Morphine is an arteriolar vasodilator in man

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Abstract

AIM The mechanisms of action of morphine on the arterial system are not well understood. The aim was to report forearm vascular responses and their mediation, to intra-arterial morphine in healthy subjects. METHODS Three separate protocols were performed: (i) dose ranging; (ii) acute tolerance; (iii) randomized crossover mechanistic study on forearm blood flow (FBF) responses to intrabradial infusion of morphine using venous occlusion plethysmography. Morphine was infused either alone (study 1 and 2), or with an antagonist: naloxone, combined histamine-\(^{-1}\) and histamine-\(^{-1}\) receptor blockade or during a nitric oxide clamp. RESULTS Morphine caused an increase in FBF at doses of \(0.05\) g min \(^{-1}\) [(\(0.05\) (\(0.05\) mg min \(^{-1}\) kg \(^{-1}\) )/m \(^{-1}\) ) (mean (SEM)] doubling at \(0.43\) g min \(^{-1}\) to \(2.24\) (\(2.24\) (\(2.24\) mg min \(^{-1}\) kg \(^{-1}\) )/m \(^{-1}\) ), throughout the 30-min infusion period. Vasodilation was abolished by pretreatment with antihistamines (\(P = 0.0001\)) and the nitric oxide clamp (\(P < 0.0001\)), but not affected by naloxone. The maximum FBF dose of morphine was double at \(0.43\) mg min kg \(^{-1}\) /m \(^{-1}\) after 20 min, whereas with morphine alone it reached \(2.24\) (\(2.24\) mg min kg \(^{-1}\) /m \(^{-1}\) ). CONCLUSIONS Intra-arterial infusion of morphine into the forearm circulation causes vasodilation through local histamine-modulated nitric oxide release. Opioid receptor mechanisms need further exploration. © 2006 The British Pharmacological Society.