CENTRAL EFFECTS OF PHENCYCLIDINE HYDROCHLORIDE (SERNYL)

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Central effects of phencyclidine HCl (Sernyl, Parke Davis & Co.) were studied in cats. Immediately after i.v. injection, 1-2 mg/kg, the animal lost righting ability. Respiration became irregular, inspiratory spasticity being prominent. Nystagmus and mydriasis with irregular change in pupil size were noticed. Knee jerk reflex was somewhat exaggerated and tonic neck reflex was present. Although the animal was seemingly in anesthesia, some spastic gross movements were manifested. Three to 12 hrs after injection, the animal walked with heavy ataxia. Peculiar shaking of the head was characteristic symptom during recovery. Anesthetic dose (loss of righting reflex and gross movement of the head) was estimated to be 1.7 mg/kg. Some symptoms seemed to suggest the drug producing pharmacologic transection of the higher brain stem.

In curarized cats cortical and subcortical EEG activity as well as phrenic discharge and blood pressure were recorded. Upon i.v. injection of the drug, 1-2 mg/kg, phrenic volley was depressed and markedly prolonged in duration. Blood pressure was slightly elevated following initial fall. In all EEG tracings multiple-spikes and/or fast wave bursts alternately superimposed on the background activities. Marked changes were noticed in the suprasylvian gyrus and hippocampus. Larger doses
produced more frequent groupings of these waves. Transection of the brain stem intensified the appearance of these groupings. These behavioral and EEG changes generally supported the observations of precedent workers.

When a piece of filter paper soaked in 1% solution of the drug was topically applied to the cortical surface close to the recording electrodes, high-voltage waves were periodically recorded in the localized area of application. This type of localized response was most frequently observed in the anterior sigmoid gyrus. The periodicity of these waves was closely related to that of phrenic volley (see Fig. 1). Bilateral vagotomy or temporary arrest of artificial ventilation altered the pattern of phrenic volley and the periodicity of the localized waves in a parallel fashion. Spontaneous periodic activity coinciding with phrenic volley was less frequently observed in the anterior sigmoid gyrus*. This drug seemed to reveal this periodic activity in the neocortex. The pattern of periodic waves was modified considerably by transection of the brain stem at various levels.

*See preceding paper.