Just Pop It: Early AROM After Cervical Ripening Reduces the Time to Delivery

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In pregnant patients at term undergoing induction of labor, early time-based artificial rupture of membranes (AROM) within 1 hour of Foley bulb expulsion results in a shorter duration of labor by nearly 9 hours with no significant difference in cesarean delivery rates or maternal or neonatal adverse outcomes.[1] (J Am Board Fam Med 2024;00:000–000.)

Keywords: **Amniotomy, AROM, Cervical Ripening, Cesarean, Early Rupture of Membranes, Induced, Induction, Labor, Pregnancy, Singleton, Third Trimester**

Strength of Recommendation

SOR B: Based on moderate quality randomized controlled trials with inconsistent findings.

Illustrative Case

A 27-year-old G1P0 at 40 2/7 weeks estimated gestational age (EGA) with no pregnancy complications presents to Labor and Delivery for a scheduled elective induction of labor. Her Group B Streptococcus culture test was negative. A Foley bulb was placed and intravaginal misoprostol was given for cervical ripening. After 6 hours the foley bulb fell out and a cervical examination at that time showed 3 cm dilation with good fetal head engagement. You are planning on starting oxytocin.

Should you also consider artificial rupture of membranes (AROM) at this time?

Clinical Context

As of 2020, approximately 31% of births involved labor induction in the United States which had more than tripled since 1990.[2] Approaches to labor induction at term are variable, and different philosophies, interventions, and protocols are well established in the literature.[3] Artificial rupture of membranes (AROM) is an ACOG recommended intervention that is widely used in labor management, although there is no standardization of when this should be completed during the labor process.[4]

AROM is a relatively safe and inexpensive procedure, with potential risks including umbilical cord prolapse and intraamniotic infection. There are several studies showing that early AROM, typically defined as AROM before the active phase of labor or early in the labor course, reduces labor duration with no significant difference in cesarean delivery

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rates or maternal or neonatal adverse outcomes.[5,6] A 2013 Cochrane review including 14 RCTs and 8033 women support a reduction in duration of spontaneous labor in women undergoing early AROM with oxytocin versus expectant management.[5] A 2020 meta-analysis illustrated that early AROM in labor induction after cervical ripening, such as with a Foley catheter or prostaglandins, leads to a reduction in labor duration of up to 5 hours which significantly impacts not only the patient, but also physicians, nurses, and hospital administrators.[6] However, other studies illustrate increased risk of cesarean delivery with early amniotomy, leading to conflicting evidence.[7] Therefore, the optimal timing of AROM during labor induction remains unknown. The purpose of this study was to evaluate whether AROM within 1 hour of foley bulb expulsion during labor induction reduced time to delivery.

Methods

This article was identified as a potential PURL through the standard systematic methodology. An additional literature search was conducted by searching DynaMed, UpToDate, and PubMed with the term "early amniotomy" to find additional literature to place this research into the context of current clinical practice.[8]

Study Summary

This study was a randomized controlled trial conducted at a single tertiary care center to compare artificial rupture of membranes (AROM) within 1 hour of Foley bulb (FB) expulsion to expectant management (EM) after FB expulsion, and the effect on labor duration.[1] Inclusion criteria included women ≥ 18 years old with singleton pregnancies in the cephalic position who were ≥ 37 weeks gestation and undergoing induction of labor with combination Foley catheter and misoprostol. Exclusion criteria included known prior uterine scar, known major fetal congenital anomaly, HIV or hepatitis C infection, category 3 fetal heart tracing, hemolysis, elevated liver enzymes, low platelets syndrome (HELLP), eclampsia, and growth restriction. The induction for all patients consisted of cervical ripening with a FB filled with 30 mL of fluid and intravaginal misoprostol (25 mcg every 3 hours for up to 6 total doses or a maximum of 24 hours). The FB was removed after 12 hours if still in place. Oxytocin was started if there was a contraindication to repeat misoprostol doses or after FB expulsion. After FB expulsion or removal, a cervical examination was done within 1 hour and if AROM was deemed safe, the patient was consented and randomized to either early AROM group or the EM group. In the early AROM group, the cervical examination was immediately repeated and AROM was performed. In the EM group, a team of midwives, residents, and attendings made decisions about when to perform AROM, however AROM was performed no earlier than 4 hours after FB expulsion with a median time of FB expulsion to AROM of 10 hours. A power analysis using a 4-hour difference in labor time indicated a need for 160 patients assuming a combined 10% crossover and dropout rate.

The trial included 160 patients with 79 women randomized to the early AROM group and 81 in the EM group. Randomization, including by parity, achieved well-matched groups. Neither the providers nor patients were blinded to the randomization, as this was not possible. The demographics between the 2 groups were similar with a median age of 29 in the early AROM group versus 30 in the EM group. The median gestational age was 39 weeks in both groups with the same median Bishop score of 2. In the early AROM group 62% were nulliparous compared with 63% in the EM group. The most common indication for induction in both groups was a 39-week induction (31.6% of early AROM group vs 34.6% of EM group). There was a significant difference in cervical dilation at time of amniotomy, with those in the early AROM having a median dilation of 3.00 cm (interquartile range [IQR] 3.00 to 4.00) compared with 5.00 cm (IQR 4.00 to 6.50) in the EM group, $P < .001$.

The primary outcome of time to any mode of delivery after FB expulsion was significantly shorter in the early AROM group (median, 11.1 hour; IQR 6.25-17.1) versus the EM group (19.8 hours; IQR 13.2 to 26.2), $P < .001$. Time to vaginal delivery was significantly shorter in the patients receiving early AROM (median, 10.1 hour; IQR 5.14-13.1) versus expectant management (17.2 hours; IQR 11.3 to 20.6), $P < .001$. In addition, time to active labor was shorter in the early AROM versus EM group (median, 6.71 hours; IQR 4.06 to 9.15 vs 14.2 hours; IQR 10.2 to 17.7), $P < .001$. This trend was observed

among both nulliparous and multiparous patients and was consistent after adjusting for maternal age, BMI, Bishop score, and mode of delivery. Among the secondary outcomes, there was no significant difference between the 2 groups regarding intraamniotic infection, cord prolapse, cesarean delivery, or need for amnioinfusion. There was also no statistical difference for the neonatal outcomes of severe respiratory distress syndrome or NICU admission.

What Is New

Previous trials show an increased risk for cesarian delivery with early artificial rupture of membranes (AROM).[7] However, this study shows that early AROM within 1 hour of Foley bulb expulsion resulted in decreased time from Foley bulb expulsion to any mode of delivery compared with expectant management without any increased adverse outcomes.

Caveats

Limitations include that it was a single-center study with a relatively small sample size, so results may not be generalizable. Another limitation is that the providers and patients were not blinded to randomization, although blinding was not possible. In addition, in comparison to other studies, the current study used a uniform induction method and only included participants that were deemed safe for AROM. Early AROM was also clearly defined by timing relative to FB expulsion and regardless of cervical examination.

Challenges to Implementation

Amniotomy is an intervention that is widely available and inexpensive. Most labor and delivery units already practice this intervention regularly and have the necessary supplies. However, patient and provider preferences may impact widespread adoption. As previously presented, this time-based evidence for early amniotomy will be countered by cervical dilation-based protocols and practices.

To see this article online, please go to: http://jabfm.org/content/00/00/000.full.

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