Effects of ketamine on EEG data: a case report

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Background: Ketamine is an arylcyclohexylamine derivative with sedative properties, which is also used in the management of perioperative and neuropathic pain. The compound produces a dissociative state apparently through electrophysiological inhibition of thalamocortical connections and stimulation of the limbic system. In this report we describe an EEG-derived spectrographic pattern observed after ketamine administration.

Case report: A 30-year-old male patient (80 kg) presenting with acute abdomen from a bullet wound was submitted to general anesthesia (sufentanil 75 µg, propofol 200 mg, succinylcholine 70 mg), orotracheal intubation and neuromuscular blockade (rocuronium 1ED95%). Anesthesia was maintained with desflurane adjusted to maintain a BIS value of 45-60 and zero burst suppression. The spectrogram evidenced hypersynchronization of alpha, delta and slow oscillations, with low amplitudes at high frequencies. After anesthesia stabilization, ketamine (80 mg) was administered, resulting in a rise in the BIS value from 46 to 68, a rise in the raw EEG frequency, and high amplitudes predominantly in the beta band, with attenuation of alpha, delta and slow oscillations.

Discussion: Ketamine administration significantly increased beta oscillations and reduced alpha, delta and slow oscillations as a result of the inhibition of the glutamatergic stimulus in the inhibitory GABAergic interneurons, producing aberrant excitatory activity in the cortex, hippocampus and the limbic system.

References: 1.Akeju O, Hamilos AE, Song AH et al. GABAA circuit mechanisms are associated with ether anesthesia-induced unconsciousness. Clin Neurophysiol. 2016;127:2472-81. 2.Brown EN, Lydic R, Schiff ND. General Anesthesia, Sleep, and Coma. N Engl J Med 363;27: 2638-2650.