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Prevalence and risk factors of inadequate cervical dilation following laminaria insertion in second-trimester abortion — case control study

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Abstract

Objective: The objective was to explore the prevalence of and risk factors for inadequate cervical dilation following insertion of a single set of laminaria in women scheduled for dilation & evacuation (D&E) at 14–24 weeks' gestation.
Study design: We retrospectively reviewed all cases of women who underwent pregnancy termination by D&E at 14–24 weeks' gestation between January 2003 and December 2013. All cases in which the surgical procedure was cancelled due to failure to achieve adequate cervical dilation after a single set of laminaria inadequate cervical dilation were included. The control group was women who underwent D&E following adequate cervical dilation after a single set of laminaria, and were matched according to gestational week in a ratio of 1:3.
Results: The overall dilation failure rate was 3.2%, with 4.0% among the induced-abortion patients and 1.5% among the patients with fetal demise (p=.002). Patients who had inadequate cervical dilation had lower rates of gravidity (p=.002) and previous spontaneous vaginal delivery (p<.001), along with higher rates of primigravidity, nulliparity (p<.001), previous cesarean section/s (p=.041), previous abdominal surgeries (p=.001) and previous cervical procedures (p=.003), compared to controls. A multivariable logistic regression analysis revealed two risk factors for inadequate cervical dilation following laminaria insertion, namely, previous cesarean section (p=.002) and previous cervical procedure (p<.001), whereas increased gravidity was found to protect against inadequate cervical dilation (p=.002).
Conclusions: Previous cesarean section/s, cervical procedures and primigravidity were found to be risk factors for failure to achieve adequate cervical dilation after a single set of laminaria. Women who are scheduled for D&E, and in whom one of these risk factors exists, might benefit from additional interventions to achieve better cervical preparation.

Keywords: Abortion; Dilatation & evacuation; Inadequate cervical dilation; Laminaria; Risk factors

1. Introduction

Abortion during the second trimester of pregnancy accounts for 10%–15% of abortions performed worldwide [1,2]. Pregnancies most commonly are terminated in the second trimester by induction of labor or dilation and evacuation (D&E). D&E generally is the preferred method when skilled providers and facilities are available because it is safe, cost effective and efficient [3].

Late second-trimester abortion by D&E is associated with low complication rate. A Cochrane review that compared surgical and medical methods used for inducing abortion in second-trimester pregnancy with regard to efficacy, side effects, adverse effects and acceptability found that D&E is superior to instillation of prostaglandin F2α, mifepristone and misoprostol [3]. D&E was found to be safe in the presence of placenta previa [4], multiple pregnancies [5] and scarred uterus [6,7].

Preoperative preparation of the cervix is recommended before surgical evacuation of second-trimester pregnancies [8]. The cervix may be prepared with osmotic dilators, pharmacologic agents or both. The most common method for second-trimester D&E is by overnight laminaria placement [9]. Retrospective studies have shown that use of osmotic dilators such as laminaria tents decreases the risk of cervical laceration and uterine perforation [10]. The minimal dilation

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required depends on the type of instrument and gestational age [11]. Cervical preparation for D&E is deemed essential at 14weeks' gestation and beyond [12,13] and can be achieved through the use of pharmacologic agents, osmotic dilators and Foley balloon catheters [14–20].

Osmotic dilators exist in three main forms: laminaria tents, Lamicel TM, and Dilapan-STM. Laminaria tents are dried, compressed seaweed stems that absorb fluid and gradually expand, providing both mechanical dilation and dilation from endogenous prostaglandin release [21], thus making adjunctive manual dilation easier. Laminaria absorb fluid within the cervix and swell to about three to four times their original diameter. Most of this dilation occurs within the first 6h, with the maximum effect occurring in 12 to 24h. Reports regarding laminaria use date back to 1862, giving laminaria a long record of successful dilation with an excellent safety profile [22,23].

Occasionally, the internal os of the uterine cervix fails to dilate following a single set of laminaria insertion. These cases usually are diagnosed during the D&E procedure. Many surgeons would not cancel the D&E but instead would mechanically dilate the cervix or place a set of Dilapan and do the case later in the day. Some providers schedule the patients who may not have received an adequate number of dilators for gestational duration to come in early on the operative day to remove the dilators to assess the cervix. If the cervix is too closed and/or too noncompliant, they then place an additional set of dilators and/or use adjuvant misoprostol before taking the patient to the operation room either for later that day or for a subsequent day. Although used for many decades, studies of cervical preparation offer few data about success of cervical preparation with different patient characteristics. Therefore, the current study aims to explore the prevalence and potential risk factors for inadequate dilation.

2. Materials and methods

The gynecologic department in Assaf Harofeh Medical Center is a tertiary referral center for D&E. All the women admitted for second-trimester pregnancy termination undergo ultrasonographic evaluation prior to laminaria insertion for fetal biometry measurements as well as placental location. The medical charts of these women are stored in a computerized database.

The inclusion criteria of the study group were singleton pregnancies at 14–24 weeks of gestation on the preprocedure day. Multiple pregnancies were excluded, as the prerequisite of adequate cervical dilation is stricter than in singleton pregnancies.

Two experienced surgeons completed all D&Es. Laminaria japonica tents (4-mm diameter, MedGyn, IL, USA) were placed 12–20 h before the procedure by one of several practitioners who did not perform the D&E. The number of laminaria used for each case varied directly with increasing gestational age. Between 13 and 15 weeks of gestation, 3 laminaria tents are inserted; between 16 and 18 weeks of gestation, 4–5 laminaria tents are inserted; between 19 and 20 weeks of gestation, 7 laminaria tents are inserted; and above 20weeks of gestation, at least 10 laminaria tents are inserted. Any case in which the minimal number of laminaria tents based on gestational age was not inserted was excluded since, in these cases, the diagnosis of incompliant cervix was made preoperatively.

At the beginning of the surgical procedure, under general anesthesia, the surgeon took out the laminaria and assessed the degree of cervical dilation. All cases in which 20-mm diameter Hegar dilator could not pass the internal cervical os without resistance and/or there was inability to safely dilate the cervix mechanically following cervical preparation due to incompliant cervix was defined as failure to achieve adequate cervical dilation after a single set of laminaria and were included in the study group. Since each case of dilation failure was managed by laminaria reinsertion under general anesthesia, a computerized search for the latter procedure identified these cases. The control group included women who underwent D&E and in whom satisfactory dilation of the internal os was achieved following a single set of laminaria insertion. Controls were matched to cases in 3:1 ratio by computerized search of the next three consecutive women who underwent a D&E at the same gestational age as each case. Patient with fetal demise were excluded from the control group. Since the number of laminaria tents inserted was dependent on the gestational age, each case in the study group was matched to the control group according to the gestational week in 1–1 matching (for each case, three controls were selected). We did not match the controls by surgeon.

The study groups were compared with respect to patient characteristics, indication for abortion, number of laminaria tents used, length of hospitalization, and rate of intraoperative and postoperative complications.

Descriptive parameters were expressed as mean±. Frequencies were presented as percentages. Comparison of mean values between the two subgroups was performed using analysis of variance test, while χ^2 test was used for comparison of proportions. Calculations were performed using SPSS software (version 11, Chicago, IL, USA). Values of $p<.05$ were considered statistically significant. Approval for the study was obtained from the Ethics Committee of Assaf Harofeh Medical Center, Zerifin, Israel.

3. Results

A total of 2233 medical records of women undergoing pregnancy termination were identified in our hospital computerized database, either due to induced abortion (1500 women, 67.2% of the study population) or missed abortion (733 women, 32.8% of the study population) by D&E at 14–24 weeks' gestation between January 2003 and December 2013. There were no missing records. The overall dilation failure rate was 3.2% ($n=71$), with 4.0% ($n=60$)