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Original paper

Improving external cephalic version for foetal breech presentation

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Abstract

Objectives: **If success rate of external cephalic version (ECV) increases, the rate of primary caesarean sections declines. The aims of this retrospective cohort study were to evaluate the ECV and to identify factors associated with the success rate of ECV for breech presentation at term. The second aim of this study was to analyse the outcome of labour of all patients with a foetus in breech near term.**
Methods: **All women with a foetus in breech near or at term were included. Logistic regression analyses were performed to identify the association between patient characteristics and success rate of ECV.**
Results: **The overall rate of successful ECV's was 19%. Foetal and maternal complications after ECV were negligible. BMI, type of breech and amount of amniotic fluid were significantly correlated with a successful ECV. The rate of primary caesarean sections for the group of patients who underwent an ECV was lower than the rate in the group who did not (52.9% vs. 79.6%). The rate of spontaneous deliveries was increased after ECV (36% versus 12%). After successful ECV the rate of spontaneous deliveries was 75%; after unsuccessful ECV 26.8%.**
Conclusion: **The overall rate of successful ECV was low (19%). BMI, type of breech and amount of amniotic fluid were significantly correlated with a successful ECV. The rate of primary caesarean sections was significantly lower in patients with ECV (52.9% versus 79.6%). The rate of spontaneous deliveries was significantly higher (36% versus 12%).**

Key words: **BMI, breech presentation, caesarean section, external cephalic version, pregnancy.**

Introduction

In the Netherlands, approximately 6000 foetus present in breech position near term each year. This counts for 3-4% of all pregnancies (Hickok et al., 1992; Kuppens et al., 2010). Foetal breech presentations and deliveries in breech are associated with an increased risk of foetal and maternal complications, like prolapsed umbilical cord, cord compression, difficulties with foetal head delivery, asphyxia, etc. (Hutton et al., 2011; Hannah et al., 2000).

After the publication of the Term Breech Trial by Hannah et al. (2000), the rate of (primary) caesarean sections because of breech presentations tremendously increased. In The Netherlands, the rate of primary caesarean sections because of breech increased from 57.4% in 2000 to 80.85% in 2001 (Molkenboer et al., 2003).

Besides after this publication, ECV increased its popularity (Hutton et al., 2011; Collaris et al., 2004). In 2002, ECV was re-introduced at the Orbis medical center (OMC) as well.

ECV near term is a safe procedure that may reduce the incidence of breech presentation at labour, and so the rate of primary and secondary caesarean sections in women with a foetus in breech presentation (Collaris et al., 2004; Hofmeyr et al., 2000). The aim of this retrospective cohort study is to evaluate the external cephalic version (ECV) and to identify factors associated with the success rate of ECV for breech presentation near term.

Methods

The OMC is a non-university, teaching hospital in the South of the Netherlands that counts for about 1300 deliveries each year. All women with a singleton foetus in breech that underwent an ECV near term (gestational age > 36 weeks) at the OMC in Sittard, from 2006 until 2011, were included. Women were only included once, in the case of a repeated version in a subsequent pregnancy the second version will be excluded from the cohort. Also, all patients who had a breech delivery (pre- or at term) or visited our clinic with a foetus in breech presentation in this period were included. The results and mode of delivery of the patients in the ECV-group were compared with those of the non-ECV patients.

According to our local protocol patients with a breech were counselled for an ECV after a gestational age of 35 weeks. After patients' agreement, the ECV was performed at a gestational age of 36-38 weeks by a gynaecologist under foetal monitoring. Tocolysis was administered as Partusisten (Fenoterol®) infusion of 500 mcg or Tractocile (Atosiban®) infusion of 6.75 mg only in nulliparous women. The technical procedure of the ECV in the OMC is equal to techniques described in literature (Ranney, 1973; Skupski et al., 2003). We considered successful version as cephalic presentation immediately after the ECV. Complications during or after ECV were routinely described. The primary outcome was the success rate (SR) of ECV. Factors associated with the SR of the ECV were noted. The duration of the breech presentation was evaluated by assessing foetal presentation at a gestational age of 30 weeks. Secondary outcomes were mode of delivery, complication rates and neonatal outcome.

Data were managed using a Microsoft Excel database and SPSS statistics 19. Independent T-test and a Chi-square test to compare baseline characteristics between the ECV and the non-ECV group were carried out. To examine the correlation between several patient characteristics, we performed multiple logistic regression analysis. A p-value < 0.05 was considered statistically significant.

Results

Overall, 414 patients were included: 189 patients underwent an ECV (group A) and 225 did not (group B). The patients in group B did not have an ECV for several reasons: 21 patients (9%) were excluded for ECV because of premature start of labour; 33 patients (15%) were discouraged, because they had a medical contraindication such as a known uterus bicornis. The remaining 171 patients (76%) refused ECV after counselling mostly because of fear for pain and complications.

Baseline characteristics

The mean age of all patients was 31.4 ± 4.8 years; the mean BMI was 24.7 ± 5.1 kg/m^2. Baseline characteristics like parity, ethnicity, placental localisation and type of breech of patients from group A and group B were not significantly different. A history of breech is defined as having had a breech delivery or an ECV in a previous pregnancy. This was positive in 3.7% in group A versus 12.8% in group B, this was significantly different.

Outcome after ECV (group A) if compared to no ECV (group B)

If the two groups are compared, the rate of primary caesarean sections was significantly lower for patients of group A (52.9%) compared to for patients of group B (79.6%) (p < 0,001). The rate of secondary caesarean sections was 11.6% for group A and 8.4% for group B. The rate of spontaneous deliveries (including vaginal breech deliveries) was 36% for group A, compared to 12% for group B (P < 0.001). After successful ECV, the rate of spontaneous deliveries was 75%. After unsuccessful ECV, the rate of spontaneous deliveries was 26.8%.

Among the 36 patients in group A who had a successful ECV, 27 (75%) had a cephalic presentation at labour and 9 returned back to breech before labour started. Among the 27 patients who had a cephalic presentation during start of labour, 24 had a vaginal delivery from a foetus in cephalic position and 3 had a secondary caesarean section. Among the 9 remaining patients, 3 had a vaginal breech delivery, 4 had a primary caesarean section and 2 had a secondary caesarean section. Among the 153 patients who had an unsuccessful ECV, 8 (5.2%) had a cephalic presentation at labour after spontaneous turn of the foetus. Eventually 7 patients (4.6%) had vaginal delivery of a foetus in cephalic presentation, 34 (22.2%) had vaginal breech delivery, 96 (62.7%) had a primary caesarean section and 16 (10.5%) underwent a secondary caesarean section (Figure 1). In group B, 27 (12%) patients had a vaginal breech delivery, 179 (79.6%) patients underwent a primary caesarean section and 19 (8.4%) had a secondary caesarean section. In group A 4 vacuum extractions were reported compared to no vacuum extractions in group B.

Success rate (SR) of ECV

The SR of the ECV's was 19.0%. Associations with SR and several patient characteristics were analysed

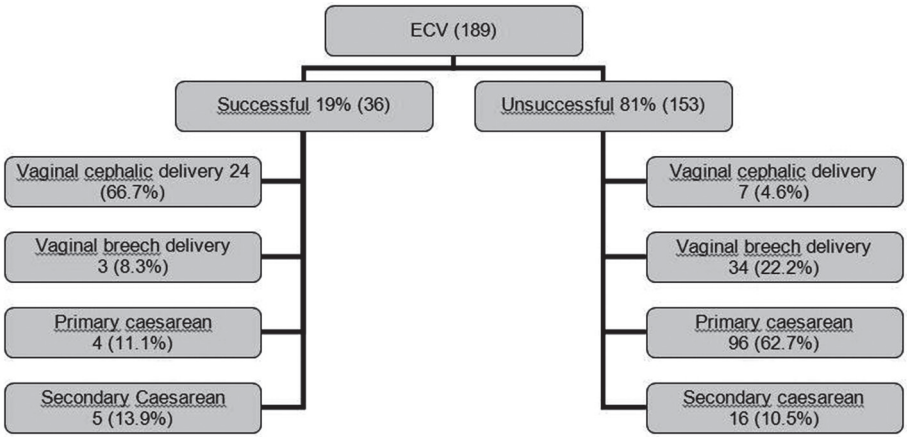

Fig. 1. — Flowchart reflecting mode of delivery of all patients after an ECV.

by logistic regression analysis. The type of breech was found to be a significant association with successful ECV. The SR of ECV in patients with a foetus in frank breech (n = 142) was 14.1%, in patients with a foetus in complete breech (n = 26) 34.6%. The association was significant [OR 0.197, $p < 0.05$, 95% CI 0.068-0.568]. BMI was significantly correlated with higher success rates. Patients with higher BMI are less likely to have a successful ECV (OR 0.866 [$p < 0.05$, 95% CI 0.764-0.568]). Also the amount of amniotic fluid was significantly correlated with higher SR of ECV. Patients with more amniotic fluid were more likely to have a successful ECV (OR 1.079 [$p < 0.05$, 95% CI 1.005-1.158]).

Placental location was found to be a not significant associated factor. The placental location was anterior in 46.6% and non-anterior in 53.4%. SR in patients with a non-anterior placental location was 24.2%, compared to 13.6% for patients with an anterior placenta [OR 0.493, $p = 0.070$ 95% CI 0.230-1.058]. Parity was not significantly associated with the SR of ECV. Of the patients in group A 61.4% was nulliparous versus 38.6% multiparous women. The SR of ECV in nulliparous women was 15.5%, compared to 24.7% in multiparous women [OR 1.782, $p = 0.122$ 95% CI 0.857-3.705].

No significant association was found for ethnicity. For caucasian patients, SR was 17.3% versus 30.8% for non-Caucasian patients (mostly Africans) [OR 0.470, $p = 0.111$ CI 95% 0.186-1.188] (Figure 2).

The use of tocolytics (100% in nulliparous women and 0% in multiparous women) and the type of tocolytic used (Partusisten (Fenoterol®) or Tractocile (Atosiban®)) was not significantly associated with success rates. Also, the estimated foetal weight, the engagement of the breech and duration of breech position were not significantly correlated with SR of ECV.

Complications and neonatal outcome

All complications after the ECV were reported. No neonatal mortality neither other maternal or neonatal complications were reported. In one case persistent CTG-abnormalities after the ECV was reported, requiring an emergency caesarean section approximately 6 hours after the ECV. The neonatal outcome was good (Apgar score 8/9).

Discussion

In (inter-)national literature, the SR of ECV is 30-61% (Kuppens et al., 2010, Skupski et al. 2003). The SR of ECV in our population was exceptionally low if compared to these statistics (19%). We found, in accordance with other literature that BMI, type of breech and amount of amniotic fluid were of significant influence on the success rates of ECV (Skupski et al., 2003; Hutton et al., 2008; Kok et al., 2011; Burgos et al. 2011). Despite the SR being low, the rate of primary caesarean sections was significantly reduced in the ECV-group if compared with the non-ECV group (79.6% vs. 52.9%). The rate of spontaneous deliveries was significantly increased after ECV (36% vs. 12%).

After 10 years of experience of ECV in the Orbis Medical Center, the percentages in literature of successful ECV (30 - 61% (Kuppens et al., 2010; Skupski et al., 2003) are never achieved. We focussed on the bad results of ECV and hypothesized that the low success rates in our clinics, is strongly biased by several home practising midwives doing ECV's at their own consultation hours. Besides, it may be partially explicable by the lack of rationale in our protocol for selection of patients for ECV. With the knowledge of the factors associated with the SR, we must better counsel and select our

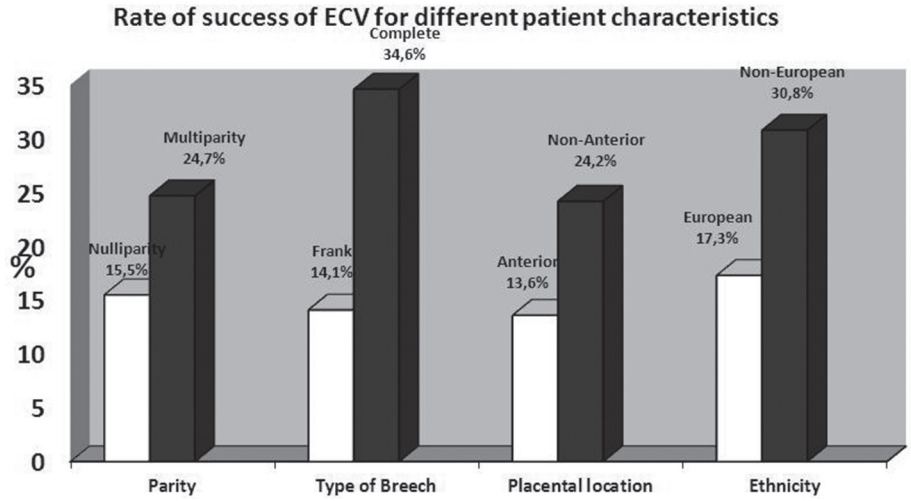

Fig. 2. — Although only type of breech turned is significantly associated with the success rate of ECV, the chart shows how success rates are different for changing patient characteristics.

patients for the ECV. Also the timing of counselling could be reconsidered. Patients might be more susceptible for choosing ECV if counselled earlier in pregnancy before having heard stories from several non-professionals.

Analysing our disappointing small SR of ECV, we focussed on associated aspects. Kok et al. described, after analyzing 310 women, a statistically significant advantage for multiparous women with an OR of 2.85, 95% CI 1.74-4.67 (Kok et al., 2011). In our population, a 10% higher SR in multiparous women, compared to nulliparae was found. This was a non-significant correlation [OR 1.782, p = 0.122 95% CI 0.857-3.705].

Caucasian women were less likely to have a successful ECV [OR0.470, p = 0.111 CI 95% 0.186-1.188]. We hypothesized that this was because of a statistically significant higher incidence of multiparity in the non-Caucasian group. However after adjustment for parity, we still found a difference

Table 1. — Baseline characteristics of patients in the ECV group compared to patients in the non-ECV group.

Characteristics	Value* all patients	Value* patients with ECV	Value* patients without ECV	P-value
BMI	24.67 (± 5.09)	24.58 (± 5.07)	24.85 (± 5.13)	N.S.
Age	31.4 (± 4.84)	31.2 (± 5.00)	31.5 (± 4.72)	N.S.
Parity				N.S.
Nullipara	259 (63%)	116 (61.4%)	143 (63.7%)	N.S.
Multipara	155 (37%)	73 (38.6%	82 (36.3%)	
Placental localisation				N.S.
Anterior	178 (43.0%)	88(46.6%)	90 (40.0%)	
Posterior	215 (51.9%)	99(52.3%)	116(51.6%)	
Other	21 (5.1%)	2 (1.1%)	19 (8.4%)	
Ethnicity				N.S.
Caucasian	370 (89.3%)	162 (85.7%)	208 (92.4%)	
other	44 (10.7%)	27 (14.3%)	17 (7.6%)	
History of breech presentation				p < 0.01
Yes	36 (8.7%)	7 (3.7%)	29 (12.8%)	
No	378 (91.3%)	182 (96.3%)	196 (87.1%)	
Type of Breech				N.S.
Frank	315 (81%)	142 (78.9%)	173 (82.8%)	
Complete	50 (12.9%)	26 (14.4%)	24 (11.5%)	
Other	24 (6.2%)	12 (6.7%)	12 (5.7%)	

*Values are given as mean ± SD or number (percentage).

between the two groups. This could possibly be explained by a different pattern of engagement in women of African descent (Kuppens et al., 2010).

Lack of experience with performing ECV's is in our opinion an important factor explaining the low SR. The past ten years, ECV's were performed by 7 gynaecologists, which makes the total amount of performed ECV's very low. The number of ECV's performed each year vary from 1-30 for the different gynaecologists. Therefore we reduced the gynaecologists performing the ECV's to 1-2 gynaecologists. Besides, despite the technical procedure being comparable to the technique used in other clinics, we suggested that inter- and intra-individual feedback may also improve the success rates.

The importance of experience of the performing gynaecologist and the setting of the ECV is described in literature as well. Kuppens et al. (2010) found a significant improvement of success rates (61% vs. 47%) after implementing four procedural or circumstantial factors concerning the ECV: 1. routine (only performed by 2 experienced obstetricians), 2. regularity (one fixed morning in the week for ECV's), 3. rest (the obstetrician was free from other tasks) and 4. relaxation (use of tocolytic). Reconsidering our setting may improve results easily, while in our setting ECV is not centralized to 2-3 obstetricians only and ECV is often performed in between by the gynaecologist on call. Introducing a fixed consultation for ECV's with only a few selected obstetricians performing the ECV might result in an improvement of our SR.

In our study no significant difference was found for placental location. However, several publications show significantly better results for women with a non-anterior placenta (Kok et al., 2009, 2011; Burgos et al., 2011). For example, Burgos et al found a significant advantage for women with a posterior placental location. Women with a posterior placental location had an increased success rate of 2.85 times compared with an anterior placenta (95% CI 1.87-4.36) (Burgos et al., 2011). A meta-analysis by Kok et al. found comparable results. Chances of success were significantly lower in women with an anterior placenta with an OR of 0.6 (95%CI 0.5-0.8) (Kok et al., 2009). We found a difference in success rate for women with an anterior placenta if compared to a non-anterior placenta (13.6% vs. 24.2%), however this was not statistically significant (OR 0.493, $p = 0.070$ 95% CI 0.230-1.058). We hypothesize that -taking the results described in literature into account- our results could possibly be biased by the retrospective study design. Also the fact that we considered non-anterior placenta location as one group and compared it to anterior location instead of comparing posterior and anterior placenta location could have influenced the results.

Finally, the use of tocolytics may be an important factor associated with SR, though the benefit is controversial until now (Kok et al., 2009; Impey et al., 2005; Burgos et al., 2010; Nor Azlin et al., 2005). Our protocol prescribed the use of tocolytics in nulliparous women only. However, recent studies showed increasing evidence for the benefit of routine administration of betamimetics in both nulliparous and multiparous women (Burgos et al., 2010; Nor Azlin et al., 2005). Burgos et al. (2010) found that Ritodrine® improved the success rate of ECV for both nulliparous and multiparous women. Recently, a Cochrane review of Cluver et al. (2012) described a statistically significant increase in cephalic presentation at labour and birth and a significant reduction in caesarean sections if both nulliparous and multiparous women were administered tocolytic drugs preceding an ECV (RR 1.38, 95% CI 1.03-1.85). We introduced the administration of betamimetic drugs as a standard treatment for nulliparous as well as multiparous women preceding the ECV after finishing this study. The use of tocolytics only in nulliparous women during our study period could be an important factor explaining the lack of statistical difference between nulliparous and multiparous women in terms of SR of ECV.

It will take some time to implement the new procedures and monitor the progression of the success rate. Further research is needed to identify other factors associated, possibly focussing more on circumstantial factors and the adequate selection of patients.

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