Outpatient second-trimester D&E abortion through 24 menstrual weeks' gestation*

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Abstract

Over a period of 5½ years, a total of 1,000 patients with gestations ranging from 13 to 24 menstrual weeks have received dilatation and evacuation (D&E) abortion on an outpatient basis. Various modifications of a serial multiple laminaria treatment were used to achieve cervical dilatation. Laminaria treatment lasted from 24 to 48 hours prior to D&E with as many as two to three changes of laminaria and as many as 12 laminaria being placed at one time. A total of 176 patients whose pregnancies were from 21 to 24 weeks' gestation received intrauterine infusions of from 80 to 120 gm hyperosmolar urea solution several hours prior to D&E. This was principally instilled intraamniotically, but also included were some fetal intrathoracic injections under direct ultrasound vision.

Follow-up contact with 75% of patients revealed an infection rate of 0.8% overall and a retained tissue rate of 1.0%. Three patients (0.3%) experienced major complications. One aborted spontaneously following laminaria treatment but prior to D&E and required transfusion. Another experienced a uterine perforation requiring laparotomy and repair. A third experienced a brief episode of convulsive syncope following a vasovagal reaction.

Introduction

Dilatation and evacuation (D&E) abortion has become the most common method of second-trimester abortion in the United States in the past few years, and numerous papers have appeared in the medical literature documenting its safety.[1] In a preliminary report, we described the performance of early midtrimester D&E abortion on an outpatient basis through 19 weeks from the last menstrual period (LMP).[2] The present paper describes clinical experience with 1,000 midtrimester abortion patients from 1975 through September, 1980, using variations on the serial multiple laminaria protocol described previously. In addition, patients whose pregnancies were advanced to more than 20 menstrual weeks' gestation were treated with an intrauterine infusion of hyperosmolar urea prior to the D&E procedure.

Materials and methods

The setting for this experience has been a small, private 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 abortion through the second trimester of pregnancy. Patients receive individual counseling and support throughout their experience at the clinic. Diagnostic ultrasound was used for estimating fetal age as soon as it became available at the community hospital, and this was supplanted by

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routine real-time ultrasound preoperative evaluation on the clinic premises. Eighty seven percent of the patients in this series received ultrasound evaluation prior to abortion.

Patients came from throughout the Rocky Mountain region, with only 6% from the local community and 42% from out of state. The median age was 19. Sixty-five percent of the patients were experiencing their first pregnancy, and 86% were having their first abortion. Preoperative estimates of fetal age (based on the LMP[2]) ranged from 11 to 22 weeks, with sonographic biparietal diameter readings from 19 to 56 mm.[3]

Routine protocol following ultrasound evaluation and counseling included one to three laminaria placed in the cervix on day 1, replaced by four to twelve laminaria on day 2 at one or two sittings, and D&E procedure on day 3.[4] Patients in whom a diagnosis of 21+ menstrual weeks' gestation was made (fetal age, 19+ weeks) received an intrauterine infusion of hyperosmolar urea approximately five hours prior to D&E on day 3. This protocol was followed in 176 patients, of whom three did not receive urea owing to a failed attempt or to evidence (in one patient) of intravascular injection at the beginning of the infusion. Hypertonic saline was used for three patients owing to a temporary shortage of urea. One of these patients did not receive a full saline instillation because she began experiencing symptoms of intravascular injection in spite of a clear aspiration.

Patients receiving an intraamniotic urea infusion were prepared and draped in the usual manner, and either a straight 18-gauge spinal needle or 17-gauge catheter needle was used to obtain a free flow of amniotic fluid. Following removal of an adequate quantity (100 to 300 ml) of amniotic fluid, either 80 or 120 gm of hyperosmolar urea solution was then injected directly into the amniotic cavity. Patients were then observed for up to five or six hours for evidence of labor and/or fetal demise as documented by Doppler ultrasound examination. Patients experiencing active labor were taken to the procedure room where membranes were ruptured and the uterus was emptied.

In ten patients with advanced pregnancies, a fetal intrathoracic infusion of hyperosmolar urea was attempted under direct ultrasound visualization. In the seven cases in which this procedure was successful, evidence of entry into the fetal thoracic cavity included the sensation of needle entry accompanied by depression in the fetal thoracic cavity, diminution of fetal heart rate, visual evidence of fluid movement within the cavity, and cessation of fetal heart activity. This procedure was abandoned except for indicated circumstances because its disadvantages appeared to outweigh the advantages for routine use. It would appear to be a valuable alternative, however, in such cases as oligohydramnios.

The D&E procedure was performed under paracervical block anesthesia and light narcotic analgesia with meperidine was given intramuscularly 15 to 20 minutes prior to the procedure. For all patients with 15 weeks' gestation or more, an intravenous infusion of Ringer's lactate was begun prior to the procedure. From 40 to 60 units of oxytocin were routinely added to 500 to 1,000 ml of the Ringer's lactate upon delivery of the fetal skull and 0.2 mg of methylergonovine maleate was given intramuscularly upon delivery of the placenta.

Following removal of the most recent pack of laminaria, membranes were routinely ruptured and amniotic fluid was drained off as completely as possible. With the exception of the patients receiving urea, the fluid was measured and separated so that blood loss could be measured as accurately as possible. Procedure time was measured from the time the uterine cavity was entered with instruments or at the time active suction was applied until the procedure was completed.

Examination of the tissue postoperatively included weighing the fetus and placenta separately and careful measurement of fetal parts.

Patients were routinely observed in the recovery room for two hours or more, depending on patient response and the appearance of complications.

Ninety percent of all patients received routine antibiotic coverage following the D&E procedure. The standard protocol was 1 gm of tetracycline immediately after the procedure followed by 500 mg every six hours for five days.

Patients were given strong encouragement to return for follow-up examination and were provided with forms to send in when they could not return in person for an examination. Efforts were made to arrange 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 examinations at one and four weeks following the abortion. Follow-up contact was obtained for 75% of the patients, and 40% were seen in the clinic for one of the two recommended examinations.

Ninety percent of the procedures reported here were performed by the author; 9% and 1%, respectively, were performed by two other physicians.

Results

The final estimate of gestational age ranged from 13 to 26 menstrual weeks; 40% of the pregnancies were from 13 to 15 weeks of gestation, 26.8% from 16 to 18 weeks, 15.8% from 19 to 20 weeks, 10.8% from 21 to 22 weeks, 6.4% from 23 to 24 weeks, and 0.2% from 25 to 26 weeks. Median procedure time was 6.5 minutes, and median blood loss was 100 ml with a mean of 150 ml. Blood loss was higher and procedure times were generally longer in the 16- to 20-week range, with an increase in procedure time in the more advanced gestations (Table I). Serious underestimation of the length of gestation occurred in two patients with postoperative estimates of gestational age at 25 and 26 weeks, respectively. Fetal weights ranged from 11 to 730 gm, fetal foot lengths ranged from 9 to 51 mm, and biparietal diameters ranged from 18 to 62 mm. Gestational age estimates were derived originally from Streeter,[5] but a new analysis using the current data base was used for most of these estimates. A preliminary synopsis of these data is in press.[4]

Among patients receiving urea amnioinfusion, injection-to-procedure time averaged about five hours (Table II), although some patients went into labor quickly and were aborted within two hours after injection. One patient, however, was observed overnight owing to a lack of labor in an advanced gestation, and in another patient the procedure was postponed for a total of 48 hours owing to the failure of the initial laminaria treatment to cause dilatation.

While blood loss was generally low and within acceptable limits, 3.1% of all patients experienced a blood loss of 500 ml or more, and four of these experienced a blood loss of 1,000 ml or more. These included one patient who experienced a spontaneous abortion on the evening of the second day of laminaria treatment and showed evidence of incipient shock upon arrival at the office. Following initial

TABLE I
Procedure characteristics (all patients).

Estimate of gestational age (weeks from LMP)	No. of patients (N = 1,000)	Median procedure time (min.)	Median blood loss (ml)
13	117	5.0	50
14	95	6.0	61
15	188	6.0	98
16	123	7.4	101
17	76	6.8	103
18	69	7.3	143
19	84	7.5	151
20	74	6.0	152
21	62	5.5	202
22	46	6.3	154
23	41	8.1	142
24	23	9.7	103
25	1	20.0	500
26	1	72.0	100

TABLE II
Intraamniotic urea infusion followed by D&E.

Gestational age (weeks from LMP)	No. of patients	Median amniotic fluid withdrawn (ml)	Median urea injected (gm)	Median injection-to-procedure time (hours)
20	9	130	80	4.0
21	46	120	80	5.4
22	42	170	85	5.7
23	39	300	110	5.3
24	23	313	120	5.3
25	1	55	80	4.0
26	1	120	120	6.0

treatment with colloid, volume replacement, and dilatation and curettage, 2 units of packed cells were given, with immediate improvement and discharge from outpatient care.

Another patient who required tranfusion experienced a uterine perforation during the D&E procedure. This patient's pregnancy was advanced to 23 weeks' gestation, and an attempt at urea amnioinfusion was unsuccessful. A decision was made to perform the D&E without the benefit of urea, and the procedure proved to be extremely difficult. At one point, the patient complained of abdominal pain at the same time that difficulty was experienced in removing tissue. A perforation was suspected, and the procedure was completed under direct ultrasound visualization without difficulty. After the uterus was emptied, it was explored with a Kelly uterine forceps by sensation and ultrasound visualization. A perforation site could not be identified. The patient was observed in the recovery room, and tissue examination revealed what appeared to be mesenteric fat. The patient showed diminished bowel sounds, faint rebound tenderness, and pallor upon standing. Vital signs remained within normal limits, and she felt well. She was transferred to the hospital where a laparotomy was performed revealing a 2-cm posterior wall uterine defect and an abrasion of the sigmoid colon. Approximately 500 ml of blood was found in the abdominal cavity along with a small amount of fetal tisue. Following repair and transfusion with 2 units of whole blood, the patient recovered without incident.

These two patients constitute two of the three who are classified as having major complications under the definition given by Tietze and Lewit (major unintended surgery; hemorrhage requiring transfusion; fever for three days or more).[6] The third patient experienced a momentary convulsion following vasovagal reaction and syncope, and would be included under the Tietze and Lewit protocol.

Other complications included a 1% incidence of unsuspected retained tissue requiring treatment and an 0.8% incidence of clinically identifiable infections (Table III). The latter category includes one woman who developed transitory evidence of sepsis on the morning of the procedure following serial multiple laminaria treatment in the presence of amniotic fluid leakage. She had received tetracycline during the laminaria treatment but experienced chills and fever two hours after urea amnioinfusion. Intravenous antibiotics were begun and the D&E was performed according to routine protocol. Her sepsis symptoms disappeared within one hour after intravenous antibiotic therapy was begun. She was hospitalized overnight on a precautionary basis, with a continuation of the intravenous antibiotics, and experienced no subsequent complications. Patients classified as having infections included all those with uterine tenderness at follow-up examination responding to antibiotic therapy, or with more than transitory fever of 100.4 F (38C) or more.

A total of five patients were hospitalized in this series, of whom only one, already described, was hospitalized for more than one night. Two patients were hospitalized for heavy postoperative bleeding due to uterine atony that was controlled before

TABLE III
Overall complication rates.

Major complications		0.3%
One perforation including abrasion of sigmoid colon requiring laparotomy, repair, transfusion		
One blood transfusion following laminaria treatment and spontaneous abortion during treatment		
One transitory convulsion following syncope		
Minor complications		8.4%
Clinically identifiable infections	0.8%	
Unsuspected retained tissue requiring treatment	1.0%	
Reaspiration within one week	0.7%	
Reaspiration beyond one week	0.3%	
Reaspiration within 6 hours	3.2%	
Total blood loss of 500 ml or more	3.1%	
1,000+ ml (includes two major complications)	0.4%	
Cervical lacerations	0.3%	

hospitalization, and one of these showed minor evidence of coagulopathy by laboratory examination (the partial thromboplastin time was briefly abnormal). Another patient was hospitalized overnight for observation because of a suspicion that uterine perforation had occurred as final curettage was completed. The patient was asymptomatic throughout, showed no subsequent evidence of abdominal signs or perforation, and had an uncomplicated recovery.

One clearly documented and clinically apparent case of coagulopathy occurred after closure of this series, and it will be reported later in detail. The patient recovered uneventfully following evacuation of a small amount of clot from her uterus and required neither hospitalization or other medical treatment.

Three minor cervical lacerations occurred. The first accompanied failure of laminaria dilatation followed by manual dilatation of a stenotic cervix in a patient with a pregnancy of 13 weeks' gestation. The laceration involved a tenaculum tear and was closed with one suture. A second occurred during a procedure at 20 weeks' gestation in which a 1-cm lateral laceration occurred during delivery of fetal parts. The third occurred when one of the physicians attempted excessive dilatation in a procedure at 18 weeks' gestation. Both latter lacerations required one suture for approximation.

A total of five patients aborted spontaneously following laminaria treatment, two without assistance. One of these, already decribed, experienced severe bleeding requiring transfusion.

Discussion

In this series, a wide variety of unusual circumstances were encountered which tended to complicate the procedure, but we found that it was possible to manage most within the framework of the protocol. Notably, there were three patients with didelphic uteri at various stages of pregnancy. One of the patients was aware of her condition prior to pregnancy. She was in her 23rd week of gestation when she presented for treatment. The two cervices appeared identical, and one laminaria was placed in each. Since identification of the pregnant horn was difficult by pelvic examination, ultrasound was used to determine this. The diagnosis was correct, and the nonpregnant horn was emptied of decidua on the second day. The cervix of the pregnant horn was treated with serial multiple laminaria as usual. A urea infusion was performed and the D&E procedure was performed without incident.

One patient was referred for D&E with a history of amenorrhea for 18 weeks but accompanied by occasional spotting. Ultrasound evaluation revealed a hydatidiform mole and a large posterior (probably theca-lutein) cyst. Serial multiple laminaria treatment was followed and the patient was scheduled for a procedure

on day 3. An oxytocin infusion was begun prior to the procedure. Immediately upon removal of the laminaria, profuse drainage of dark blood began. Bleeding was relatively heavy during aspiration but the advantage of the wide cervical dilatation was apparent in use of large curettes (Hunter; Bumm) to empty the uterine cavity quickly in order to allow contraction. Blood loss was approximately 500 ml. Table IV shows several other unusual conditions that were encountered.

A frequent problem at the beginning of this series was difficulty in removing the fetal skull from the uterus. The incidence of this declined with experience, more aggressive use of laminaria in dilatation, and acquisition of new and more satisfactory instruments for performance of this procedure. It still occurs occasionally, and is managed by completing the procedure under direct ultrasound visualization or having the patient wait in the recovery room for one or two hours. The part being sought invariably migrates to the lower uterine segment and is easily grasped and delivered.

The procedure of fetal intrathoracic infusion of 80 gm of urea was initiated when it was observed that intraamniotic infusion of this amount in advanced (23 to 24 weeks') gestation was not effective. The fetal intrathoracic injection under direct ultrasound visualization appeared to be a feasible approach, but it did not produce enough uterine irritation with accompanying cervical dilatation and effacement to justify its routine use. It has been reserved for situations in which a clear aspiration of amniotic fluid was difficult or impossible to obtain. It has now been supplanted by 120 gm of intraamniotic infusion for patients with pregnancies of 22+ weeks' gestation. This has proven to be reliable and effective. A frequent occurrence with this regimen is active labor within three to four hours accompanied by assisted delivery of an intact fetus and negligible blood loss.

It must be emphasized that a key component of the late D&E procedure, whether supplemented or not by urea amnioinfusion, is serial multiple laminaria treatment over 24 to 48 hours, which produces marked cervical softening and effacement in most cases. Attempts to shortcut this procedure, while possible, have not yielded optimum results in terms of blood loss, procedure times, and uterine emptying. It is also necessary to emphasize that the procedure requires great caution, gradual advancement from early to later gestations, and considerable time commitment on the part of the physician.

Both staffing and equipment have become more extensive and specialized as we accepted the more advanced gestations. One of the principal advantages of this procedure for patients, aside from safety, is the freedom from having to experience unattended expulsion of a fetus that may or may not show signs of life.[7] Delivery of the fetus or uterine evacuation is performed by the physician under controlled conditions. Removal of the placenta and curettage is immediate, reducing the risk of unusual bleeding and infection. Staffing requires the employment of highly committed individuals who are expert in nursing, counseling, and patient support. Equipment includes the availability of a wide range of instruments appropriate to this procedure, real-time ultrasound, and adequate recovery space. A full discussion of these issues may be found in the 1981 issue of Obstetrics and Gynecology Annual (Ralph M. Wynn, editor).[4]

In our experience, there are several

TABLE IV
Unusual cases not considered as complications per se.

Finding	No. of patients
Hydatidiform mole	1
Didelphic uterus (17, 20, 23 wk gest.)	3
Multiple pregnancy	7
Extrauterine mass (5–10 cm dia.)	3
Late fetal demise	2
Ruptured membranes during laminaria treatment	3

components to the outpatient provision of midtrimester abortion services that are essential:

- Absolute staff support for the patient
- Specialized physician training and experience in the performance of this procedure
- Routine preoperative evaluation by ultrasound
- Multiple laminaria preparation of the cervix prior to the D&E procedure—serially, if possible
- Availability of specific appropriate instruments in sufficient quantities
- Recovery space for a routine minimum of two hours
- Immediate thorough inspection, by the operating physician or other specially trained person, of tissue obtained through D&E
- Immediate access (within 15 minutes) to a full-service hospital (with blood bank, intensive care unit, and operating room)
- Recognition of the emotional stress experienced by staff in assisting with or performing this procedure[8,9]

Conclusion

Experience with 1,000 patients with gestational ages ranging from 13 to 26 menstrual weeks showed that abortions performed by D&E following serial multiple laminaria treatment and urea infusion can safely be performed for advanced gestations on an outpatient basis with an acceptably low complication rate. A wide variety of complicating gynecologic and surgical factors were encountered and no evidence was found that these presented contraindications to performance of this procedure.

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