A 49-year-old woman with a 10-year history of untreated dizziness and depression was hospitalized because of aggravation of dizziness associated with vomiting. Computed tomographic scan and magnetic resonance imaging revealed a roundish lesion about 4 cm in diameter in the fourth ventricle. The mass reached the Luschka and Magendie foramina and caused dilatation of the supratentorial ventricular system. It showed calcified areas and appeared homogeneously enhanced upon contrast administration (Figure 1).

The lesion was surgically removed. The pathologic tissue was gray-yellow, bleeding, and infiltrating. The surgical excision was pronounced to be a gross total resection by the surgeon. The patient's postoperative course was uneventful. Postsurgical magnetic resonance imaging did not show any contrast enhancement in relation to the previous mass, thus confirming total excision. No further therapy was recommended. The patient is alive and well 12 months after surgery.

Light microscopy revealed a lesion with double architectural pattern: extensive solid areas and papillary zones. The tumoral cells were large and polygonal, with distinct cytoplasmic borders and finely granular eosinophilic cytoplasm. Multinucleated pleomorphic cells were appreciable, particularly in the solid areas. Mitotic figures were exceedingly rare. Necrosis and vascular hyperplasia were not observed. Abundant calcifications were appreciable (Figures 2 and 3).

Upon performing immunohistochemistry, neoplastic cells were diffusely and intensely transthyretin and neuron-specific enolase positive and weakly positive for synaptophysin and neurofilaments; cytokeratins, CAM 5.2, vimentin, and S100 protein provided positive results in the papillary areas only; and no immunoreaction for glial fibrillary acidic protein, thyroglobulin, or p53 was detected. Proliferating cells, as evaluated by Ki-67, were 3%.

Ultrastructurally, the examined tissue was made up of a single layer of columnar cells extending between thin stromal papillae and narrow intercellular slits. The single nucleus was oval, with pale chromatin and a large nucleolus rich in fibrillar and granular components. The cytoplasm was full of elongated mitochondria, rich in cristae, and with pale matrix (Figure 4). The other organelles were poorly developed. The cells contained many round granules with electron-dense content, about 150 to 300 nm in diameter. The apical cell surface expanded in short, variably oriented microvilli. A continuous basal lamina bordered the basal cell surface.

What is your diagnosis?
Pathologic Diagnosis: Oncocytic Variant of Choroid Plexus Papilloma

Neoplasms composed of large eosinophilic granular cells are occasionally observed as a result of cytoplasmic accumulation of mitochondria, lysosomes, smooth endoplasmic reticulum, or secretory granules.1

In 1962, Hamperl2 defined the oncocyes as epithelialized cells characterized by the presence in their cytoplasm of abundant swollen mitochondria. Oncocytic transformation may occur in differentiated types of tissues in pathologic and nonpathologic conditions, possibly as a consequence of compensatory mitochondrial hyperplasia due to defects of the oxidative metabolism.3

Nearly all tumors may show oncocytic changes, but they are more frequent in renal, thyroid, and salivary gland neoplasms. With the exception of the pituitary adenomas, oncocytic tumors are uncommon in the intracranial region: oncocytic transformation occurs in 21% to 30% of null cell pituitary adenomas,4 but it has been described only 11 times in the other intracranial tumors. To our knowledge, 7 cases of oncocytic meningioma1 and 4 cases of choroid plexus papilloma5-7 have been documented to date in the international literature (the present oncocytic choroid plexus papilloma is the fifth case).

Oncocytic choroid plexus papilloma seems to occur predominantly in the fourth ventricular region of adult women: 4 of 5 patients were older than 21 years of age and were women; the only young patient, a 12-year-old girl, had the only tumor in a site different from the fourth ventricle (left temporoparietal).

Although true oncocytic tumors are considered to be those that show oncocytic changes in more than 75% of neoplastic cells,1 oncocytic transformation was focal in 1 case. In 3 tumors the architecture was diffusely papillary; in the present lesion there were papillary and solid areas; in the remaining case, information on the tumoral architecture was lacking. Mitotic figures were rare in all cases, whereas multinucleated pleomorphic cells were documented in 2 of them. Calcifications were appreciable in 3 cases.

In the ultrastructural study the most notable finding was the presence of innumerable mitochondria, which were rich in cristae. Of those lesions that could be put in differential diagnosis with reference to oncocytic choroid plexus papilloma, a metastatic oncocytic carcinoma should be excluded first. However, the typical intraventricular localization and the immunohistochemical coexpression of vimentin, cytokeratins, and neuro-glial markers may certainly represent helpful information in distinguishing choroid plexus tumor from metastatic carcinoma. In addition, the negativity to thyroglobulin may be decisive in the differentiation from a metastatic Hürthle tumor. Transthyretin is considered a marker for pathologic and nonpathologic choroid plexus epithelia; however, it is determined to be negative upon immunohistochemistry in up to 20% of choroid plexus papilloma and is positive in some metastatic carcinomas.8

The clinical behavior of the oncocytic variant of choroid plexus papilloma is unclear. Of the 5 cases, 2 patients died postoperatively, 1 (the young patient affected by the only known lesion outside of the fourth ventricle lesion) experienced a recurrence 12 months after the subtotal resection of the tumor and showed clinical and histologic evidence of tumor evolution from benign to malignant oncocytoma, our patient is alive and well 12 months after the surgery, and 1 case lacked sufficient follow-up. The high incidence of recurrence in patients with oncocytic meningioma as well as in those with oncocytic pituitary adenoma indicated a more aggressive behavior of the oncocytic intracranial lesions.1 However, at present, this feature cannot be considered to represent a prognostic factor.

Because of the rarity of oncocytic tumors in the intracranial region and because of the unfavorable behavior of some of these tumors, further studies are necessary to ascertain the benignity of these rare intracranial tumors.

References