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The use of atosiban and ritodrine in external cephalic version

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Abstract
Objective. To compare the efficacy of atosiban and ritodrine as tocolytic agents for successful external cephalic version (ECV). Factors affecting the success of ECV, as well as maternal and perinatal outcomes are reviewed. *Method.* A retrospective review of women who underwent ECV with either atosiban (2004) or ritodrine (2002). *Results.* Atosiban and ritodrine were similarly effective (28 versus 41%, $p > 0.05$). Side effects were more common with ritodrine. No significant adverse maternal and perinatal outcomes were recorded following procedures with either tocolytic. *Conclusion.* Atosiban is a safe choice for ECV with less maternal side effects. However, it is no more effective than ritodrine and the benefit of safety has to be balanced against that of cost.

Key words: *External cephalic version, tocolysis, atosiban, ritodrine*

Introduction

Non vertex presentation accounts for approximately 4% of all pregnancies at term. Treatment options include caesarian section (CS), external cephalic version (ECV), trial of vaginal breech delivery, or expectant management with anticipation of spontaneous version to cephalic presentation (1). ECV and CS have become the preferred management for non-vertex presentations due to the poor fetal outcome associated with vaginal breech delivery.

The Term Breech Trial has brought major changes and controversy in management of the singleton breech fetus at term. The initial data suggested that elective CS compared with planned vaginal birth reduced perinatal and neonatal mortality and morbidity for the singleton term breech baby but at the expense of increased maternal morbidity (2). However, long term infant and maternal outcomes were not significantly different between the groups two years after completion of the trial (3,4). CS is a major operation with a longer recovery period compared to vaginal delivery; in addition to financial costs, it also implicates risk of further CS, placenta praevia and morbidly adherent placenta.

Fetal monitoring with cardiotocography (CTG) and ultrasonography (US) has made ECV a safe procedure with reported success rates of between 35 and 86% (1). Clinical complications include placental abruption, rupture of membranes, cord prolapse and transient abnormal CTG patterns (5). It is, however, reassuring that there have been less than ten ECV-associated still births reported in the literature since 1980 (6).

While tocolysis has been shown to increase the success rate of ECV, the choice of tocolytic agent for the procedure is still uncertain (7). The oxytocin antagonist, atosiban, has clinical advantages over other tocolytic therapies in that maternal side effects are significantly less than that of sympathetomimetics (8). It is routinely used in premature labour but there is little published data on its use as a tocolytic in ECV. It was on this theoretical basis that tocolytic of choice for ECV in the authors' unit was changed from ritodrine to atosiban in 2003 without direct clinical comparison. The authors have therefore decided to perform a retrospective study to assess the relative success rates of ECV with atosiban and ritodrine.

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Material and methods

A retrospective study was performed in an inner city London hospital, with an annual delivery of approximately 3500 infants. Obstetric notes of women who underwent ECV with atosiban (January 2004–December 2004) and those who received ritodrine for the procedure (January 2002–December 2002) were reviewed.

ECV was offered to all patients with a singleton breech presentation confirmed on departmental scan after 37 weeks of gestation, provided there were no contraindications. Exclusion criteria include intrauterine growth retardation, poly or oligohydramnios, pre-eclampsia, placenta praevia, congenital anomalies, multiple gestation and previous uterine surgery.

Consent comprised of a detailed description of the procedure, and discussion of intended benefits and risks. Portable ultrasound scan was used to confirm presentation on then day of the procedure and CTG was performed for 20 minutes prior to ECV attempt. Anaesthesia and immediate operative facilities were available in case an emergency CS was required.

In the 2002 group of women, an infusion of ritodrine (150 mg in 50 dextrose) was given as an initial intravenous dose of 0.05 mg/min increasing every 15 minutes prior to ECV. With atosiban, a single bolus dose of 6.75 mg over one minute was administered 10 minutes prior to ECV attempt.

The procedure was abandoned after two unsuccessful attempts or if the mother felt excessive discomfort. After the version attempt, a CTG was performed and Anti-D was administered if indicated. The ECVs were performed by three consultant obstetricians with interest in the procedure.

Several variables have been identified previously as predictive of version success (9). In the authors' study, six factors (age, weight, height, parity, gestational age, fetal weight) were selected for the analysis. Data analysis was performed with the SPSS statistical package and a p value of <0.05 taken to indicate significance.

Results

Data from 21 women who underwent ECV with atosiban was compared to that of 17 women who received ritodrine infusion. Data are expressed as the mean and standard deviation (SD) (Table I).

Atosiban was more successful in older women ($p = 0.01$) (Table II) and this is likely to be due to the positive correlation between age and increased parity ($p = 0.005$) in the atosiban group. Previous studies have shown that ECV is more likely to be successful when performed on multiparous women (10). Age did not appear to influence the success rate of ritodrine.

Table I. Demographic data of women receiving atosiban and ritodrine for ECV (mean ± SD).

	Atosiban	Ritodrine	p Value
Age (years)	30.1 ± 6.4	30.7 ± 5.2	NS
Parity	1.2 ± 1.5	1.2 ± 1.4	NS
Gestation (weeks)	38.3 ± 7.5	38.5 ± 12.5	NS
Height (cm)	163.6 ± 6.1	165.8 ± 7.7	NS
Weight (kg)	78.1 ± 17.9	69.4 ± 10.1	NS
Fetal weight (kg)	3.3 ± 0.5	3.1 ± 0.5	NS

Height, weight, Body Mass Index (BMI), parity and fetal weight did not have any positive predictive value in a binary logistic regression model. Neither tocolytic agent was shown to be more effective than the other (successful ECV: atosiban versus ritodrine: 28 versus 41%, $p = 0.4$).

Interestingly, 11 women had spontaneous versions (16.1%) while waiting for the procedure to be performed. Following ECV, four cases of spontaneous version occurred in atosiban group (two cases after successful ECV and two cases after failed ECV), while there were none in the ritodrine group.

Side effects, commonly palpitations, nausea and headaches were more common with ritodrine but no adverse maternal outcomes were found with either agent.

Non-adverse perinatal outcomes included four cases of positional talipes which were noted after failed ECV. There was no significant maternal morbidity which could be attributable to either tocolytic.

Discussion

This is a small retrospective study comparing two cohorts that received interventions at different times. It was within these limitation that the comparative efficacies of atosiban and ritodrine were reviewed and it must be pointed out that this study may demonstrate association rather than causation.

The overall success rate of ECV in this study was 34.2% which is lower than that reported in

Table II. Age and ECV.

	Atosiban	Ritodrine	
Age	Mean ± SD	Mean ± SD	p Value
Success	31.4 ± 5.7	35.3 ± 2.9	NS
Failure	30.2 ± 5.1	28.0 ± 6.3	NS
p value	NS	0.01	

the literature (1). Overall CS rate in non-vertex presentations in the authors' unit was 91.54%, while the CS in after ECV trial was 71%. Thus, successful ECV appeared to decrease the incidence of breech presentation and reduce the CS rate.

More recent randomised studies confirmed that the administration of ritodrine prior to ECV improved outcome compared to placebo (11,12). Impey and Pandit, in fact, suggested that atosiban may be a safer alternative compared to ritodrine due to its better side effect profile and as its' shorter duration of exposure (12).

Although the authors' study is neither prospective nor randomised, it appears to be the first of its kind assessing the relative efficacy of atosiban against a conventional β-agonist in ECV tocolysis. In the authors' study, ritodrine was administered in for up to 50 minutes while atosiban was given as a bolus intravenous injection and thus was easier to administer with potentially less maternal side effects. However, the economic impact of the routine use of atosiban should also be considered (atosiban versus ritodrine; €27.64 versus €4.42).

Review of the mode of delivery after successful ECV in this study showed that in just two cases of successful version (15.3%), failure to progress led to CS. This outcome contradicts reports that pregnancies after successful ECV are at higher risk of both prolonged labour and fetal distress (13).

The practice of ECV is still poorly taken up by women with non vertex presentation. This can be partially explained by an exaggeration of the risks for women and fetuses undergoing this technique. Over the two years studied, 19.1% of patients declined ECV irrespective of its practice in a medical environment that optimizes safety for both the mother and foetus.

In conclusion, atosiban is as clinically effective as ritodrine in ECV and is better tolerated and quicker acting when compared to ritodrine. Further prospective studies are needed to establish whether atosiban is cost effective and should be routinely used in ECV.

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