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Original Research

Second-Trimester Abortion for Fetal Anomalies or Fetal Death

Labor Induction Compared With Dilation and Evacuation

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See related editorial on page 775.

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OBJECTIVE:

To compare the safety and effectiveness of dilation and evacuation (D&E) and labor-induction abortion performed for fetal anomalies or fetal death in the second trimester.

METHODS:

We performed a retrospective cohort study of second-trimester abortions performed for fetal indications. We compared the frequency of complications and effectiveness of abortions performed at 13–24 weeks for these indications. We calculated proportions of patients with complications for these two methods and controlled for confounding using a log binomial model.

RESULTS:

Labor-induction abortions had higher complication rates and lower effectiveness than did D&E. Thirty-two of 136 women undergoing labor induction (24%) experienced one or more complications, in contrast to 9 of 263 women (3%) undergoing D&E (unadjusted relative risk 6.9 [95% confidence interval 3.4–14.0]). When controlled for confounding, the adjusted risk ratio for labor induction was 8.5 (95% confidence interval 3.7–19.8) compared with D&E.

CONCLUSION:

Dilation and evacuation is significantly safer and more effective than labor induction for second-trimester abortion for fetal indications. Bias and chance are unlikely explanations for these large discrepancies. Women facing this difficult decision should be offered a choice of methods and be provided information about their comparative safety and effectiveness.

LEVEL OF EVIDENCE:

II

The optimal method of second-trimester abortion for fetal anomalies or fetal death is not well established. Worldwide, labor-induction abortion is used more often than dilation and evacuation (D&E). Reasons given for preferring labor induction include not requiring skilled providers, allowing for an intact fetus, and allowing for the process of labor. Whereas some women may prefer this method, others opt for D&E when given the choice.[1]

Nearly all of the literature on abortion for fetal indications has compared methods of labor induction[2–4]; D&E has received little attention.[5] In general, for second-trimester abortion, D&E is safer and more acceptable to women than labor induction,[6,7] but whether this is true for abortions done for fetal indications is less clear.[8,9] The objective of this study was to compare the safety and effectiveness of D&E and labor-induction abortion performed for fetal anomalies or fetal death in the second trimester. We hypothesized that D&E would be superior to labor-induction abortions.

MATERIALS AND METHODS

We conducted a retrospective cohort study of second-trimester abortions performed for fetal anomalies and fetal death. The gestational age range was 13–24 weeks of gestation. Using current procedural terminology codes (59840, 59841, and 59850–59857) and diagnosis codes for fetal death and fetal anomalies (632, 655.0–655.9), we identified all women undergoing labor-induction or D&E abortion at the University of North Carolina Hospitals from January 1, 1998, to December 31, 2008. We also used delivery and outpatient surgery log books to search for labor-induction abortions that might have been missed by the initial search criteria. Patients were excluded if the indication for abortion was not fetal anomaly or fetal death. Exclusion criteria also included spontaneous rupture of membranes, intrapartum fetal death (without anomaly), and the onset of labor before the abortion. Data were abstracted from the paper and electronic medical records onto standardized data collection forms by the authors. The sample size was one of convenience: the beginning of the study period corresponded with the initiation of a standard approach to D&E at the hospital. In our institution, women are offered a choice between labor induction and D&E. The study protocol was approved by the University of North Carolina Institutional Review Board.

Our primary outcome was a complication documented in the medical record. Complications were defined as fever requiring antibiotics, blood loss requiring transfusion, retained tissue requiring dilation and curettage (D&C) or manual removal of placenta, injury to cervix or uterus requiring repair, laparotomy or laparoscopy required after procedure, hospital admission after D&E or readmission after labor induction, failure to abort by the primary method chosen, admission to the intensive care unit, and emergency room visit after procedure. Within the labor-induction group, we further assessed those who failed to abort within 24 hours. Demographic variables, reproductive history, gestational age, and reason for abortion were also collected. For labor-induction abortions, the method(s) used was recorded. Data collection was limited to medical records; no attempt was made to contact patients.

At the University of North Carolina Hospitals, D&E procedures were routinely performed in an outpatient surgery suite. Second-year obstetrics and gynecology residents performed most of the procedures under faculty supervision. Most procedures were performed under light general anesthesia without intubation. Patients routinely had laminaria placed in the cervix 24–48 hours before the procedure. Paracervical block using 20 mL of 0.5% lidocaine with four units of vasopressin for hemostasis was administered before the D&E. Patients received oral doxycycline antibiotic prophylaxis for 24 hours after the procedure.

Labor-induction abortions were typically performed on the labor and delivery unit. Methods varied by physician. Until 2005, when a randomized controlled trial showed that laminaria use led to longer induction times,[10] laminaria were commonly used. Feticidal potassium chloride injections or hypertonic intra-amniotic saline infusion was sometimes performed before labor-induction abortion. Antibiotics were not routinely given.

Data were doubly entered into Epi Info 3.5.1 and then exported into Stata 11.0. We used Pearson's χ^2 test for categorical variables and the two-tailed Student *t* test and Mann-Whitney U-test for continuous variables to compare characteristics of the women by abortion method. We estimated relative risks (RRs) for complications with 95% confidence intervals (CIs). We estimated the number needed to harm based on the absolute risk reduction of D&E compared with labor induction.[11] Log binomial regression[12] was performed to estimate an adjusted risk ratio, controlling for confounding factors. Potential confounders were identified based on known risk factors for both complications and procedure chosen. We used a change-in-effect method to determine which factors were actual confounders. Variables were removed from the final model if the change in the adjusted RR was less than 10%. We adhered to the Strengthening the Reporting of Observational Studies in Epidemiology guidelines for reporting observational studies.[13]

RESULTS

A total of 603 charts was identified through our search criteria. Of these, 196 were excluded. Eighty-five were excluded because no anomaly was present, 59 because of spontaneous rupture of membranes or inevitable abortion, 26 for maternal indication for abortion, 8 for gestational age greater than 24 weeks, and 10 for gestational age less than 13 weeks. Eight other patients were excluded: one with complete hydatidiform mole, two with ectopic pregnancies, one with retained placenta, one with elective hysterotomy, one with emergency hysterectomy for placenta percreta at 23 weeks, and two patients for whom no procedure was identified. In all, 399 women with 407 abortions were eligible for inclusion in the study and analyzed. For the eight women who had more than one procedure, only the first procedure was included for analysis. For these eight women, both procedures were D&Es without complications.

Patients in the two groups differed in some demographic characteristics (Table 1). Women in the labor-induction group were younger than those in the D&E group. The labor-induction group had more Hispanic women, and the D&E group had more white (non-Hispanic) women. The gestational age of the labor-induction group was about 2 weeks higher than that of the D&E group. Differences in the indication for abortion emerged as well. In contrast, gravidity, parity, and body mass index (BMI, calculated as weight (kg)/[height (m)]^2) were similar in the two groups. Body mass index data were missing for one quarter of the labor-induction group. The methods of labor induction included vaginal misoprostol alone (49%), misoprostol with laminaria (39%), oxytocin and something else (5%), Foley bulb and a uterotonic (5%), and oxytocin alone (2%).

Table 1:
Baseline Characteristics of Women Undergoing Labor-Induction Abortion or Dilation and Evacuation

Women undergoing labor induction had more complications than did women undergoing D&E (Table 2). Of 136 women in the labor-induction group, 32 (24%) had one or more complications. Of the 263 women in the D&E group, the corresponding figure was nine (3%). The unadjusted RR for any complication in the labor-induction group compared with D&E was 6.9 (95% CI 3.4–14.0; *P*<.001). Three patients in the labor-induction group had more than one complication compared with five in the D&E group.

Table 2:
Complications Associated With Labor Induction Compared With Dilation and Evacuation

Complications differed by procedure type (Table 2). Among labor-induction abortions, the most common complications were retained placenta requiring D&C or manual removal and fever requiring antibiotics. One patient had a failed labor induction at 48 hours and underwent D&E.

In the D&E group, complications included fever requiring antibiotics, hospital admission after D&E, repeat aspiration after D&E, and failed attempted D&E requiring labor induction. Three women made emergency room visits after D&E. Of these, one was seen 2 days after her procedure with complaint of fever at home. She was afebrile on evaluation, had no evidence of endometritis, and was released without treatment. Another patient was seen 10 days after her procedure for vaginal bleeding and was given methylergonovine maleate for an endometrial ultrasound echo measurement of 4 mm. Another patient was seen in the emergency department and subsequently hospitalized for chest pain 6 days after D&E; pulmonary embolus and myocardial infarction were excluded, and she was sent home without treatment. Superficial thrombophlebitis developed in another patient. The other four hospitalizations after D&E included two for antibiotic administration, one for conversion to labor induction, and one for observation after repeat aspiration.

We used a log binomial regression model to estimate an adjusted risk ratio, controlling for confounding factors. Potential confounders included patient age, race, gravidity, parity, gestational age, and indication for abortion. Among these, only race, gestational age, and indication for abortion were confounders and remained in the final model. The adjusted risk ratio for labor induction was 8.5 (95% CI 3.7–19.8; $P<.001$) compared with D&E.

The number needed to harm estimates the clinical effect of the morbidity differences observed. The absolute risk reduction in morbidity was 21%. Thus, for every five patients (95% CI 4–8) undergoing labor induction, one suffered a complication that could have been avoided had D&E been chosen instead.

Twenty-nine women (21%) undergoing labor induction failed to abort within 24 hours. In nine of these women, a complication occurred in addition to the extended time for the induction. Six women required a D&C or manual removal of placenta. Two had fever requiring antibiotics. One induction took more than 48 hours, when the decision was made to proceed to D&E.

DISCUSSION

D&E results in less morbidity than does labor-induction abortion when done for the indications of fetal anomalies and fetal death. When controlled for potential confounding factors, the difference in morbidity risk was nine-fold. Correspondingly, the number needed to harm was small.

The need for uterine evacuation for these fetal indications is global. One report estimated a prevalence of 2.5 abortions for fetal abnormalities per 1000 live births.[14] Given the wide use of labor-induction methods,[2,8] the number of women who suffer preventable complications may be large on a worldwide basis.

This study has both strengths and weaknesses. Among the strengths, we included all identified eligible patients over an 11-year interval. The paper and electronic records of all patients had uniform data abstraction by the authors. We used log binomial regression to control for potential confounding by the known major factors. Chance is an unlikely explanation because of the small *P* values observed.

Selection bias is possible, because patients were not randomly allocated to abortion method. Information bias may have occurred as a result of different surveillance for complications; labor-induction patients were observed in hospital, whereas D&E patients have less intensive surveillance as outpatients. This might have biased results in favor of D&E. However, information bias is unlikely to have accounted for the large difference in morbidity observed. No formal follow-up of patients was done for reasons of confidentiality, but patients in both groups had equal access to the hospital in case of complications. Residual confounding is possible. About one quarter of labor-induction patients were missing BMI data, so controlling for this potential confounding factor was not possible. However, BMI has not been a confounding factor in previous studies.[6,15] Varying labor-induction techniques were used in this study, reflecting obstetric practices at our hospital during the study interval.

Although mifepristone plus misoprostol leads to faster abortion times than do uterotonics alone,[16] the problem of retained placentas is common with all labor-induction abortions in the midtrimester.[1,2,17,18] Although some suggest that retained placenta is not a complication per se, it leads to a second, unplanned procedure, which carries risks similar to D&E. Retained placenta constitutes an incomplete abortion, regardless of the primary method used.

The superiority of D&E found in this study is consistent with the existing literature. Case-series reports,[19,20] cohort studies,[6,21] and randomized controlled trials[1,22,23] over three decades have repeatedly confirmed the safety and effectiveness of D&E. The consistency of our findings with the literature strengthens the inference that D&E abortion causes fewer complications than does labor induction, and D&E is more acceptable to women as well.[1] Although labor induction is considered the preferred method by some authors,[8,9] no comparative data support this view.

When faced with the difficult decision of aborting a pregnancy for fetal indications, women should be offered a choice of the best methods. The three fundamental ethical principles of beneficence, autonomy, and justice govern medical practice.[24] Beneficence requires that D&E be offered, because it is the safest method available. Advocating methods requiring the least skill, independent of patient safety, is inconsistent with this principle.[8,9] Given the potential for long-term psychological morbidity from abortions done for these indications,[25–27] the obligation to provide the safest and most compassionate procedure is heightened. In addition, the delivery of an intact fetus for the purpose of autopsy does not appear to be a valid indication for labor induction.[5]

Autonomy denotes choice among methods, and offering only labor induction is inconsistent with this principle. Providing D&E or referring patients to a skilled provider offers women this autonomy. Justice implies equal distribution of resources; choice of abortion methods should not be limited by geography. Women choosing abortions for fetal indications should be allowed to make a truly informed decision based on the best available evidence. When given this choice, most prefer D&E.[1,17]

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