

Perinatal Outcomes After Undergoing External Cephalic Version

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Abstract: The external cephalic version (ECV) represents the standard for pregnancies at term with a non-cephalic presentation as it avoids planned caesareans. The aim of this study was to assess the caesarean rate and prognostic factors at birth after undergoing ECV, which was compared with scheduled caesareans for a non-cephalic presentation (SCG) and spontaneous cephalic presentations at birth (GG). No difference was observed between the caesarean rate of the ECV (n=65) and the GG (n=3711) groups (9.84% and 14.47%, respectively, p-value=0.30), and neither was found between the ECV group and both the GG and SCG (n=76) groups in the Apgar scores and postpartum pH, but for the five-minute Apgar score (9.98 and 9.84 in the ECV and SCG groups, respectively, p-value=0.04). This study provides further evidence for clinical practice regarding good perinatal outcomes after undergoing ECV. Further research is required to consistently prove the increase in the intrapartum caesarean rate after ECV that has been previously described in the literature, which has not been found in the present study.

Keywords: External Cephalic Version, Breech Presentation, Caesarean Rate, Perinatal Outcomes, Apgar Score, Postpartum Ph.

INTRODUCTION

External cephalic version (ECV) is the procedure consisting of manual manipulation of the pregnant abdomen so as to rotate the foetus from a non-cephalic to a cephalic presentation. It is highly recommended by professional societies like the American College of Obstetricians and Gynaecologists (ACOG) and the Royal College of Obstetricians and Gynaecologists (RCOG) (Impey et al., 2017a, ACOG 2020).

Even though other alternatives like scheduled caesarean delivery exist, in the absence of specific contraindications, ECV is the evidence-based choice for non-cephalic presentations in near term pregnant women in order to achieve a vaginal delivery, thus reducing the caesarean rate (Chan LY et al., 2004).

As any other intervention, it is not free of risk. A complication rate of up to 6.1% of the cases has been described in meta-analysis, not being related with the foetal presentation after the procedure, and at the expense of transient foetal bradycardia, premature rupture of membranes, vaginal bleeding and, only in 0.23% of the cases, placental abruption or even foetal death (Grootscholten K et al., 2008).

The aim of this study was to evaluate the differences in both the caesarean rate and prognostic factors at birth (postpartum pH, Apgar score) after undergoing ECV, in comparison with scheduled caesareans due to non-cephalic presentations and spontaneous cephalic presentations at birth.

MATERIAL AND METHODS

Participants

A retrospective cohort study with three independent cohorts was conducted. A total of 65 pregnant women

who had successfully undergone external cephalic version in the University Hospital Reina Sofía in Córdoba (Spain) (UHRS) between 2007 and 2013 were included in the ECV group. The general group (GG) comprised 3711 pregnant women with a cephalic presentation at term and whose deliveries were attended at the UHRS in 2012. Twin deliveries were excluded. The scheduled C-section group (SCG) included 76 women who underwent a scheduled caesarean section in UHRS in 2012 due to a non-cephalic foetal presentation.

These groups were selected in order to compare the variables under study.

This study was approved by the Ethics Committee of the Hospital and the needed data was collected from clinical reports.

ECV Procedure

Along the 37th week, pregnant women with a non-cephalic presentation and in the absence of exclusion criterion (Table 1) were accurately informed about the risks and benefits of the recommended option: ECV. A copy of the informed consent of both the planned caesarean delivery and the ECV were provided. If the patient chose to undergo an ECV, an appointment was made within one week. On the scheduled day, the patient needed to have fasted for 8 hours before the procedure. Before starting it, foetal well-being was checked performing a foetal biophysical profile, using both ultrasonography and a 20-minute non-stress test. Afterwards, peripheral venous and bladder catheterization was performed. Tocolysis was administered using ritodrine at a rate of 200 picograms/min. To carry out the ECV, a midwife, a nursing assistant and two gynaecologists were involved.

The patient was placed in the Semi-Fowler's or light Trendelenburg position. The Forward Roll was the first needed manoeuvre, being the Back Flip one only

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Table 1: Exclusion criterion for ECV.

Preterm labour (< 37 weeks)
Non-reassuring biophysical profile before delivery
More than one previous caesarean section
Presence of at least one criterion for a scheduled caesarean section (placental abruption, low-lying placenta)
Rejected procedure by the patient
Oligohydramnios (Amniotic Fluid Index < 5)
Severe foetal malformation
Multiple gestation
RhD alloimmunisation
Haematological pathology (e.g., coagulation disorders or treatments)
Uterine malformations

occasionally performed. The total duration of the procedure rarely exceeded 10 minutes. A nearby fully equipped room for unexpected complications was ready. Foetal well-being was checked again once the procedure had ended. Finally, anti-D immunoglobulin was administered to RhD negative patients. The patient, from then onwards, was subjected to a normal gestational follow-up.

Approximately 80% of the patients showed high satisfaction with the procedure and its average pain subjective score was 3.38 out of 10.

Statistical Analysis

Quantitative variables were described with means and qualitative variables as frequencies. Differences on pH, Apgar scores and caesarean rates between groups were analysed with independent Student's t-tests. The level of statistical significance was set at $p < 0.05$. All statistical analysis were carried out with the software G-STAT version 2.0 (Department of Biometry, GlaxoSmithKline S.A., Madrid, Spain).

RESULTS

Demographic Characteristics

As it is shown in Table 2, the gestational age ranges from 39 to 40 weeks of pregnancy, being closer to 40 weeks in the ECV group and to 39 in the SCG group, what could be explained by the planification of the majority of caesarean sections in the latter. Birth weight is higher in the group with more gestational weeks, and vice versa, even though statistical analysis has not been applied to sociodemographic variables so as to

conclude on the statistical significance of the differences.

Differences in Caesarean Rates Between ECV and GG Groups

No difference was observed between the caesarean rate of the ECV and GG groups (9.84% and 14.47%, respectively, p -value=0.30, data not presented).

It is to be noted that in one out of the 65 patients who underwent an ECV, an urgent caesarean was needed while performing the procedure. She was a 38-week pregnant nulliparous woman who presented with sustained foetal bradycardia (confirmed by ultrasound scan) after having started the manoeuvres to achieve the external version. The manoeuvres were ceased and since intrauterine resuscitation did not work, an urgent caesarean delivery was performed for non-reassuring foetal status. A partial placental abruption was observed during the delivery. A male, weighing 3270 grams, was born with a 7.17 pH and scoring 8 and 9 in the one-minute and five-minute Apgar score, respectively. The neonate did not require admission in the neonatal unit (data not presented).

Differences in Prognostic Factors at Birth (pH and Apgar Score)

As detailed in Table 2, no differences were found between the ECV group and both the GG and SGG groups in the prognostic factors at birth (pH and Apgar score), but for the Apgar score at 5 minutes in the ECV and SCG groups (9.98 and 9.84, respectively, p -value 0.04). None of the postpartum pH results was indicative of foetal acidosis and all the Apgar scores were within their normal range.

Table 2: Sociodemographic variables.

	ECV (N=65)	GG (N=3711)	SCG (N=76)	p-value ^{1 2}
Gestational age (weeks)	39.93	39.51	39.23	
Birth weight (g)	3379.74	3326.63	3226.12	
PH	7.29	7.28	7.30	p=0.28; p=0.43
1 min. APGAR	8.93	8.81	8.77	p=0.17; p=0.11
5 min. APGAR	9.98	9.88	9.84	p=0.13; p=0.04

1 p-value for Student's T-test comparing ECV group with GG group.

2 p-value for Student's T-test comparing ECV group with SCG group.

DISCUSSION

The caesarean delivery rate is a quality indicator in Obstetrics. The World Health Organization (WHO) recommends it to be within 10-15% since 1985, which constitutes a difficult goal to achieve particularly for those tertiary hospitals addressing high complexity pathology (WHO 2015). An abnormal presentation occurs in approximately 3-4% of at term pregnancies, thus representing 15% of all the caesarean indications (ACOG 2020). Even though success rates of ECV vary, approximately 50% of all women following an ECV attempt have a cephalic presentation at birth (Beuckens et al., 2016). Consistent evidence exists regarding the significant increase in cephalic presentation at birth and consequent decrease in the caesarean rate in those pregnancies undergoing ECV for a non-cephalic presentation at term (Hofmeyr et al., 2015), in contrast with options that have been associated with a lack of evidence (e.g. moxibustion) (Coyle et al., 2012) or increased neonatal morbidity and mortality (e.g. breech vaginal birth) (Hannah et al., 2000). For this reason, in addition to its well-proven safety, ECV should be offered to all women in this scenario (Impey et al., 2017b).

The main finding of the present study was consistent with the literature, which stated that deliveries after ECV do not present with a worsening in neonatal outcomes (herein measured by means of the Apgar score and postpartum pH). In this way, all Apgar scores were normal and none of the umbilical cord pH was indicative of foetal acidosis.

The absence of increase in the perinatal morbidity and mortality in pregnancies that have undergone ECV was concluded in a Cochrane review (Hofmeyr et al., 2015), in which no differences were reported as for Apgar score, umbilical vein pH and neonatal deaths in this collective. It has been posteriorly ratified by multiple studies carried out in tertiary hospitals (2006-2016 follow-up and 509 successful ECV in Chicago (Son et al., 2018), 2007-2017 follow-up and 55 successful ECV in France (Chevreau et al., 2020), 2002-2018 follow-up and 321 successful ECV in Portugal (Correia Costa et al., 2021)) which compared perinatal results from both spontaneous and after ECV cephalic presentations, and

no significant intergroup differences in terms of Apgar score or umbilical cord pH were found. Regarding the difference in the five-minute Apgar score that has been detected in the present study between the ECV and SCG groups, it is to be noted that no clinical relevance has to be given to it as both means are above 9 and, thus, reflective of a good Apgar score and, consequently, perinatal outcome. In this way, the Apgar score is a convenient shorthand tool for reporting the status of a newborn infant, but numeric differences within a certain category of results do not predict specific neurologic outcomes in pregnancies at term (that is, good Apgar scores, which range from 7 to 10, mean the newborn is in good health) (Stark et al., 2006).

As for the caesarean rate after undergoing ECV in pregnancies at term with a non-cephalic presentation, its reduction by means of correcting the foetal malpresentation in comparison with those pregnancies on which ECV has not been attempted has been widely proved and, for this reason, it has not constituted an objective of the present study (ACOG, 2020). Likewise, one of its aims has been to analyse whether these pregnancies have an increased risk of requiring a caesarean while in the delivery process. To our knowledge, divergent results have been found on this matter. In a systematic review and meta-analysis carried out by Hundt et al. in 2014 (de Hundt et al., 2014), which included three cohort and eight case-control studies (46641 women in total), concluded that labours after successful ECV are at increased risk for caesarean delivery due to both dystocia and foetal distress with and odds ratio of 2.2 (95% CI 1.7-2.8), as compared with women with a spontaneous cephalic presentation. Remarkably, a retrospective observational study carried out by Chevreau et al. (2020) in a tertiary hospital in France from 2007 until 2017 concludes that a successful ECV does not seem to guaranty an identical labour progress and obstetrical outcome as spontaneous cephalic presentations. In particular, its results show a bigger proportion of induced labour, occiput-posterior variety at birth (which is associated with an increased risk of emergency caesarean in comparison with other foetal positions (Tempest et al., 2020)) and intrapartum caesarean section, results that were also reported in a

case-control study conducted in Britain between 2004 and 2006 which included 93 women having undergone a successful ECV (Jain et al., 2010). Nevertheless, mixed results exist as other trials with more limited sample sizes have reported no significant differences in the rate of caesarean births in these subjects. Specifically, no differences have been found in the present study. However, the results reported herein should be considered in the light of some limitations. The authors postulate this might be due to the very limited sample size of the ECV group (n=65) in comparison with that of the GG group (n=3711), what makes it more difficult to find statistically significant differences between both groups. Additionally, the GG group was made up of general pregnant population with a cephalic presentation at birth without having undergone an ECV. Consequently, it was a naturally heterogeneous group where there might coexist pregnancies with an elective caesarean indication rather than foetal malpresentation with others without a contraindication for vaginal delivery. Such heterogeneity, in the presence of a hypothetical increased caesarean rate in the ECV group due to emergency and blocked labour indications, could further account for these particular results of non-observable differences. We suggest further studies with a proper design being conducted in this field to corroborate the increase in the caesarean rate that was described in previous studies. In this way, some authors have recommended to consider pregnancies which have undergone an ECV of "high risk" as, wouldn't they only increase the risk of a caesarean in the current pregnancy, but also in a potentially future one (more risk of uterine rupture, planned caesarean deliveries and incidence of abnormally invasive placenta) (Impey et al., 2017a).

As for complications of the ECV at term, one out of 65 subjects in the ECV group had to undergo an emergency caesarean with good perinatal outcomes. This finding is in accordance with the literature, provided even not enough evidence from randomized trials exists to assess complications of the procedure, large observational studies suggest they are rare (Hofmeyr et al., 2015, Beuckens et al., 2016).

To conclude, no differences have been found in terms of perinatal morbidity and mortality between deliveries after undergoing ECV, those with a planned caesarean due to foetal malpresentation and pregnancies with a spontaneous cephalic presentation, which is in accordance with the rest of the literature and reflects perinatal outcomes are not affected by those conditions provided an appropriate management of the delivery process exists. Nonetheless, and despite such results have not been found in the present study, the likely potential increase in the caesarean rate in pregnancies after successful ECV in comparison to those with a spontaneous cephalic presentation, could account for more maternal morbidity and a higher caesarean rate in future pregnancies.

The ECV in pregnancies at term with a non-cephalic presentation represents a low-risk and effective procedure that decreases the caesarean rate when compared to the alternative of performing a planned caesarean delivery. For this reason, it represents the current evidence-based recommendation for these situations. This study provides further evidence that prognostic factors at birth (pH, Apgar scores) do not seem to differ according to the route of delivery, thus implying it does not influence the perinatal outcomes. Nevertheless, and contrarily to what has been found in this study, several studies suggest pregnancies which have undergone a successful ECV are at a greater risk of needing a caesarean. Other studies with an appropriate design should be carried out to further consolidate these findings.

Disclosure of Interest

The authors report no conflict of interest.

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