INTRODUCTION

Women with advanced maternal age (AMA) and morbid obesity (MO) are at a greater risk for postpartum hemorrhage (PPH). Oxytocin is the first line drug in the treatment of PPH. Prolonged exposure to oxytocin, as during labor augmentation, can result in the desensitization phenomenon. Desensitization is likely to result in poor uterine tone after delivery leading to PPH, with attenuated response to oxytocin. It is unknown if oxytocin desensitization specifically affects contractility in women with AMA and MO when compared to younger or normal weight populations. Further it is not known if the higher incidence of PPH seen in these women is due to poor uterine contractility. We aimed to investigate the effect of oxytocin-desensitization on oxytocin-induced myometrial contractility in these patient populations.

METHODS

The in-vitro study was conducted after REB approval and written informed consent from patients undergoing elective cesarean deliveries. Three groups of patients were studied: control (≤35 yr, BMI 20–24.9 kg/m²), AMA (≥40 yr, BMI 20–24.9 kg/m²), and MO (≤35 yr, BMI ≥40 kg/m²). Myometrial tissue obtained from the uterine incision was dissected into six strips. Each strip was mounted in a single organ bath with physiological salt solution (PSS) and then pretreated with oxytocin 10^{-5} M (desensitization model) or left in PSS (untreated) for 2 hours. This was followed by a dose-response testing to oxytocin 10^{-10} M to 10^{-5} M. The primary outcome was motility index (MI; amplitude x frequency) of myometrial contractions. Data was analyzed using the % response during the dose response relative to the baseline contractions.

RESULTS

So far 126 experiments have been performed (required n=168) with samples from 33 women: control(n=56), AMA(n=48), MO(n=22). The MI, calculated as a cumulative dose-response average, was higher in the control group (457%) compared to the AMA (414%) and MO (321%) groups in samples not pretreated with oxytocin. In the oxytocin-pretreated samples, the MI was lower in the control group (111%) compared to the AMA (158%) and MO (281%) groups (Fig 1). We plan to complete this study by March 15, following recruitment of 7 more patients.
DISCUSSION
Our results validate the desensitization phenomenon, as the MI of oxytocin-induced contractions was higher in untreated than oxytocin-pretreated groups for all patient populations. In the absence of oxytocin pretreatment, women with AMA and MO exhibit poor oxytocin-induced myometrial contractility compared to the control group. While, in the setting of oxytocin-pretreatment, women with AMA and MO exhibit enhanced myometrial contractility compared to the control group. These results indicate that the higher incidence of PPH seen in AMA and MO patients may be due to not only the desensitization phenomenon, but also their poor intrinsic uterine contractility.

References:

2. Anesthesiology 2013; 119: 552-561