Reticulin stain in differentiating astrocytomas from neurilemmomas on frozen sections

Technical note

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The authors recommend the use of a reticulin stain for frozen sections to differentiate between astrocytomas and neurilemmomas during surgery. This technique was first described for the diagnosis of pituitary adenomas.

KEY WORDS: frozen-section diagnosis · reticulin stain · astrocytoma · neurilemmoma

VELASCO, et al., recently described a quick reticulin stain of Wilder to be used to differentiate between normal tissue of the anterior lobe and microadenomas of the pituitary on frozen sections. Since the publication of that paper, we have found this method very useful in numerous cases of pituitary biopsies in our laboratory. Like the authors, we were able to prepare a completed stained section in about 7 minutes after sectioning in a cryostat.

Recently we have found that the same method can be successfully applied to differentiation between astrocytomas and neurilemmomas in the course of surgical exploration. This problem is most likely to occur with tumors of the posterior fossa. In most instances, clinical and roentgenological evidence and the gross findings during surgery enable us to differentiate between an acoustic neurilemmoma and a cerebellar or pontine astrocytoma. However, there are cases when an astrocytoma of the brain stem protrudes into the pontocerebellar angle simulating a tumor of the eighth nerve. Conversely, an acoustic neurilemmoma may penetrate into the cerebellum or pons to the point of becoming “pseudo-intraaxial” on radiological studies and appear as such even during exploration.

While in many instances “ordinary” frozen sections (stained with hematoxylin and eosin) will spell out the difference between an astrocytoma and a neurilemmoma, in some cases the differential diagnosis is fraught with great difficulties. Wavy parallel bundles of spindle-shaped cells characterize both the pilocytic astrocytomas and the Antoni A areas of neurilemmoma (Fig. 1 left). In addition, the loose texture caused by myxoid degeneration in Antoni B areas of neurilemmomas may appear very similar to astrocytomas with microcystic degeneration (Fig. 1 right). Rosenthal fibers, when present, help to establish the diagnosis of astrocytoma because they are not featured in neurilemmomas; however, they are not always found in frozen sections of gliomas either.

A reticulin stain is most useful in differentiating a brain-stem or cerebellar astrocytoma from a neurilemmoma. In the former, positive-staining areas are usually restricted to basement membranes of blood vessels, and the glial cells themselves are not surrounded by reticulin. In a neurilemmoma, on the other hand, each Schwann cell is surrounded by basement membrane material and some degree of collagen production is usually also present, resulting in a dense array of reticulin fibers commonly presenting in parallel, slightly wavy bundles. The silver impregnation method described by Velasco, et al., when applied to a neurilemmoma, will outline the characteristic reticulin pattern for a quick diagnosis on frozen section (Fig. 2).

Although the problem of histological differential diagnosis between astrocytoma and neurilemmoma most often occurs with tumors of the posterior fossa, occasionally neurilemmomas arising within the spinal
Differentiation of astrocytomas and neurilemmomas

Fig. 1. Photomicrograph of a frozen section from an acoustic neurilemmoma of an 18-year-old man. The tumor was deeply embedded in the left cerebellar hemisphere and closely imitated an astrocytoma. Left: Parallel bundles of tumor cells resemble piloid astrocytes. Right: In looser areas (Antoni B zones), some tumor cells imitate multipolar astrocytes. H & E, × 200.

Fig. 2. Reticulin stain of Velasco on frozen section shows characteristic pattern of fibers as seen in neurilemmomas, × 180.

canal may also become compressed against the spinal cord so as to appear intraaxial. Conversely, spinal cord astrocytomas may grow into the subarachnoid space. Reticulin stain on frozen sections may be applied to resolve this particular problem also.

References


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