A Study of the Incidence of Calcification in a Histological Survey of Surgical Biopsies of Meningiomas

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Calcification has long been recognized as an inconstant feature of meningiomas, both histologically and roentgenologically.

The exact histological incidence has not been well documented.

While reviewing the histology of 2,000 surgical biopsies of tumors of the central nervous system a special search was made for calcification and it is the purpose of this report to present the incidence of calcification noted in the entire group and thereafter to limit the report to the group of meningiomas.

Material and Methods

The material represents 2,000 consecutive cases of surgical biopsies removed at the National Hospital, Queen Square, London during the period April 1950 through December 1959.

The tissue was fixed mainly in 10 per cent formal-saline, embedded in paraffin and stained with hematoxylin and eosin, phosphotungstic acid hematoxylin, and van Gieson's stain.

The gliomas were classified according to Kernohan's classification. The meningiomas were classified according to Bailey and Bucy as follows:

- Meningotheliomatous type (Fig. 1). (Meningothelial type I, Cushing and Eisenhardt; leptomeningioma, Globus; syncytial, Russell).
- Psammomatous type (Fig. 2). (Meningothelial type II, Cushing and Eisenhardt; primitive, Globus; transitional, Russell.)
- Fibroblastic type (Fig. 3). (Dural fibroblastoma, Globus; exothelioma laminar, Rio-Hortega.)

Fig. 1. Meningotheliomatous meningioma. Large islands of arachnoidal cells with abundant cytoplasm and indistinct boundaries. Nuclei are moderately large. There are no mitoses. There is a slight tendency toward whorl formation. Hematoxylin and eosin, X120.
Psammomatous meningioma. Arachnoidal cells tend to form whorls, in many of which are concentric laminations with calcium salts and iron deposits forming "psammoma (sand-like) bodies." Hematoxylin and eosin, X120.

Sarcomatous type (Fig. 4).

Angioblastic type (Fig. 5). (Angioblastic, Russell;3 Cushing and Eisenhardt;7 and Globus.8)

In most cases one to several pieces of tissue were examined and no attempt was made to study the entire specimen. Therefore, the number of tumors showing calcification represents the minimal number. The degree of calcification was in the various forms or patterns shown in Figs. 6, 7 and 8. It is entirely likely that a more detailed study would reveal an even greater incidence of calcification.

Fibroblastic meningioma. Note elongated cells with slender nuclei and tendency to form interlacing bundles. In central portion of photograph there is a group of plump cells which resemble arachnoidal cells as seen in the meningotheliomatous type. Hematoxylin and eosin, X120.