ABSTRACT

Background. The two methods of management of prolonged pregnancy, induction of labour and expectant management with foetal surveillance, have pros and cons. Therefore, we compared the induction of labour with serial antenatal foetal monitoring in the management of post-term pregnancy.

Methods. Seventy-four women with uncomplicated pregnancy at 41 weeks (287 days) of gestation were randomly assigned to undergo either induction of labour or serial antenatal foetal monitoring. Labour was induced in the latter group whenever there was evidence of foetal compromise. Antenatal monitoring consisted of the foetal kick count, non-stress test and biophysical profile.

Results. Fifty-seven per cent of women went into spontaneous labour by 41 weeks and 4 days (291 days) of gestation and only 14% developed foetal compromise before that. However, when the gestational age was more than 41 weeks and 4 days (291 days), the incidence of meconium staining of amniotic fluid and evidence of uteroplacental insufficiency increased significantly. The rate of caesarean section, instrumental delivery, foetal distress and duration of labour did not differ significantly between the two groups.

Conclusion. The policy of inducing labour at 41 weeks and 4 days (291 days of gestation) in uncomplicated pregnancies is justified in our population. However, foetal monitoring should begin at 41 weeks of gestation.

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INTRODUCTION

The management of uncomplicated pregnancy extending beyond the expected date of confinement remains controversial. Prolonged pregnancy has been associated with increased foetal and neonatal morbidity and mortality rates. However, the benefit of reducing a potential foetal risk with induction of labour must be balanced against the morbidity associated with the procedure.
Two protocols are often used to manage post-term pregnancy. Expectant management consists of various antepartum surveillance tests to monitor the foetus, and labour is induced only if foetal compromise is evident. The other involves an active policy of induction of labour at 42 weeks or earlier. Traditionally, post-term foetal surveillance was started at 42 weeks of gestation based on data that showed increased perinatal morbidity and mortality rates if the pregnancy continued beyond this period. However, several studies have suggested that there is an increased incidence of adverse outcome, stillbirth, abnormal non-stress test, oligohydramnios, caesarean section for foetal distress and admission to the neonatal intensive care unit beyond 41 weeks of gestation. The changes ascribed to the uteroplacental insufficiency of post-dated pregnancies probably represent a continuum that may in fact begin before 42 weeks.

The present study was undertaken in the Department of Obstetrics and Gynaecology, Christian Medical College Hospital, Vellore. The trial was approved by the research and ethical committee of our institution and was conducted over a period of 6 months. The participants were selected from among the women attending the antenatal clinic of this institution. Low-risk pregnant women with a well established gestational age of 41 weeks (287 days) and a live singleton foetus with cephalic presentation were considered eligible for the study. The gestational age was considered to be well established if the patient had a reliable last menstrual period defined as a known date with regular monthly cycles with a uterine height corresponding to the period of gestation and had taken no oral contraceptives for at least 3 months prior to the last menstrual period.

The exclusion criteria included the presence of risk factors known to increase perinatal mortality and morbidity such as chronic hypertension, pre-eclampsia, maternal diabetes mellitus, foetal growth retardation, multiple gestation, hydramnios, premature rupture of membranes, antepartum haemorrhage and previous caesarean section. Informed consent was obtained from all the women who opted to participate in the study and fulfilled all the inclusion criteria.

The women enrolled in the study were randomized to two groups using a series of consecutively numbered, sealed envelopes containing their group assignment, generated from a table of random numbers. For women assigned to the induction group, labour was induced at 41 weeks (287 days) of gestation. Women assigned to the expectant management group were asked to keep a daily foetal movement count and underwent biophysical profile scoring on alternate days. Induction of labour was undertaken for women in the expectant management group if any of the following foetal monitoring signs were present:

1. Marked decrease in foetal movement perceived by the women when compared to the previous day or <4 movements per hour
2. Non-reactive non-stress test
3. Largest amniotic fluid pocket <3 cm
4. A biophysical profile score of <6/10

Electronic foetal monitoring (EFM) abnormalities, mode of delivery, duration of labour, meconium staining of amniotic fluid, meconium aspiration, 1- and 5-minute Apgar scores and the need for neonatal intubation were noted in the two groups. The birth weight of all the babies was recorded and signs of postmaturity were noted.

**Methods of induction**

After confirmation of the Bishop's cervical score by one of the authors, women with a cervical score of <5 were subjected to cervical ripening with an extra-amnioniotically placed 16 F Foley catheter with 20 ml of saline. For women with a cervical score >5, stripping of the membranes was performed. Twelve hours later, labour was induced by amniotomy of the forewaters and oxytocin infusion.

The standard method of foetal monitoring was by intermittent auscultation. Continuous electronic foetal monitoring was used whenever there was any evidence of foetal compromise, meconium-stained amniotic fluid or any foetal heart rate abnormality detected on auscultation. The EFM trace was considered abnormal when there was tachycardia, poor variability, bradycardia, complicated variable deceleration, late deceleration or a combination of any of these patterns. Each of the above indicators was defined as:

1. Tachycardia: A baseline foetal heart rate of >160/minute
2. Poor variability: Variability of <5 beats/minute
3. Bradycardia: Baseline heart rate of <5 beats/minute
4. Complicated variable deceleration: Variable deceleration with delayed recovery, overshoot, poor variability, etc.
5. Late deceleration: Foetal heart deceleration occurring after the onset of uterine contractions, the nadir occurring after the peak uterine contraction with a return to baseline after the end of the contraction.

Women with thin (grade I) meconium-stained amniotic fluid were treated as those with a clear liquor. The presence of moderate (grade II) and thick (grade III) meconium was considered important.

An analysis of all the data was done using the Chi-square test except the mean duration of labour and the duration of hospital stay, for which the Student's t test was used. Statistical significance was defined as p<0.05.

**RESULTS**

Seventy-four women were enrolled for and completed the study. Of these, 37 (50%) were assigned to the induction group and 37 (50%) to the expectant management group. Table I shows that there was no significant difference in the two groups with regard to maternal age, gravidity, parity, gestational age at first visit and incidence of previous history of postmaturity. Of the 37 women in the expectant management group, 23 (62%) had spontaneous onset of labour while 14 (38%) were induced. The reasons for induction of labour in this group are shown in Table II. Ten women had more than one abnormal sign suggestive of foetal compromise. Three women were induced exclusively for decreased amniotic fluid volume and one for decreased foetal movements.

Table III shows a comparison of maternal outcome while Table IV compares the foetal and neonatal outcomes in each group. The rates of caesarean section, instrumental delivery and the mean duration of labour were not significantly different between the two groups. When the indications for caesarean section and instrumental delivery were analysed, no significant difference in the incidence of foetal distress was noted between the two groups. The
incidence of foetal heart rate abnormalities in the two groups was also not significantly different. The frequency of meconium-stained amniotic fluid was significantly lower in the induction group (5% vs 21%; p<0.05). However, the incidence of meconium aspiration syndrome was not significantly different between the two groups.

None of the babies in the induction group were premature. There were no stillbirths or neonatal deaths in either of the two groups. The two groups did not differ significantly in the frequency of low 1- or 5-minute Apgar scores nor in the incidence of macrosomia. However, babies born to mothers in the expectant management group were on an average 150 g heavier and significantly more postmature than babies born to mothers in the induction group. Women in the induction group had significantly shorter mean hospital stay (1.73 days vs. 6.32 days; p<0.05).

Table V shows the distribution of gestational age at delivery in women in the expectant management group. Twenty-one (57%) women had spontaneous onset of labour by 41 weeks and 4 days (291 days). Only 5 (14%) women had to be induced before 41 weeks and 4 days (291 days) for foetal compromise. After 41 weeks and 4 days (291 days) only 2 women (5%) had spontaneous onset of labour while 9 (24%) had to be induced for foetal compromise. One woman in this group did not return for monitoring after the first 2 visits until 312 days when she was found to have markedly decreased liquor, an abnormal biophysical profile and a postmature baby.

DISCUSSION
In 1954, Clifford described a syndrome found in infants born after the expected date of delivery which in many respects resembled intrauterine growth retardation.12 There was often thick meconium staining of the amniotic fluid and signs of foetal distress during labour in postmature infants. The development of this syndrome contributes significantly to the increased foetal and neonatal morbidity and mortality associated with prolonged pregnancy. The exact gestational age at which foetal monitoring of post-term pregnancy should begin in order to optimize perinatal outcome remains uncertain.13

Conventionally, most centres in the West begin management of post-term pregnancy at 294 days (42 weeks) of gestation. However, recently there has been a trend towards accepting 41 plus weeks as the cut-off for post-term pregnancy.14,15 It has also been noticed that problems of postmaturity set in much earlier in certain ethnic groups. Dyson introduced the concept of differential risk and pointed out that in prolonged pregnancy different patient populations have different risks of developing uteroplacental
insufficiency.\(^\text{18}\) It has been proved that routine induction of labour at 40 weeks of gestation in low-risk women is followed at some centres does not confer any benefit and is hardly justified.\(^\text{19}\) However, the same cannot be said for the management of pregnancies beyond 41 weeks.\(^\text{20}\) Pregnancies beyond this period have been shown to have a significant risk of foetal death.\(^\text{21}\)

Based on our findings, a policy of inducing labour at 290 days seems to be justified as there was no difference in the rate of caesarean section or instrumental delivery between the two groups. Some workers have opposed elective induction in prolonged pregnancy as it may increase the rate of caesarean section, instrumental delivery, failed induction and prolonged labour.\(^\text{22}\) We did not find this to be true. Others have reported a lower rate of caesarean section for foetal distress in the induction group than among those in the expectant management group.\(^\text{18,21}\) However, our study failed to demonstrate any difference in the caesarean section rate for foetal distress.

In our study cervical ripening was undertaken prior to induction of labour. It appears that if induction of labour is carried out at 41 weeks (287 days) following cervical ripening, it is not associated with any maternal or perinatal risks.

In our study, 57% of women in the expectant management group had spontaneous onset of labour between 41 weeks (287 days) and 41 weeks and 4 days (291 days), while 14% developed foetal compromise during this period. Of the remaining 11, nine developed foetal compromise while waiting and only two had spontaneous onset of labour. If all women were to be electively induced at 41 weeks, it would increase the induction rate as well as the number of women needing intensive monitoring in the labour room. In developing countries where the nurse–patient ratio is not optimal and electronic foetal monitors are scarce, this would pose a tremendous load on obstetricians. A policy of expectant management till 41 weeks and 4 days (291 days) results in more than half of the women going into spontaneous labour and thereby reduces the number of inductions.

On the basis of these findings, we suggest that in our population, women with a prolonged pregnancy should undergo:

1. Foetal surveillance by ultrasound examination, non-stress test on alternate days and daily foetal movement count beginning at 41 weeks of gestation (287 days).
2. Induction of labour at 41 weeks and 4 days (291 days) of gestation after cervical ripening, if necessary.

REFERENCES