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ABNORMALITIES IN EEG RECORDINGS FROM ACTIVELY SENSITIZED ANIMALS WITHOUT CLOSE CORRELATION TO ANAPHYLACTIC RESPONSE

By

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The aim of this investigation was to compare the EEG and the behaviour of animals during the anaphylactic reaction. The EEG of rabbits and guinea-pigs that were actively sensitized with horse serum or re-crystallized egg albumin was recorded from chronically implanted electrodes resting on the dura. Low shock dosages were used to prolong the response in order to obtain long records of the EEG from each stage of the reaction.

In many cases, re-administration of antigen elicited the classical anaphylactic reaction. The majority of the changes in the electrical cortical activity recorded could easily be explained as the result of impaired respiration and failure of the systemic circulation. Initially, there was an intense desynchronization of the EEG activity in parallel with the signs of increased motor activity and uneasiness of the animal. Later, low voltage slow waves appeared together with motor artefacts derived from twitches and jerks of the animal, the general tonus of which was now markedly reduced. Finally, the records became iso-electric with bursts of convulsive potentials mixed with motor artefacts that coincided with the generalized convulsions that gradually faded out at exitus. In some animals, usually early after the injection of the challenging dose, episodes of

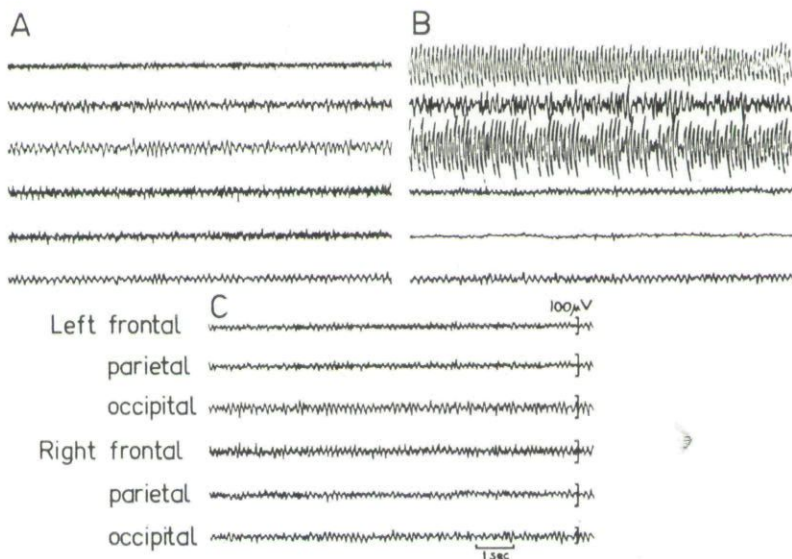


Fig. 1.

The effect on the EEG of an intraperitoneal injection of 100 mg re-crystallized egg albumin to a sensitized rabbit (weight 3.5 kg). The samples of records were taken before (A), 25 minutes after (B), and one hour after the challenge (C). On the bottom record, electrode positions, calibrations and time scale are given. *Note* depression of the EEG activity in the right parietal cortex, and hypersynchronous 9 c.p.s. waves in the entire left hemisphere. Complete restitution one hour after the challenge. No visible signs of the anaphylactic reaction in the behaviour that was continuously recorded on film.

hypersynchronous slow waves and epileptiform potentials, similar to those described in the literature, were sometimes recorded (see *Gozzano & Colombati, 1949, Brandon, 1955, Heimlich et al., 1956*). On the other hand, astonishingly normal EEG activity could occur, even at the stage of severe dyspnoea.

Unexpectedly, severe EEG abnormalities could also be recorded from animals that did not show any visible signs of the anaphylactic reaction. At those occasions, the changes in the electrical activity appeared 3 to 10 minutes after the intraperitoneal injection of the antigen, reached a maximum after 10 to 30 minutes and disappeared after one or two hours. The EEG

changes were of many different types. The frequent occurrence of asymmetries in the recordings from the two hemispheres was the most remarkable finding (Fig. 1). In those cases, high voltage slow waves or hypersynchronous rhythms of about 6 or 10 c.p.s. were obtained from one side. In other cases, abnormal potentials appeared bilaterally. Long-lasting depression of the activity of one hemisphere, or even from a part of it, could also occur (see for example the record from the right parietal area in Fig. 1). Occasionally, sharp waves were seen bilaterally, and once, for a period of 20 seconds, grand mal-like activity was observed. All these severe abnormalities could be registered from animals that seemed untouched by the challenge as judged from their behaviour.

In conclusion, it can be stated that there is apparently no direct relation between the EEG abnormalities and the degree of anaphylactic response. Nevertheless, it seems reasonable to regard the disturbances of the electrical cortical activity as a part of the anaphylactic reaction that can easily be overlooked because of its lack of behavioural correlates.

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