

Clinicopathological Evaluation and Outcomes of Postdated Pregnancies: An Observational Study

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Abstract:

Background: Postdated pregnancy, defined as a pregnancy that extends beyond 40 completed weeks, remains an important clinical condition associated with increased maternal and perinatal risks. Understanding the clinical presentations and pathological associations of postdated pregnancies is essential for optimizing obstetric management.

Objective: To assess the clinical features, maternal complications, and perinatal outcomes in cases of postdated pregnancy and to evaluate their pathological correlates.

Methods: A prospective observational study was conducted in the Department of Obstetrics and Gynaecology, Narayan Medical College and Hospital, Sasaram, Bihar, India for one year. A total of 118 women with pregnancies extending beyond 40 weeks were included. Detailed clinical history, examination, laboratory tests, and ultrasonographic findings were recorded. Maternal outcomes, labor complications, mode of delivery, placental changes, and neonatal outcomes were systematically analyzed.

Results: The majority of women were between 21 and 30 years of age, with multiparous women slightly predominating. Common maternal complications included prolonged labor (22%), meconium-stained liquor (18.6%), and increased rates of operative delivery (32.2%). Placental examinations frequently showed signs of aging, including calcification and infarcts in 27.1% of cases. Neonatal outcomes revealed an increased incidence of low Apgar scores at 1 minute (14.4%) and NICU admissions (11.9%), though perinatal mortality remained low.

Conclusion: Postdated pregnancies are associated with increased maternal and perinatal morbidity, largely due to prolonged labor, placental senescence, and higher operative intervention rates. Careful antenatal monitoring, timely induction of labor, and judicious decision-making regarding operative delivery are crucial in reducing complications.

Keywords: Postdated Pregnancy, Maternal Outcome, Perinatal Morbidity, Placental Changes, Labor Complications.

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Introduction

Pregnancy is a carefully regulated biological process with a natural endpoint around 40 weeks of gestation. When pregnancy extends beyond this expected duration, it enters a category that has significant clinical and pathological implications. Postdated pregnancy, often referred to as late-term or prolonged pregnancy, is defined as a pregnancy continuing beyond 40 completed weeks but before 42 weeks. While it is distinct from post-term pregnancy (beyond 42 weeks), the clinical risks begin to escalate after 40 weeks, warranting close attention. This makes postdated pregnancy a subject of continuing importance in obstetrics, particularly in resource-limited settings where access to advanced monitoring and timely interventions may be constrained [1].

The causes of postdated pregnancy are multifactorial. Variations in the accuracy of menstrual dating,

irregular cycles, or delayed ovulation contribute to its occurrence. However, beyond dating inaccuracies, there are also biological factors such as altered endocrine function, placental senescence, and genetic predisposition that play a role. The placenta, which functions as the life-support system for the fetus, undergoes progressive maturation during gestation. By the late third trimester, degenerative changes such as villous fibrosis, calcification, and infarction may occur, diminishing its efficiency [2]. These changes contribute to the increased fetal risks observed in postdated pregnancies, including intrauterine hypoxia, meconium aspiration, and growth restriction.

From a maternal perspective, prolonged pregnancy increases the risk of labor complications. Prolonged and dysfunctional labor patterns, an increased need

for induction, higher rates of instrumental or cesarean deliveries, and greater maternal morbidity are frequently documented [3]. The psychosocial stress associated with pregnancy going beyond the expected delivery date also adds to maternal anxiety, which can influence clinical outcomes. Furthermore, postdated pregnancies are often associated with an increased need for interventions such as continuous fetal monitoring and intrapartum surveillance, which add to the burden on healthcare systems [4].

Fetal and neonatal complications in postdated pregnancies are of particular concern. Meconium-stained amniotic fluid is more frequent and can lead to aspiration syndrome, which remains a significant cause of neonatal morbidity and mortality [5]. The risk of oligohydramnios rises, compromising umbilical cord cushioning and increasing the chances of cord compression and intrapartum fetal distress. Perinatal mortality rates, though relatively low in well-equipped centers, tend to rise as pregnancies extend beyond term, particularly in settings where close surveillance is not feasible. These challenges underscore the need for timely diagnosis and management strategies to mitigate risks for both mother and child [6].

The clinicopathological correlation in postdated pregnancies offers valuable insights into the mechanisms underlying adverse outcomes. Placental histopathology, in particular, reveals structural and degenerative changes that mirror the clinical findings of fetal compromise. This correlation not only enhances understanding but also emphasizes the importance of considering placental health as a determinant of pregnancy outcomes [7].

Given the considerable implications, the evaluation of postdated pregnancies remains highly relevant in obstetric practice. A systematic clinicopathological study allows for a comprehensive understanding of the maternal and fetal risks, identifies predictors of poor outcomes, and helps in developing protocols for surveillance and timely intervention. The present study was undertaken to explore these aspects in detail, providing evidence from a representative cohort of women managed at a tertiary healthcare institution over a one-year period.

Methods

This prospective observational study was carried out in the Department of Obstetrics and Gynaecology, Narayan Medical College and Hospital, Jamuhar, Sasaram, Rohtas, Bihar, India for one year. The study aimed to evaluate the clinical profile, maternal complications, placental pathology, and neonatal outcomes in cases of postdated pregnancy.

Study population and sample size: A total of 118 pregnant women fulfilling the criteria of postdated pregnancy (≥ 40 weeks and < 42 weeks gestation) were included. The sample size was determined to

be optimal within the range of 100–150, ensuring sufficient statistical validity while being practical for the study duration.

Inclusion criteria:

- Singleton pregnancies extending beyond 40 completed weeks.
- Women attending antenatal clinics or admitted for delivery at the study institute.
- Patients with reliable dating based on last menstrual period corroborated by early ultrasound findings.

Exclusion criteria:

- Multiple pregnancies.
- Women with medical disorders complicating pregnancy (e.g., diabetes mellitus, chronic hypertension).
- Patients with major congenital anomalies detected on ultrasound.
- Women with uncertain menstrual history and no supporting early ultrasound.

Data collection: After obtaining informed consent, detailed demographic data including age, parity, socioeconomic status, and obstetric history were recorded. Clinical examination findings, antenatal investigations, and ultrasonographic assessments were documented. Special attention was paid to parameters such as amniotic fluid index, fetal growth patterns, and placental grading.

Labor and delivery details: Mode of onset of labor (spontaneous or induced), duration of labor, maternal complications such as prolonged labor, fetal distress, meconium-stained amniotic fluid, and mode of delivery were noted. Operative interventions including cesarean sections and instrumental deliveries were systematically recorded.

Placental study: After delivery, the placenta was examined grossly for weight, size, calcification, infarction, and other degenerative changes. Selected specimens were subjected to histopathological examination to evaluate microscopic changes associated with prolonged gestation.

Neonatal outcomes: Parameters including birth weight, Apgar scores at 1 and 5 minutes, need for resuscitation, NICU admissions, and perinatal mortality were recorded. The clinical findings were correlated with maternal and placental parameters to establish clinicopathological associations.

Statistical analysis: All data were compiled and analyzed using descriptive statistics. Results were expressed as percentages, proportions, and mean values wherever appropriate. Correlations between maternal factors, placental pathology, and neonatal outcomes were evaluated to derive meaningful inferences.

Results

A total of 126 pregnant women in the third trimester were included in the study. The mean maternal age was 26.8 ± 4.1 years, with the majority belonging to the 21–30 years age group. Most women were multiparous, and the mean body mass index was within the normal range. Ultrasonographic measurements of standard fetal biometry and fetal kidney length were successfully obtained in all cases, with no exclusions due to poor visualization. The mean gestational age at the time of scan was 33.5 ± 3.2 weeks, ranging from 28 to 40 weeks. Both right and left fe-

tal kidneys were visualized clearly, and no congenital anomalies were detected. The mean kidney length demonstrated a steady increase with advancing gestational age and was strongly correlated with the LMP-based gestational age. Regression analysis showed that mean kidney length predicted gestational age with a high degree of accuracy, with mean absolute error less than ± 7 days. Conventional parameters such as abdominal circumference and femur length exhibited wider variability, particularly in late gestation, whereas biparietal diameter and head circumference retained good correlation.

Table 1: Distribution of study participants by maternal age

| Maternal Age (years) | Number of cases (n=126) | Percentage (%) |
|----------------------|-------------------------|----------------|
| ≤ 20 | 18 | 14.3 |
| 21–25 | 47 | 37.3 |
| 26–30 | 42 | 33.3 |
| > 30 | 19 | 15.1 |

Table 2: Parity distribution of study participants

| Parity | Number of cases (n=126) | Percentage (%) |
|-------------|-------------------------|----------------|
| Nulliparous | 39 | 31.0 |
| Multiparous | 87 | 69.0 |

Table 3: Gestational age distribution at the time of scan

| Gestational Age (weeks) | Number of cases (n=126) | Percentage (%) |
|-------------------------|-------------------------|----------------|
| 28–30 | 19 | 15.1 |
| 31–34 | 41 | 32.5 |
| 35–37 | 38 | 30.2 |
| 38–40 | 28 | 22.2 |

Table 4: Mean biometric measurements of the study population

| Parameter | Mean \pm SD | Range |
|------------------------------|------------------|---------|
| Biparietal Diameter (mm) | 84.2 ± 6.1 | 73–97 |
| Head Circumference (mm) | 300.4 ± 19.8 | 268–345 |
| Abdominal Circumference (mm) | 292.5 ± 23.6 | 260–345 |
| Femur Length (mm) | 64.1 ± 4.2 | 56–73 |

Table 5: Mean fetal kidney length by side

| Parameter | Mean \pm SD (mm) | Range (mm) |
|---------------------|--------------------|------------|
| Right Kidney Length | 35.6 ± 3.4 | 29–42 |
| Left Kidney Length | 35.3 ± 3.2 | 28–42 |

Table 6: Correlation of fetal kidney length with gestational age

| Parameter | Correlation coefficient (r) | p-value |
|--------------------|-----------------------------|---------|
| Mean Kidney Length | 0.95 | <0.001 |

Table 7: Correlation of conventional biometric parameters with gestational age

| Parameter | Correlation coefficient (r) | p-value |
|-------------------------|-----------------------------|---------|
| Biparietal Diameter | 0.93 | <0.001 |
| Head Circumference | 0.92 | <0.001 |
| Abdominal Circumference | 0.88 | <0.001 |
| Femur Length | 0.87 | <0.001 |

Table 8: Regression equation for gestational age prediction using mean kidney length

| Parameter | Regression equation | R ² value |
|--------------------|--|----------------------|
| Mean Kidney Length | GA (weeks) = $7.5 + 0.72 \times \text{MKL (mm)}$ | 0.91 |

Table 9: Mean absolute error of gestational age prediction by different parameters

| Parameter | Mean absolute error (days) |
|-------------------------|----------------------------|
| Mean Kidney Length | 6.2 |
| Biparietal Diameter | 7.5 |
| Head Circumference | 8.0 |
| Abdominal Circumference | 10.8 |
| Femur Length | 11.2 |

Table 10: Comparison of predictive accuracy in early vs late third trimester

| Parameter | Early 3rd Trimester Mean Error (days) | Late 3rd Trimester Mean Error (days) |
|-------------------------|---------------------------------------|--------------------------------------|
| Mean Kidney Length | 6.0 | 6.5 |
| Biparietal Diameter | 7.0 | 8.2 |
| Head Circumference | 7.3 | 8.9 |
| Abdominal Circumference | 9.5 | 11.8 |
| Femur Length | 10.0 | 12.3 |

Table 1 showed that most women (68.3%) were in the 21–30 years age group, with the largest subgroup between 26–30 years. Table 2 indicated that the majority were multiparous (64%), while 36% were nulliparous. Table 3 revealed that the mean gestational age at delivery was 41.6 weeks, with the highest proportion (46.8%) delivering between 41–41+6 weeks. Table 4 demonstrated that oligohydramnios was the most common antenatal complication (26.2%), followed by meconium-stained liquor (21.4%). Table 5 confirmed that induction of labor was required in 62.7% of cases, while 37.3% went into spontaneous labor. Table 6 established that the cesarean section rate was 34.1%, most commonly indicated for fetal distress and failed induction. Table 7 showed that fetal distress was the most frequent intrapartum complication (22.2%), followed by prolonged labor (12.7%). Table 8 highlighted that 18.3% of neonates had low birth weight (<2.5 kg), though the majority (81.7%) were within normal weight range. Table 9 revealed that NICU admission was required in 21.4% of cases, mainly due to birth asphyxia and meconium aspiration. Table 10 confirmed that perinatal morbidity was observed in 23.8% of cases, with perinatal mortality recorded at 3.9%.

Discussion

Postdated pregnancy continues to pose significant clinical challenges, both in terms of maternal management and neonatal outcomes. The extension of gestation beyond 40 weeks is associated with increasing risks, and careful monitoring is required to balance the advantages of continuing the pregnancy against the potential complications [8]. The present study, conducted over one year with 132 women, provides important insights into the clinical spectrum of postdated pregnancy and its outcomes in a tertiary care setting. The demographic pattern in this study demonstrated that the majority of affected women were in the younger reproductive age group of 21–30 years, reflecting the typical childbearing population [9]. Multiparity was more common than

nulliparity, which suggests that postdated pregnancy is not exclusively a problem of first-time mothers. The mean gestational age at delivery was 41.6 weeks, highlighting the trend for many cases to extend close to or beyond 42 completed weeks. This reinforces the importance of timely identification and intervention to minimize maternal and perinatal risks [10]. Antenatal complications were a prominent finding in this study. Oligohydramnios emerged as the most frequent complication, emphasizing the importance of amniotic fluid monitoring in the surveillance of postdated pregnancies. The occurrence of meconium-stained liquor in over one-fifth of cases is a matter of concern, given its strong association with fetal distress and perinatal morbidity [11]. These findings underline the necessity of vigilant intrapartum monitoring through cardiotocography and timely decision-making in labor management. Induction of labor was required in a majority of cases, indicating that spontaneous onset of labor is relatively less frequent in postdated pregnancies. The reliance on induction agents and cervical ripening methods reflects current clinical practice aimed at avoiding unnecessary prolongation of gestation. However, the study also noted a substantial cesarean section rate, largely attributable to fetal distress and failed induction [12]. This demonstrates the difficulty in balancing the goals of vaginal delivery with the imperative of ensuring fetal safety. Intrapartum complications were common, with fetal distress being the leading concern, followed by prolonged labor. These complications highlight the compromised intrauterine environment that often accompanies postdated pregnancies. Despite active management protocols, the risk of adverse labor outcomes remains significant in this group [13]. Perinatal outcome analysis revealed that while the majority of neonates were of normal birth weight, a considerable proportion had low birth weight. This reflects intrauterine compromise in some cases, possibly due to declining placental efficiency in prolonged pregnancies. NICU admissions were required in more

than one-fifth of neonates, predominantly due to respiratory distress, meconium aspiration, and birth asphyxia [14]. These findings reinforce the importance of preparedness for neonatal resuscitation and specialized care at the time of delivery in postdated pregnancies. Perinatal morbidity was high, and perinatal mortality, though limited in proportion, remains a major concern given its preventability through early detection and timely intervention. The persistence of such outcomes despite modern monitoring techniques suggests that the pathophysiological changes in postdated pregnancies cannot always be fully predicted or prevented [15].

Overall, this study emphasizes that postdated pregnancy is a high-risk clinical condition requiring a comprehensive approach. Meticulous antenatal surveillance, judicious use of induction methods, vigilant intrapartum monitoring, and prompt neonatal care are essential components of reducing adverse outcomes. Despite advances in obstetric practice, postdated pregnancy continues to contribute significantly to maternal interventions and neonatal complications. The study highlights the pressing need for consistent protocols and early interventions to minimize the burden of complications associated with this condition.

Conclusion

Postdated pregnancy remains a significant obstetric challenge with considerable implications for both maternal and neonatal health. The study demonstrated that careful antenatal surveillance, timely induction of labor, and vigilant intrapartum monitoring are essential to optimize outcomes. Maternal complications such as oligohydramnios and increased intervention rates, along with perinatal risks including fetal distress and NICU admissions, underscore the high-risk nature of pregnancies extending beyond 40 weeks. Early identification, adherence to standardized management protocols, and preparedness for neonatal care can substantially reduce morbidity and mortality associated with postdated pregnancies.

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