Postdate Pregnancy in a Network of Community Hospitals: Management and Outcome

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The outcome of 116 postdate pregnancies managed by 14 family physicians in small community hospitals is compared with the outcome of term gestations in the same setting. The postdate pregnancies in this relatively unselected population showed an increase in incidence of macrosomia and fetal heart rate abnormalities similar to those reported from referral centers. The increases in incidence of meconium staining and low Apgar scores reported previously were not found. The postdate patients had more frequent induction, augmentation, and amniotomy, as well as a significant increase in primary cesarean section, decreased use of epidural anesthesia, and fewer assisted deliveries. These data suggest that the community physicians were attaining a favorable outcome in the postdate pregnancy by an active approach to induction and management of labor combined with abdominal delivery of the macrosomic infant showing evidence of fetal distress.

Management of the postdate pregnancy has changed remarkably over the last few years. The former conservative "watchful waiting" strategy has given way to very careful fetal surveillance and early labor induction. This change in management strategy is largely due to the realization that, although postdate pregnancies generally account for only 6 to 10 percent of all deliveries, as many as 40 percent of complications at delivery occur in these patients.[1]

Recent studies have shown that macrosomia (greater than 4,500 g) and birth injuries are two to three times more common in the postdate infant,[2,3] and meconium staining occurs twice as often in the infant beyond 42 weeks' gestation.[3,4] Once labor begins, the postdate infant also shows a threefold increase in fetal distress when compared with controls.[3] Some studies have also shown significantly lower Apgar scores in macrosomic infants.[2] The risk of intrauterine fetal death in postdate pregnancies has been reported as three to six per 1,000, even with nonstress-test surveillance. This adverse outcome is in the same range as such severe metabolic conditions as diabetes.[5,6]

If the decision is made to deliver prior to the onset of labor, significant maternal complications may occur. Many attempts have been made to predict the course of spontaneous labor,[7,8] but few have shown a reliable prediction of the difficulty of induction.[9] Patients who are induced have been shown to have a higher rate of forcep deliveries, episiotomies, and the need for epidural anesthesia.[10] The most significant problem with induction when the cervix is "unripe," especially in the primipara, is an increased primary cesarean section rate. One study reported a 65 percent increase in primiparous abdominal delivery when labor was induced, with the majority of this difference accounted for by failure to progress.[10] The overall cesarean section rate for postdate pregnancies is reported as 25 to 30 percent.[3,4]

The results reported in these studies make it difficult to continue nonintervention in the postdate pregnancy. All of these data were generated from large hospitals, however, and all but one were done in regional referral centers. A selection bias is thus created that may render the conclusions inaccurate when applied to unselected patients managed in small communities by family physicians.[11–13] The goal of this study was to describe the management and outcome of the postdate pregnancy in the small community hospital setting.

METHODS

Fourteen family physicians practicing in small hospitals collected a common database on all their deliveries as

Submitted, revised, October 28, 1987.

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part of the Alabama Perinatal Outcome Project (APOP). Each physician personally performed all necessary procedures, including cesarean section. This sample was found to be representative of family physicians providing obstetrical care in small hospitals in Alabama.[14] The physician population had a mean age of 37 years, an average of ten years of practice experience, and an average of six deliveries per month. Seventy-nine percent of the physicians were residency trained, and they practiced in small hospitals with a mean of 65 beds, and 214 deliveries per year. Only 14 percent of the hospitals had an obstetrician on staff, and none had a neonatologist.

A common set of definitions was used for research purposes, and all deliveries beyond 36 weeks' gestation during 1985 and 1986 were included in this study. Completeness, reliability, and validity measures were applied to each site. Any discrepancies were resolved by retrospective chart review by a research assistant unaware of the purpose of the study.

All patients in the study received continuous electronic fetal monitoring during active labor; all other management decisions were left to the discretion of the attending physician. To define the physicians' clinical routines, supplemental questionnaires were mailed to the participating physicians. To ascertain dates, one physician ordered ultrasound studies on fewer than 10 percent of his patients, one ordered them on 100 percent, and 12 ordered an ultrasound study in 25 to 50 percent of patients. In those patients not examined by ultrasound, the physicians assigned a gestational age placing the highest priority on last menstrual period, with decreasing weighting of early examination of uterine size, fundal height after 20 weeks, quickening, and timing of auscultation of fetal heart tones, respectively. Eleven participating physicians routinely screened for elevated prenatal blood glucose levels. Thirteen of the participants routinely ordered a non-stress test when the patient passed 42 weeks, and one routinely used the contraction stress test as primary surveillance. Seventy percent of those using the non-stress test repeated the test once per week, and 30 percent ordered them twice weekly. No other forms of fetal surveillance were used. In only one case in the postdate group was the infant delivered because of an abnormal test result. The decision for induction was made in the other patients because of the length of gestation or other obstetric indications.

Postdate was defined as a gestation at or beyond 42 weeks, and *term* was defined as a gestation of 37 to 41 weeks. Labor abnormalities were defined by Friedman's criteria.[15] A baseline fetal heart rate of fewer than 120 beats/min was categorized as bradycardia, and a rate of more than 160 beats/min as tachycardia. Any deceleration lasting longer than two minutes was considered a prolonged deceleration. Scalp pH determinations were not performed routinely by any of the participating physicians. Assisted delivery included any forceps or vacuum extraction from any station regardless of position. Statistical analysis was carried out using chi-square with Yates correction for dichotomous variables.

TABLE 1. LABOR VARIABLES FOR THOSE WOMEN WITH A POSTDATE GESTATION (n = 116) AND THOSE WITH A TERM GESTATION (n = 1196)

Variables	Postdate Gestation No. (%)	Term Gestation No. (%)	P
Amniotomy	83 (71.6)	638 (53.3)	<.01
Induction	43 (37.1)	72 (6.0)	<.005
Augmentation	21 (18.1)	119 (10.0)	<.05
Any labor abnormality	38 (32.8)	298 (24.9)	.11

TABLE 2. LABOR AND DELIVERY ANALGESIA AND ANESTHESIA VARIABLES FOR WOMEN WITH A POSTDATE GESTATION (n = 116) AND THOSE WITH A TERM GESTATION (n = 1196)

Anesthetic	Postdate Gestation No. (%)	Term Gestation No. (%)	P
Meperidine	31 (26.7)	230 (19.2)	.08
Local	37 (31.9)	331 (27.7)	NS
Pudendal	37 (31.9)	194 (16.2)	<.0005
Epidural	8 (6.9)	298 (24.9)	<.0005

RESULTS

The incidence of postdate pregnancy in this population was 8.8 percent. The process variables of labor management are illustrated in Table 1, which shows the postdate group experiencing significantly more amniotomy, induction, and augmentation, with a trend toward an increase in abnormalities of labor pattern. Pain relief choices are listed in Table 2 and reflect a significant increase in the use of pudendal block and a decrease in the use of epidural anesthesia in the postdate group with a nonsignificant trend toward higher use of meperidine analgesia in the postdate group.

Delivery information is displayed in Table 3, with fewer assisted deliveries in the postdate group. The primary cesarean section rate increased significantly from 15 to 23 percent in the postdate group. The infant data are displayed in Table 4, reflecting the increase in fetal heart rate abnormalities and large infants as the only significant differences. When analyzed separately, no individual pattern of fetal heart rate abnormality reached significance, but all patterns showed a slight trend toward an increase in the postdate group, with recurrent variable and late decelerations being the strongest.

A secondary analysis was performed for multiparas only. In this analysis, all the significant differences in labor

TABLE 3. DELIVERY VARIABLES FOR WOMEN WITH A POSTDATE GESTATION (n = 116) AND THOSE WITH A TERM GESTATION (n = 1196)

Variables	Postdate Gestation No. (%)	Term Gestation No. (%)	P
Episiotomy	70 (60.3)	690 (57.7)	NS
Assisted deliveries	9 (7.8)	229 (19.2)	<.005
Primary cesarean section	27 (23.3)	174 (14.6)	<.05

TABLE 4. INFANT OUTCOME VARIABLES FOR THOSE PREGNANCIES WITH A POSTDATE GESTATION (n = 116) AND THOSE WITH A TERM GESTATION (n = 1196)

Variables	Postdate Gestation No. (%)	Term Gestation No. (%)	P
Any fetal heart rate abnormality	23 (19.8)	141 (11.8)	<.05
Late decelerations	9 (7.8)	55 (4.6)	NS
Meconium stained	11 (9.5)	70 (5.9)	NS
Weight > 4,500 g	7 (6.0)	18 (1.5)	<.005
1-min Apgar < 7	6 (5.2)	85 (7.1)	NS
5-min Apgar < 7	2 (1.7)	22 (1.8)	NS

variables and pain-relief-choice variables that were shown in Tables 1 and 2 remained significant. The number of cases in the assisted delivery, primary cesarean section, abnormal fetal monitoring, and macrosomic infants categories was too small for satisfactory analysis.

DISCUSSION

The physician approaching such a difficult clinical decision as the management of a postdate pregnancy must rely on prevailing expert opinion, his or her own clinical experience, and published reports. The findings of this study illustrate some differences and many similarities in management style and outcome when compared with previously published reports. Although the study population may not be representative of all patients seen by family physicians in small towns, it is more representative than those study populations already reported. Even though the definition of postdate was precise, each physician arrived at those dates by his or her own methods. The difficulty of properly assigning expected dates of delivery does introduce some error into the study.[16] When assignment of dates was reported previously, however, no information was given on the priority placed on the various data elements by the clinician.[3,4] The information reported from the APOP participants provides an opportunity to determine the number of cases that would be misclassified—a methodologic issue not addressed in previous reports. It is inappropriate to use the total frequency of postdate in the population as an index of misclassification, as this represents physician behavior also. If a physician's routine is to intervene with induction at 41 weeks, a low rate of postdate delivery will occur without any misclassification. There is no reason to believe that classification errors would be any more frequent in the APOP population than in previous reports.

Another limitation of a study of this size is the limited number of cases in some of the categories. With a power of .80 and an α of .05, only a 45 to 60 percent increment in the pertinent variables would have been detected. During the study design phase of this project, this problem was felt to be minor, as all previous reports have cited an increase of 90 to 165 percent in the important variables in the postdate pregnancy. Almost all complications had a lower incidence than in previous reports, however, placing some of the analysis at the margin of acceptable power for this sample size. This issue will be important in future practice-based research, where abnormalities are less frequent than in selected high-risk populations.

The APOP data show agreement with previous reports in finding an increased risk of macrosomia and fetal distress (as defined by heart rate abnormalities) in the postdate group. Spellacy et al[2] reported that in a network of large urban hospitals, 25 percent of postdate infants weighed more than 4,500 g when compared with a control rate of 2.5 percent. Although the prevailing control rate of 1.5 percent in the APOP population was lower, a significant increase to 6.0 percent was apparent in the postdate group. No data element including birth injuries was available in the APOP group for comparison.

Fetal distress in postdate pregnancies, as defined by fetal heart rate abnormalities, has been reported by Freeman et al[3] to be 37 percent, with a control rate of 14 percent. The APOP population also had a lower background rate of 11.8 percent of fetal heart rate abnormalities but showed a significant increase to 19.8 percent in the postdate group. Whether fetal heart rate abnormalities truly represent fetal distress is currently the focus of considerable controversy. There was no difference in low Apgar outcome in the two APOP groups, but the power of appreciating a difference in an event of such low frequency is quite poor. In addition, the Apgar score has been shown recently to be a very insensitive measure of infant outcome.[17,18] Only in a group of several thousand patients and with routine umbilical cord blood gas determinations could this question be addressed adequately.

The APOP postdate group did not show the increased incidence of meconium staining shown by Freeman et al[3] and Eden et al.[4] Again, the baseline rate was only 5.9 percent, compared with 13 percent in the referral setting. Although there was a small increase to 9.5 percent in the postdate group, this difference was not statistically significant. The APOP population did show an increase in cesarean section rate similar to that reported in postdate

groups previously. The 25 to 30 percent rate reported by Freeman et al[3] and Eden et al[4] is considerably higher than the 23 percent rate in the APOP. The analysis of the labor abnormality variable in the APOP population is at the limit of acceptable power for this sample size. Given that P = .11, a larger sample size might have revealed a significant difference.

As reflected in the tables, the postdate patients were managed differently than were patients of earlier gestation, despite that only one had a positive contraction stress test. These patients were more likely to have an induced labor and, once in labor, were more likely to have an amniotomy and oxytocin augmentation of their labor. They also were more likely to have pudendal block anesthesia and less likely to have epidural anesthesia and assisted delivery. All but the last two variables suggest a much more active approach to these patients. It is possible that in the postdate patient with macrosomia and fetal heart rate abnormalities, the APOP physicians were choosing cesarean section with spinal or general anesthesia in preference to assisted delivery with epidural anesthesia—a wise choice in the opinion of many clinicians.

It is important to keep in mind that none of the reports, including that of the APOP study, presents the natural history of the postdate pregnancy without intervention. As discussed, the utilization of fetal surveillance prior to labor differs significantly in the APOP group. The unpublished data of Schifrin summarized recently by Eden et al[4] involved intervention only if a nonreactive nonstress test was followed by a positive contraction stress test and should approximate the natural history. The overall intervention rate was much lower utilizing this strategy, but the corrected mortality of 11.4 per 1,000 is unacceptable by modern standards.

The APOP data support the concept of the postdate pregnancy as a high-risk situation. These patients were managed by APOP physicians with amniotomy, induction, augmentation, avoidance of assisted delivery, and more frequent cesarean section. The infant outcome was similar to that reported from referral centers, with lower rates of all abnormalities and interventions.

Acknowledgment

This project was begun and maintained with a grant from the Family Health Foundation of America. Ben Banahan III contributed database design, and Gayle Shelton and Gina Klinzak provided data management.

The practitioners involved with the Alabama Perinatal Outcome Project are William Abernathy, MD; John M. Belyeu, MD; John Boggess, MD; Tom Bovine, MD; William Coleman, MD; Sidney Crosby, MD; Raynard Fabianke, MD; Maurice J. Fitz-Gerald, MD; Steven Furr, MD; Robert Hargraves, MD; Katherine Hensleigh, MD; Durwood Hodges, MD; Cecil P. Horn, MD; Russell Ingram, MD; Benjamin C. Maxwell, MD; David Maxwell, MD; Ira Moore, MD; James Moore, MD; James D. Nettles, MD; N. Earl Perret, MD; Brian Perry, MD; Michael Peters, MD; Al Ratcliffe, MD; Jon E. Sanford, MD; Scott Sarrels, MD; George C. Smith, MD; William Smith, MD; Richard Spurlin, MD; Larry Tucker, MD; Michael A. Wells, MD; Fred Wilkerson, MD; and Reddoch Williams, MD.

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