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A CLINICAL TRIAL OF ACTIVE MANAGEMENT OF LABOR

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Abstract *Background.* Active management of labor is a multifaceted program that, as implemented at the National Maternity Hospital in Dublin, is associated with a lower rate of cesarean delivery than the rate usually found in the United States. We conducted a randomized trial to evaluate the efficacy of this approach in lowering the rate of cesarean section among women delivering their first babies.

Methods. We randomly assigned 1934 nulliparous women at low risk of complications of pregnancy, before 30 weeks' gestation, to active management of labor or to a usual-care group. The components of active management were customized childbirth classes; strict criteria for the diagnosis of labor; standardized management of labor, including early amniotomy and treatment with high-dose oxytocin; and one-to-one nursing. A low-risk subgroup was defined as including women with full-term, uncomplicated pregnancies who spontaneously went into labor (the protocol-eligible subgroup). Women meeting these criteria who had been randomly assigned to the ac-

tive-management group were admitted to a separate unit where their labor was managed by trained, certified nurse-midwives.

Results. There was no difference between groups in the rate of cesarean section either among all women (active management, 19.5 percent; usual care, 19.4 percent) or in the protocol-eligible subgroup (active management, 10.9 percent; usual care, 11.5 percent). In the protocol-eligible subgroup, the median duration of labor was shortened by 2.7 hours by active management (from 8.9 to 6.2 hours), and the rate of maternal fever was lower (7 percent vs. 11 percent, $P=0.007$). The percentage of women in whom labor lasted longer than 12 hours was three times higher in the usual-care group than in the active-management group (26 percent vs. 9 percent, $P<0.001$).

Conclusions. Active management of labor did not reduce the rate of cesarean section in nulliparous women but was associated with a somewhat shorter duration of labor and less maternal fever. (*N Engl J Med* 1995;333:745-50.)

O'DRISCOLL and colleagues at the National Maternity Hospital in Dublin, Ireland, pioneered a multifaceted approach to the management of labor in nulliparous women that is now referred to as active management of labor.¹ It was introduced to shorten labor at a time when the rate of cesarean section was under 5 percent. Active management of labor includes strict criteria for the diagnosis of labor, early rupture of the amniotic membranes, prompt intervention with high-dose oxytocin in the event of inefficient uterine action, and a commitment never to leave a woman unattended during labor.

As the rate of cesarean section rose in most industrialized countries during the 1970s and 1980s, the persistently low rate of cesarean delivery at the National

Maternity Hospital led other obstetrical services to use active management of labor as a means to reduce rates of cesarean section. However, the efficacy and safety of this protocol were not universally accepted.^{2,3} We conducted a randomized trial to evaluate this strategy for lowering the rate of cesarean section in nulliparous women.

METHODS

This study protocol was reviewed and approved by the human research committees of the participating institutions. The safety of the protocol and quality control were monitored by an external data-monitoring board.

Study Population and Randomization

We recruited women from 17 prenatal care sites. Participants were nulliparous, at least 18 years old, English-speaking, and planning to deliver their babies at Brigham and Women's Hospital in Boston between June 10, 1991, and October 17, 1993. Women with conditions associated with an increased risk of preterm or cesarean delivery — such as multiple pregnancy, diabetes, cervical incompetence, or pregnancy-induced hypertension — were ineligible.

Medically eligible women were randomly assigned to the active-management group or to a usual-care group before 30 weeks' gestation. The primary method of randomization (used for 97 percent of the women) was through telephone calls placed by recruiters to the coordinating center; sealed, numbered envelopes were issued to each

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recruiter for use if necessary. Group assignments, stratified according to site, were determined with the use of random numbers in permuted blocks of six and eight.

Prenatal Period

All women received prenatal care from their own health care providers. Women in the active-management group attended special childbirth classes designed to explain the active-management protocol. To ensure equal access to childbirth education, women in the usual-care group received payment to attend classes of their choice.

Management of Labor

Fetal monitoring was routinely used in both groups, and all women had similar access to pain relief, including epidural anesthesia.

Usual Care

The study placed no constraints on the management practices of physicians caring for the women in the usual-care group. Therefore, as in all institutions, there was variation in practice among providers. However, the usual practice at our hospital was to initiate treatment with oxytocin, if it was used, at a dose of 1 to 2 mU per minute and to increase the dose periodically by 1 to 2 mU per minute. It was not the usual practice to rupture the membranes on admission to the hospital for labor and delivery. Although providers were not required to practice in this way, most did, and the two treatment groups differed markedly with respect to the use of oxytocin and the timing and frequency of amniotomy. In the usual-care group, there was no standardized protocol for initiating or stopping oxytocin, nor was there a prescribed schedule for measuring dilatation of the cervix.

Women in the usual-care group had their labor managed in the hospital labor and delivery unit, staffed with one nurse for every two patients until a late stage of labor, when a single nurse provided care to each patient. Women were not identified as study participants in their prenatal or hospital records.

Active Management

The active-management protocol was administered in a physically separate unit staffed by certified nurse-midwives and registered nurses who worked exclusively for the study. To be eligible for active management of labor, women had to reach term without medical complications and have spontaneous onset of labor with a singleton fetus in a vertex presentation. Women in the active-management group who did not meet these criteria had their labor managed in the hospital labor and delivery unit by their regular care provider.

The labor protocol for the active-management group had three main components:

One-to-one nursing care. A nurse (who changed only with shifts) remained with the patient throughout labor.

Standardized criteria for the diagnosis of labor. The certified nurse-midwife in charge made the diagnosis of labor. The criteria were painful contractions accompanied by effacement of at least 80 percent, bloody show (not precipitated by vaginal examination), or spontaneous rupture of the membranes.

Management of labor. Amniotomy was performed within one hour of the diagnosis of labor (or as soon as clinically feasible) if the membranes were still intact. Cervical examinations were performed at least every two hours to ensure prompt detection of inefficient uterine action. Inefficient uterine action was diagnosed during the first stage of labor if the rate of cervical dilatation was less than 1 cm per hour and during the second stage of labor if the time between full dilatation and the fetus's head reaching the pelvic floor was greater than one hour. Inefficient uterine action was treated with oxytocin. Oxytocin could also be initiated if the time between the head's reaching the pelvic floor and the delivery of the baby was more than 30 minutes.

The oxytocin infusion was begun at a dose of 4 mU per minute and increased by 4 mU per minute every 15 minutes until the maximal dose of 40 mU per minute was reached, unless hyperstimulation or a nonreassuring fetal-heart pattern was noted (in both groups, the guidelines for a nonreassuring fetal-heart rate were those of the American College of Obstetricians and Gynecologists).⁴ Hyperstim-

Table 1. Criteria for Inclusion in the Protocol-Eligible Subgroup.

Full-term pregnancy
Singleton fetus
Vertex presentation
Spontaneous onset of labor
Absence of the following pregnancy-related complications:
Pregnancy-induced hypertension*
Nonreassuring fetal-heart pattern at admission†
Gestational diabetes*
Intrauterine growth retardation*
Oligohydramnios*
Polyhydramnios*
Placenta previa*
Prolapsed cord
Score of <6 out of 8 on a biophysical profile
Treatment with systemic steroids during pregnancy*
Fetus with major congenital anomaly*
Active herpes
Absence of the following medical conditions:
Diabetes
Human immunodeficiency virus infection, with CD4 lymphocyte count <500*
Serious chronic medical condition*

*Conditions that would have excluded the affected women from eligibility for the study had they been recognized at randomization.

†Guidelines for nonreassuring fetal-heart pattern were those of the American College of Obstetricians and Gynecologists.⁴

ulation was defined as more than seven contractions of at least 30 seconds' duration during a 15-minute period or a single contraction lasting more than 60 seconds. In the event of hyperstimulation, the dose of oxytocin was initially decreased by 8 mU per minute. If the hyperstimulation persisted or a nonreassuring fetal-heart pattern occurred, oxytocin was stopped for 15 minutes and started again at half the previous dose.

Failure to progress was diagnosed if, during the first stage of labor, normal progress of cervical dilatation (at least 1 cm per hour) did not resume within 1 hour of the establishment of efficient uterine action with oxytocin (five to seven contractions of good quality in 15 minutes) or if the second stage of labor was prolonged. Until March 11, 1993, a prolonged second stage was defined as one longer than two hours for all women treated in the active-management unit (the initial protocol). After that date, the definition was changed to three hours for women who had an epidural catheter in place (the final protocol). This change was consistent with the guidelines of the American College of Obstetricians and Gynecologists⁵ and was the practice in the usual-care group. To maximize the number of women treated under the final protocol, after the change was made two women were randomly assigned to the active-management group for every one woman assigned to usual care.

The women's regular care providers assumed responsibility for care in the event of the failure of labor to progress as defined by the protocol, fetal distress, heavy meconium staining, substantial bleeding, hypertension, maternal fever, or the need for operative vaginal delivery.

Data Analysis

An intention-to-treat analysis included all women categorized according to study group. A secondary analysis included only women in the active-management group who were medically eligible to receive treatment according to the protocol at the onset of labor and their counterparts among the women in the usual-care group, with this group designated the protocol-eligible subgroup. Table 1 shows the criteria for inclusion in the subgroup.

Crude rates of cesarean delivery, relative risks, and 95 percent confidence intervals were calculated. Logistic-regression analyses controlled for any imbalances in base-line characteristics. Since the frequency of use of epidural anesthesia was different in the two study

groups, the odds ratios were adjusted to evaluate the effect of active management independent of the use of epidural anesthesia.

Vaginal deliveries were categorized as either spontaneous or operative, and cesarean sections were classified according to the stage of labor (first or second) during which they were performed. The difference between the initial and final protocols affected only the duration of the second stage of labor before failure to progress could be diagnosed. Therefore, in analyzing outcomes related to failure to progress during the second stage we took into account the change in the protocol. The change had no bearing on other outcomes, including measures of safety.

Management practices during labor in the two groups were compared. We evaluated safety by examining complications of labor, postpartum complications, and the outcomes of the infants.

RESULTS

Recruitment and Study Population

From January 14, 1991, through July 31, 1993, we identified 3028 nulliparous women eligible for the study, of whom 1934 (64 percent) agreed to participate and were randomly assigned to the active-management group (n = 1017) or to the usual-care group (n = 917). The characteristics of the women in the two groups were balanced with regard to race, age, education, and smoking habits. Data on the deliveries of 19 women were missing (8 from the active-management group and 11 from the usual-care group), and these women were therefore excluded from further analyses.

Intention-to-Treat Analysis

Among the 1915 women for whom data on outcomes were available, the rate of cesarean section was virtually identical in both groups: 19.5 percent in the active-management group and 19.4 percent in the usual-care group (relative risk, 1.0; 95 percent confidence interval, 0.8 to 1.2) (Table 2). Adjusting for base-line characteristics and use of epidural anesthesia with logistic regression left the results unchanged. In both groups, cesarean sections were performed at a similar rate in response to the failure of labor to progress (active management, 7 percent; usual care, 8 percent).

The effects of active management were then studied in the protocol-eligible subgroup. Although this was not an intention-to-treat analysis, it provided the clearest information regarding the effect of the protocol on women who remained at low risk for complications of pregnancy at term.

Analysis of the Protocol-Eligible Subgroup

Between randomization and the onset of labor, medical complications developed in one third of the women or their labor was induced with oxytocin, making them ineligible for the labor protocol (active management, 33 percent; usual care, 35 percent) (Table 3). Induction of labor accounted for 56 percent of the ineligibility for the active-management labor unit. The protocol-eligible subgroup was composed of 1263 women who had uncomplicated term pregnancies and a spontaneous onset of labor (active management, 678; usual care, 585). Of the 678 women in the active-management group who were eligible for the protocol, 633 (93.4 per-

Table 2. Frequency of Cesarean Section in the Study Groups, According to Indication.

INDICATION	ACTIVE MANAGEMENT (N = 1009)	USUAL CARE (N = 906)	RELATIVE RISK (95% CONFIDENCE INTERVAL)*
	percent (number)		
Failure of labor to progress†	6.8 (69)	8.1 (73)	0.9 (0.6–1.2)
Fetal distress only	3.0 (30)	2.2 (20)	1.4 (0.8–2.4)
Presentation or position	4.6 (46)	4.7 (43)	1.0 (0.6–1.4)
Failed induction of labor	4.4 (44)	3.2 (29)	1.4 (0.9–2.2)
Other (herpes, placenta previa)	0.8 (8)	1.2 (11)	0.7 (0.3–1.6)
All	19.5 (197)	19.4 (176)	1.0 (0.8–1.2)

*Relative-risk values represent the risk of cesarean section in the active-management group as compared with the usual-care group.

†This category includes cesarean sections performed for failure of labor to progress, macrosomia, and failed trials of forceps or vacuum delivery, but not cesarean sections performed after the failure of induction. Eight women in the active-management group and nine women in the usual-care group with indications for cesarean section noted as both failure of labor to progress and fetal distress are included in this category.

cent) were treated according to the protocol. Among the 331 women in the active-management group who were ineligible, 18 (5.4 percent) were treated according to the protocol.

Base-Line Characteristics

The characteristics of these women did not differ in the two study groups and were similar to those of the overall study population (data not shown).

Status of Labor at Admission and Labor Practices

At hospital admission, the percentage of women whose membranes had ruptured was similar in the two

Table 3. Reason for Ineligibility for the Protocol, According to Study Group.*

REASON	ACTIVE MANAGEMENT	USUAL CARE
	no. (%)	
Multiple gestation	3 (0.3)	0
Preterm labor	52 (5.2)	36 (4.2)
Malpresentation†	40 (4.0)	38 (4.0)
Induction with oxytocin	175 (17.3)	174 (19.2)
Scheduled cesarean section or no labor‡	9 (0.9)	13 (1.4)
Pregnancy-induced hypertension	25 (2.5)	21 (2.3)
Other maternal or fetal problem§	14 (1.4)	22 (2.4)
Induction with intravaginal prostaglandin E gel	13 (1.3)	17 (1.9)
Total ineligible for protocol	331 (32.8)	321 (35.4)
Total eligible for protocol	678 (67.2)	585 (64.6)
Total enrolled with follow-up data	1009 (100)	906 (100)

*Each woman was assigned one reason only. The reason assigned was the first reached in the list. Nineteen women were excluded from this table because of a lack of follow-up data. Six women (active management, two; usual care, four) had spontaneous or induced abortions after enrollment. One woman in the active-management group (and her fetus) died at 30 weeks from a ruptured aneurysm. Twelve women (active management, five; usual care, seven) were lost to follow-up.

†Malpresentation was any presentation other than vertex.

‡Causes included macrosomia, placenta previa, herpes, and fetal distress.

§Problems included intrauterine growth retardation, diabetes, oligohydramnios, fetal distress at admission, hematologic disease, placenta previa, rheumatologic disease, polyhydramnios, score of <6 out of 8 on a biophysical profile, treatment with steroids during pregnancy, prolapsed cord, contraindication to vaginal delivery, and maternal death due to congestive heart failure before labor with delivery of a live-born infant.

study groups (active management, 37 percent; usual care, 34 percent), as was the mean cervical dilatation at first examination (active management, 3.3 cm; usual care, 3.6 cm) (Table 4).

Practices for the management of labor mandated by the protocol differed in the two groups (Table 4). Women in the active-management group had more frequent vaginal examinations (mean frequency, every 1.6 hours, as compared with every 2.5 hours in the usual-care group). Their membranes were artificially ruptured more often (61 percent vs. 51 percent) and earlier (within one hour of admission in 76 percent, as compared with 15 percent in the usual-care group).

More women in the active-management group received oxytocin (70 percent vs. 56 percent), and the time from admission to the administration of oxytocin was typically 2 hours shorter (3.7 vs. 6.0 hours). The mean maximal dose of oxytocin administered was higher in the active-management group (24.1 mU per minute, vs. 7.4 mU per minute in the usual-care group). Women in the active-management group requested epidural anesthesia less often (54 percent vs. 64 percent) and tended to receive epidural anesthesia somewhat later in labor (mean cervical dilatation at the administration of anesthesia, 5.9 vs. 5.4 cm).

Method of Delivery

Overall, the rates of cesarean section were similar — 10.9 percent in the active-management group and 11.5 percent in the usual-care group. The odds ratio for cesarean section (adjusted for the use of epidural anesthesia) was 0.9 (95 percent confidence interval, 0.4 to 1.9) for the women in the active-management group as compared with those in the usual-care group during the final protocol (in which women in the active-management group were allowed a maximum of three hours for the second stage of labor with epidural anesthesia); the odds ratio was 1.2 (95 percent confidence interval, 0.8 to 1.8) during the initial protocol (with a maximum of two hours allowed for the second stage of labor with epidural anesthesia). The small difference between these two estimates was due to a lower rate of cesarean section during the second stage of labor with the final

Table 4. Status of Labor at Admission and Labor Practices for Protocol-Eligible Participants with Spontaneous Labor, According to Study Group.

VARIABLE	ACTIVE MANAGEMENT (N = 678)	USUAL CARE (N = 585)	RELATIVE RISK (95% CONFIDENCE INTERVAL)*
Mean (\pm SD) cervical dilatation at admission (cm)	3.3 \pm 2.0	3.6 \pm 2.1	
Artificial rupture of membranes (%)	61	51	1.2 (1.1–1.3)
Mean time from admission to rupture (min)	50	246	—
Mean dilatation at rupture (cm)	3.7	5.6	—
Induction of labor with oxytocin (%)	70	56	1.3 (1.2–1.4)
Mean initial dose (mU/min)	3.8	1.5	—
Mean maximal dose (mU/min)	24.1	7.4	—
Epidural administration of anesthesia (%)	54	64	0.8 (0.8–0.9)

*Relative-risk values represent the likelihood of a particular labor practice in the active-management group as compared with the usual-care group.

Table 5. Method of Delivery for Protocol-Eligible Participants According to Study Group.*

METHOD OF DELIVERY	ACTIVE MANAGEMENT (N = 678)	USUAL CARE (N = 585)	RELATIVE RISK (95% CONFIDENCE INTERVAL)
	<i>percent</i>		
Spontaneous vaginal	78.3	74.2	1.1 (0.8–1.4)
Instrumental vaginal (forceps or vacuum)	10.8	14.4	0.8 (0.6–1.2)
Cesarean section			
Stage 1	5.2	6.5	0.9 (0.5–1.4)
Stage 2	4.0	4.8	0.9 (0.3–2.4)

*Percentages do not add up to 100 percent because for cesarean sections during stage 2 the results are presented from the final protocol, which allowed three hours of second-stage labor before a diagnosis of fetal distress when epidural anesthesia had been administered.

protocol. The results were essentially unchanged when adjustment was made for base-line characteristics of the groups.

There was a small but consistent decrease in the rate of cesarean section during first-stage and second-stage labor, as well as in the rate of operative vaginal delivery in the active-management group (Table 5). None of these differences were statistically significant. For both groups, the rate of cesarean section performed because of fetal distress was low (active management, 2.2 percent; usual care, 1.2 percent). Therefore, the overall cesarean-section rates in the protocol-eligible subgroup reflect cesarean sections performed because labor failed to progress.

The median length of labor was 6.2 hours in the active-management group and 8.9 hours in the usual-care group. Differences in the length of labor remained when the groups were stratified according to the extent of cervical dilatation at first examination.

Maternal Complications and Infants' Outcomes

The only maternal complication that differed significantly in frequency between the groups was fever, which had a lower incidence in the active-management group (relative risk, 0.6; 95 percent confidence interval, 0.4 to 0.9). There was no significant difference in the occurrence of a number of other complications, including fetal distress, placental abruption, shoulder dystocia, and vaginal lacerations.

Among the infants, we observed no significant differences between the two groups in the frequency of jaundice, seizures, treatment for sepsis, resuscitation at birth, or admission to the neonatal intensive care unit. Only two infants in each group had five-minute Apgar scores of 5 or lower. Although there were more clavicle fractures in the active-management group (five, as compared with one in the usual-care group)

and more nerve injuries in the usual-care group (seven, as compared with two in the active-management group), these differences could have been the result of chance, since both of the events were rare.

DISCUSSION

In this clinical trial we investigated whether the implementation of a protocol for active management of labor would safely lower the rate of cesarean section among nulliparous women. We included all the components of the National Maternity Hospital protocol for active management of labor: customized education, specific criteria for the diagnosis of labor, specific management steps, use of high-dose oxytocin, and one-to-one nursing. Active management was implemented by a separate staff to guard against the bias that could result if the same staff simultaneously cared for patients in labor under both the active-management and usual-care protocols. In addition, the active-management staff worked in a delivery unit that was physically separated from the main labor and delivery unit of the hospital, which minimized contact between the staff members assigned to the two groups.

The safety of the protocol, including the use of high-dose oxytocin and management of labor by midwives, was confirmed. Shorter labors and a decreased occurrence of maternal fever were also noted. However, the anticipated substantial decrease in the rate of cesarean section was not observed. The overall rate of cesarean section was virtually the same in the two groups. In the subgroup of women who were at low risk because they had a spontaneous onset of labor at term, the rate of both first-stage and second-stage cesarean section was slightly lower in the active-management group. This decrease was neither statistically significant nor clinically relevant, because the overall rate of cesarean section was not altered. Although there was a small difference between the groups in the use of epidural anesthesia, this difference could not be responsible for

our results, since all analyses were adjusted for the use of epidural anesthesia.

In another large, randomized trial of active management of labor,⁶ the rate of cesarean section was reduced from 14.1 percent to 10.5 percent, and the difference reached statistical significance only after a number of factors were controlled for. The fact that in that trial the labor of women in both study groups was managed in the same labor and delivery unit by the same personnel could have introduced bias that accounted for differences of the order of magnitude of the observed results.

A possible explanation for our negative results could be the Hawthorne effect⁷ — that is, that because the study focused on rates of cesarean section, the rate in the usual-care group was lowered. To evaluate that possibility, we compared the routes of delivery and labor practices for women in the usual-care group who were protocol-eligible with those of all women at similarly low risk who delivered first babies during the six months before the trial began. The rates of cesarean section and operative vaginal delivery, as well as of the use of oxytocin, were similar in the two groups (Table 6).

Another reason for our negative results could be that rates of cesarean section at our institution are already lower than would be expected in similar populations elsewhere. We do not believe that this is the case. For all nulliparous women delivering during the six months before the study, the rate of cesarean deliveries was 23.8 percent. In our study population, which excluded women known to be at high risk for cesarean delivery before randomization, the rate of cesarean section was 19.4 percent. The rate of 11.5 percent reported here is the rate of cesarean deliveries for the very lowest risk group — women who went into labor spontaneously at term with the infant in the cephalic presentation and who had none of a number of complications of pregnancy. The slightly higher rate of cesarean section in

Table 6. Labor Practices and Outcomes with Active Management and Usual Care.

VARIABLE	USUAL CARE			ACTIVE MANAGEMENT OF LABOR		
	FRIGOLETTO ET AL. PRETRIAL BASE LINE (N = 935)*	FRIGOLETTO ET AL. USUAL CARE (N = 585)†	LÓPEZ-ZENO ET AL. USUAL CARE (N = 354)	FRIGOLETTO ET AL. ACTIVE MANAGEMENT (N = 678)‡	LÓPEZ-ZENO ET AL. ACTIVE MANAGEMENT (N = 351)	NATIONAL MATERNITY HOSPITAL, 1992–1993 (N = 3477)‡
	<i>percent</i>					
Spontaneous vaginal delivery	73	74	58	78	64	81
Operative vaginal delivery	16	14	28	11	25	14
Stage 1 cesarean section	6.5	6.5	9	5.2	7	4.8
Stage 2 cesarean section	4.2	4.8	5	4.0	3	0.2
Epidural anesthesia	64	64	72	53	72	51
Oxytocin use	53	56	66	70	71	54
Labor >12 hr	27	26	19	9	5	2

*Percentages include all nulliparous women delivering during the six months before the randomized trial who had singleton fetuses in a vertex presentation and a spontaneous onset of labor at ≥ 36 weeks of gestation. They exclude women with breech presentations and those with specified medical complications.

†Percentages include members of the protocol-eligible subgroup — that is, women enrolled in the trial with singleton fetuses in a vertex presentation, with a spontaneous onset of labor at ≥ 36 weeks of gestation. They exclude women with breech presentations and those with specified medical complications.

‡Percentages include women who were more than 17 years old with singleton fetuses, in a cephalic presentation, with a spontaneous onset of labor at ≥ 36 weeks of gestation.

the control group in the study of López-Zeno et al.⁶ (14 percent) could be due to the fact that women with medical conditions such as hypertension and diabetes were not excluded from their study.

A striking difference between the data on cesarean sections from the randomized trials of active management of labor and those from the National Maternity Hospital is the distribution of cesarean sections between the first and second stages of labor. The rates of first-stage cesarean section were similar in all three cases: 5.2 percent in this study, 7 percent in the trial of López-Zeno et al., and 4.8 percent at the National Maternity Hospital (Boylan P, Robson M: personal communication). In contrast, active management of labor resulted in markedly different rates of cesarean section during the second stage of labor: 4 percent in our study and 3 percent in the trial of López-Zeno et al., as compared with only 0.2 percent at the National Maternity Hospital (Boylan P, Robson M: personal communication). This difference suggests the need for a careful assessment of practices for the management of the second stage of labor in North America.

In this randomized trial, we did not find that the active-management protocol was effective in reducing the rate of cesarean section. On the basis of results of the previously reported randomized trial⁶ and observational data,^{1,8,9} some managed-care organizations are suggesting that active management be instituted as the standard of practice in order to reduce the rate of cesarean sections. Although the active-management protocol did have some benefits — such as shorter labor and a decreased occurrence of maternal fever — our data do not provide justification for that recommendation.

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CORRECTION

A Clinical Trial of Active Management of Labor

A Clinical Trial of Active Management of Labor . On page 748, in Table 4, the third main entry in the left-most column of the table should have read, “*Augmentation* of labor with oxytocin (%),” not “*Induction* of labor with oxytocin (%),” as printed. We regret the error.