Contractile efficacy of different prostaglandins in pregnant rat myometrium pre-treated with oxytocin

**Presenting Author:** Mrinalini Balki MD  
**Presenting Author’s Institution:** Mount Sinai Hospital, University of Toronto - Toronto, Ontario  
**Co-Authors:** Nikki Kanwal BSc - Mount Sinai Hospital, University of Toronto - Toronto, Ontario  
Magda Erik-Soussi MSc - Mount Sinai Hospital, University of Toronto - Toronto, Ontario  
Jose C.A. Carvalho MD, PhD - Mount Sinai Hospital, University of Toronto - Toronto, Ontario  
John Kingdom MD - Mount Sinai Hospital, University of Toronto - Toronto, Ontario

**Introduction:** Oxytocin receptors in both human and rat myometrial cells are desensitized by exposure to oxytocin, thereby reducing the ability of cells to respond to subsequent administration of oxytocin (1). It has been shown that this oxytocin-induced desensitization phenomenon does not occur with carboprost (2), however, it is unclear if other prostaglandins respond in a similar fashion.

**Methods:** After approval by the Animal Care Committee, the study was conducted in 24 pregnant Wistar rats at 21-22 days of gestation. Four longitudinal myometrial strips (2x2x10 mm each) were isolated from each animal, and allowed to equilibrate in separate 10 ml organ bath chambers containing physiological salt solution (PSS) at 1 g tension. The myometrial strips were pre-treated with either oxytocin 10-8M (experimental group) or physiological salt solution (control group) for 1h period, then subjected to a dose-response study (cumulative increases from 10-10M to 10-5M) with oxytocin (n=32), carboprost (n=16) dinoprostone (n=16), alprostadil (n=16) or misoprostol (n=16). The amplitude, frequency and motility index (amplitude x frequency) of contractions during the dose-response period were analyzed using mixed linear modeling and compared among the groups.

**Results:** There were no significant differences in the mean amplitude, frequency or motility index during the dose-response testing with all prostaglandins between the oxytocin-pretreated strips and the control strips. However, there was a significant difference in the frequency (p=0.02) and motility index (p=0.05) in the dose-response curves of oxytocin in oxytocin-pretreated and the control groups (Fig 1). Overall oxytocin produced superior contractions compared to all other prostaglandins, while dinoprostone and misoprostol produced the weakest contractions.

**Discussion:** The uterotonic effects of various prostaglandins are not affected by the phenomenon of oxytocin desensitization. Oxytocin, despite the phenomenon of desensitization, provides superior uterine contractions when compared to all the prostaglandins. Should these data be replicated in human myometrium, they will have important clinical implications in the pharmacological management of postpartum hemorrhage.

**References**  
Figure 1: Dose response curves for Motility index (MI) in oxytocin-pretreated and control groups.