The method of surgical hippocampal lesions in dogs

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INTRODUCTION. Hippocampal formation is one of the most explored structure in the experiments concerned with learning and memory, and there is a lot of data about the influence of hippocampal lesions, especially in monkeys and rats, on different forms of behavior. Since the hippocampus is a large structure with a complicated shape, it is extremely difficult to make electrolytic or chemical lesions of whole structure. Thus, surgical lesion of hippocampus seems to be the one of the best methods of removing it. The aim of this paper is to show the way of surgical removal of the hippocampus in dog, one of the best experimental object in behavioral studies.

METHOD AND RESULTS. On the day of surgery the dog was sedated by Combelen (Propriomylopromazyne) 0.2 ml/kg with an Atropine (0.05%) 0.03 mg/kg (i.m.). Then, the animal was anesthetized with Nembutal (25 mg/kg i.p.). Surgery was done under aseptic conditions with the aid of an operating microscope. Skin was cut along the midline. The m. temporalis was resected in the margin of its aponeurosis and pushed outside without cutting it. Then, the skull of the dog was opened 25-45 mm from the posterior end, and 11-30 mm from the midline. On the cortex, the place of entering (about 7 mm in diameter) was localized between the f. ectolateralis and f. suprasylvia, according to Kreiner (2), which is the part of parietal visual association area (1). The hippocampus was seen in the temporal corn of lateral ventricle, in the deep of 11-13 mm.

Fig. 1 shows the shape and localization of the hippocampus in dog’s brain with the relation to the cortical fissures, and the place of entering to it. Surgery was done by suction under the scope control. This method allows to remove almost whole hippocampus. The most difficult is removal of the anterior parts of dorsal and ventral hippocampus. An example of such lesion is shown on the coronal section of the dog’s brain (Fig. 2). In this case, the lesion affected mostly medium part of the hippocampus, and extended to the ventral and dorsal part of it, with small incisions to their anterior parts. There was also an accidental minor invasion of the fibers of f. ectosylvia.

Fig. 1. Lateral view of the right hemisphere of dog’s brain. Hippocampus (H) is assigned by striped lines. F.s. fissura sylvia; F.es. f. ectosylvia; F.es.p. f. ectosylvia posterior; F.ss. f. suprasylvia; F.ss.p. f. suprasylvia posterior; F. el. f. ectolateralis; F.l. f. lateralis; F.cor. f. coronalis; F.cr. f. cruciatus; F.ps. f. presylvia; F.rh.a. f. rhinalis anterior; F.rh.p. f. rhinalis posterior.

Fig. 2. Coronal section of the dog’s brain on the level indicated in Fig. 1 by black arrow. Abbreviations as in Fig. 1; c.g.l. corpus geniculatum lateralis; c.g.m. corpus geniculatum medialis; C.e. cortex etorhinalis. Black arrow on Fig. 2 shows the place of entering to the hippocampus.