A NEW TECHNIQUE FOR THE MICROSCOPIC EXAMINATION OF CEREBRAL VESSELS

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(Received for publication December 13, 1956)

DURING the past century, microscopic studies of the cerebral vessels of living animals have been made by many investigators of whom Hill, Florey, Forbes, Wolff, Villaret and Cachera must be especially mentioned. Forbes' introduction of the cranial-window technique made it possible to carry out observations under more physiological conditions, and the avoidance of secondary movements of the brain during respiration aided greatly both in the direct examination of the cerebral vessels and in the photographic recording of the vascular alterations. In general, the various authors reached approximately the same conclusions, namely, that the cerebral arteries are relatively inactive to neural and chemical stimuli in comparison with similar-sized vessels in other regions of the body.

In attempting to observe the state of the smaller vessels (15-50 μ) and measure their caliber accurately, we have utilized some of the recent improvements in microscopic and photographic equipment, and have developed a satisfactory technique in which the Leitz Ultrapak incident light illuminator is employed. In this apparatus (Figs. 1, 2, 3), illumination is introduced from the outside, transmitted through the objective and focused on the field under observation by means of a ring of condensers which surround the objective lens. The illumination is brilliant and color-photography is possible at magnifications of more than 240X. While the above procedure was being perfected, our principal goal in working in the field of experimental vascular physiology remained the development of a method whereby human vessels might be viewed microscopically in the operating room during craniotomy. This too has been achieved and it is now possible for the first time to take the Ultrapak apparatus to the operating theater and observe and photograph human cerebral vessels not only in their "normal" state but also under the influence of various stimuli. This technical advance is simply the result of using "Saran" paper—a plastic wrapping tissue—as a sterile drape over the exposed cortex. The Saran material, which is transparent, preserves the sterility of the operative field without interfering in any way with the microscopic examination. The present communication is a preliminary report of the method as it has been developed so far.

* This work was supported in part by Grant B-731(C) from the National Institutes of Health, United States Public Health Service.

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Fig. 1. Photograph of the assembled apparatus in the operating room.

The Use of the Ultrapak: Figs. 1 and 2 show the assembled apparatus in the operating room. The body of the Ortholux microscope is carried on the stand of a floor-model dissecting-microscope by means of a metal arm provided at

Fig. 2. Close-up photograph of surface of brain being examined.