FIBRIN FILM IN NEUROSURGERY, FURTHER STUDIES

THE INSERTION OF FIBRIN FILM BETWEEN THE SUTURED DURA AND THE INTACT LEPTOMENINGES: THE EFFECT OF ROENTGEN THERAPY ON TISSUE REACTIONS TO FIBRIN FILM*

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I. THE USE OF FIBRIN FILM IN CRANIOTOMIES

In previous experimental and clinical studies,\(^4,5\) it has been shown that fibrin film is a valuable dural substitute and is effective in the prevention of meningocerebral adhesions. Additional experiments have been carried out to determine whether there was any advantage in using fibrin film in craniotomies in which no dural defect is left. It also seemed desirable to study experimentally the effect of roentgen therapy on wounds in which fibrin film had been implanted, since the material has found a considerable place in the surgery of central nervous system tumors.

The selection of cases in which fibrin film should be used depends upon the expected probability of scar and adhesion formation. In operations where the brain and dura are traumatized or sections of dura are removed, it is desirable to close the dural defect with fibrin film. To test whether this material should be used following intracranial operations in which the dura is completely closed after little manipulation of the brain and leptomeninges, we have performed temporoparietal craniotomies in monkeys with and without insertion of fibrin film under the sutured dura.

It is generally thought that trauma to the leptomeninges is required for the formation of adherent meningocerebral scars.\(^6,8\) In the course of our studies with fibrin film we have made several observations suggesting that in monkeys no detectable injury is required. In our earlier experiments designed to show the effect of fibrin film in preventing meningocerebral adhesions,\(^4,5\) circular sections of the dura were removed and replaced with fibrin film. Adhesions did not form after implantation of fibrin film, whether or not the leptomeninges had been injured. In 3 control animals the fibrin film was omitted. Two of these developed firm adhesions between the brain and the temporal muscle even though the leptomeninges had not been visibly dam-

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Further evidence that adhesions may form without apparent injury to the leptomeninges came from 2 of the animals in which fibrin film had been implanted. In each case the disc of fibrin film had slipped, leaving approximately one half of the dural defect uncovered. In both of these animals, adhesions formed in the area not covered by fibrin film even though trauma to the leptomeninges had been carefully avoided, but the portion in which the fibrin film remained in place was entirely free from adhesions.

Experiments. In 4 monkeys (Macaca mulatta) bilateral temporoparietal bone flaps were made. With the animal under nembutal anesthesia the scalp was prepared and a longitudinal midline incision was made extending from the brow to the external occipital protuberance. The scalp was mobilized and reflected downward, first on the left. A trapezoidal bone flap was made with four burr holes, its upper edge parallel with the longitudinal sinus (Fig. 1). The dura was then opened for a distance of about 6 cm. A rectangle of fibrin film was placed

Fig. 1. Craniotomy. The bone flap has been raised, exposing the dura.

Fig. 2. Brain and dura separated after fixation. A faint discoloration of the dura near the suture line was caused by the fibrin film.