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Effect of Oral Hydration on External Cephalic Version at Term

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ABSTRACT

Objective: To evaluate the effect of oral hydration on the success rate of external cephalic version (ECV).

Design: Randomized controlled and single-blind trial.

Setting: Academic tertiary hospital with approximately 3,000 births annually.

Participants: One hundred sixty-four women at a gestational age of at least 37 weeks with breech-presenting fetuses and normal amniotic fluid indexes (AFIs).

Methods: Participants were randomly assigned to drink 2000 ml or no more than 100 ml of water in the 2 hours before undergoing ECV. The AFIs were assessed before and after treatment by the same sonographer, who was blinded to the treatment group. Data were collected on relevant maternal and fetal characteristics and ECV success.

Results: The mean AFI after hydration was significantly greater than that in the control group (15.5 cm vs. 13.4 cm, $p = .003$). The ECV success rate was 53.7% in the hydration group and 46.3% in the control group (odds ratio: 1.34, 95% confidence interval [0.69, 2.59]; $p = .349$). Hydration was well tolerated and there were no serious adverse events.

Conclusion: Oral hydration significantly increased the AFIs but did not affect the success rate of ECVs.

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Breech presentation at term occurs in 3% to 4% of pregnancies and is associated with a greater rate of cesarean birth than is cephalic presentation (Hickok, Gordon, Milberg, Williams, & Daling, 1992; Royal College of Obstetricians and Gynaecologists, 2006). External cephalic version (ECV) is a maneuver used to change the presentation of the fetus from breech to cephalic to reduce the need for cesarean birth (De Hundt, Velzel, De Groot, Mol, & Kok, 2014; Hofmeyr & Kulier, 2012). ECV is generally safe, and its use results in minimal complications for a woman and her fetus, such as vaginal bleeding and transiently abnormal cardiotocographic patterns. However, ECV is not indicated in cases of placenta previa, nonreassuring fetal statuses, intrauterine growth restrictions, ruptured membranes, twin pregnancies, or significant uterine anomalies (Collaris & Oei, 2004; Grootscholten, Kok, GuidOei, Mol, & Van der Post, 2008). The presence of uterine scars is still considered a relative contraindication for ECV, but authors of a recent study found that ECV was not associated with increased complications in women who had previous cesarean births (Weill & Pollack, 2017).

Although ECV is recommend in the first-line management of breech presentations at term by the Royal College of Obstetricians and Gynaecologists (2006) and the American College of Obstetricians and Gynecologists (2016), this procedure is underused (Beuckens et al., 2016), and breech presentation is the third most frequent indication for cesarean births (Collaris & Oei, 2004). In some hospitals, almost all women with breech presentations have cesarean births (Sullivan, Moran, & Chapman, 2009).

It is important to foster the use of ECV and investigate the factors that can increase its success and potentially reduce the incidence of cesarean births. The reported ECV success rates in routine clinical practice range from 30% to 80% (American College of Obstetricians and Gynecologists, 2016; Royal College of Obstetricians and Gynaecologists, 2006). Factors associated with successful ECV include multiparity, tocolysis, nonfrank breech variety, posterior placenta location, and increased estimated fetal weight (Boucher, Bujold, Marquette, &

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Breech presentation is associated with a high rate of cesarean birth, which can be reduced by more successful use of external cephalic version.

Vezina, 2003; Cho, Lau, Lo, Tang, & Leung, 2012; Indraccolo et al., 2015). Researchers also showed a direct relationship between the amniotic fluid index (AFI) at the time of ECV and the likelihood of success (Boucher et al., 2003; Mowat & Gardener, 2014).

Amniotic fluid volume is controlled on the basis of a balance between amniotic fluid production and absorption that takes into account important factors such fetal swallowing and urination (Brace & Moore, 1991) and maternal hydration (Hofmeyr, Gulmezoglu, & Novikova, 2002; Salzer et al., 2015). The first randomized trial to show a significant increase in AFI in women with oligohydramnios after oral hydration dates to 1991 (Kilpatrick et al., 1991). These results have since been confirmed (Burgos et al., 2014; Magann et al., 2003) and extended to women with normal AFIs (Burgos et al., 2014; Kilpatrick & Safford, 1993; Magann et al., 2003). After they confirmed the association between maternal hydration and amniotic fluid volume, authors of a Cochrane Review advocated the use of randomized controlled clinical trials to assess the clinical benefits of hydration on various procedures (Hofmeyr et al., 2002). Maternal oral hydration is a noninvasive, easily used, and inexpensive intervention that may have beneficial effects on ECV success rates.

One cohort study of the effect of maternal intravenous fluid therapy on the ECV success rate has been published (Burgos et al., 2014). In this study of 200 women with breech presentations at term and normal amounts of amniotic fluid, investigators found that hydration was an effective and safe means to increase amniotic fluid volume, but it did not increase the ECV success rate. However, the lack of randomization and the fact that the comparisons of hydration and standard of care were made with a historic control group of women who did not receive fluid therapy gave rise to a number of potential biases that have important implications for the interpretation of the trial's nonsignificant results. Because the effect of hydration on the ECV success rate has not been thoroughly investigated, the aim of our randomized controlled trial was to determine whether the use of standardized maternal oral hydration before ECV increases amniotic fluid volume and improves the success rate of the procedure.

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Methods

Study Design and Setting

We conducted a randomized, controlled, blinded trial at a single academic institution (San Gerardo Hospital, Monza, Italy) where approximately 3,000 births occur per year. The study was approved by the San Gerardo Hospital Ethics Committee (reference Ethics Committee No. 426/2011) and was registered at clinicalgov.it (NCT01911481). Informed written consent was obtained from all of the participants.

Sample

We recruited a sample of 164 participants (82 in each group) to detect an absolute posthydration change of at least 20% in the proportion of successful ECVs, starting from the 60% baseline success rate in our hospital calculated on the basis of historic data (Regalia & Pozzi, 2007) with a power of 80% ($\alpha = 0.05$, two-sided). The inclusion criteria were a fetus in breech presentation, a singleton pregnancy, a gestational age of at least 37 weeks, an AFI of 7 to 24 cm, intact membranes, and an estimated fetal weight between the 10th and 90th percentiles using ultrasonography. The exclusion criteria were the presence of fetal or maternal diseases (e.g., maternal diabetes, preeclampsia, fetal malformations), placenta abnormalities, uterine contractions, or fetal distress. The treatments were allocated on the basis of a randomization list generated by a statistical package using consecutively numbered, sealed, opaque envelopes.

Procedures

The participants randomly assigned to the hydration group were asked to drink 2,000 ml of water in the 2 hours before the ECV procedure; the water was provided in the form of 1 half-liter bottle every 30 minutes. The participants in the control group were asked to drink no more than 100 ml of water during the same period.

Measures

For each participant, baseline ultrasonography was used to determine the type of breech presentation, fetal position, location of placenta, and the AFI, which was measured using the technique described by Phelan et al. (1987). Maternal blood pressure, heart rate, and respiratory rate were

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