

Postmaturity: how far is it a clinical entity in its own right?

G. CARLOMAGNO - G. CANDUSSI - S. ZAVINO - M. R. PRIMERANO

Summary: In 1990 we adopted a protocol of antepartum testing for all booked pregnant patients, permitting healthy pregnancies to go beyond 42 completed weeks of gestation. This retrospective study regards 84 patients delivering after 42 completed weeks of pregnancy and a control group of 1351 patients delivering after 37 completed and before 41 completed weeks of pregnancy. Records were revised for maternal age and parity, previous obstetric history, managing and complications of the actual pregnancy, labour and mode of delivery, neonatal biometric data and outcome. Only 4 patients delivered after 43 completed weeks of gestation, while none in the series delivered later than 44 completed weeks after the beginning of the last menstrual period. The overall frequency of caesarean birth was higher, but not significantly, in study group. Average neonatal birthweight and length were significantly greater in the study group. No significant difference in neonatal outcome was observed between study and control groups in terms of perinatal mortality. Low 1' Apgar score was significantly more frequent in the study group, but a similar frequency of 5' Apgar score and need for intensive care was observed in the two groups.

INTRODUCTION

The title of the present paper comes from the Chapter on "Postmaturity and Dismaturity" in the 1969 edition of Ian Donald's "Practical Obstetric Problems" (1). The Author posed this question together with several other: "How can one be sure that the case is postmature? What are the risks and what steps should be taken to counter them?"

Regarding the first question, and according to different Authors, pregnancy should be regarded as prolonged if its

duration exceeds 293 days (1,2,3) or 285 days (4), calculated from the beginning of the last menstrual period, by 14 days or more. Pregnancy chronology should be sonographically confirmed before 18-20 weeks of gestation, but sonographically available parameters allow a plus/minus of 7 day error equalling the 14 day period peculiar to the definition of prolonged pregnancy.

Two of the three standards proposed for definition of feto-neonatal postmaturity (pregnancy exceeding 290 days, fetal length exceeding 54 cm, fetal weight exceeding 4.000) are ascertainable only after the actual delivery and all three conditions were satisfied in 2% of cases which were classified as postmature (5).

Regarding the second question - "What are the risks and what steps should be taken to counter them?" - other problems arise. A progressively diminished oxygen saturation level in umbilical vein blood

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from term onwards has been demonstrated^(6, 7) by some studies. Conversely other studies showed no correlation between the oxygen level and fetal age⁽⁸⁾ and demonstrated that fetuses may assume daily, even post-term, 6-10 mg of protein per kilo of body weight⁽⁹⁾.

Many studies emphasize the association between prolonged pregnancy and adverse perinatal outcome and, also taking into account delivery complications due to oligoamnios, macrosomia or large shoulders, suggest a more liberal induction policy at term^(2, 5, 10, 11). Conversely, others underline the need for routine ante-partum testing, starting near term, to screen all possible pregnancy complications, while waiting for spontaneous labour in cases of purely prolonged pregnancy^(12, 13, 14).

Some randomized trials provided rather divergent conclusions: ante-partum testing, letting the pregnancy go beyond 42 completed weeks of gestation, brought no significant differences versus induction of labour in terms of neonatal Apgar scores, but a greater proportion of babies required intubation⁽¹⁴⁾ or a greater number of operative deliveries was needed in the non-induced group⁽¹²⁾; routine induction of labour in prolonged pregnancy brought a reduction in perinatal morbidity and mortality, but also an increased incidence of caesarean births⁽¹⁵⁾; routine induction brought a decreased incidence of fetal distress and caesarean births⁽¹⁶⁾.

More interesting is the observation that a policy of ante-partum testing beginning at 41 weeks, and assigning to induction only selected cases, may reduce perinatal mortality and intrapartum fetal distress in prolonged pregnancies⁽²⁾.

In our practice we have adopted this policy for many years with encouraging results⁽¹⁷⁾. More recently this policy was adopted in the Isernia School of Midwifery; the present paper reports our experience as a contribution to the problem of prolonged pregnancy management.

MATERIALS AND METHODS

In 1990 we adopted a protocol of ante-partum testing for all booked pregnant patients, who represent the majority of the patients delivering in our institution. Pregnancy duration is calculated from the last menstrual period, eventually corrected by early sonography. Possible misdating of the last period or a history of irregular periods are recorded. From 37 completed weeks all pregnant patients are invited to record active fetal movements according to Pearson⁽¹⁸⁾. From 40 completed weeks of gestation, on a day hospital basis, they are tested as follows:

1. twice during week 41 (40 completed weeks)
 - ultrasonography, non stress test, amnioscopy;
2. at 41 completed weeks
 - oxytocin challenge test, amnioscopy;
3. every second day during week 42
 - non stress test, amnioscopy;
4. at 42 completed weeks
 - oxytocin challenge test, amnioscopy;
5. every second day during week 43 and until labour
 - non stress test, amnioscopy.

Positivity of the non stress test according to Fisher⁽¹⁹⁾ is regarded as an indication for performing an oxytocin challenge test; positivity of the latter is regarded as an indication to induce labour. No inductions are made on the sole basis of prolongation of pregnancy.

This retrospective study regards a series of 1763 singleton pregnancies from a 34 month period ending in October 1992.

Within the entire series we identified a study group (84 patients delivering after 42 completed weeks of pregnancy) and a control group (1351 patients delivering after 37 completed and before 41 completed weeks of pregnancy). To have a clear cut off between study and control cases, patients delivering during week 42 were excluded from evaluation. Records were revised for maternal age and parity, previous obstetric history, management and complications of the actual pregnancy, labour and mode of delivery, neonatal biometric data and outcome.

Evaluation of the significance of the statistics has been carried out through the standard chi-square test and the Student's test. Statistical significance was attributed to *p* values of less than 0.05.

RESULTS

The study group (84 cases) and the control group (1351 cases), as defined above, respectively account for 4.76% and 76.63% of the entire series. In table

Table 1. — Maternal and obstetric history (*p* value is reported when statistically significant).

| | Study group (84) | | <i>p</i> | Control group (1351) | |
|-------------------------------------|------------------|---------|----------|----------------------|---------|
| | n. | (%) | | n. | (%) |
| Parity = 0 | 54 | (64.28) | < 0.01 | 616 | (45.59) |
| Average maternal age | 27 | | | 28 | |
| Irregular periods | 9 | (10.71) | | 98 | (7.25) |
| Uncertain last period | 7 | (8.33) | | 66 | (4.88) |
| Booked patients | 67 | (79.76) | | 1119 | (82.82) |
| Average prenatal controls | 4 | | | 5 | |
| Ultrasonography ≥ 2 | 70 | (83.33) | | 1115 | (82.53) |
| Gestational hypertension | # | | | 6 | (0.44) |
| Diabetes | # | | | 2 | (0.14) |

1 we report data regarding maternal history and other data of obstetric interest. In both groups, in more than 80% of the patients, gestational age from the last menstrual period as reported, was confirmed by early ultrasonography; this observation confirms the accuracy of gestational chronology, considering also the small percentage (10% or less) of cases with irregular periods or uncertain last

menstrual period occurring in both groups. The accuracy of pregnancy chronology is also confirmed by the negligible number of possibly misdated pregnancies: only 4 patients delivered after 43 completed weeks of gestation, while none in the series delivered later than 44 completed weeks after the beginning of the last menstrual period. Nearly 80% of the cases in both groups were booked cases

Table 2. — Labour and mode of delivery (*p* value is reported when statistically significant).

| | Study group (84) | | <i>p</i> | Control group (1351) | |
|-----------------------------------|------------------|---------|----------|----------------------|---------|
| | n. | (%) | | n. | (%) |
| Meconial liquor | 16 | (19.04) | | 178 | (13.17) |
| Oligoamnios | 7 | (8.33) | | 53 | (3.92) |
| Breech | 2 | (2.38) | | 53 | (3.92) |
| Transverse lie | 2 | (2.38) | | 6 | (0.44) |
| Induction | 1 | (1.25) | | 2 | (0.16) |
| Augmentation | 12 | (15.00) | < 0.01 | 67 | (5.45) |
| Labour > 10 h * | 9 | (11.25) | < 0.05 | 60 | (4.88) |
| Spontaneous delivery | 64 | (76.19) | | 1133 | (83.86) |
| Vag. op. deliv. | 1 | (1.19) | | 4 | (0.30) |
| Caesarean section | 19 | (22.61) | | 214 | (15.84) |
| – Elective C. S. ** | 4 | (21.05) | < 0.01 | 122 | (57.00) |
| – Non elective C. S. ** | 15 | (78.95) | < 0.01 | 92 | (43.00) |
| – Mech. dystocia *** | 8 | (53.33) | | 43 | (46.73) |
| – Dynam. dystocia *** | 3 | (20.01) | | 27 | (29.34) |
| – Fetal distress *** | 4 | (26.66) | | 22 | (23.93) |

Note: * denominator: patients admitted to labour (study: 80, controls: 1229); ** denominator: CS (study: 19, controls: 241); *** denominator: non elective caesarean sections (study: 15, controls: 92).

Table 3. — *Post-partum and neonatal outcome (p value is reported when statistically significant).*

| | Study group (84) | | p | Control group (1351) | |
|--------------------------|------------------|---------|---------|----------------------|---------|
| | n. | (%) | | n. | (%) |
| Placental retention * | 1 | (1.53) | | 19 | (1.67) |
| Average plac. wght g | 550 | | | 546 | |
| Plac. wght < 350 g | 1 | (1.19) | | 27 | (1.99) |
| Average neon. wght g | 3487 | | < 0.001 | 3294 | |
| Neon. wght < 2500 g | 1 | (1.19) | | 43 | (3.18) |
| Neon. wght 2500-2999 g | 8 | (9.52) | < 0.05 | 278 | (20.57) |
| Neon. wght 3000-3999 g | 68 | (80.95) | | 959 | (70.98) |
| Neon. wght > 3999 g | 7 | (8.34) | | 71 | (5.27) |
| Average neon. length cm | 51.87 | | < 0.001 | 49.78 | |
| Neon. length > 52 cm | 11 | (13.09) | | 97 | (7.19) |
| Apgar 1' < 7 | 11 | (13.09) | < 0.05 | 83 | (6.14) |
| Apgar 5' < 7 | # | | | 14 | (1.03) |
| Males | 38 | (45.24) | | 693 | (51.60) |
| Females | 46 | (54.76) | | 658 | (48.40) |
| Congenital malformations | 3 | (3.57) | | 20 | (1.48) |
| N.I.C.U. | 4 | (4.76) | | 113 | (8.36) |
| Perinatal mortality | # | | | 6 | (4.44‰) |
| Shoulder dystocia * | 8 | (12.30) | < 0.02 | 61 | (5.36) |
| - Clavicle fracture * | 7 | (10.76) | | 53 | (4.66) |
| - Brachial paresis * | 1 | (1.53) | | 8 | (0.70) |

Note: * denominator: patients delivering vaginally (study: 65, controls: 1337).

entering the ante-partum testing protocol defined above. Prolonged pregnancy resulted significantly more frequent among nulliparous patients.

In table 2 we report data regarding labour and mode of delivery. Meconium stained liquor and oligoamnios were more frequent, but not significantly, in the study group. The overall frequency of caesarean birth was higher, but not significantly, in study group. An elective caesarean section was needed only 4 times in the study group: two were breech cases and two were transverse lie cases; the significantly higher relative frequency of elective caesarean sections among controls was obviously due to the wider range of fetal and/or maternal conditions requiring elective caesarean section near/at term. The relative frequency of indications for non elective caesarean section was similarly distributed in both groups.

According to the low frequency of pregnancy complications, such as diabetes or gestational hypertension, induction was rarely needed in either group. A significantly higher frequency of prolonged (more than 10 hours active phase) labour was observed in the study group; consequently augmentation of labour was significantly more frequent. In table 3 we report data regarding post-partum and neonatal outcome. Only a few cases of intrauterine growth retardation were observed in the study group, due to the capability of ante-partum testing to screen them for induction in previous weeks. Average neonatal birthweight and length were significantly greater in the study group. No significant difference in neonatal outcome was observed between study and control groups in terms of perinatal mortality. Low 1' Apgar score was significantly more frequent in the

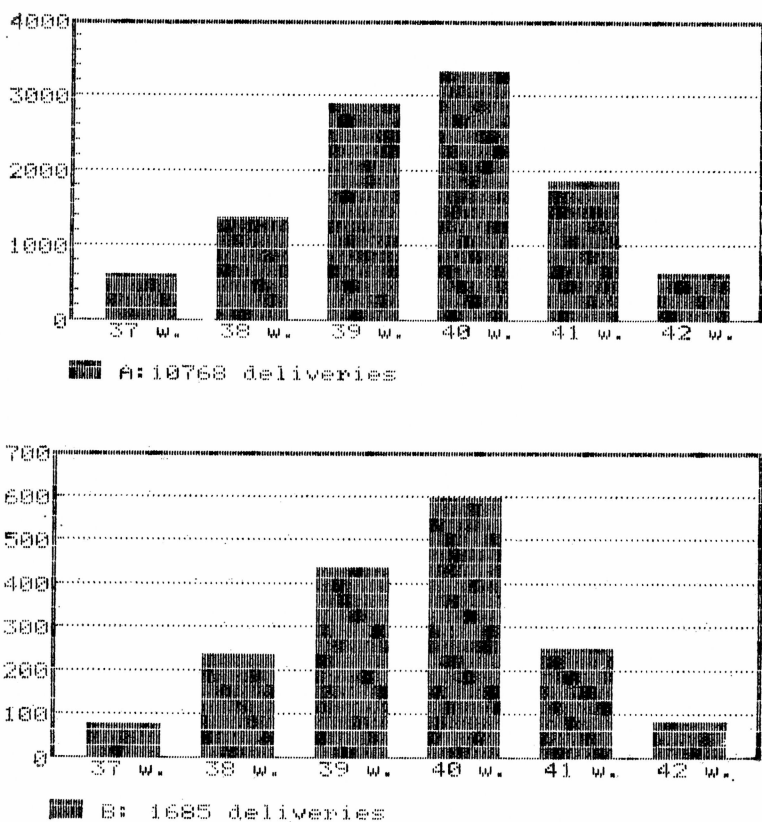


Fig. 1. — Distribution of pregnancy duration after 37 completed weeks of gestation, without routine induction of prolonged pregnancies. A: from a series of 11,701 births before 1972 (Trieste, Italy); B: from a series of 1,763 births 1990-92 (Isernia, Italy).

study group, but a similar frequency of 5' Apgar score and need for intensive care was observed in the two groups. An inverse male to female ratio was observed in the study group (0.82 versus 1.05).

Shoulder dystocia was significantly more frequent in the study group; transient brachial paresis complicating shoulder dystocia occurred rarely, and with similar frequency in both groups. A more common complication of shoulder dystocia was clavicle fracture, occurring with fairly significantly higher frequency in the study group.

DISCUSSION AND CONCLUSIONS

“Postmaturity: how far is it a clinical entity in its own right?”. If prolonged pregnancy is an abnormal condition, it should have its own pathology; this condition is not fulfilled according to our data, nor is it according to results of some of the reviewed studies (8, 9, 12, 14, 17). Having started near/at term to screen pregnancy complications which may affect fetus wellbeing and growth or which represent risk factors for maternal health, and permitting only healthy pregnancies to go beyond 42 completed weeks of gestation, we did not find any pathological

condition peculiar to longer pregnancy duration.

The fetus kept growing⁽²⁰⁾, labour started spontaneously not later than 44 completed weeks of pregnancy, and most of cases delivered vaginally. The duration of pregnancy depends, after all, on the beginning of labour which is triggered by the activation of a complex, only partly understood, mechanism involving hormones, electrolytes, prostaglandines and other factors^(21, 22, 23, 24). Dealing with so many variables, one would expect a variability of pregnancy duration inside a normality range of some weeks. In fact, studying to a series of more than 11,000 patients delivered before 1972⁽²⁵⁾, we see that the duration of pregnancy, calculated on the basis of a correctly recorded last menstrual period, and not influenced by an induction policy, distributed along a regular Gaussian curve from 37 until 42 completed weeks of pregnancy. The same distribution, in the range of fetal maturity (37 weeks or more), was observed in our experience, without routine induction of prolonged pregnancies (Fig. 1).

While confirming the need for an antepartum testing protocol to be entered near/at term by all booked pregnant patients^(2, 26), our data seem to indicate that a pregnancy duration of 42 completed weeks is not to be considered an abnormal condition, but just the upper limit of a normality range.

As a partial answer to the other question – “What are the risks and what steps should be taken to counter them?” – a higher frequency of shoulder dystocia and connected neonatal morbidity (low 1' Apgar score, transient brachial paresis, fracture of the clavicle) was observed. This does not represent a pathology peculiar to prolonged pregnancy so it is not in contrast with our previous conclusion; but the management problem still remains unsolved. Unfortunately shoulder dystocia is not easily predictable^(27, 28). Firstly, ultrasonographic screening for macrosomia

in prolonged pregnancies is associated with a relatively low positive predictive value⁽²⁹⁾, secondly, many cases of shoulder dystocia occur with normal fetal weight. In study group neonatal birthweight of shoulder dystocia cases ranged between 2612 and 3840 grams, while only 6 out of 53 cases of shoulder dystocia occurred in the control group with neonatal birthweight greater than 3999 g.

In our opinion, it would be hard to advocate routine induction for all prolonged pregnancies to prevent shoulder dystocia, considering the expected frequency of induction failures and need for caesarean section (and consequent maternal morbidity) observed both with oxytocin and local application of prostaglandin^(30, 31), but which steps are to be taken to this particular risk associated with prolonged pregnancy still represent a dilemma.

A final consideration regards women's attitude after term. It has been observed, and is a common experience, that many women cannot “stand the thought of being pregnant for more than 42 weeks”; a good suggestion would be to abandon the term “expeted date” and give the patients a 4 week leeway upon which the delivery date can be normally expected⁽³²⁾.

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Address reprint requests to:
 Dr. G. CARLOMAGNO
 Scuola di Ostetricia
 P.O. Box, 201
 I-86170 Isernia (Italy)