



Utilization of Nitroglycerin as the Primary Uterine Relaxation Agent for Ex-Utero Intrapartum Treatment (EXIT) Procedures

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Background

Ex Utero Intrapartum Treatment (EXIT) procedures usually are performed for fetal anomalies involving airway. Fetal exposure under maternal placental circulatory blood supply is the key element of these procedures. Extremely large interdisciplinary teams including Maternal-Fetal Medicine (MFM), Pediatric ENT Surgeon, Cardiac Surgeons, Neonatologists, Maternal and Pediatric Anesthesiologists, Perioperative Nurses, Social Workers, and other supporting teams, all need to work together. Over the past several decades, fetal surgery has made significant progress. However, little has been achieved on the subject of uterine relaxation. Traditional uterine relaxation has been accomplished using high dose of volatile anesthesia agent. However, such practice has been associated with significant fetal cardiac dysfunction and bradycardia. We have been piloting the practice of using titration of high-dose intravenous nitroglycerin infusion for uterine relaxation during EXIT procedures. This retrospective study was to analyze the utility of such practice.

Methods

Retrospective review of fetal EXIT procedure was conducted. A series of cases during which nitroglycerin was administered as primary uterine were identified. Immediately after the skin incision was made, the infusion of nitroglycerin at 100 mcg/min was started. At the same time, total intravenous anesthesia with infusion of propofol and phenylephrine with titration to maintain the blood pressure at the preoperative level. Uterine relaxation were verified by MFM Attending before hysterotomy was made. Once fetus was partially exposed, a pulse oximetry was applied to the fetus to monitor fetus oxygen saturation. Maintenance of continued uterine relaxation were confirmed by surgeon. Nitroglycerin infusions were stopped at the time of cord clamping, followed by oxytocin bolus and infusion. Dosage of phenylephrine was titrated to maintain the blood pressure at the preoperative level.

Results

In all cases, uterine relaxation provided solely by nitroglycerin

were satisfied by surgeons. Maternal and fetus hemodynamics were stable. All maternal anesthesia went successfully. Patient covered with no complications.

Discussion

Grunewald et al demonstrated that nitroglycerin improved placental circulation in severe preeclampsia. Maternal mean arterial pressure could be easily maintained through alpha-adrenergic agonist, phenylephrine. High serum concentration of nitroglycerin in the mother and fetus may produce methemoglobinemia. Fortunately, it has been confirmed repeatedly that nitroglycerin rapidly extracted and metabolized from the maternal serum across a vascular bed of lungs and mesenteries in a dose-dependent manner. Our data demonstrated that nitroglycerin infusion can be used as the primary uterine relaxation agent for EXIT procedures.

References

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