Intravenous nitroglycerin as a tocolytic agent for intrapartum external cephalic version

M. A. BELFORT

Abstract

A minibolus dose of intravenous nitroglycerin provided excellent uterine relaxation without cardiovascular detriment in 2 cases of successful intrapartum external cephalic version.


The appropriate use of intrapartum external cephalic version (ECV) may help reduce the need for cesarean section and has been shown to be safe and effective. Intravenous nitroglycerin, which has a potent yet short-lived tocolytic effect, has been used to relax the uterus during manual extraction of retained placenta without clinically significant haemodynamic effects. The use of this agent as a tocolytic has not previously been reported in ECV.

Case 1

A 20-year-old black woman (gravida 5, para 3, abortus 1) was admitted with contractions at uncertain gestation after smoking 'crack' cocaine. Maternal blood pressure and heart rate were 145/100 mmHg and 110/min respectively. Ultrasound evaluation revealed a normal fetus in a 'back down' transverse lie with appropriate amniotic fluid. Estimated fetal weight was 1 687 g (30 1/7 weeks). Placentation was fundal without obvious abruption. The fetal heart tracing was reactive, the biophysical profile was 6/8 (-2 for lack of respiration), and uterine contractions were noted every 2 minutes. The cervix was 9 cm dilated with bulging amniotic membranes. The patient consented to an ECV and emergency caesarean section if required. After being placed in a dorsal lithotomy position, 50 μg of nitroglycerin were given intravenously as a bolus dose. The uterus relaxed palpably within 20 seconds of the injection. The fetus was easily turned through a forward somersault into a cephalic presentation. Fetal heart tones remained normal throughout the blood pressure, heart rate and level of peripheral oxygen saturation were recorded every minute for 10 minutes after injection of the drug. Maternal blood pressure decreased from 145/100 to 130/75 mmHg, and stabilised at 130/85 mmHg within 2 minutes. The heart rate and oxygen saturation remained stable at 102/min and 100% respectively. Contractions restarted within 4 minutes after controlled rupture of the membranes and oxytocin infusion (3 mIU/min). The patient proceeded to vaginal delivery 30 minutes later. The female infant weighed 1 687 g (30 1/7 weeks). Placental weight was 1 687 g (30 1/7 weeks). Placenta without clinically significant haemodynamic effects. The use of this agent as a tocolytic has not previously been reported in ECV.

Case 2

A 19-year-old Hispanic woman (gravida 2, para 1) was admitted at 39 1/2 weeks' gestation with contractions every 2 minutes. An unengaged complete breech presentation was confirmed by ultrasound showing a normal fetus (estimated fetal weight 3 037 g with appropriate amniotic fluid and a fundal placenta. Vaginal examination revealed a 5 cm dilated cervix, 70% effaced; both fetal feet were palpated through the intact membranes. Past medical history was uncomplicated and she had previously delivered a 3 100 g fetus normally. She consented to an ECV and possible cesarean section, was taken to the delivery room and placed in the dorsal lithotomy position. Fentanyl (75 μg), followed by 100 μg of nitroglycerin, was given intravenously and the uterus relaxed palpably within 15 seconds. The fetus was easily rotated through a forward somersault to a cephalic presentation. Maternal blood pressure decreased from 120/60 mmHg to 112/60 mmHg within 1 minute and remained stable. Maternal heart rate did not change (96/min). Fetal heart rate remained normal throughout the procedure. The amniotic membranes were then ruptured. Oxygen infusion (3 mIU/min) started contractions within 5 minutes. The patient progressed to an uneventful vaginal delivery 8 hours later. The male fetus weighed 3 160 g and had Apgar scores of 9 and 9 at 1 and 5 minutes respectively. The third stage was uncomplicated (9 minutes). Estimated blood loss was 350 ml. A Kleihauer-Betke test performed after ECV did not show any fetal cells.

Discussion

Intrapartum ECV is effective and safe in dealing with abnormal presentations during labour, and avoids the need for primary caesarean section in many cases. Tocolysis with β-stimulants is frequently used to relax the uterus during this manoeuvre. The sympathomimetic stimulants of these agents imbues them with unpredictable and potentially dangerous haemodynamic side-effects, particularly in patients with hypertension, tachycardia or pre-existing cardiovascular stimulation from drug abuse. Nitroglycerin is a potent smooth-muscle relaxant with a good mechanical relaxant effect on the uterine. In the above mentioned patients it resulted in rapid and effective relaxation of rapid onset and short duration, allowing easy and safe manipulation of the fetus. The dosage used was much smaller than the 500 μg bolus dose given for manual removal of the placenta, and there were no untoward cardiovascular effects noted in either mother. In addition, there was no increase in the tachycardia or blood pressure of the patient who was still under the influence of 'crack' cocaine. Neither fetus appeared compromised, either during the procedure or subsequently during labour and delivery. The re-establishment of uterine contractions was prompt and without difficulty, allowing stabilisation of the fetal lie and normal progress of labour.

This is the first report of nitroglycerin being used to temporarily relax the uterine tone in antepartum patients. The potential uses of such an agent are many and further controlled studies are required.

REFERENCES


Department of Obstetrics and Gynecology, Baylor College of Medicine, Houston, Texas, USA


Accepted 1 Jun 1992.