Review

External cephalic version: a review of the literature

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ABSTRACT

External cephalic version (ECV) is a manipulation of the fetus through mother's abdomen in which the baby is rotated from the breech to the cephalic presentation in order to reduce the incidence of caesarean sections indicated by pelvic presentation, what would by far reduce the incidence of postpartum maternity morbidity. External cephalic version does not change the Apgar scores of the babies, pH levels in the umbilical cord, the percentage of babies admitted to the intensive care unit, perinatal mortality, or the duration of delivery. Incidence of pelvic presentation is 3-4% of all term pregnancies. Breech position is the third most frequent indication for cesarean section, repeat cesarean section and labor dystocia. According to recommendations from ACOG, Royal College of Obstetricians and Gynecologists, the Dutch Society for Obstetrics and Gynecology and Royal Dutch Organization for midwifes, external cephalic version should be available and offered to all women with near term pregnancies and a breech position, if there are no contraindications for the procedure. For pregnant women who meet certain conditions ECV is considered to be safe and effective procedure for rotating the fetus to the cephalic presentation, in order to increase the probability of cephalic vaginal delivery. Studies show that after ECV the risk of breech delivery is reduced by 54%, and the risk of cesarean delivery is reduced by 33%. Although ECV decreases the incidence of cesarean deliveries, the cesarean delivery after ECV is still higher than in the general population, being contributed to both dystocia and non-reassuring cardiotocography CTG patterns as indications for the cesarean section.

KEYWORDS: breech presentation; cesarean section rate; external cephalic version; tocolysis

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INTRODUCTION

External cephalic version (ECV) as a procedure is recommended from most of the national organizations for obstetrics and gynecology for term pregnancies with breech position in order to increase the probability of cephalic vaginal delivery. That is applied only to certain women without contraindications for the procedure (1-6).

Although the cause of breech position in a certain patient isn't always clear, both mothers and fetal causes of malpresentation should be considered. Prematurity is the most common factor associated with breech presentation, because premature children have the highest frequency of breech position, considering the relative small fetus and an increased amniotic fluid volume, the fetus has relatively more space to change position. As the pregnancy progresses, amniotic fluid volume is decreasing, and the fetus is growing, therefore because of different dimensions in between different body parts the head is most frequently oriented to the pelvis. In a very similar way polyhydramnios and multiparity are also factors that increase frequency of fetal malpresentation. Vice versa, conditions like cornual placenta or placenta previa, narrow pelvis, uterine anomalies, myoma, certain fetal anomalies

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(hydrocephalus, sacrococcygeal teratoma) and multiple gestation predispose fetal malpresentation because of limited movement of the fetus. When fetal malpresentation and breech position occur, potential neurological disabilities, muscular dystrophy and short umbilical cord, should be considered, especially when planning an ECV (5-9).

Considering that the ECV reduces the incidence of cesarean deliveries by 33%, being a great number given that breech position as an indication has increased the incidence of cesarean deliveries by 30% in the last 20 years, ECV should be presented and advised to pregnant women after 36 weeks as a safe procedure (10). For the ECV to be safe and successful, identification of suitability criteria is necessary. The Australian National Antenatal Care have made guidelines and a scoring system considering parity, placement of the placenta and variation of breech presentation, by which the success rate of the procedure can be predicted. ECV success means rotation from breech presentation to a cephalic one and also a cephalic delivery. The procedure's success rate according to different studies varies between 35-86% being 46.1% successful in primiparas while the multiparas have much higher success rate of 72.3%.

There are two categories of factors associated with the successfulness of the procedure: clinical factors are anamnesis and physical examination; and ultrasound prognostic factors (11,12).

Clinical factors associated with higher ECV success rates include multiparty, no descent of the breech into the pelvis, no tension of the uterus, palpable fetal head in the fundus, mothers weight under 85 kg.

Ultrasound factors related to a successful ECV include amniotic fluid volume AFI>10 cm, posterior placenta placement, laterally located fetal spine, complete breech presentation.

Success rates of ECV are drastically reduced when fetal mobility is reduced, or the obstetrician is finding it difficult to manipulate the fetus. In addition, when mother is experiencing pain because of the procedure, success rates are reduced. Factors indicating a lower success rate are nulliparity, anterior or cornual placenta, decreased amniotic fluid volume AFI<10, ruptured membranes, descent of the breech into the pelvis, obesity, fetal head not palpable and posteriorly located fetal spine.

It is considered that firm maternal abdominal muscles cause much lower success rates in nullipara, which is also a predisposition for the frank breech presentation, being an independent factor for impeded ECV. Pain that occurs during the procedure is also an unfavorable prognostic factor because it is usually caused by firmer pressure during the rotation. Most common reason is the descent of the breech into the pelvis (12).

SUITABILITY FOR ECV

Contraindications for ECV include any condition that is threatening to the fetal wellbeing or making it very unlikely successful procedure (13). If there is any other indication for a cesarean section present, then the ECV is contraindicated. Absolute contraindications are: placenta previa, placental abruption, non-reassuring fetal heart rate, intrauterine growth restriction in association with abnormal umbilical artery Doppler index, isoimmunization, severe preeclampsia, history of vaginal bleeding within the last 7 days and significant fetal or uterine anomalies. Ruptured membranes and fetus with a hyperextended fetal are also contraindications for ECV. Relative contraindications are maternal obesity, small for gestational age and oligohydramnios (14). Previous uterine scar from cesarean delivery or myomectomy is another relative contraindication (15). ECV isn't recommended for multiple pregnancies with exception of ECV for the second twin after delivery of the first twin.

PROCEDURE PLANNING

The recommended time for ECV is at >36 weeks of gestation. There have been several studies researching the optimal timing for the procedure. In a few retrospective studies patients were randomly assigned to ECV at 36+0 to 35+6 weeks gestation (early ECV) or at 37+0 to 37+6 weeks gestation (term ECV). Although early ECV resulted in fewer fetuses in malpresentation (57% versus 66%), the rate of cesarean delivery was not significantly reduced (64.7% versus 71.6%). Hutton et al. in their study confirmed these results and showed that early ECV increases the risk of preterm birth (16). Accordingly, ACOG recommends ECV after 36 completed weeks of gestation and not earlier considering there is no significant decrease in cesarean delivery rate nor is the procedure more successful (around 58%) while the number of complications associated with prematurity is significantly reduced. Royal College of Obstetricians and Gynecologists guidelines state that there is no upper gestation limit for when ECV can be attempted. ECV was successful even at 42 completed weeks of gestation and during early labor.

Several studies evaluated attempts of ECV during early labor. For a safe attempt of ECV

a woman should present in labor with intact membranes, normal amniotic fluid volume and no contraindications for the procedure. ACOG recommends avoiding immediate induction of labor after a successful ECV. Some studies, however show that amniotomy is appropriate after successful ECV in women with nonlongitudinal lies. So-called stabilizing induction after successful ECV after 39 weeks gestation have certain theoretical advantages: possibility of continuous CTG monitoring, easy approach to an operating area if there is a need for an urgent cesarean delivery, delay of anti-D immune globulin administration until the fetal blood type is determined. Disadvantages include higher frequency of breech descent into the pelvis-reducing the success rates of the procedure, longer labors but also higher incidence of cesarean delivery rates.

Final recommendation of numerous national perinatology and obstetric organizations is immediate labor induction only after an ECV when there is non-longitudinal lie, because fetal oblique and transverse lie are more likely to go back to their primary lie after the version. In that case ECV is performed at 39 completed weeks of gestation, followed by amniotomy to stabilize the fetus in a longitudinal position.

A cohort study that included 627 pregnant women showed factors to increase the cesarean section rate after a successful ECV to be: induction of labor, less than 2 weeks period between the ECV and the birth, high maternal BMI and a previous cesarean section. Another study including 301 women found only 13% cesarean deliveries after a successful ECV and 6% instrumental deliveries. The only risk factor for an operative delivery was nulliparity (17).

ECV PROCEDURE

The most important preprocedural factor is a well-informed woman. Counseling should include presenting benefits and risks of the procedure, explaining why the procedure is being performed, answering questions related to the procedure, presenting risks of any medications that may have to be administrated (tocolytics, anti-D immune globulin) (18). Management plan should be formed in case of an unsuccessful procedure (expectative management, ECV retry, vaginal breech delivery or cesarean section if necessary). Before the attempt of version, the woman should sign an informed consent form. Even though complication rates are so low, some providers restrict oral intake for 8 hours before the procedure and place an intravenous catheter.

ECV should be performed in proximity to an ultrasound device, CTG monitor and with ready access to an operating room in case of complications.

Prior to performing ECV physical and ultrasound examination should be performed, as well as a documented normal CTG tracing. Satisfactory biophysical profile score, lie, presentation and type of breech presentation (complete breech presentation is optimal for ECV) must be assessed with an ultrasound examination. If all conditions are met, the procedure can be performed.

The woman is lying on her back, slightly flexed legs for better abdominal muscles relaxation. Abdominal skin is covered with gel or talk for easier manipulation. Direction of the somersault isn't determinate and should be attempted in a more mobile direction. The technique is divided into a few steps. The first and the most important one is mobilization of the breech from the pelvis. After that, the head is manipulated towards the pelvis, while simultaneously moving the breech to the fundus. The fetal heart rate should be assessed between the steps, with interruption of the procedure if necessary. It is recommended to emphasize the hand pushing the breech to avoid risk of neck hyperextension or hyperflexion. The procedure is completed when the head is set above the pelvic brim.

If ECV is unsuccessful after 3-4 attempts or after 5 minutes (more than that isn't recommended), also after a successfully performed version, fetal well-being is evaluated by cardiotocography. Fetal heart rate monitoring should be done until it is normal, rather than for a minimum of 1 hour. It is common for fetal heart rate to be nonreactive for 20 to 40 minutes after ECV. Most experts recommend administering anti-D immune globulin immediately after ECV even though fetomaternal hemorrhage is almost always less than 30 mL.

Recommendations in case of an unsuccessful procedure are to try it again in a couple of days. In case of two unsuccessful attempts in a couple of days, it's advised to give up on further attempts (19).

Different studies have tried to enhance ECV success rates. The most commonly tried methods are tocolysis, analgesia, vibroacoustic stimulation, hydration and amniotransfusion.

In 2015, several studies explored tocolytics administration for performing ECV found that only beta-adrenergic agonists are efficient enough to be brought into the standard procedure (20). Parenteral or subcutaneous use of beta stimulants increased success rates of ECV, also the number and success rates of ECV during early labor, shortened the time needed to perform the procedure, and decreased

cesarean section rates, bradycardia and procedure-related hemorrhage. Tocolysis is also recommended for repeat ECV in women who have undergone a previous unsuccessful attempt of ECV. Suggested protocols include a slow intravenous ritodrine infusion or a subcutaneous bolus of salbutamol or terbutaline.

In the past years there was a lot of controversy around neuraxial anesthesia use for ECV. In a 2016 systematic review of nine randomized trials showed that epidural and spinal analgesia increased ECV success rate compared to the control group without analgesia (54% vs. 44.6%) (19-21). Theoretically there is a possibility that with no pain sensation may allow excessive use of force, complication rates were similar in both groups. It is proven that neuraxial anesthesia may improve the success of ECV when EVC with tocolysis is unsuccessful.

Fetal vibroacoustic stimulation has increased the success rate of the procedure only in cases of anterior spine position. It stimulates the fetus shift to a spine lateral position, which facilitates manipulating the fetus (22). Preprocedural hydration and amniotransfusion do not appear to improve success rates.

COMPLICATIONS OF ECV

Overall risk of complication of EVC is relatively low. Newest studies show a 0.1-0.16% perinatal mortality rate associated with ECV. Most common complications are transient fetal heart rate changes lasting 20 to 40 minutes (5.7%), fetal heart rate changes lasting longer than 40 minutes (0.37%), fetomaternal transfusion (0.9%) and vaginal bleeding (0.4%) (16).

Extremely rare complications – each in only 0.2% are ruptured membranes, placental abruption, cord prolapse and fetal death.

Transient changes of fetal heart rate are associated with shot-term fetal hypoxia and reaction to stress. Nevertheless, it is necessary to keep track of the CTG record cautiously to notice signs of fetal suffering.

Vaginal bleeding is mostly asymptomatic but placental abruption must be considered although the frequency after ECV is lower than in general population (16,22).

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