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Umbilical cord transection to induce fetal demise prior to second-trimester D&E abortion☆

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Abstract

Objective: Induction of fetal demise via transabdominal injection has been used to facilitate second-trimester abortion but requires a second procedure and has associated risks. The method of amniotomy, cord transection and documentation of fetal asystole immediately prior to dilation and evacuation (D&E) is an alternative approach; however, characteristics of this method have not been described.

Study Design: This descriptive report from a single center involves a large case series of D&Es ranging from 16 to 23 weeks of gestation. Umbilical cord transection (UCT) was attempted immediately prior to D&E in 407 cases, which were reviewed to determine success, time to fetal asystole and complications.

Results: Both UCT and asystole were achieved in 100% of cases. Mean time from UCT to asystole was 3.35±2.11 min. When compared to cases performed at less than 20 weeks of gestation, mean time to asystole was slightly longer in the ≥20-week group (3.7±2.4 min vs. 3.1 ±1.9 min; p=.008). Few patients had minor (4.6%) or major (0.3%) complications; time to asystole was not associated with complications.

Conclusions: Umbilical cord transection immediately prior to D&E is a feasible, efficacious and safe way to induce fetal demise without performing additional procedures.

Implication statement: This study demonstrates the feasibility, effectiveness and safety of utilizing umbilical cord transection to induce fetal demise in a large cohort. This method is an alternative to other feticidal procedures.

Keywords: Second-trimester termination; Feticide; Fetal asystole

1. Introduction

The induction of fetal demise has been performed in conjunction with second-trimester pregnancy termination for over 2 decades. Indications have included a theoretical facilitation of dilation and evacuation (D&E), avoidance of extramural delivery with signs of life and patient preference [1–5]. More recently, feticidal injections have been utilized to ensure compliance with the Partial-Birth Abortion (PBA) Ban Act of 2003 [6]. Commonly used feticidal injections include intracardiac potassium chloride (KCl) and intrafetal or intraamniotic digoxin.

Feticidal injections require a separate procedure for the patient that is not without risk. Although intracardiac KCl is highly effective, it requires additional training and a high level of ultrasonography skills and equipment. There also has been a case report of nonfatal maternal cardiac arrest after accidental intravascular administration [7]. The safety of digoxin use has recently been evaluated by several investigators, yielding conflicting results. A large case series concluded that rates of extramural delivery and infection are acceptably low following digoxin use prior to scheduled D&E [8]. However, a retrospective cohort study utilizing historical controls showed that women who received digoxin were more likely to experience spontaneous abortion, infection and hospital admission than those who underwent D&E without feticidal injection [9]. Although one study has reported that patients may prefer the induction of fetal demise prior to D&E, this randomized, double-masked,

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placebo-controlled trial did not find increased efficacy of second-trimester abortion with digoxin use [2].

Alternatively, fetal asystole can be induced as the first step of the D&E procedure by amniotomy and umbilical cord transection (UCT). This technique was first described by Davis in 1972 [10]. The feasibility and safety have not been described in the modern medical literature. We conducted a retrospective case series analysis to determine the success rate, time to asystole and safety of planned UCT as a method of inducing fetal demise prior to D&E.

2. Materials and methods

The study was approved by the Colorado Multiple Institutional Review Board. We used the Excel® database of a free-standing women's surgical center that provides abortion to 22 weeks of gestational age (GA) for this analysis. This database was created and is maintained by the clinic's long-standing Medical Director. Date of procedure, demographic variables, preprocedure GA by ultrasound, final GA by fetal foot length, time of cord transection, time of asystole, estimated blood loss (EBL) and procedure complications are recorded in the paper record and entered daily into the database by the Medical Director.

Since the passage of the PBA ban, induction of fetal demise by UCT has routinely been performed for all abortions ≥16 weeks at this facility. This occurs immediately after removal of laminaria and amniotomy: a suction curette is introduced into the uterine cavity, and the cord is brought to the level of the external os with electric vacuum aspiration and then transected. Although the time needed to complete UCT is not recorded, this is usually accomplished quickly and without ultrasound guidance; the use of ultrasound guidance and/or forceps to extract the cord is rarely needed. If ultrasound and forceps are needed, the cord is grasped in the area of the placenta and efficiently extracted. The times of UCT and asystole (observed on transabdominal ultrasound) are documented in the medical record.

We identified all patients who presented to this center for abortion between January 1, 2007, and August 31, 2010. Preprocedure GA was determined at presentation by using ultrasound measurements of biparietal diameter (BPD) or BPD and femur length (FL) on a Siemens Sonoline SI-250 machine with a 5-mHz linear-array transducer. The limit for elective terminations in this clinic during the study period was a BPD of 53 mm (equivalent to 21 weeks, 4 days) [11–13].

Laminaria were placed for all cases over 12 weeks. Two days of cervical preparation was initiated for cases ≥20 weeks of GA. Depending on GA, a total of 1 to 10 laminaria were placed. Intracervical anesthetic blocks were administered for laminaria placement as needed. Oral doxycycline was initiated at the time of laminaria placement and continued for 1 week. Patients presenting with a temperature ≥38°C and/or with maternal tachycardia or fundal tenderness received intravenous (iv) ceftriaxone at the time of D&E. They then continued the routine outpatient oral antibiotic regimen. Cervical preparation with Dilapan-S or misoprostol was not used at this center during the study period. D&Es were performed under iv sedation with fentanyl and midazolam.

Although eligibility to obtain an abortion was determined by ultrasound dating, cases with a final GA confirmed to be ≥16 weeks' gestation by postoperative foot length measurement were included in the analysis [14]. Exclusion criteria included cases of spontaneous intrauterine fetal demise (IUFD), precipitous delivery after laminaria placement and incomplete medical records. During the study period, UCT and D&E were performed by one of two experienced D&E providers, and ultrasound determination of fetal asystole was performed by a single nurse practitioner. Intraoperative ultrasound after confirmation of asystole was utilized when requested by the providing surgeon.

All cases were reviewed for demographic, reproductive and outcome variables. Individual chart review was conducted to obtain outcome information identified as missing from the database. Outcome variables included successful performance of amniotomy and UCT, time to asystole (defined as the time from UCT to fetal asystole documented by transabdominal ultrasound) and D&E complications. Complications were classified by the National Abortion Federation (NAF) definitions [15]. Minor complications included the use of iv antibiotics, need for resuction and/or retained POCs, blood loss requiring additional medications but not transfusion (and not exceeding 500 mL), and cervical injury causing significant bleeding or requiring surgical repair. Major complications included uterine perforation, hysterectomy, EBL greater than 500 mL, embolism and need for inpatient hospital admission. EBLs were determined by surgeons' estimations; uterotonics were administered and resuctioning was performed at the surgeons' discretion.

We used descriptive statistics to quantitatively describe the population as well as the outcomes. Correlation coefficients (Spearman's rho) were used to measure the strength of linear dependence between variables. We conducted subgroup analyses of cases ≥20 weeks. Bivariate analyses comparing patients <20 weeks to those ≥20 weeks were conducted; t tests were used to compare continuous variables, χ^2 tests were used to compare proportions, and Fisher's Exact Tests were used when cell sizes were <5. SPSS statistical software (version 19.0.0; SPSS Inc., Chicago, IL, USA) was used for the analyses.

3. Results

During the study period, 468 patients presented at 16–22 weeks as determined by preoperative ultrasound. Fifteen cases were excluded from the cohort for clinical reasons (e.g., IUFD, precipitous delivery). An additional 46 patients were excluded due to incomplete medical records. Thus, 407 cases were eligible for analysis. The majority of subjects were Caucasian (58%); mean age of the cohort was 25±7