

Title: EFFECTS OF KETAMINE ON PULMONARY ARTERIES

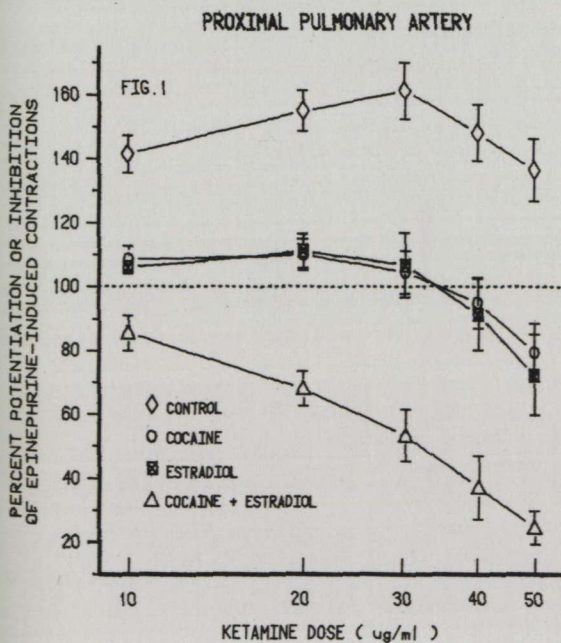
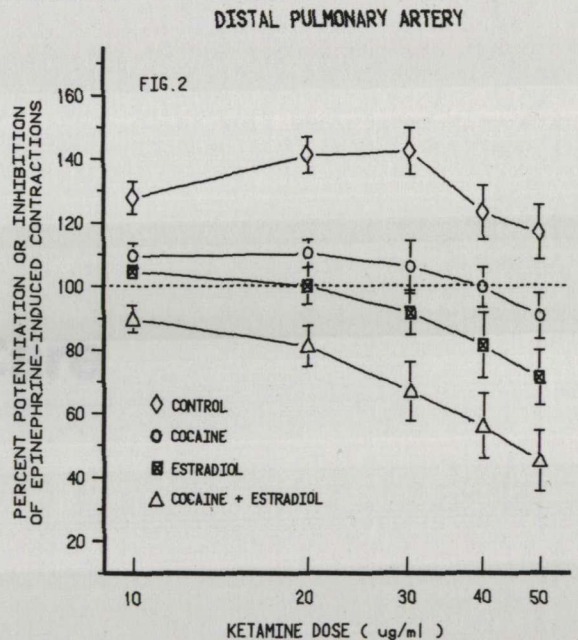
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Introduction: Ketamine (KT) has a stimulatory effect on the circulation which has been attributed to blockade of catecholamine uptake at nerve endings¹ or by extraneuronal structures². We have examined the effects of KT on pulmonary artery rings and the contribution of block of catecholamine uptake to these effects.

Methods: Guinea pigs were sacrificed by a blow to the head. The distal main (DMPA), proximal main (PMPA), right (RPA) and left (LPA) pulmonary arteries were removed, cut into rings and placed in tissue baths between two hooks, one immovable, the other attached to a Grass FT03 isometric transducer. The baths were filled with Krebs's solution at 37°C, aerated with 95% O₂ and 5% CO₂. Initial tension was set at 6 gms in MPAs and 3 gms in LPA and RPA. Changes in tension were recorded on a Gilson polygraph. Two studies were carried out: 1) Specimens were contracted with epinephrine (EPI) 3×10^{-7} M and KT added to produce concentrations of 10, 20, 30, 40 and 50 µg/ml. 2) Specimens were treated with cocaine (C), 3×10^{-5} M, and/or 17-β estradiol (βE), 3.7×10^{-5} M, then contracted with EPI, 3×10^{-7} M and KT was then added to produce 10, 20, 30, 40 and 50 µg/ml concentrations. Analysis of variance was performed for KT effect on each tissue. Paired t test's compared the effects of KT between different segments of the pulmonary artery.

Results: Figures 1 and 2 show the results from the PMPA and DMPA. KT from 10 to 30 µg/ml potentiated the EPI induced contraction of PMPA and DMPA but not that of the LPA and RPA. Pretreatment with C or βE diminished but did not abolish this effect. Pretreatment with both C and βE completely abolished ketamine's effect of potentiating EPI induced contraction.



Discussion: The present experiments support the conclusion that KT inhibits uptake of EPI by both nerve endings (C like effect) and by extraneuronal structures (βE like effect)³, since both were necessary to completely block the effect of KT. The absence of effects in the RPA and LPA may be due to the paucity of innervation in these structures and therefore less neuronal EP uptake is possible.

References:

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3. Salt PG, Barnes PK, Beswick FJ: Inhibition of neuronal and extraneuronal uptake of noradrenaline by ketamine in the isolated perfused rat heart. *Brit J Pharmacol* 51:835-838, 1979.

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