-demographic characteristics of the patients having post-dated pregnancy.
- To find out the combined induction of labor in post-dated pregnancy.

METHODS

This prospective interventional study was conducted at the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Bangladesh, from March 2013 to August 2013. Patients with post-dated pregnancies admitted for delivery in the Department of Obstetrics and Gynecology in BSMMU were considered as the study population. A total of 50 patients were selected as study subjects by purposive sampling technique as per inclusion and exclusion criteria.

Inclusion Criteria

- Patients with singleton postdated pregnancies are admitted to BSMMU Hospital and DMCH for delivery.
- Patients in whom pregnancy was dated by early USG.
- Patients who were willing to give consent.

Exclusion Criteria

- Patients with multiple pregnancies.
- Patients with known or detected fetal malpresentation.
- Patients with known or detected fetal abnormality.
- Patients with the presence of coexisting medical disorders which affect the pregnancy outcome (e.g. Diabetes mellitus, Hypertension)
- Patients who did not give consent to participate in the study.

Some data were collected from the patients through face-to-face interviews, and some were collected from investigation reports. All data were collected using a pre-formed questionnaire. In this study, 34.0% of patients' labor induction was given by oxytocin drip followed by ARM, and 20.0% of patients' labor induction was given by ARM followed by oxytocin drip. In 46.0% of patients with an unfavorable cervix, prostaglandin was used followed by ARM. Close and careful evaluation of the cases concerning the mode of delivery, intranatal and postnatal management, fetal outcome, immediate and early postpartum complications were performed and recorded in the datasheet. The condition of the fetus at birth was determined by APGAR scores (If living). Collected data were analyzed using different methods of statistics. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 20.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean value was calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. The chi-

square test was used to analyze the categorical variables. Student t-test was used for continuous variables. P values <0.05 were considered statistically significant. After analysis, the data were presented in tables. Ethical clearance was taken from the ethical committee of BSMMU. Informed written consent was obtained from the participants.

RESULTS

Table 1: Distribution of the study patients by age (N=50)

Age (years)	n	%
<20	10	20.0
20-30	34	68.0
>30	6	12.0
Mean± SD	25.4±4.32	
Range (min-max)	(18-34)	

Most of the patients were in the age group 20-30 years and the mean (±SD) was 25.4±4.32 years. [Table 1]

Table 2: Distribution of the study patients by educational status (N=50)

Educational status	n	%
Illiterate	23	46.0
Upto primary	17	34.0
Secondary	10	20.0

23(46.0%) of the patients were illiterate and 17(34.0%) of the patients had primary education and the rest 10(20.0%) had secondary education. [Table 2]

Table 3: Distribution of the study patients by socioeconomic condition (N=50)

Socioeconomic condition	n	%
Lower class	25	50.0
Middle class	17	34.0
Upper class	8	16.0

In this series, 25(50.0%) of the patients were lower class 17(34.0%) of the patients had middle-class socioeconomic conditions and the rest 8(16.0%) had upper-class socioeconomic conditions. [Table 3]

Table 4: Distribution of the study patients by gravidity (N=50)

Gravidity	n	%
Primigravida	30	60.0
Multigravida	20	40.0

In the present study, 30(60.0%) of the patients were primigravida and 20(40.0%) were multigravida. [Table 4]

Table 5: Distribution of the study patients by duration of pregnancy in the patients (N=50)

Duration of pregnancy (week)	n	%
40 weeks completed (40+wk) (280-287 days)	23	46.0
41 weeks completed (41+wk) (288-294 days)	18	36.0
42 weeks completed (42+wk) (294+ days)	9	18.0

Among the patients 23(46.0%) came at 40+ weeks of pregnancy, 18(36.0%) came at 41+ weeks of pregnancy and 9(18.0%) came at 42+ weeks of pregnancy. [Table 5]

Table 6: Distribution of the study patients by procedure of calculation of E.D.D (N=50)

Procedure of diagnosis	**n**	**%**
By LMP with clinical assessment only	13	26.0
By LMP with clinical assessment and confirmed by investigation (USG)	37	74.0

E.D.D was calculated by LMP with clinical assessment only in 13 cases and by LMP with clinical assessment was confirmed by investigation (USG) in 37 cases. [Table 6]

Table 7: Distribution of the study patients by pre-induction clinical findings (N=50)

Pre-induction clinical findings	**n**	**%**
Engagement of head		
Engaged	21	42.0
Not Engaged	29	58.0
Bishop's score		
0-5 (unfavorable cervix)	26	52.0
6-13 (favorable cervix)	24	48.0

Out of the study population, 24 patients had pre-induction bishop's score within 6-13 (favorable cervix) and 26 patients had bishop's score within 0-5 (unfavorable cervix); 21 patients had engaged head and 29 patients had non-engaged head during the examination. [Table 7]

Table 8: Distribution of the study patients by methods of induction (N=50)

Methods of induction	**n**	**%**
Oxytocin drip followed by ARM	17	34.0
ARM followed by Oxytocin drip	10	20.0
Prostaglandin-E2 followed by ARM	23	46.0

In this series, in 17 patients labor induction was given by oxytocin drip followed by ARM, and in 10 patients labor induction was given ARM followed by oxytocin drip. In 23 patients with unfavorable cervix was used prostaglandin-E2 followed by ARM. [Table 8]

Table 9: Distribution of the study patients by the outcome of induction and condition of the cervix (N=50)

Mode of delivery	Induction is given with unfavorable cervix Bishop's score 0-5 (n=26)		Induction is given with unfavorable cervix Bishop's score 6-13 (n=24)		*P* value
	n	%	n	%	
Vaginal delivery	12	46.2	18	75.0	0.037[s]
Cesarean section	14	53.8	6	25.0	

s=significant

P value reached from the chi-square test

The outcome of induction is better in patients with a favorable cervix than an unfavorable cervix i.e. here we have found that the mode of delivery significantly depends on cervix condition (p-value= 0.037). The number of patients to whom induction was given with favorable cervix is 26. Among them 12 patients delivered vaginally and 14 patients needed caesarean section. The number of patients to whom induction was given unfavorable cervix was 24 and among them, 18 patients had a vaginal delivery, and a cesarean section was needed in 6. [Table 9]

Table 10: Distribution of the study patients by characteristics of failed induction cases (n=20)

Gravidity	n	%
Primi gravida	18	90.0
Multi gravida	2	10.0
Procedures of diagnosis of postdated pregnancy		
Clinical assessment with investigation	8	40.0
Clinical assessments only	12	60.0
Methods of induction		
Oxytocin drip with ARM	9	45.0
Prostaglandin with oxytocin drip with ARM	11	55.0

The total number of induction failures (who needed cesarean section) was 20. Among them 18(90.0%) were primigravida. In patients who needed cesarean section, diagnosis of postdated pregnancy was done by main investigations (USG) in 8(10.0%) patients and by history with clinical features in 12(60.0%) patients. Out of total induction failure in 9(45.0%) patients' induction was given by oxytocin and ARM and in 11(55.0%) patients' induction was given by prostaglandin followed by oxytocin and ARM. [Table 10]

Table 11: Distribution of the study patients by mode of delivery of the patients (N=50)

Mode of delivery	n	%
Normal Vaginal delivery	25	50.0
Assisted Vaginal delivery	5	10.0
Vacuum extraction	3	6.0
Forceps delivery	2	4.0
Cesarean section	20	40.0

Total normal vaginal delivery was 25 and assisted vaginal delivery was 5. Among assisted vaginal delivery 3 cases have solved by vacuum extraction and 2 by forceps. Cesarean section was done in 20 patients. [Table 11]

Table 12: Distribution of the study patients by mode of delivery in relation to gravidity (N=50)

Mode of delivery in relation to gravidity	Primigravida (n=30)		Multigravida (n=20)		p value
	n	%	n	%	
Vaginal delivery	12	40.0	18	90.0	0.001[s]
Cesarean section	18	60.0	2	10.0	

s=significant

P value reached from the chi-square test

It was observed that the mode of delivery significantly depends on the gravidity of the patients (p-value=0.001). Among primigravida (total of 30 patients) 12 had vaginal delivery and 18 had caesarean section. Among multigravida (total of 20 patients), 18 had a vaginal delivery and 2 had a cesarean section. So, the success rate of induction is higher in multigravida than in primigravida. [Table 12]

Table 13: Distribution of the study patients by indications of cesarean section (n=20)

Indication	n	%
Fetal distress	11	55.0
Abnormal uterine action	9	45.0
Uterine inertia	5	25.0
Hyperstimulation	2	10.0
Cervical dystocia	2	10.0

The table shows that among the total number of cesarean sections, 11 were done due to fetal distress and 9 were done due to abnormal uterine action, cervical dystocia 2, uterine inertia 5, and hyperstimulation 2. [Table 13]

Table 14: Distribution of the study patients by maternal complication (intrapartum/postpartum) (n=14)

Maternal complication	n	%
Abnormal uterine action	8	57.1
Cervical tear	2	14.3
Postpartum haemorrhage	2	14.3
Manual removal of placenta	0	0.0
Blood transfusion needed	2	14.3

There was no perineal tear and 2 patients had cervical tears which were repaired. In 2 patients there was postpartum hemorrhage. Among them, 2 patients needed blood transfusion. There was no intrapartum or postpartum pyrexia. [Table 14]

Table 15: Distribution of the study patients by neonatal condition at birth (N=50)

Neonatal condition	n	%
Fetal outcome		
Healthy baby	40	80.0
Asphyxiated baby	8	16.0
Stillbirth	0	0.0
Other complications	2	4.0
LBW	2	4.0
Birth trauma	1	2.0
Post maturity syndrome	1	2.0
APGAR score at 1 minute		
<5	2	4.0
5-6	6	12.0
7-10	42	84.0
APGAR score at 5 minutes		
<5	0	0.0
5-6	4	8.0
7-10	46	92.0
Birth weight		
<2.5 kg	6	12.0
2.5-4 kg	42	84.0
>4 kg	2	4.0

It was observed that 40 babies seemed to be healthy, and 8 babies were asphyxiated and were resuscitated properly. There were some other complications like 2 LBW babies 1 with birth trauma and 1 with Post maturity syndrome. A majority (84.0%) of the babies had birth weight within the normal range of 2.5-4 kg. The 5-minute APGAR score was in the range of 7-10 in the majority 92.0% cases. [Table 15]

Table 16: Distribution of the study patients by neonatal complications (N=50)

Complication	n	%
Intrapartum fetal distress		
Fetal heart rate abnormal	4	8.0
Variable fetal heart rate with meconium staining	8	16.0
Resuscitations		
Resuscitations not needed	40	80.0
Resuscitations needed	10	20.0
Referral neonatal Care		
Asphyxia and low APGAR score	4	8.0
LBW	1	2.0
Birth trauma	1	2.0
Post maturity syndrome	1	2.0
Admission to the neonatal care unit		
Low birth weight	2	4.0
Birth Asphyxia	0	0.0

It was observed that intrapartum fetal distress occurred in a total of 12 babies. 10 babies needed resuscitation and 40 babies needed no resuscitation. In terms of referral to the neonatal care unit it was found that a total of 6 babies were referred to the neonatal care unit due to different complications, 2 babies needed admission to the neonatal care unit due to low birth weight. [Table 16]

Table 17: Distribution of the study patients by perinatal outcome according to duration of pregnancy (N=50)

Fetal outcome	Completed 40 weeks (n=23)		Completed 41 weeks (n=18)		Completed 42 weeks (n=9)	
	n	%	n	%	n	%
Healthy baby	20	87.0	18	100.0	2	22.2
Asphyxiated baby	2	8.7	0	0.0	6	66.7
Other complications	1	4.3	0	0.0	1	11.1

In this series, among the healthy babies, a majority (20) were born at 40 completed weeks of gestation, 18 babies at 41 completed weeks, and 2 babies were born at 42 completed weeks of gestation. Among the asphyxiated baby 6 babies were borne at 42 completed weeks of gestation, no one at 41 completed weeks, and 2 asphyxiated babies were borne at 40 completed weeks of gestation. All babies with other complications like LBW, birth trauma, and post-maturity syndrome. [Table 17]

DISCUSSION

In this current study, it was observed that most (68%) of the post-dated pregnancy cases were found in 3rd decade, 20.0% were in 2nd decade 12.0% were in 4th decade and the mean age was 25.4±4.32 years ranging from 18 to 34 years. Similarly, Zubyra *et al.,* [9] found the mean age was 24.6±5.2 years with a range from 17 to 40 years, which closely resembled the current study. In this present study, it was observed that the majority (60.0%) of the patients having post-dated pregnancy were primiparous and 40.0% were multiparous. Similarly, Zubyra *et al.,* [9] showed nulliparas were predominant in their study of patients with prolonged pregnancy. Routine induction was done to all uncomplicated pregnancies most of which were done before 42 weeks (46% at 40+ weeks and 36% at 41 weeks) which is comparable with the gestational age of women in another study. [10] Regarding the Bishop's score, 52.0% of women with initial Bishop's score belonged to 0-5 and 48.0% of women between 6-13; 42.0% of patients had head engaged and 58.0 had non-engaged heads during the examination. This finding correlates with the initial Bishop's score of the study done by Castanede *et al.,* [11] The present study showed better outcomes in patients with favorable cervix, but in cases of unfavorable cervix, the outcome is better than in some previous studies due to the use of prostaglandins for cervical ripening. A similar study showed that 63.0% of patient with unfavorable cervix required cesarean section after induction of labor and in their study, no prostaglandins were used for cervical ripening. [12] In this present study, it was observed that 50.0% were normal vaginal delivery and 10.0% assisted vaginal delivery (6.0% Vacuum extraction and 4.0% forceps delivery). Among assisted vaginal delivery 6.0 cases had solved by vacuum extraction and 4.0% by forceps. Forty percent of patients underwent cesarean section was done in 20 patients. Abotalib *et al.,* [13] and Dasari *et al.,* [14] findings resemble the present study regarding the mode of delivery. In this study, it was found that due to routine induction of labor beyond the expected date of delivery cesarean section rate was less in multigravida (10.0%) and more in primigravida (60%). These results are comparable with a similar study. In that study, among multigravida, induction of labor was associated with a

significant reduction in the incidence of cesarean section for multigravida Parry, Parry and Pattison *et al.*, [15] The evidence for multiparous women that induction of labor is associated with improved outcomes of vaginal delivery. Here the mode of delivery significantly depends on gravidity ($p<0.05$). A total of 20 patients underwent cesarean section in this current study, of which 11(55%) cesarean sections were done due to fetal distress and the rest 9(45%) due to failure to abnormal uterine action, among them 5 uterine inertia, 2 hyperstimulation and 2 cervical dystocia but according to several studies, these indications of cesarean section are not potentially related to induction of labor. Bodner-Adler *et al.,* [16] and Herabutya, Prasertsawat, and Tongyai [17] mentioned that the most frequent indications were fetal distress and unfavorable cervix in postdated pregnancy. Regarding maternal complications it was observed that abnormal uterine action was more common (8 cases) maternal complication, there was no perineal tear, and 2 patients had cervical tears which were repaired. In 2 patients there was postpartum hemorrhage. Among them, 2 patients needed blood transfusion. There was no intrapartum or postpartum pyrexia, which is similar to the study conducted by Kemedy *et al.,* [18] Abotalib *et al.,* [13] found the mean birth weight was 3.3±0.44 kg in <42 weeks of gestation, which comparable with the present study, where the mean birth weight was found 3.0±0.35 kg in 40 -41 weeks of gestation and 3.1±0.41 kg in 41-42 weeks of gestation, and 2.7±0.20 kg in 42 weeks of gestation. In another study, Maghoma and Buchmann [19] obtained an APGAR score of 7-10 at 5 minutes 83.0%, which is almost similar to the current study. In this current study, it was observed that intrapartum fetal distress occurred in 12 babies. In terms of referral to the neonatal care unit it was found that a total of 6 babies were referred to the neonatal care unit due to different complications, 2 babies needed admission to the neonatal care unit due to low birth weight. Almost similar findings were obtained by Bodner-Adler *et al.,* [16] Regarding the perinatal outcome according to duration of pregnancy it was observed among the healthy babies majority of 20 babies were born at 40 completed weeks of gestation, 18 babies at 41 completed weeks and 2 babies were born at 42 completed weeks of gestation. Among the asphyxiated baby 6 babies were borne at 42 completed weeks of gestation, no one at 41 completed weeks, and 2 asphyxiated babies were borne at 40 completed weeks of gestation. All babies with other complications like LBW, birth trauma, and post-maturity syndrome. Asphyxiated babies and other complications are increased with elevated gestational age (42 completed weeks of gestation). In another study, postdated pregnancy was associated with perinatal complications like fetal distress, meconium aspiration syndrome, and fetal asphyxia. There was an increased risk of obstetrics complications like postpartum hemorrhage (PPH), perineal tear, cervical tear, and shoulder dystocia. [20]

Limitations of The Study

The last menstrual period (LMP) and expected date of delivery (EDD) were recorded as stated by the patients, which may mislead. Assessment of the actual pregnancy profile was not possible due to the absence of emergency ultrasonography facilities at BSMMU. Various maternal and fetal parameters had to be monitored clinically due to the absence of required sophisticated instruments (intrapartum weight of the baby). This study was done without a control group and the sample size was small so, the observed result of this study might not reflect the expected real outcome.

CONCLUSION

This study concludes that the most frequent indication was fetal distress and unfavorable cervix in postdated pregnancy. Abnormal uterine action and asphyxiated baby were the more frequent maternal and fetal complications respectively. A small number of LBW, birth trauma, and post-maturity syndrome were observed but no maternal and fetal death was found in this study.

RECOMMENDATION

With increased awareness among the general population of Bangladesh, improved obstetric care, and the availability of improved maternal and childcare facilities, the probable risk factors and hazardous outcomes could be substantially reduced. The antenatal coverage should be strengthened so that the mothers including their families get the opportunity to be informed about the duration of labor & danger signs of delivery. The quality of ANC should also be improved so that all health messages are delivered by the health care providers to deal with prolonged labor. Moreover, further studies should be conducted involving a large sample size and multiple centers.

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Ethical approval: The study was approved by the Institutional Ethics Committee.

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