

Conclusive Properties of Éthrane, Fluroxene, Halothane and Chloroform Anesthesia. T. A. JOAS, M.D. and W. C. STEVENS, M.D., *Department of Anesthesia, University of California, San Francisco Medical Center, San Francisco, Calif.* During evaluation of Éthrane (compound 347; 2-chloro-1,1,2-trifluoroethyl difluoromethyl ether) in dogs, twitching movements of the limbs and body were observed. The electroencephalogram (EEG) showed high-voltage spikes during this increased neuromuscular activity and in response to hand-clapping at the dog's ear. A survey of EEG activity during Éthrane, fluroxene, diethyl ether, divinyl ether, halothane and chloroform was undertaken to determine the seizure potential of these drugs and to form a baseline against which other yet-to-be-developed anesthetics might be compared. *Methods:* Unpremedicated dogs were anesthetized with the agent being evaluated and oxygen only. EEG tracings were obtained at the minimum alveolar anesthetic concentration (MAC) and at multiples of MAC for each agent before and during hand-clapping. Pa_{CO_2} was maintained at 20 torr. *Results:* Seizure patterns occurred in those animals anesthetized with the ethers but did not occur in animals anesthetized with halothane or chloroform. The seizure patterns seen with Éthrane could be induced at will at almost any depth by an auditory stimulus. All of these animals survived. The seizure patterns seen with divinyl ether occurred only at very deep levels, were spontaneous in onset and were often accompanied by overt neuromuscular activity. All of these animals died. The changes seen in the animals anesthetized with fluroxene resembled those seen in animals anesthetized with Éthrane. In contrast, the results observed with diethyl ether were similar to the results observed with divinyl ether. With fluroxene two of four animals survived, whereas with diethyl ether three of four died and the one survival was ataxic. *Summary:* The exact significance of the seizure patterns is difficult to interpret. The EEG activity which we have seen with diethyl and divinyl ether, although not always accompanied by gross neuromuscular activity, may be indicative of

serious central nervous system damage, because of the small number of animals that survived exposure to these agents.

Indirect Methods for Monitoring the Performance of the Heart During Anesthesia: The Time Interval of Electrical and Mechanical Systole. L. B. KADIS, M.D., N. T. SMITH, M.D., E. I. EGER, II, M.D., C. WITCNER, M.D., and D. CULLEN, M.D., *Departments of Anesthesia, Stanford University School of Medicine, Stanford, Calif., and University of California San Francisco Medical Center, San Francisco, Calif.* Nondestructive recording techniques (electrocardiogram, phonocardiogram and carotid artery waveform) and analog/hybrid computer methods permit on-line computation of the time duration of the phases of ventricular systole on a beat-by-beat basis. *Methods:* Left ventricular ejection time and pre-ejection period were measured in human volunteers who received either halothane anesthesia, methoxamine, or mephentermine. *Results:* Changes in the pre-ejection period and left ventricular ejection time correlated with the changes in stroke volume (dye dilution) following administration of cardioactive drugs. Both methoxamine and halothane had negative inotropic actions, while positive inotropy was seen following mephentermine. *Summary:* Left ventricular ejection time and the pre-ejection period can be recorded by nondestructive techniques and provide useful information about the performance of the heart during anesthesia.

Naloxone-Oxymorphone Interaction in Man. T. KALLOS, M.D., and T. C. SMITH, M.D., *University of Pennsylvania School of Medicine, Philadelphia, Penna.* Naloxone (Narcan,® Endo Laboratories) is a potent opioid antagonist without agonistic effects. We expected it to reverse mild degrees of depression, in contrast to nalorphine and levallorphan, which may add to mild narcotic depression. *Methods:* Five intramuscular injections, 2.5, 5, and 10 $\mu\text{g}/\text{kg}$ naloxone with 14 $\mu\text{g}/\text{kg}$ oxymorphone, and 7 and 28 $\mu\text{g}/\text{kg}$ oxymorphone