TITIE: VENTILATORY EFFECTS OF DEXMEDETOMIDINE IN HUMANS

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Introduction. Dexmedetomidine (DEX), a centrally acting α2 adrenergic agonist, produces complete or nearly complete anesthesia in animals (1). Thus, it is potentially a new anesthetic agent in humans.

Methods. We studied the ventilatory effects of placebo and 0.25, 0.5, 1.0, and 2.0 µg·kg⁻¹ of DEX infused over two minutes in 37 normal male subjects (consented and IRB approved). Prior to the infusion, two control CO₂ ventilatory response curves were determined while the subjects were breathing 60% O₂. The CO₂ challenge was repeated every 45 minutes starting approximately 15 minutes after the infusion. The slope and intercepts were determined by linear regression on the ventilation and P₆₅₀, breath-by-breath data. Room air arterial blood gases were obtained prior to each CO₂ challenge. Ventilation, P₆₅₀, and P₃₉₀ were measured continually during and immediately after DEX infusion and during normoxia just prior to each CO₂ challenge.

Results. DEX caused marked sedation in all subjects. No adverse reactions occurred. By four hours after the infusion, all subjects were fully awake and alert. Compared to the average of the two control periods, the peak ventilatory depression was seen on the second and third measurements after DEX. The maximum decrease in ventilation was 2.44 ± 1.33 l·min⁻¹ (mean ± SD) in the 2.0 µg·kg⁻¹ group by a reduction in tidal volume with little change in respiratory frequency. The P₆₅₀ increased by 1.3 ± 0.2, 0.9 ± 0.2, 5.0 ± 0.2, and 4.3 ± 2.4 mmHg for the four increasing DEX doses (placebo showed an increase of 0.61 ± 2.4 mmHg). The increases for the two highest doses were significantly different from placebo.

Figure 1 gives the results for the arterial P₆₅₀ and the P₃₉₀ response slopes and intercepts at the 2.0 µg·kg⁻¹ dose for all time periods.