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## The External Version in Modern Obstetrics

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### 1. Introduction

The incidence of breech presentation is 3-4% (Enkin et al 1995). It is still debated what is the best performance. In particular, both the role of the external cephalic version and the birth type have been extensively debated.

In contrast to cephalic presentations, breech presentations has a higher mortality and morbidity due to the associated incidence of prematurity, congenital malformations or intra-partum asphyxia. Thus, many efforts have been made in order to establish the best performance regarding the birth type: either vaginal delivery (in those women selected after evaluating different fetal and pelvic parameters) or the elective caesarian. On the other hand, the external version can be also considered. (American College Obstetricians and gynecologist [ACOG], 2001). It aims to avoid the vaginal delivery or caesarian complications by turning a breech presentation into a cephalic presentation.

Breech presentation is an independent factor associated with higher morbidity (Royal College of Obstetricians and Gynaecologists [RCOG], 2006). In fact, a high prevalence rate in children disabilities after breech presentation (16%) has been registered both in vaginal and caesarean delivery (Danielian et al, 1996).

Traditionally, there has always been a general agreement on the preference of caesarian delivery instead of a elective vaginal delivery in case of breech babies in the following circumstances: feet first, large fetus, intrapartum risk of loss of fetal well-being, congenital malformations (meaning a mechanical problem for a vaginal delivery) or in case of inexperienced obstetricians.

Some obstetricians advocate caesarean intervention in order to reduce the perinatal risks associated with breech presentation. Unfortunately this is based on their personal experience, medical legal aspects and non-randomized studies. Nevertheless, other obstetricians still advocate for vaginal delivery in selected cases, as it may reduce the maternal morbidity and the use of medical resources. In 2000, the results of a multicentric and randomized clinical study conducted by *Hannah* et al. in collaboration with *The Term Breech Trial* were published in *The Lancet* (Hannah et al, 2000). In this study, the caesarean delivery was highly recommended in breech babies at term. The Cochrane database also published a meta-analysis including *Hannah's* project (Hofmeyr



et Hannah, 2003). This analysis concluded that the elective caesarean reduces both the perinatal and neonatal morbidity and mortality at the expense of a moderate increase in maternal morbidity.

This study led to a worldwide change in medical practice. Several national recommended the caesarean delivery in term breech babies. In fact, in many American and European countries, this performance has become the only one to be considered.

In view of this opinion about avoiding the vaginal delivery in breech babies by using the caesarian delivery, there has been a growing interest in retaking the external version performances in order to reduce the caesarian delivery frequency.

Definitely, the external version has become more and more relevant as well as a controversial and a topical issue since this is a valid option against the elective caesarian. It has been shown that its use significantly reduces the vaginal delivery frequency as well as the caesarian delivery frequency in breech presentation in full term pregnancies. In spite of this fact, the external version is still not implemented in many countries.

This review article aims to discuss the complications in breech babies and the use of external version as an alternative (regarding the process itself, the conditions and the right moment to perform it, its contraindications, its adverse effects, etc.).

## 2. Material and methods

Articles have been searched in *Medline* and *Pubmed* database as well as in the *Cochrane Database of Systematic Reviews*. The search has been limited to those studies in human beings and articles in English or Spanish developed between 1995 and 2007. Current clinical practice guidelines (from the -American, British, Canadian and Spanish national associations of obstetricians and gynecologists on external version and breech presentation have also been reviewed. Key words: Breech, cephalic version, external version, adverse event "and" cephalic version.

## 3. Breech presentation

Breech presentation is defined as a fetus in a longitudinal lie with the buttocks or feet closest to the cervix and the head closest to the fundus of the uterus. There are three types of breeches.

The incidence of breech presentation in neonates before the 28<sup>th</sup> gestation-week is 20%. This percentage decreases to 3-4% with advancing gestational age. These data show that most babies turn around during the third trimester of pregnancy. Under normal circumstances, as the shape of the uterus changes, the fetus turns simultaneously to headfirst position between the 28<sup>th</sup> and the 32<sup>nd</sup> week of pregnancy. As of this moment, the uterus will expand more vertically than transversely. This situation facilitates the previous fetal position. Although the simultaneous turn is more common during the weeks of pregnancy mentioned above, this turn is also possible at delivery. However, this is more common in multiparous women rather than in primiparous women. Thus, it seems that the fetus plays an active role at adopting the best position in the uterus.



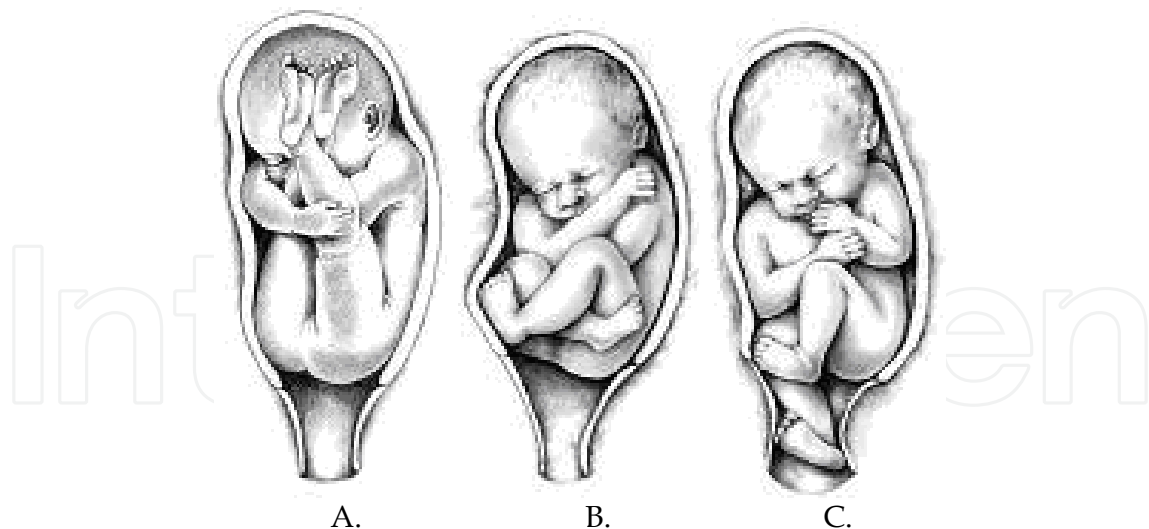


Fig. 1. A. Frank breech (65-70%) The baby's legs are flexed at the hip, his or her knees are extended and feet next to the head. This is the most common type in pregnancies at term. B. Complete breech (5%) In this case, the baby's hips and knees are flexed. The fetus positions is the same as in the vertex presentation but, in this case, the polarity is reversed. C. Incomplete breech (~30%) The baby has one or both knees flexed so that baby's legs (not his or her bottom) are poised to deliver first. This type is common in preterm deliveries.

From the etiologic point of view, the breech presentation could be caused by situations avoiding or hampering the spontaneous cephalic version.

- Fetal factors: Prematurity, low weight, multiple pregnancy, structural anomalies, chromosomopathies, reduced fetal mobility.
- Maternal factors: Primiparous women, uterine malformations that change the uterus normal morphology, previous tumour, pelvic stenosis.
- Ovular factors: Anomalies of placental insertion (placenta previa), short umbilical cord and the changes in the amniotic fluid volume (both oligohydramnios and polyhydramnios).

The incidence of breech presentation is closely related to the gestational age. In the case of single-gestation pregnancies, the preterm delivery is probably the aspect that contributes the most to a breech presentation at delivery. Before the 28th week, the incidence is almost 10 times higher than at term, and almost 12% of preterm deliveries show breech presentation. However, 50%-80% of the cases do not show any etiologic factor responsible for the breech presentation (Sociedad Española de Ginecología y Obstetricia [SEGO], 2001).

#### 4. The term breech trial: Clinical practice implications

The article: "Elective caesarean vs. vaginal delivery with breech presentation at term: The International Term Breech Trial", was a randomized trial published by Hannah et al. in The Lancet magazine in 2000. The conclusions of the study were immediately adopted by the medical society, leading to a great change in obstetric practice.

The purpose of the study was to create a clinical guideline based on the evidence regarding the best performance to follow with respect to breech presentation. The study was carried



out in 121 centres of 26 different countries. It included a total of 2008 pregnant women at term with breech babies. Those women were randomly given the date of the planned caesarean or the planned vaginal delivery. After a three-month monitoring, it was performed a two-year monitoring.

There was a reduction in the neonatal mortality and morbidity in the elective caesarean delivery group when compared with the elective vaginal delivery group, without any significant increase of maternal morbidity or mortality. Furthermore, it was found that the adverse perinatal outcomes were less common when the caesarean had been planned before delivery, while they increased if the caesarean was performed intrapartum.

The subgroup analysis failed to demonstrate any independent association with deliveries performed after long delivery labor, those oxytocin or prostaglandin induced, those cases of incomplete breech presentation, those with unknown breech presentation and those breech presentation deliveries performed by inexperienced obstetricians.

Another subgroup analysis was carried out according to the national perinatal mortality rate (low versus high). In this case, the results showed some changes, obtaining a higher reduction of perinatal mortality in countries with lower national perinatal mortality rate than in those with higher mortality rates. Therefore, the benefits of the at term caesarean will be higher in countries with lower perinatal mortality rates, as it is the case of Spain. One reason for this difference could be that, in these countries, women were discharged at an early stage after the vaginal delivery. Therefore, the collection of neonatal complications has been less complete than the records concerning caesarean-born babies, as they need to stay longer in the hospital.

All subgroups analysis, except the already mentioned one, showed similar risk reductions when using an elective caesarean delivery, compared with the planned vaginal deliveries of the main study (Hannah et al, 2002).

Concerning maternal morbidity, the urinary incontinence occurring three months after delivery was lower in the planned caesarean group. Abdominal pain was more common in the planned caesarean group, while perineal pain was more common in the planned vaginal delivery. There were not statistically significant differences in low back pain, faecal incontinence, postpartum depression, maternal dissatisfaction with the method of care, breastfeeding, bonding with the newborn, bonding with the woman's partner or dyspareunia. However, neither the morbidity associated to uterine scars in subsequent pregnancies nor the ability to carry out everyday activities were evaluated.

As it has been mentioned, the results of the analysis of Hannah's three month after delivery study yield an significant impact for obstetrician practice and were adopted almost immediately by the medical societies. The Cochrane database also published a meta-analysis including *Hannah's* project. This analysis concluded that the planned caesarean reduces both the perinatal and neonatal morbidity and mortality at the expense of a moderate increase in maternal morbidity. These conclusions were included in the national associations of obstetrics and gynaecology's clinical guidelines and protocols. Some of these societies are the Royal College of Obstetricians and Gynaecologists (RCOG), the Society of Obstetricians and Gynaecologists of Canada (SOGC) or the American College of Obstetricians and Gynaecologists (ACOG). Obviously, the Spanish Society of Obstetrics and Gynaecology



(SEGO, as per its Spanish initials) also included these conclusions and recommended in its breech presentation protocol the fact of informing the patient about the results from previous studies. This recommendation has caused an increase in breech presentation caesarians in pregnancies at term. Thus, a study published in 2003 and carried out in 80 centres and 23 countries stated that 92% of the centers studies had opted for the caesarean delivery in breech presentation instead of the vaginal delivery (Hogle et al, 2003).

The two year monitoring of this same project (published in 2004) did not show any difference between the groups concerning the following aspects: Breast feeding, bonding with the newborn or her partner; subsequent pregnancy; incontinence; depression; urinary, menstrual or sexual problems; fatigue; or distressing memories of the birth experience. The planned caesarean was related to a higher risk of constipation. It is remarkable the fact that the mothers from the planned caesarean group showed less concern about their babies' health than the ones from the planned vaginal delivery group (Hannah et al, 2004).

After two years, there were not any differences in the perinatal results between the elective caesarean and the elective vaginal delivery, regarding the risk of death or the developmental delay in two years old children. In other words, the lower number of neonatal deaths observed in the project after three months was compensated with a higher number of developmental delay in the elective caesarean delivery group (RCOG, 2006). This was a very surprising result, because three months after the project, performing a planned caesarean delivery proved a reduction both of risk of perinatal death and of severe neonatal morbidity. In conclusion, the planned caesarean delivery is not related to a risk of death reduction or to a developmental delay in two year old children, although this reduction is observed until six months after birth (whyte et al, 2003). Therefore, this new analysis two years after delivery revealed that the initial conclusion could not be maintained, as there were not any significant differences in neonatal morbidity and mortality between both groups. These new conclusions generated debated regarding the recommendations of The Term Breech Trial as the authors continued to reiterate the conclusions from the initial analysis in following papers despite the results obtained after the second year. Projects criticising the methodological reliability and setting out possible biases in Hannah's project. Even though, both the Cochrane and the different national obstetrics and gynaecology societies that adopted the initial results in its recommendations, have not gone into the question again since then. This is not surprising, as the breech presentation delivery is related to many risks from a medico-legal point of view, which makes the caesarean delivery option seem a more convenient option and with lower medico legal risk. Thus, for many obstetricians, Term Breech Trial has become an ideal excuse to adopt a type of delivery they already preferred over the other one.

All the aforementioned has resulted in a large increase of the caesarean delivery rates over the last few years. For instance, in the United Kingdom, caesarean delivery represented 2% of births in 1953, 18% in 1997 and 21% in 2001. In Norway, the rates has gone from 12,8% in 1999 to 13,0% in 2000 and 14% in 2001. The highest increase took place in the last few months of 2000, concurring with the publication of the Term Breech Trial. In the Netherlands, the caesarean delivery rate with breech presentation went from 50% to 80% in less than two months since the release of the Term Breech Trial (Rietberg et al, 2005).



This phenomenon must be analyzed, as we cannot obviate the non-negligible maternal risk related to caesarean, in spite of having notably decreased in the last few decades, thanks to the improvement of the surgical technique, the anesthesia, the infection control, thromboembolic prophylaxis, etc.

The caesarian is the most indendently associated factor with postpartum maternal mortality and morbidity (Minkoff et al, 2003). The mortality rate associated to elective caesarean almost tripled the vaginal delivery (Hall & Bewley, 1999). It is estimated that caesarean (both elective and urgent) quadruple the severe morbidity risks in comparison with vaginal delivery (Waterstone et al, 2001). Caesarean also increases the number of hospital readmissions. During 1995 and 1998, the Canadian hospital readmission rate during the three months after birth (attributable to complications following their birth) was 3,9% for caesarean delivery while for vaginal delivery was 2,6% (Health Canada, 2000). An American research also revealed higher hospitalization rates after a caesarean, with 1,8 relative risk compared with the vaginal delivery (Lydon-Rochelle, 2000).

Apart from this increase in postpartum morbidity after caesarean, there are also long-term risks and complications. The presence of uterine scars increases the risk of complications in subsequent pregnancies, such as ectopic pregnancy, placenta praevia, placenta accreta, premature placenta detachment and uterine rupture. It has been estimated that every caesarean performed to save a child will produce a uterine rupture in the subsequent pregnancy (Hodnett et al, 2005). In a project carried out in the Netherlands, it was calculated that the increase of 8.500 planned caesarean deliveries, which took place within four years of the Term Breech Trial would have avoided 19 perinatal deaths. However, it caused four avoidable maternal deaths. In subsequent pregnancies, it could cause 9 perinatal deaths caused by uterine rupture and 140 women could suffer complications related to the uterine scar (Palencia et al, 2006). The risk of intra-abdominal adhesions, endometriosis on implantation and adenomyosis. Caesareans have also been associated to emotional problems such as postpartum depression and distressing memories of the birth experience, as well as restrictions in everyday activities, and breastfeeding problems. However, it is not the case among those women electing the caesarian delivery. It has also been suggested that neonatal risks increase in caesarean delivery. Some of these risks are the following: increase in admissions to neonatal units (and mother-infant separations postbirth), iatrogenic prematurity, increase in neonatal respiratory problems and fetal deaths in the subsequent pregnancy.

In view of this situation, it is obvious the adequacy of the external version in pregnant women at term with breech presentation. This is the only performance able to turn a breech presentation into a cephalic presentation. Thus, the inherent risk of breech presentation delivery (both in vaginal or caesarean delivery) seems to disappear. A review of the strategies followed to reduce the caesarean risks identified the external cephalic version (ECV) as the only clinical performance gathering evidence (evidence level I) for the total reduction of primary caesarean rates. A Cochrane's review stated that the ECV implementation at term ( $\geq 37$ th week) increases the probability of cephalic presentation at birth and reduces the necessity of a caesarean delivery. Thus, ECV should be recommended in the absence of contraindications for every woman with breech babies.



## 5. External cephalic version (ECV): Concept and history

The external cephalic version is an obstetrics performance aiming at turning a breech presentation into a cephalic one, more favourable to vaginal delivery. It can also be used to turn a transverse situation into a longitudinal (breech or cephalic) presentation. However, its current use is exclusively aimed at turning breech presentation into cephalic presentations.

This performance was widely used before 1970s, but it began to decline because it was considered an unsafe method. It has been performed from the time of Hippocrates (460-377 BC). Aristotle (384-322 BC) was the author of some texts describing that many doctors advised midwives to handle the baby's head so that it was presented at birth.

Over the last century, this performance gradually rose until the sixties, when it saw a boom caused by the increasing demand for a less medical intervention at birth. Before the seventies, the cephalic version was performed preterm because it was believed that this process could hardly be successful if it was performed at term. The external cephalic version was included in the daily obstetric practice due to the obvious and immediate effectiveness of the process as well as the results from non-randomized clinical projects. Its popularity began to decline in the mid-seventies due to the doubts raised about its effectiveness and safety. Reports about a considerable perinatal mortality associated to this performance were published (Bradley Watson, 1975) and the caesarian delivery was presented as the safest option against the external cephalic version or breech presentation. That is the reason why this practice was gradually abandoned until becoming an unusual performance. It must be considered that in those times there were neither ultrasound scans nor antenatal monitoring.

Subsequent projects proved that the external cephalic version in breech babies at term significantly reduced non cephalic presentation at birth as well as the rates of caesareans with no worse perinatal outcome. This situation, as well as the implantation of the Term Breech Trial's results made the external cephalic version be considered as the best option in order to avoid the caesarean in breech babies at term.

## 6. ECV impact on the reduction of caesarean deliveries and breech presentation at birth

The Cochrane, in a systematic review, assessed the external cephalic version at term effects. The results proved a clinically and statistically significant reduction of breech babies as well as of caesareans deliveries when the external cephalic version was used. No significant effects on perinatal mortality were observed. No significant differences in the incidence on Apgar score were observed (7 at the first minute or at the fifth minute, low umbilical artery PH level or perinatal death).

In fact, the Cochrane Foundation recommended offering the external version to every woman with normal pregnancies and breeching presentation at term (37<sup>th</sup>-42<sup>nd</sup> week) (level of recommendation A).

The cephalic version at term reduces the incidence of breech presentation (risk difference 52%, NNT 2) as well as the caesarean rate (risk difference 17%, NNT 6) at birth. In daily



clinical practice, most of breech babies are born by elective caesarean, without considering the vaginal delivery possibility. That is why the number of caesarians has a further increase in daily clinical practice that in the projects. This reduction in the number of caesareans continues in spite of the increase of intrapartum caesareans (which has been observed in cephalic babies after a successful version in comparison to babies with spontaneous cephalic presentation). Furthermore, this increase is regardless of a higher induction rate and it is caused by both maternal and fetal indications.

Grade of recommendation	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Table 1. Definitions of Grade of Recommendation.

With respect to the external cephalic version effect on the perinatal outcome, the Cochrane data base indicates that, even though no statistically significant differences on perinatal mortality were observed, there is not enough evidence to precisely evaluate the risks related to the process. More projects must be carried out to determine the adverse effects as well as on the external version practice at birth or on the foetuses in non-longitudinal situation.

7. ECV procedure

Before starting the version, the woman must be informed about the importance of keeping calm. She must also know that the procedure can be uncomfortable, although it is not painful. The external version cannot be performed without her consent or when the abdominal wall shows resistance. For this reason, the woman must be aware of the importance of her cooperation.

Before the performance, the abdomen is liberally coated with ultrasonic gel in order to decrease friction and lessen the chances of an over vigorous manipulation

First of all, the baby must be moved up and away from the pelvis in the right direction in order to increase the fetal flexion. If this manoeuvre is not successful, the next version trial must not be carried out. With both hands on the surface of the baby’s buttocks, they must be gently elevated. It can also be possible to try to move the baby’s head towards one of both sides, but this must never be done before the buttocks have been moved. Sometimes, you may need help to handle one of the fetal poles. The relaxation of the uterus, abdomen and legs and the Trendelenburg position will facilitate the maneuver.



Secondly, the baby's must be move by palpating the backbone. This can be achieved by using both hands simultaneously. While with one hand, the babies feet are moved upwards, with the other hand the baby's head must be moved to the opposite side and towards the pelvis. The rotation must continue until achieving the optimal vertex position (SEGO, 2001).

It must not be performed any sudden manoeuvres, but moderate and sustained pressure, trying that the fetus make the rest of the movement. Basically, the purpose is that the fetus itself finds a more comfortable position than the one that it has under pressure.

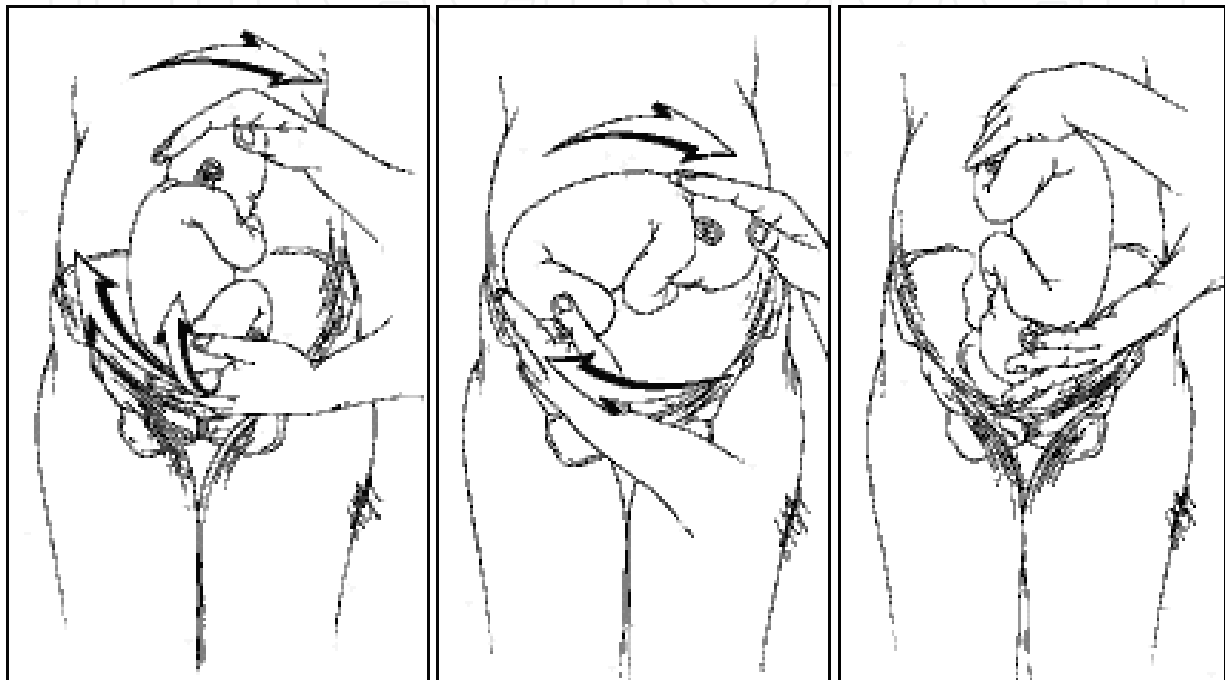


Fig. 2. Maneuvers to secure the cephalic presentation in fetuses with breech presentation.

During the maneuver the fetal presentation must be monitored with the ultrasound scan and the fetal cardiac frequency with continuous cardiotocography. Transitional fetal bradycardia commonly occurs. It is spontaneously solved in most of cases. However, the version must be stopped if it is sustained and still continues after relieving the pressure. It will also be stopped if it does not succeed after a short period of time or in case of severe pain. The benefit of performing the version without anesthesia is that the pain suffered is an indicator of the limit of pressure in the maneuver. Furthermore, the use of epidural analgesia has not proved neither a greater success in the maneuver, nor a reduction in subsequent caesarean rate (Hofmeyr, 2003). After the procedure, the tocolytics perfusion will be stopped and the success of the manoeuvre will be confirmed by ultrasound scanning.

Regardless of the success or the failure of the version, the fetal status must be evaluated again after performing the procedure. The fetus must be monitored for at least 45 minutes. If the cardiotocographic record is normal and there is no vaginal bleeding or pain, the patient can be discharged, although a 24 hour relative rest will be recommended.



If this technique does not succeed and the fetus returns to breech presentation, the version can be repeated after 5-7 days. It is estimated that 5-10% of the fetus return to the presentation previous to the version, as the cause that generated the abnormal presentation continues. This spontaneous reversion is more common in multiparous than in nulliparous mothers. However, there is no scientific evidence recommending the immediate labor induction in order to reduce the possibility of reversion (American College of Obstetricians and Gynecologist [ACOG], 2001).

Rh (-) patients will be given anti-D gamma globulin after the version, as it is estimated that the risk of fetomaternal hemorrhage is approximately 1%.

## 8. ECV: Prerequisites

The following prerequisites are necessary before performing an external version:

- Informed consent signed by the pregnant.
- Absence of contraindications.
- Previous checking of fetal wellbeing (reactive NST [Non Stressing Test]).
- Ultrasound scanning to reveal any contraindications in order to perform the method instead of a vaginal delivery. It will also be useful to know: the fetal estimated weight, the fetus presentation, position and situation, the amniotic fluid index, and the location of the placenta and of the umbilical cord. Using an ultrasound scan while performing the maneuver is very advantageous.
- Performance of the procedure near a operating theatre equipped for an emergency caesarean, in case of potential severe complications.
- The pregnant woman must be placed in the supine position, in semi-Fowler and with a light Trendelenburg in order to facilitate the buttocks move.
- Insertion of an intravenous (IV) to perfuse uterine relaxants (a ritodrine dose of 200 µg/min).

## 9. ECV: Contraindications

The Spanish, British and Canadian obstetrics and gynaecology association agree that there is not enough evidence to draw up a contraindication list. Nevertheless, they do take into account some situations that seem to be related to an increase in morbidity and mortality. Among them, the following can be considered:

- Fetal compromise or suspected fetal compromise (abnormal RGTC)
- Placenta praevia
- Abruptio placentae
- Vaginal bleeding in the previous seven days.
- Oligohydramnios
- Intrauterine fetal demise.
- Severe malformations.
- Rupture of membranes.
- Multiple gestation.
- RH isoimmunization.



- Severe uterine anomaly.
- Alterations of coagulation.
- Existence of some caesarean delivery indicators.

Determining which situations could be considered as relative contraindications is more difficult, but the following are some of them:

- Hypertensive disorders during pregnancy (preeclampsia with proteinuria).
- Delayed fetal growth with alteration in uteroplacental Doppler flow.
- Deflexed fetal head.
- Estimated weight >3800-4000 grams.
- Anterior placenta.
- Already initiated labour.
- Unstable fetal position.
- Regarding the previous caesarean, there are not any randomised projects yet, so there are not enough data to advise for or against performing it in this situation.

## 10. ECV: Predictors and success rate

The spontaneous version rate in nulliparous women, as of the 36th week, is 8%. However, if the version is not successful, this rate is only 5%. The probability of reversion after a successful version is only 5%.

Depending on the series, the external version success oscillates between 30-80%. This success also depends on the race, parity, uterine tone, amniotic fluid volume, cephalic engagement, possibility of palpation of cephalic pole and use of tocolytics. The highest success rates have been observed in multiparous nonwhite women with relaxed uterus, when the breech presentation is not fixed and the cephalic pole can be easily palpated (Lau et al, 1997). This would be the optimal condition in order to obtain a successful version.

Many authors have been looking for patterns aiming at predicting the cephalic version success or failure (Newman et al, 1993). Those factors considered as the most significant tones in a failed external version are the following: the cephalic pole palpation, the engagement presentation level and a tense uterus when palpated. When these factors are missing, the probability of a failed external version is only 6%. However, the failure probability increases over 80% if more than one of these three factors occurs. Thus, in a group composed of 243 pregnant women subject to an external cephalic version, the ECV was successful in 94% of the cases when none of these factors occurred, as well as in at least 20% of the cases if two of those factors occurred and 0% of the cases if the three factors took place.

Nevertheless, other factors considered as significant independent predictors in the past, as the placental location, the backbone position, the breech type, the maternal body mass index and the fetal weight seem to be less significant if the three factors mentioned above are controlled (they are not independent factors). However, it must be taken into account that the usefulness of these indicators is still awaiting confirmation by further research.



Even though some projects reveal that the higher amniotic fluid volume is, the more successful ECV can be. This statement has not been proved yet and it can also imply a higher number of spontaneous revisions.

Pregnant women should be informed that approximately 50% of those external versions performed by an experienced professional are successful, even though the results must be separately identified for each patient (level of recommendation B) (RCOG, 2006).

## 11. Making the ECV easier

The procedures that have proved their usefulness in randomized studies are only the tocolytics aiming at relaxing the uterus at the version.

In a 2005 *Cochrane's* review, tocolytics were related to a reduction of the failure risk in external cephalic version both with nulliparous and multiparous women, as well as to a reduction in the caesarean rate. In the "tocolytic groups" the achievement of the external cephalic version in a minute and the fetal bradycardia was less common. These results are valid for tocolytics such as ritodrine, salbutamol and terbutaline (both by an intravenous or subcutaneous injection). However, no evidence has been proved in order to use other tocolytics suggested in other projects (such as the intravenous nitroglycerin, sublingual glyceryl trinitrate or nifedipine). Thus, pregnant women should be warned about the tocolytics adverse effects (evidence level Ia and recommendation level A).

In the same revision it was concluded that despite the fact that many multiple studies have been carried out, there is not enough scientific evidence proving the use of epidural analgesia, vibroacoustic stimulation or amnioinfusion in order to facilitate the version.

A small prospective study published in 2010 concluded that the factors increasing the probability of success and reducing the rate of adverse effects in ECV are a single attempt at the maneuver, total duration of the maneuver of less than 5minutes, and use of salbutamol as a uterine relaxant (Delgado et al, 2010).

There were contradictory results regarding the outcomes using the epidural or spinal analgesia to facilitate the version maneuvers. Therefore, the use of regional analgesia in order to facilitate the external cephalic version cannot be recommended.

In the case of the acoustic stimulation of the fetus, there is a small project which proved a significant reduction in the external cephalic version failure rate in midline fetal spine positions. Nevertheless, as this project is small, the confirmation of the results by other projects is necessary before including this procedure into the clinical practice.

No randomized clinical studies on the amnioinfusion practices as a method to facilitate the external version were found.

## 12. ECV: The right moment for its performance

The external version should be performed as of the 37th week (at term). The reasons for this recommendation are the following: the fetus is mature and, in case any problem takes place, the labour can be induced easily. Moreover, the spontaneous cephalic versions without



trying the external cephalic version or the reversion after a successful external cephalic version are less common at term.

The *Cochrane's* meta-analysis on cephalic versions in fetus at term (at least 37 weeks) evidently prove that the possibility of breech presentation and the caesarean practice can be substantially reduced without significantly increasing the perinatal mortality. As a result, there are many reasons for the clinical use of the external cephalic version at term (with the suitable precautions) in any pregnant woman where the cephalic vaginal delivery probability overcomes the version risk.

However, another *Cochrane's* meta-analysis in pregnancies at term indicated that the early external cephalic version (from the 32<sup>nd</sup> to the 37<sup>th</sup> week) has not proved any significant effect on the position of the fetus at term (from the 38<sup>th</sup> to the 40<sup>th</sup> week) or on the caesareans incidence or perinatal results. In view of the absence of evidence on the effectiveness of the early external cephalic version and the existence of (observational) studies which relate it to higher risks, no procedure can be currently recommended.

Controlled and randomized studies have established that external cephalic version at term increases the probability of cephalic presentation at delivery and that, therefore, the necessity of a caesarian is reduced. However, the success rates are low (particularly in North America and Europe). The ECV studies at term carried out in Africa expressed high success rates. However, these results were not repeated in the studies from North America and Europe. It was suggested that this situation could be caused by the pelvic structure differences in white women, making the fetus prematurely engage and, thus, hampering the ECV.

In order to solve this problem and with the purpose of increasing the success rates, the University of Toronto carried out a pilot study to determinate if the ECV at preterm (at the 34<sup>th</sup> or 35<sup>th</sup> week) could be more effective than when started at term ( $\geq$  the 37<sup>th</sup>-38<sup>th</sup> week). This study was aimed at reducing the breech presentation rates at delivery if the procedure was previously performed. If the breech presentation rate was finally reduced, an wider study to consider the caesarean rates, fetal results and neonatal adverse results should be carried out. It was observed an significant reduction both in the cephalic presentation rates at delivery (9,5%) and in the caesareans (7%). However, these results were not relevant enough since the sample was very small. No differences in the neonatal results from both groups were shown. Apart from that, the reversion rate in breech presentation was low in both groups. Besides, most of women stated that they could consider the ECV in prospective pregnancies. That shows an increase of the acceptance level (Hutton et al, 2003).

These results show that the ECV at the 34<sup>th</sup>-35<sup>th</sup> week could be more effective than ECV at term. Taking into account that the caesarian rate decreased 9% (~10%) with ECV at the 34<sup>th</sup> week, 10 patients should be treated (NNT) in order to prevent 1 caesarian. This means that only 10 women would need a preterm ECV (instead of receiving a ECV at term) in order to avoid 1 caesarean. However, these results must be reconfirmed by a wider study. The fetal safety and the preterm version must also be verified before recommending a change in the clinical practice. The *Early External Cephalic Version 2 Trial*



project has been recently approved (in May, 2007). This project will indicate if early ECV is better than ECV at term in order to avoid the caesarean delivery (University of Toronto, 2007).

### 13. ECV: Adverse effects

The external version is a procedure that is not exempt from potential problems. Nonetheless, if it is properly performed, the risk of complications is low. The Cochrane's systematic review on the external cephalic version in babies at term concluded that the ECV reduced breech presentations and caesareans, without expressing statistically significant differences on perinatal mortality. However, there is not enough evidence to specifically assess the risks related to the procedure.

The available information from the isolated observational studies and classical obstetrics books describe many complications such as hemorrhage, rupture of membranes, umbilical cord around the fetal neck, placental abruption, start of labour, fetomaternal transfusion, uterine rupture and fetal demise. The most common complication among the described complications is the fetal bradycardia which, as it has already been said, is spontaneously solved in most of the cases when the manoeuvre is stopped. It seems to be due to a temporary fetal hypoxia caused by an increased pressure generated by the uteroplacental blood flow alteration during the version manoeuvres. After the version, the nonreactive CTGR (Cardiotocography Registry), which are temporary as well, are less common. If the bradycardia continues, a caesarean must be urgently performed. For all these reasons, it is recommended to perform the technique in an appropriate room for the immediate care of the aforementioned complications. However, given the low rate of described complications, specifically in comparison with the vaginal delivery, it is not necessary to perform a patient's presurgical preparation (previous absolute diet, premedication prior to general anesthesia or peripheral venous cannulation).

Some temporary Doppler alterations in the umbilical and middle cerebral arteries, as well as an increase in the amniotic fluid volume after the version have also been described. The reasons for these alterations are currently unknown. Studies about the possible ECV effects over the fetal blood circulation revealed a reduction in the pulsatility of the middle cerebral artery. However, there were not any modifications in the umbilical artery. Therefore, it does not seem to change the placental blood flow. Furthermore, the reduction in the rate of pulsatility of the middle cerebral artery was more common in multiparous, in posterior placenta or if the procedure was difficult. However, it was not related to the fact that the version was successful (Lau et al, 2000). A recently released article associates the changes in the pulsatility rate with the pressure on the uterine wall during the manoeuvre and also reveals variations in the middle cerebral artery in cases of posterior placenta, as well as in the umbilical artery when it is lateral (Leun et al, 2004). In any case, it seems to be a physiological response and it has never been related to a negative perinatal result.

Once the cephalic version has been completed, many complications have been proved at delivery, such as greater frequency of labor dystocia, risk of fetal suffering, caesarean caused by birth anomalies and induction failure. The reasons for these complications are unknown



and they are not clearly related to the version procedure itself. After having analyzed 169 successful versions in a project, it was observed a caesarean rate at delivery 2,25 times higher in comparison with the control group (fetus with spontaneous cephalic presentation). This increase was due to the higher fetal suffering rate and dystocias. It was also proved an increase in the instrumental vaginal birth (Lau et al, 1997). A higher risk of dystocia and fetal suffering in cephalic presentation after version may require a more careful intrapartum monitoring.

Given the absence of clinical evidence available about the possible adverse effects and their real consequences two meta-analyses have been recently released. The purpose of these analyses was to analyse the adverse effects related to the extreme version procedure, as well as to know its frequency. The most common adverse effects found were the CTGR alterations (between 1% and 47%, depending on the series), specially fetal bradycardia. Most of these alterations are temporary, as they are solved between the first 5 and 60 minutes. The prolonged decelerations that required an emergency caesarean only represented 1,1%, and in all cases the fetuses were born in good condition. There was no increase in the significant risk of nuchal cord in pregnant women subject to external version in comparison with the pregnant women with breech presentation where the version was not performed. The projects describe only 0,054% of cord prolapse cases (Nassar et al, 2006), which is a really low risk compared with the risk in breech or transverse presentation fetus with premature rupture of membranes. The vaginal bleeding after the version occurred in approximately three in a thousand pregnant. The incidence of placenta abruption occurred in 0,12%, which is lower than the 0,34%, which represents the at term pregnant overall population. Other reviews, however, did not find any case in its series. Concerning the fetal adverse effects, the femoral fracture also has to be mentioned, occurring one only case among all of them.

The incidence of fetal demise after the procedure was 1,64 in a thousand versions performed. Thus, it was not clearly related to the external version and none of the cases occurred during the first 24h after the procedure. Anyway, this figure is not higher than antepartum fetal demise (between the 36th and the 40th week) rate (6,2 in a thousand newborns).

Concerning the maternal adverse effects found, the external version can be painful for the patient. Approximately 35% of the pregnant suffer mild discomfort during the version and 5% severe pain. The procedure may be stopped for this reason, and it has been observed that when the version fails the pain is higher than when it succeeds. The available data about the use of analgesia during the manoeuvre are still few. 4% suffered tachycardia or palpitations, which were solved one hour later without the use of medication. In less than 2% of the cases, it occurred fetomaternal transfusion. The results did not show any significant differences concerning the start of labour during the 24h after the version compared with the breech presentations where the version was not performed.

Basically, the data released in the two only meta-analyses reveal a low complication rate and show the external cephalic version as a safe procedure. Nevertheless, new projects supporting the aforementioned results are strongly needed.



Pregnant women should be informed of the possible (although in a low rate) complications of the external version (recommendation level B).

#### 14. ECV: Quality indicators

The auditable standards for the external version are:

- Detection of antepartum breech presentation.
- Percentage of patients with breech presentation who are offered the external version.
- Version success figures.
- Complications occurring during or after the maneuver.
- Maternal experience of the version.

#### 15. ECV: Associated costs

A 2001 British project analyses the hospital costs derived from the external version. The purpose was to determine the difference of costs between performing an external version, a vaginal delivery or a caesarean delivery for the breech presentations. The costs were calculated for the “accepted ECV” vs. “non-accepted ECV” option. Both options included the probable emergence of adverse effects, as well as the different deliveries (breech presentation, cephalic, planned caesarean, emergency caesarean, etc.) The results proved £248-£376 saving per patient. Therefore, offering ECV implies lower hospital costs than if it was not offered. An obstetrics service offering daily ECV will be cheaper than a service which does not offer it (James et al, 2001).

A cost-benefit analysis was also carried out including the *The Term Breech Trial* data. Surprisingly, it demonstrated that healthcare costs in the caesarean group were less than those produced in the vaginal delivery group. It also proved that there were not any differences regarding parity. Even though the caesarean intrapartum costs were higher, the vaginal delivery patients need more antepartum and intrapartum care as well as the babies, who need more intensive and intermediate cares, apart from the costs related to the epidural analgesia. Many studies expressing higher healthcare costs in induced labor or oxytocin stimulation have been published (Bost, 2003). These results show that the caesarean in breech presentation at term, despite being safer, it is also cheaper than vaginal labour (Palencia et al, 2006). However, this statement cannot be taken for granted, since the analysis did not take into account the long term costs (in prospective pregnancies, for instance) as well as the maternal risks.

#### 16. ECV: Alternatives

Other methods used to correct the fetal position are acupuncture, homeopathy and postural methods. There is an awakening interest in exploring alternative medicines during pregnancy and labour. This interest is especially important in the case of external version alternatives since this is considered as a “dangerous” manoeuvre by pregnant women. The alternative medicine has become so important that *Cochrane* has carried out some reviews on the effectiveness of these methods, in particular, those referring to postural methods and the moxibustion use in cephalic version.



Throughout the history, midwives and doctors have used many different techniques referring to the best position to facilitate the cephalic version. However, few articles have been published about this topic in the medical literature. The knee-chest position and the supine position with the pelvis elevated with a wedge-shaped cushion are the most common techniques. The available evidence from the controlled clinical trials is so far insufficient to uphold the use of postural methods (Hofmeyr et Kulier, 2000).

Moxibustion is a type of Chinese medicine which involves burning a herb close to the skin in order to cause a heating sensation. It has also been stated that the acupuncture point called Bladder 67 (BL67) (or *Zhiyin*, according to its Chinese name) placed on the top of the fifth toe can correct breech presentations. How it works is totally unknown, but it seems to stimulate the production of maternal hormones (placental estrogens and prostaglandin) and the uterine contractions, as well as the fetal activity. In spite of not having found any adverse effects, Cochrane did not find enough evidence to prove that the moxibustion might be useful for correcting a breech presentation. The results suggest that moxibustion may be effective to reduce the external cephalic version need and caused a reduction in the use of oxytocin. However, some additional evidence is needed to confirm (or to reject) a benefit with respect to the breech presentation correction (Coyle et al, 2005; Hutton & Hofmeyr, 2006).

Therefore, there is not enough scientific evidence to recommend neither postural methods nor moxibustion to facilitate the spontaneous cephalic version (recommendation level A).

## 17. Conclusions

The ECV is safe and useful for reducing caesarean rates. The external version success goes from 30% to 80%. The experience of the obstetrician who performed the technique plays a key role in ensuring success (Fandino et al, 2010). An obstetrics service offering daily ECV will be cheaper than a service which does not offer it (James et al, 2001). Tocolyics are recommended to be used during the manoeuvre to reduce adverse effects and increase the success rate.

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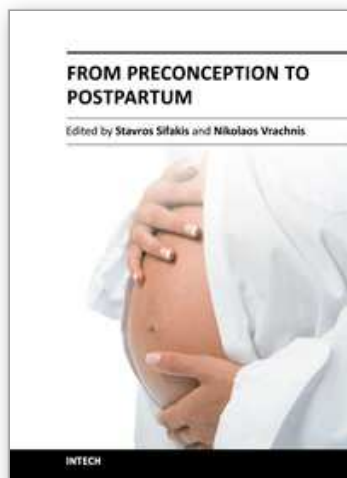


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## **From Preconception to Postpartum**

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Obstetrics is evolving rapidly and finds itself today at the forefront of numerous developments. Providing selected updates on contemporary issues of basic research and clinical practice, as well as dealing with preconception, pregnancy, labor and postpartum, the present book guides the reader through the tough and complex decisions in the clinical management. Furthermore, it deepens the scientific understanding in the pathogenetic mechanisms implicated in pregnancy and motivates further research by providing evidence of the current knowledge and future perspectives in this field. Written by an international panel of distinguished authors who have produced stimulating articles, the multidisciplinary readers will find this book a valuable tool in the understanding of the maternal, placental and fetal interactions which are crucial for a successful pregnancy outcome.

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