The Practice of Using Nitroglycerin for Uterine Relaxation

To the Editor:—The practice of using nitroglycerin (NTG) to reduce uterine smooth muscle tension acutely, has gained popularity in the past several yr. Unfortunately, we still lack reproducible quantitative data demonstrating that this intervention is effective. Further, the intravenous administration of NTG definitely reduces maternal blood pressure which may impact negatively on uterine blood flow at times when fetal oxygenation is challenged.

A recent letter to the Editor by Bell et al., describing a case of NTG induced acute relaxation of the uterus, included data suggesting that NTG might have a measurable effect on uterine contraction quantifiable with an intrauterine catheter. The maximal pressure generated during uterine contraction in this patient was clearly reduced after the NTG administration. Although frequency and resting tone appeared to be unaltered, the patient described was initially hyperstimulated by pitocin (probable half-life 3–5 min) which was discontinued at about the same time NTG was administered clouding the cause of this effect.

Work in gravid rabbits and ewes in our laboratory has failed to document a reduction in the frequency of contraction, resting tone, or the maximal force generated during spontaneous or induced labor. In-vitro studies by Shin demonstrated that uterine smooth muscle harvested from term pregnant rats responded to NTG only at pharmacologic concentrations. A study by Kumar in 1995 which examined the effect of amyl nitrate on uterine tension as examined by tocdometry similarly failed to demonstrate a measurable response to nitrovasodilators. In that study, intrauterine pressure was also monitored in women induced to labor with pitocin.

Recent data from a very different in-vitro model using uterine smooth muscle strips from primigravida rabbits at term show that the compliance of the uterus is altered by NTG. Prior to Dr. Bell’s case report no further reports of the efficacy of NTG involved the application of an external force to the uterus by the obstetrician. In a hypercontractile state, the sustained generation of active tension would be analogous to application of an external force. Hence, a change in compliance would be expected to appear as a decrease in maximal tension during sustained contraction. Dr. Bell’s findings then are consistent with this recent data from our laboratory. Although Dr. Bell’s report only describes a single patient, it presents an appealing model to consider (i.e., the hyperstimulated uterus may be a model in which a change in compliance resulting from the administration of NTG can be reproducibly demonstrated).

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References


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In Reply:—Dr. Langevin correctly points out that the animal data do not consistently support the clinically observed phenomenon of uterine relaxation resulting from administration of nitroglycerin in human parturients. Dr. Shin et al. found a dose-dependent reduction of contractility in isolated human uterine muscle segments exposed to nitroglycerin in vitro, but the mean dose to abolish spontaneous contractions was $4.5 \times 10^{-4}$ ml (250 $\mu$g in the 12 ml bath), far exceeding commonly used clinical doses. This may be a result of the scarcity of vascular endothelium present in these preparations.

Dr. Langevin also states that administration of nitroglycerin definitely reduces maternal blood pressure. In our experience, the administration of 50-100 $\mu$g of nitroglycerin intravenously or 800 $\mu$g sublingually has not resulted in decreased maternal blood pressure consistently, or even frequently, in urgent clinical settings. These include tachy uterine contraction, extraction of a breech twin, or manual extraction of placenta. I suspect that the anxiety engendered by rapid interventions such as maternal position changes, increased intravascular fluid administration, application of supplemental oxygen, and summoning the obstetrician ameliorate the vasodilatory effects of the nitroglycerin. This is in contrast to our recent trial using nitroglycerin spray in the setting of elective external version of breech position. We saw a high percentage of patients respond with decreased blood pressure (4 of 10 patients experienced a decrease of 20% or greater). It is unclear whether this was in response to the nitroglycerin or mechanical compression from vigorous attempts and certainly deserves further investigation.

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References


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Conversion of a Nasal to an Otoracheal Intubation Using an Endotracheal Tube Exchanger

To the Editor:—A 57-yr-old woman presented to the emergency room with confusion, weakness and cyanosis. Her history included a muscle biopsy and contracture test consistent with malignant hyperthermia, confirmed hypertrophic obstructive cardiomyopathy, and an undiagnosed neurologic condition characterized by progressive, episodic confusion, somnolence, dysarthria, and headache. She had been started on amiodarone and sotalol by a cardiologist for paroxysmal atrial fibrillation.

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Progressive somnolence and hyperventilated acidosis led to a decision to intubate. Airway evaluation revealed mild micrognathism but no other abnormalities. Monitoring consisted of continuous electrocardiography, oximetry, and invasive arterial blood pressure. Lidocaine spray was applied to the oropharynx and hypopharynx, but direct laryngoscopy was poorly tolerated. After prophylaxis, sleep was induced with propofol. Bag and mask ventilation was easily provided, and vecuronium was administered. With appropriate positioning, di-