Outpatient Abortion for Fetal Anomaly and Fetal Death From 15–34 Menstrual Weeks' Gestation: Techniques and Clinical Management

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Objective: **To determine the safety of providing outpatient abortion services for women with complicated advanced pregnancies.**

Methods: **During a 10-year period, 124 abortions were performed after 14 menstrual weeks' gestation at an outpatient abortion facility for indications of fetal anomaly, diagnosed genetic disorder, or fetal death. Gestational lengths ranged from 15–34 menstrual weeks. Fetal diagnoses included a variety of chromosomal abnormalities, malformations, and death. Techniques for performing the late abortions included a serial multiple laminaria method of cervical dilation. Abortions performed after 20 menstrual weeks were effected by instillation of intra-amniotic hyperosmolar urea or induction of fetal death by injection of digoxin and/or hyperosmolar urea into the fetus, followed by artificial rupture of membranes, induction of labor, and assisted expulsion or instrumental extraction of the fetus. At less than 20 weeks, dilation and evacuation following serial multiple laminaria treatment of the cervix was the method of choice.**

Results: **The median gestational age was 23 menstrual weeks. The median procedure time for all cases was 12 minutes and median blood loss was 125 mL. Procedure time increased with length of gestation ($P = .00$). Blood loss was only slightly increased by gestation length ($P = .154$) and not by procedure time ($P = .299$). Complication rates were not significantly related to gestation length ($P = .895$). There was one major complication in this series. There were no uterine perforations and one cervical laceration.**

Conclusion: **Outpatient abortion may be performed safely in most cases of fetal disorder, including death, through 34 menstrual weeks under proper conditions.** ***(Obstet Gynecol 1993;81:301–6)***

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Among the most perplexing problems in abortion practice is the clinical management of the patient with an advanced pregnancy who chooses or needs an abortion because of a fetal disorder or an acute medical complication. Although the dilation and evacuation (D&E) procedure has become well established for abortions performed through 24 menstrual weeks,[1–3] including those done for reasons of critical illness and fetal anomaly,[4–6] abortion practice beyond this point is not well established. In addition, most obstetricians, including those who perform abortions, do not accept the use of D&E for treatment of a pregnancy complicated by late fetal death. Either waiting for spontaneous expulsion or using prostaglandin E_2 suppositories for induction has been recommended,[7] but both alternatives are fraught with serious disadvantages or hazards.[8]

This report summarizes the experience with 124 patients receiving abortions from 15–34 menstrual weeks' gestation in an ambulatory extramural setting at a single institution. The report reviews techniques used to enhance the safety of the procedure, procedure variables, and overall complication rates.

Materials and Methods

All procedures were performed over a period of 10 years, ending May 1992, in a single private office outpatient abortion facility located across the street from a community hospital. The facility has been specially equipped and staffed to provide assistance for women seeking late abortion. Patients receive individual counseling and support throughout their experi-

ence at the clinic. Real-time diagnostic ultrasound is performed on all patients during the preoperative evaluation. Nearly all patients came to our facility by way of private referral, with an established preoperative diagnosis of fetal anomaly or other serious indication for late abortion.

The routine protocol after ultrasound evaluation and counseling included placement of one to four laminaria in the cervix on day 1, replaced by four to 20 laminaria on day 2 at one sitting or two sittings 6 hours apart, and performance of the abortion on day 3. Some patients experienced a third day of preoperative laminaria treatment before the abortion depending on the length of gestation and on dilation of the cervix after the first 2 days of treatment. Few patients had more than 20 laminaria placed at a single sitting on the second or third day. We used the serial multiple laminaria protocol of 2–3 days for all patients. An earlier study of single overnight multiple laminaria treatment, not yet reported, was found to give less than optimum results for women having abortions beyond 14 menstrual weeks. At less than 20 weeks, D&E following serial multiple laminaria treatment for 2 days was the method of choice.

In the early part of this series, patients at later than 20 menstrual weeks' gestation received an intra-amniotic infusion of hyperosmolar urea on day 3, and then waited for labor to begin. Labor usually began within approximately 5 hours and was often followed by spontaneous or assisted expulsion of the fetus, or by D&E if expulsion did not occur.[1,2] This protocol was gradually modified in pregnancies advanced beyond 24 menstrual weeks. Intrafetal injection of undiluted digoxin 1.5 mg under direct ultrasound visualization on the first or second day accompanied the first or second insertion of laminaria. Some of these patients also received an intra-amniotic hyperosmolar urea infusion until we observed that this step could be eliminated with similar good results.

Upon removal of the most recently inserted pack of laminaria at the beginning of the third or fourth day of treatment, the membranes were routinely ruptured and amniotic fluid was drained off as completely as possible. At that point, an intravenous (IV) line was placed, permitting administration of IV medications and infusion of Ringer's lactate solution. An attempt to induce labor was not made until a clear flow of amniotic fluid was established and the risk of amniotic fluid embolism was reduced. Amniotic fluid was measured as accurately as possible. Blood loss was determined for all patients by measuring directly the blood volume in the collecting basin at the abortion or by removing clots with the gloved hand from the fluid in the basin and measuring the volume of clots.

When patients became uncomfortable because of urea- or oxytocin-induced labor, they were given meperidine 50–75 mg intramuscularly (IM) for light analgesia about 20 minutes before the anticipated expulsion or D&E procedure. The D&E procedure was performed under paracervical block anesthesia using 10 mL of 1% lidocaine without epinephrine. Many patients received a prior long-acting cervical block with 12 mL of Marcaine (Winthrop Pharmaceuticals, New York, NY) 0.25% when the onset of labor was several hours before the anticipated D&E procedure or fetal expulsion. Approximately 40–60 U of oxytocin was routinely added to 500–1000 mL of Ringer's lactate IV infusion upon delivery of the fetal skull, and 0.2 mg of methylergonovine maleate was given IM upon delivery of the placenta. The placenta was delivered immediately in most cases by traction on the umbilical cord or forceps removal when it was adherent.

In the later cases in this series, we induced fetal death (by intrafetal injection of digoxin 1.5–2.0 mg or hyperosmolar urea 40 g under direct ultrasound visualization), followed by artificial rupture of the membranes and induction of labor by slow IV infusion of oxytocin (10 U/hour). When fetal expulsion was imminent, the patient was placed in an operating room where the expulsion was controlled by the physician. If expulsion did not occur within a few hours after artificial rupture of the membranes, D&E was performed.

In the case of assisted fetal expulsion, delivery of the fetus was controlled so as to minimize the risk of cervical or perineal laceration, sometimes by sharp dissection of presenting fetal parts. In most of the patients in this series, forceps[9] evacuation of the uterus was routinely accomplished under direct intraoperative ultrasound visualization.

The protocol combining serial multiple laminaria treatment, induced fetal death, and rupture of the membranes with induction of labor backed up by D&E appeared to give the optimum results in patient comfort and safety. Procedure time was measured from the time the uterine cavity was entered with instruments or from the beginning of delivery of the fetus, whichever came first, until completion of the procedure by final curettage and vacuum aspiration.

Postoperative tissue examination included weighing the fetus and placenta separately and carefully measuring the fetal parts, including foot length, knee-heel length, femur length, biparietal diameter, crown-rump length, rump-shoulder length, abdominal diameter, and chest diameter. The method of measurement of fetal parts has been described previously. We diagnosed actual fetal age according to fetal foot length based on previously established values.[10]

The patients were routinely observed in the recovery room for 2 hours or more, depending on patient response and the appearance of complications. All patients received routine antibiotic coverage after the abortion procedure, and those experiencing either intrafetal injection or intra-amniotic urea infusion also received chemoprophylaxis. The initial standard protocol was 1 g of tetracycline orally immediately after the procedure, followed by 500 mg every 6 hours for 5 days; the same regimen was begun immediately after intrauterine injection for those having that procedure. Doxycycline 100 mg orally twice a day for 5 days was recently substituted for the tetracycline regimen. Patients allergic to tetracycline-doxycycline were given erythromycin. Cultures for gonorrhea and chlamydia were done only in cases that appeared to be at higher than usual risk for these infections. Rh-immune globulin was administered to all patients who were Rh-negative.

All patients were strongly encouraged to return for follow-up examination if possible and were given forms to send in when they could not return in person for an examination. Arrangements were made for follow-up with the referring or other local physician when the patient came from a long distance, and for the follow-up physician to return a brief report. Standard follow-up instructions included a recommendation for examination at 1 and 4 weeks after the abortion.

We defined major complications using criteria of the Centers for Disease Control:[11] major unintended surgery, hemorrhage requiring transfusion, or pelvic infection with 2 or more days of fever and a peak of at least 40C or with hospitalization for 11 or more days. A minor complication was defined as any of the following: an operative or postoperative problem that required reaspiration or suture of a cervical laceration, infection (indicated by uterine tenderness at follow-up examination) responding to antibiotic therapy or more than a transitory fever of 38C or more, a total blood loss of 500 mL or more, and documented evidence of coagulopathy not requiring transfusion.

Results

Patients came from throughout the United States, and two came directly from foreign countries. One patient was from the local community, and 51% were from outside Colorado, of which about half were from the east coast of the United States. Patient ages ranged from 13–46 years, with a mean and median of 29. Preoperative estimates of fetal age ranged from 15–32 menstrual weeks. Advanced pregnancies (20 menstrual weeks or more) were somewhat more likely to occur in younger women ($P = .002$). Follow-up contact was obtained, with 90% of all patients eligible for follow-up at the time of writing ($N = 120$).

Table 1. Mean Blood Loss and Procedure Time by Length of Gestation

Weeks' gestation	Blood loss (mL)	Procedure time (min)	*N*
15–16	132	8	14
17–18	168	12	14
19–20	189	12	16
21–22	187	11	18
23–24	114	16	8
25–26	210	16	18
27–28	127	23	24
29+	332	27	12

The final estimate of gestational age as defined by measurable fetal foot length was 15–34 menstrual weeks, with a median of 23. The median procedure time for all cases was 12 minutes, with a mean of 16 and a range of 1–125. The median blood loss was 125 mL, with a mean of 180 and a range of 10–1500. Procedure time increased with length of gestation (Table 1); regression analysis showed that gestational length accounted for 15% of the length of procedure time (adjusted $r^2 = 0.152$; $P = .00$). However, blood loss was only slightly increased by gestation length (Table 1) ($P = .154$) and not by procedure time ($P = .299$). Fetal weights ($N = 124$) ranged from 19–2050 g, with a mean of 591 and median of 403. The median fetal foot length was 39 mm, with a range of 18–70.

One patient (27 menstrual weeks) experienced a major complication, coagulopathy requiring transfusion with packed cells. Another patient, who experienced severe hemorrhage following placental abruption, did not require transfusion and was therefore classified as having a minor complication. Thirteen women experienced minor complications (10.4%), including two in the patient with the placental abruption. There was no correlation between complication rates and length of gestation ($P = .895$). There were no uterine perforations and one cervical laceration.

Blood loss was generally low and within acceptable limits, but seven patients had a blood loss of 500 mL or more, including three (2.4%) who lost over 500 mL. The latter group included one patient who experienced coagulopathy approximately 1 hour after an otherwise unremarkable procedure, presumably due to intravascular embolism of fetal cerebrospinal fluid. In this case, the breech delivery of a severely hydrocephalic fetus was complicated by separation of the fetal skull from the thorax; the thorax was macerated because of intrafetal injection of hyperosmolar urea at that site. During the difficult extraction of the fetal head, a large

amount of fetal cerebrospinal fluid was observed issuing from the uterus. The uterus had been emptied of all amniotic fluid as confirmed by ultrasound observation; therefore the coagulopathy was likely due to absorption of fetal cerebrospinal fluid. This patient was hospitalized and the coagulopathy treated with a transfusion of 2 U of packed cells. She recovered without incident.

Another patient, whose 25-week pregnancy was complicated by severe fetal anomaly and polyhydramnios, experienced an acute placental abruption while being prepared for transfer to the operating room; she was in shock by the time she reached the operating table. Placement of forceps through the dilated cervix resulted in the instantaneous release of some 1000 mL of blood and a further drop in blood pressure. Aortic compression combined with rapid IV volume support was applied while the uterus was emptied rapidly within several minutes. This patient lost approximately 1500 mL of blood intraoperatively but stabilized within 1 hour after the abortion and did not require transfusion. She developed no evidence of postoperative coagulopathy.

Two patients with advanced pregnancies (26 and 28 menstrual weeks) presented with a history of vertical cesarean delivery. These histories contraindicated induction of labor following cervical dilation and rupture of membranes; a D&E abortion procedure was performed in each case.

Another 45-year-old patient at 29 menstrual weeks had a long history of hypertension and diabetes, with evidence of extensive pitting edema from the beginning of treatment. She also had a history of severe bleeding and prolonged clotting times.

One 32-year-old woman with a 21-week desired pregnancy and a history of insulin-dependent diabetes, severe hyperemesis gravidarum, deteriorating electrolyte balance and cardiovascular status, and profound anemia was flown by air ambulance from another state for her abortion. She went into shock on the airplane and was critically ill upon arrival, whereupon she was hospitalized immediately to stabilize her cardiovascular status. Once stabilized, she was transferred to the outpatient clinic for her abortion. She tolerated the procedure well and was relieved of symptoms within an hour after the abortion. She recovered without complication.

Another patient, already mentioned, was hospitalized for observation following acute placental abruption and the loss of some 1500 mL of blood before the uterus could be emptied. She was discharged the next day and experienced no immediate postoperative complications. However, she began bleeding several weeks later and required a D&C, with the recovery of a small amount of retained tissue.

Table 2. Fetal Anomalies, Genetic Disorders, and Disorders of Pregnancy

Chromosomal abnormalities		45
Turner syndrome/mosaic (45,X/46,XX)	8	
Trisomy 18	2	
Trisomy 21	29	
47,XXX	1	
Triploidy—69 chromosomes	1	
Atypical banding/chromosome 5	1	
Marker chromosome abnormality	1	
Chromosomal abnormalities—46,XX	2	
Neural tube defect		30
Hydrocephaly	13	
Neural tube defect—spina bifida, encephalocele, etc.	11	
Anencephaly	4	
Hydranencephaly	1	
Alobar holoprosencephaly	1	
Developmental anomalies		40
Fetal hydrops/cystic hygroma/ascities	5	
Multiple anomalies (unspecified, specified)	4	
Thanatophoric dwarfism	3	
Skeletal dysplasia/IUGR	3	
Potter syndrome	2	
Left ventricular syndrome/univentricular anomaly	2	
Intracerebral/cardiac cystic anomaly	3	
Microcephaly/macrocephaly/assorted anomalies	2	
Polycystic kidneys, etc.	1	
Conjoined twins	1	
Sacrococcygeal teratoma	1	
Abnormal alpha-fetoprotein (anomaly suspected)	1	
Dandy-Walker syndrome with IUGR	2	
Klinefelter syndrome (47,XXY)	1	
Cardiac anomalies	1	
Oligohydramnios and severe bradycardia	1	
Hemophilia diagnosed in fetus	1	
Fetal death	6	
High risk of congenital anomaly		3
Duchenne muscular dystrophy risk	1	
History of X-linked genetic abnormality, male fetus	1	
75% risk of congenital anomalies	1	
Total		118

IUGR = intrauterine growth retardation.

All but a few of the patients in this series sought abortion because of diagnosed fetal anomalies or disorders of pregnancy of varying degree, including fetal death (six cases). Six patients were treated as the result of non-fetal indications. These included extreme youth, a history of rape or forced intercourse, and illness exacerbated by pregnancy.

A wide variety of fetal disorders were documented before and after the abortions (Table 2).[12] The most common were neural tube or central nervous system defects (27%) and trisomy 21 (24%). One remarkable case of sacrococcygeal teratoma occurred and three cases of thanatophoric dwarfism were observed. In the first case of thanatophoric dwarfism, the diagnosis was

confirmed postoperatively by radiographic and histopathologic studies. Preoperative amniocentesis for cytologic study was done on request. Postoperative histopathologic and cytologic studies were done whenever possible, but fetal tissue destruction resulting from the abortion procedure did not permit this in all cases.

Discussion

Late abortion of a desired pregnancy for reasons of fetal disorder is one of the most painful dilemmas in modern society. As new career opportunities open for women and childbearing is delayed, each pregnancy becomes more precious to the couple desiring children late in a woman's reproductive life. Early diagnosis of fetal anomalies and genetic disorders presents the woman and her partner with an agonizing choice, sometimes based on incomplete or imprecise information. The charged political climate surrounding abortion in contemporary American society makes this dilemma and its resolution even more tragic and painful. The technology of late abortion presented here provides acceptably safe results and offers the woman with a diagnosis of fetal abnormality a choice she would not have had a few decades ago. The risks of the abortion must be compared with the risks of term delivery.[13] In the case of serious fetal anomaly such as hydrocephaly or conjoined twins, there is a high risk of cesarean delivery. None of the patients in this series required abdominal surgery. Only one required transfusion.

To achieve a high level of safety, one must take all possible precautions to minimize risk to the patient. A cornerstone of this preventive approach is the use of serial multiple laminaria treatment for cervical dilation.[9,14] Procedures are designed to maximize patient safety rather than preserve fetal tissue for cytologic study. There are many advantages to an outpatient setting: a selected and highly supportive staff, the availability of a full range of specialty instruments not usually available in community hospitals or even in teaching hospitals, privacy and maintenance of patient confidentiality, informal procedures that reduce patient anxiety, availability of individual counseling and support throughout the experience for both the patient and her family, lower cost, fewer bureaucratic controls, reduced political vulnerability to the community pressures experienced by hospital boards, and greater flexibility in counseling and preoperative and operating schedules.

There is no requirement for routine hospital performance of this procedure, although this option should be available in the presence of medical indications. Determination of the level of gestation at which this procedure may be safely performed on an outpatient basis depends on a variety of factors: the level of operator skill, the extent of preoperative preparation by the use of laminaria and other procedures such as induced fetal death, the level of preparation reached by the facility in question, and the proximity to a full-service hospital.

In our experience, there are several essential components of outpatient late abortion services. The patients must have absolute support from all members of the staff throughout the experience. The physicians should have specialized training and experience in performing this procedure. Nurses must be highly skilled in the management of surgical patients and must function as an integrated part of the surgical team. All patients should be routinely evaluated by ultrasound for diagnosis of fetal age, presentation, placental location, multiple gestation, and any uterine or fetal abnormalities. Serial multiple laminaria preparation of the cervix should be performed over 40–72 hours before the abortion is attempted. Specific appropriate instruments should be available in sufficient quantities.[9] Space for a routine minimum recovery period of 2 hours should be available within the facility. Tissue obtained should be inspected thoroughly by the operating physician or another specially trained person immediately after the procedure. Outpatient abortion in gestations of 25 weeks or later should occur within 5 minutes of a full-service hospital (with blood bank, intensive care unit, and operating room), providing life-support ambulance service is immediately available. Physicians and administrators should recognize the emotional stress experienced by staff in assisting with or performing this procedure.[15,16]

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