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Short Report

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The Histopathologic and the Immunohistochemical Features of Secretory Meningiomas

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Meningiomas are classified into 4 groups according to the recent "World Health Organization (WHO)" classification system: typical meningioma, atypical meningioma, papillary meningioma and anaplastic (malignant) meningioma (1-4). Secretory meningioma, which is a subtype of typical meningiomas, constitutes approximately 3% of all meningiomas. The disease is encountered predominantly in elderly females with a ratio of 9/1 (5).

Clinically, the preoperative computed tomography or magnetic resonance imaging scans show evident peritumoral edema. The main histologic feature is the hyaline inclusions formed as a result of the epithelial differentiation of the meningothelial cells (5). In this report, a 65-year-old woman diagnosed with secretory meningioma is presented, both because of the tumor's rarity and its distinctive histopathologic and immunohistochemical features.

Case Report

A 65 year-old woman (NA, 12285/99) presented with an 8-month history of headache, starting at the right side of her head and gradually spreading throughout. Computerized tomography disclosed a mass at the lateral side of the right sphenoid wing and the mass was excised totally.

On gross examination, the material consisted of hyperemic, tan to white colored tissues of 1.5x1.3x0.8 cm to 3x2x2 mm.

Histologic examination revealed round or oval tumor cells with vesiculated nuclei and eosinophilic cytoplasms. While some of the tumor cells were arranged in a storiform pattern, others formed lumens. With the hematoxylen-eosine stained sections, there was a prominent homogenous, eosinophilic material in these lumens (Fig. 1). Histochemically, periodic acid-Schiff (PAS) and elastica van Gieson (EVG) stains were applied to the paraffin embedded tissues, and the secretory globules stained red with PAS and orange with EVG (Figs. 2-3). The immunohistochemical study revealed cytokeratin (Fig. 4), carcinoembryonic antigen (CEA) (Fig. 5) and epithelial membrane antigen (EMA) (Fig. 6) positivity in the secretory globules. With these findings the diagnosis was thought to be "typical meningioma (secretory type)".

Secretory meningioma is a rare neoplasm, which is described as a new variant of meningiomas according to the WHO classification of brain tumors in 1993 (2). Most of the tumors are localized at the sphenoid or the frontal regions and the first symptom of the patients is usually either headaches or convulsions (1,5). The scanning methods reveal some distinct features of secretory meningioma which distinguish it from the other subtypes of meningioma. The most distinctive feature is its strong

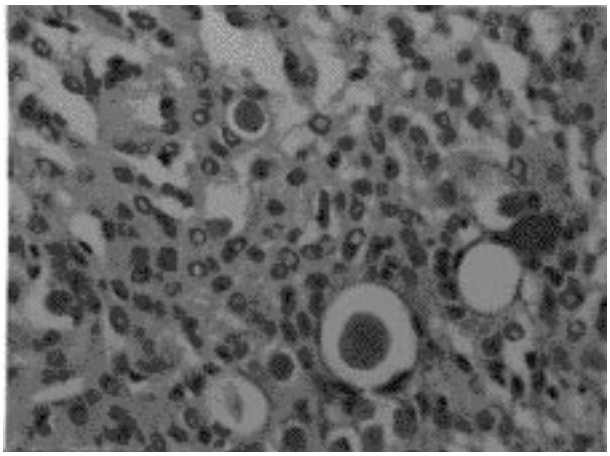

Fig 1. The adenoid structures formed by the tumor cells in this secretory meningioma case and the eosinophilic secretion in the lumen (H+E, x200).

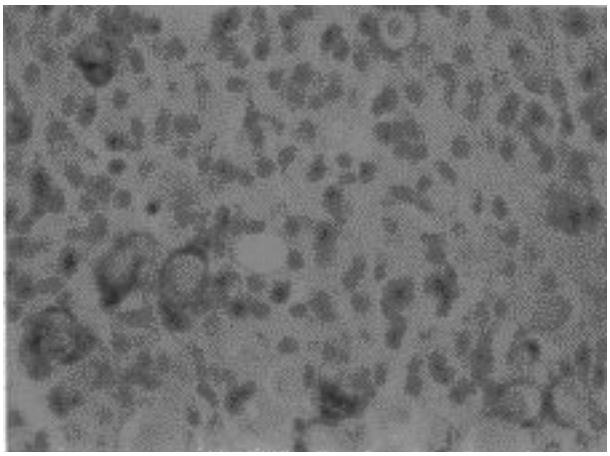

Fig 2. The secretion in the lumens of the adenoid structures stained red with the PAS reaction (x200).

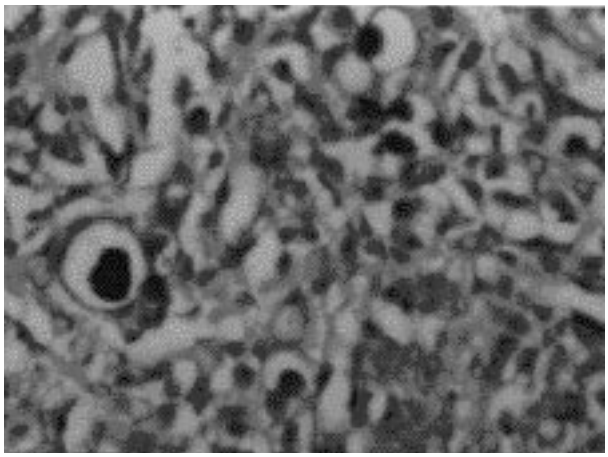

Fig 3. The secretion in the lumens of the adenoid structures stained orange with EVG (x200).

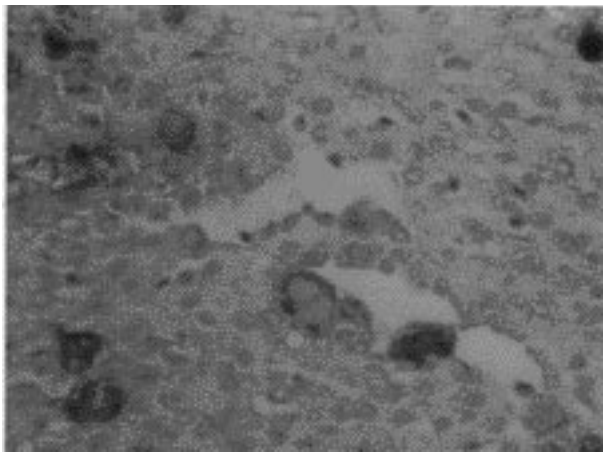

Fig 4. The secretion in the lumens of the adenoid structures stained positively with cytokeratin (x200).

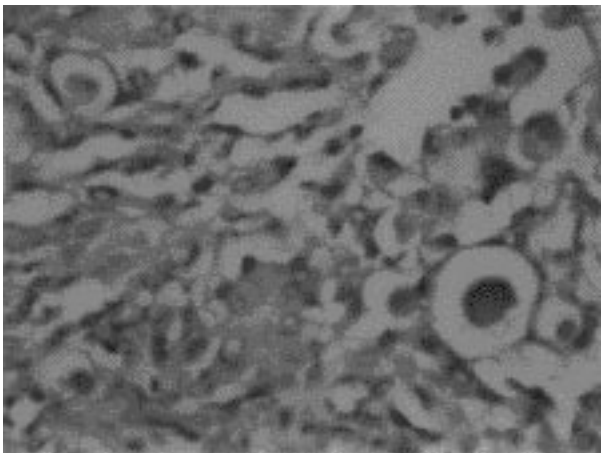

Fig 5. The secretion in the lumens of the adenoid structures stained positively with CEA (x200).

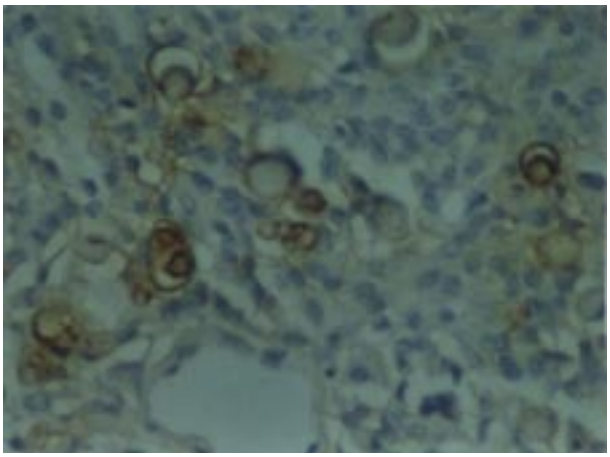

Fig 6. The secretion in the lumens of the adenoid structures stained positively with EMA (x200).

tendency to develop brain edema (5-7). Brain edema is a finding which usually accompanies malignant, aggressive and rapidly growing intraparenchymatous tumors. Since secretory meningioma is a benign, slowly developing tumor, its association with brain edema seems to be conflicting. However, as a result of some hypotheses which have been proposed to explain this association, it was thought to be multifactorial (5).

Microscopically, secretory meningiomas reveal a meningothelial growth pattern, and the presence of moderate to abundant secretory globules of different sizes is a characteristic feature (5). The first descriptive term for these characteristic structures was introduced by Cushing and Eisenhardt as "glassy hyaline inclusions" (HI) (5,8). Following a publication by Kepes in 1961, these inclusions were also referred to as "pseudopsammoma bodies" (5,9). Since 1986, after the unique secretory features of these meningiomas were established, the term "secretory meningioma," proposed by Alguacil Garcia et al., (5,10) has been used. Histochemical, immunocytochemical and ultrastructural studies have revealed that pseudopsammoma bodies in meningiomas are identical with intracytoplasmic inclusions of some epithelial neoplasms, especially of mammary and gastric carcinomas (11). Ultrastructurally these inclusions are characterized by granular, proteinous material localized in either the intracytoplasmic or the extracytoplasmic lumens surrounded by microvilli (12).

In a study by Sav et al. including 6 secretory meningioma patients, the most useful histochemical stains in determining the inclusions were found to be PAS and EVG (12). The inclusions were PAS positive, diastase resistant and stain picrofylic (yellow-orange) with EVG. On the other hand, von Kossa, Congo red and Gomori's reticulin have revealed negative staining (3,4,12). We achieved similar results with PAS and EVG in our patient (Figs. 2,3). The inclusions and the surrounding cytoplasms stain positively with cytokeratin, CEA, EMA, Alpha 1-antitrypsin, Alpha 1-antichymotrypsin and Immunoglobulins (5). On the other hand, tumor cells which lack inclusions have prominent vimentin positivity, while S-100 protein is only locally reactive. We applied cytokeratin, CEA and EMA and achieved distinct positivity (Figs. 4-6).

P53 immunoreactivity and micronecrosis are helpful findings in determining the probability of recurrences in meningiomas (13). It is also confirmed that the recurrences in patients receiving radiotherapy are fewer (13). Our patient, who had surgical excision as the only treatment, did not have a recurrence during the 10 month period.

In conclusion, since secretory meningioma is a rare variant of meningiomas and has a distinct histopathologic appearance in addition to its benignity, and although it has prominent peritumoral edema determined by the scanning techniques, it should be kept in mind and distinguished mainly from the other subtypes of meningiomas.

References

1. Parisi JE, Mena H. Nonglial tumors. In: Principles and Practice of Neuropathology. St Louis: Mosby, 1993, pp: 203-213.
2. Kleihues P, Burger PC, Scheithauer BW. The new classification of brain tumors. Brain Pathol 3: 255-268, 1993.
3. Canda MŞ. Meningiomların genel patolojik özellikleri. Türk Neopl Derg 3 (2): 79-89, 1995.
4. Canda MŞ. Meningiomların patolojisi (Yeni yöntemle 58 olgunun histopatolojik olarak sınıflandırılması ve derecelendirilmesi). Türk Patol Derg 11 (2): 272-277, 1995.
5. Probst-Cousin S, Villagran-Lillo R, Lahl R, Bergmann M, Schmid KW, Gullotta F. Secretory meningioma: clinical, histologic, and immunohistochemical findings in 31 cases. Cancer 79: 2003-2014, 1997.
6. Liebig T, Hoffmann T, Hosten N, Sander B, Van Landeghem F, Stoltenburg Didinger G, Lanksch WR. Lipomatous secretory meningioma: case report and review of the literature. Neuroradiol 40 (10): 656-8, 1998.
7. Tsuzuki N, Nakau H, Sugaya M, Hashizume K, Matsukuma S, Wada R, Kuwabara N. Secretory meningioma with severe perifocal edema-case report. Neurol Med Chir (Tokyo) 37 (8): 620-3, 1997.
8. Cushing H, Eisenhardt L. Meningiomas: their classification, regional behaviour, life history and surgical end results. Springfield, IL: Charles C Thomas, 1938.
9. Kepes JJ. Observations on the formation of psammoma bodies in meningiomas. J Neuropathol Exp Neurol 1961; 34: 282-9.

10. Alguacil-Garcia A, Pettigrew NM, Sima AAF. Secretory meningioma: a distinct subtype of meningioma. Am J Surg Pathol 10: 102-11, 1986.

11. Budka H. Hyaline inclusions (Pseudopsammoma bodies) in meningiomas: immunocytochemical demonstration of epithel-like secretion of secretory component and immunoglobulins A and M. Acta Neuropathol (Berl) 56 (4): 294-8, 1982.

12. Sav A, Söylemezoğlu F, Özer F, Pamir N, Küllü S, Ekicioğlu G. Secretory meningioma: a conventional histochemical study of six cases. Turk Neurosurg 2: 10-13, 1991.

13. Kamei Y, Watanabe M, Nakayama T. Prognostic significance of p53 and p21WAF1/CIP1 immunoreactivity and tumor micronecrosis for recurrence of meningiomas. J Neurooncol 46 (3): 205-13, 2000.