Effects of diazepam and ketamine administered individually or in combination on regional rates of glucose utilization in rat brain.

C Eintrei, L Sokoloff and C B Smith

Author Affiliations

. Department of Anaesthesia, University Hospital, Linkoping, Sweden.

Abstract

The effects of diazepam, which acts at GABAA receptors to enhance the effects of GABA, and ketamine, a non-competitive N-methyl-D-aspartate receptor antagonist, on local rates of cerebral glucose utilization (ICMRglc) were examined in unrestrained rats. Four groups were studied: vehicle-injected controls; and ketamine-treated, diazepam-treated and combined ketamine- and diazepam-treated animals. Ketamine alone produced a heterogeneous pattern of changes in ICMRglc (e.g. significant increases in the corpus callosum, olfactory tubercle and the entire Papez circuit, in addition to other limbic areas, and significant decreases in lateral habenula and some components of the auditory system). Diazepam alone statistically significantly decreased ICMRglc in the brain as a whole and in most areas of the cerebral cortex, thalamus and limbic system. The most remarkable effects of the two drugs administered together on ICMRglc occurred in the limbic system where the dramatic increases observed with ketamine alone were prevented by treatment with diazepam.