Secretory meningiomas

Report of clinical, immunohistochemical findings in 12 cases and review of literature

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Summary

Secretory meningiomas are rare meningioma subtype. Among meningiomas, the frequency of secretory meningiomas is 1.6%. Unlike other meningioma types, most of the patients were female (ratio 3 : 1). No recurrence was reported during the 24–180 months follow-up period of our secretory meningiomas in which, a low level of 0.3% Ki-67 proliferative index was reported. In this meningioma subtype, the percentage of cases with positive progesterone receptor is 33%. With carcinoembryonic antigen, cytokeratin and epithelial membrane antigen, in all the cases positivity was observed in both, the inclusions and the cells surrounding them. With human milk fat globulin 2, a high ratio (92%) of positivity was observed. Majority of the cases were negative with CA125, only three of the cases had suspicious positivity. Distribution of inclusions was irregular and their positive reactions showed varying staining features. Positivity with alpha-1-antitripsin was seen not only in the inclusions but also in some meningothelial cells as well. Ubiquitin was positive in inclusions of the 83% of cases. Staining features of the inclusions pointed out the possibility of them being in a varying age and/or content. Secretory meningiomas are a different type compared to other meningiomas, not only with their histological features but also with their clinical features as well.

Introduction

Most subtypes of meningiomas which are collected in 15 subtypes in the WHO classification do not have any prognostic significance, however some subtypes like clear cell meningiomas, papillary meningiomas are clinically aggressive groups [1]. Secretory meningiomas are rare tumors and only 119 cases of these have been reported until present. These meningiomas are histologically different type with their epithelial differentiation features reflecting the pluripotential of cap cells, they seem to be different with their clinical features as well [2–6]. Intracellular lumina and eosinophilic inclusions are their distinguishing histological features. This hyaline inclusion was first described by Cushing and Eisenhart and named as pseudosammmoma bodies by Kepes [3,7]. Alguacil-Garcia et al. has determined the secretory features of these meningiomas thus suggested the name secretory meningioma [4]. Findings of immunohistochemical and electron microscopy also revealed epithelial differentiation features of secretory meningiomas [2–5,8–12].

In this study, the clinical features and immunohistochemical findings of 12 secretory meningioma cases are examined and evaluated along with those cases reported until today.

Material and methods

During 1975–2001, 800 cases of meningioma were operated and diagnosed in Ege University, School of Medicine. Those cases were reviewed again by two pathologists according to WHO (2000) classification. Through immunohistochemical examinations, cases which were diagnosed with haemangiopericytoma, haemangioblastoma and neurinoma, including 70 cases not sufficient enough for evaluation were extracted from the study. Remaining 730 (719 of them
cranial, 11 of them spinal) cases were re-classified. Twelve cases (1.6%) were diagnosed with secretory meningioma. Clinical information of the patients was obtained from the patient files. Eight of the cases had follow-up data. No recurrence was observed during the 24–180 months (mean 77 months) follow-up period. The peritumoral edema was determined on either computerized tomography (CT) or magnetic resonance imaging (MRI) scans and graded as small, moderate and severe [12]. Sections were routinely stained with hematoxylin and eosin (H.E.), periodic acid-schiff with diastase and without diastase. Immunostaining was performed by the avidin–biotin complex method or alkaline phosphatase–antialkaline phosphatase method. The nine applied primary antibodies are listed in Table 1. Positive controls have been used as follows: epithelium of the breast tissue used for human milk fat globulin 2 (HMFG-2) positive staining; Mallory bodies in the alcoholic liver tissue used for ubiquitin positive staining; squamous epithelium of epidermis used for cytokeratin positive staining; adenocarcinoma of colon used for both epithelial membrane antigen (EMA) and carcinoembryonic antigen (CEA) positive staining; serous papillary carcinoma of over used for CA125 positive staining; liver tissue for alpha-1-antitripsin (AT) positive staining; invasive ductal carcinoma previously detected for estrogen and progesterone receptor (PR) positivity used for estrogen and PR positive staining; lymph node used for Ki-67 positive staining.

Results

Clinical features

Of all cases, nine were women; three were men with mean of 46 years (32–65 years). With regard to location: three were situated at sphenoid ridge, three at frontal base, one at frontal convexity, one at temporal convexity, one at posterior parietal, one at temporal base, one at petrous apex and one at petroclival. Of the five cases in which edema was evaluated; three had severe (Figure 1), one had moderate and the last case had no edema at all (Figure 2a,b). One of the eight cases with recorded follow-up data died postoperatively, another one died of a reason not related to tumor on the 9th year of the postoperation follow-up period. Six of the patients were followed up for a mean 77 month (range 24–180 month). No recurrence occurred during this period. One of the patients had a residual mass but no growing was observed. Detailed clinical information is given in Table 2.

Histology

The main histopathological patterns in H.E. sections were transitional in eight (67%), meningothelial in four (33%). Among them, five cases (41%) had angiomaticous features. Pericytic proliferation was a distinct feature and it was observed in 83% of the cases (Figure 3). Only three had psammoma bodies. Detailed histological finding is given Table 3. Eosinophilic inclusions that were observed in various dimensions display clusters (Figure 3). Perivascular arrangement was marked, especially in three cases. Some areas in the tumors did not contain any inclusion.

Immunohistochemistry

In all of the cases, the inclusions and the cells surrounding them were both positive with CEA (Figure 4). In five cases, inclusions were negative with cytokeratin, but in all the cases, cells surrounding these inclusions were positive. With EMA, staining was located in the periphery of the inclusions and in the cell