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Spinal Fluid Cytology of Retinoblastoma

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Of all the primary central nervous system tumors, the medulloblastoma, glioblastoma multiforme, ependymoma and pineal germinoma tend to exfoliate in the cerebrospinal space. With all other types of the tumor, abnormal cells may seldom be definitely identified in the cerebrospinal fluid. Up to now the tumor cells have been rarely found in CSF in cases of retinoblastoma. We have experienced a case of advanced retinoblastoma that showed exfoliated cells in spinal fluid.

Key Words: Retinoblastoma, Cerebrospinal fluid, Cytology

CASE REPORT

This 4 year old girl was admitted to Seoul National University Children's Hospital due to ocular pain of the right eye on July 1987. She was diagnosed to have an intra-ocular mass by funduscopy done on November 1986. However, the sugery was not carried out at that time because of the parents refusal. In the interim the ocular pain became progressively severe and was proptotic. Eventually the enucleation of the right eyeball was performed on July 25, 1987, under the diagnosis of retinoblastoma.

Submitted eyeball measured 2 cm in equatorial diameter and 2 cm in height. An 1.0 cm stump of the optic nerve with a diameter of 0.5 cm was attached to the posterior pole of the eyeball. The cornea was round and intact. Cut sections showed gray white granular tumor masses with areas of chalky white granular calcification. These tumor masses were filling the vitreous cavity almost completely, having extended into the anterior chamber and the lens (Fig. 1). The sclera was grossly intact. However, the optic nerve stump was grossly involved by the tumor showing gray white homogeneous tumor replacement.

Microscopically the tumor masses consisted of solid sheets of small hyperchromatic cells without forming any specific organoid pattern. There were large areas of necrosis and spotty calcification. The tumor cell nuclei were round to ovoid, showing fine chromatin clumpings and occasional mixture of histiocytes with clear cytoplasm (Fig. 2). Fine capillaries were scattered in the tumor. Mitotic figures were rarely seen. The tumor masses involved the entire retina, ciliary process and filled the vitreus completely. The optic disc was involved and the tumor was directly extending to the optic nerve. Whole optic nerve stump was diffusely permeated by the tumor cells, and the resection margin was accordingly involved by the tumor.

Ten days after the operation cerebrospinal fluid sample via lumbar puncture was taken as a part of workup for the postoperative chemotherapy. Three ml of clear fluid was sent. The submitted specimen was cytospinned and smears were prepared.

The tumor cells in CSF appeared in small clusters and singly. The cells were generally small, measur-

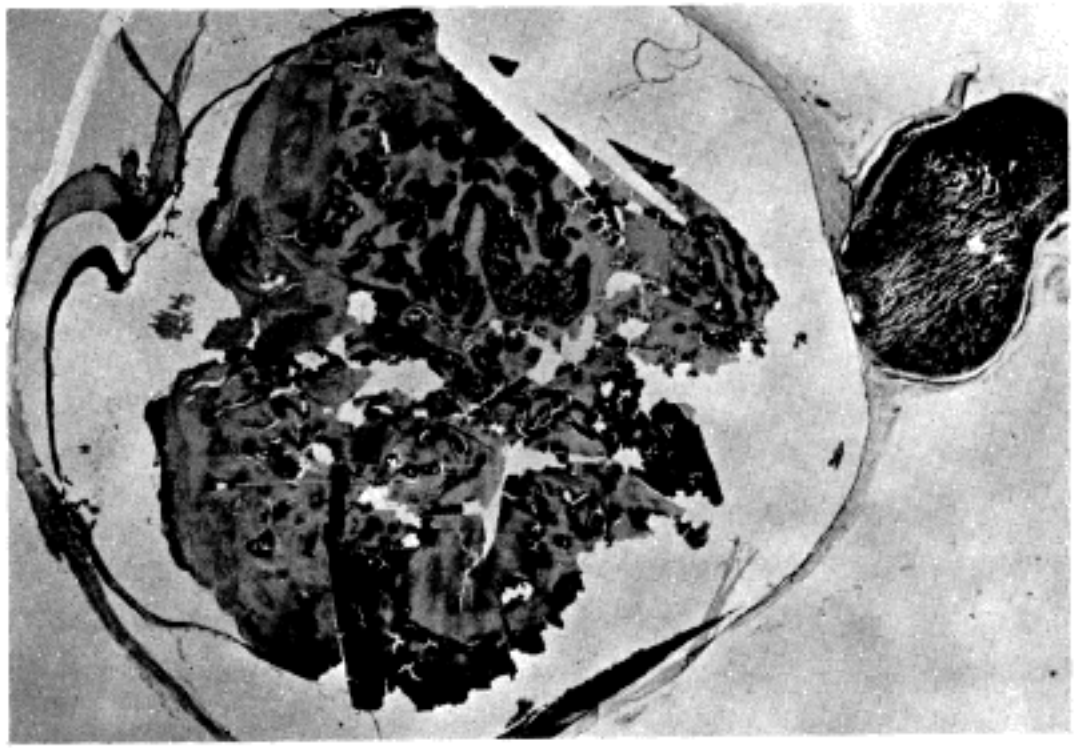

Fig. 1. Low power photomicrography of the involved eyeball, showing a massive tumor mass in the vitreous cavity. Note the optic nerve stump that is heavily infiltrated by the tumor masses.

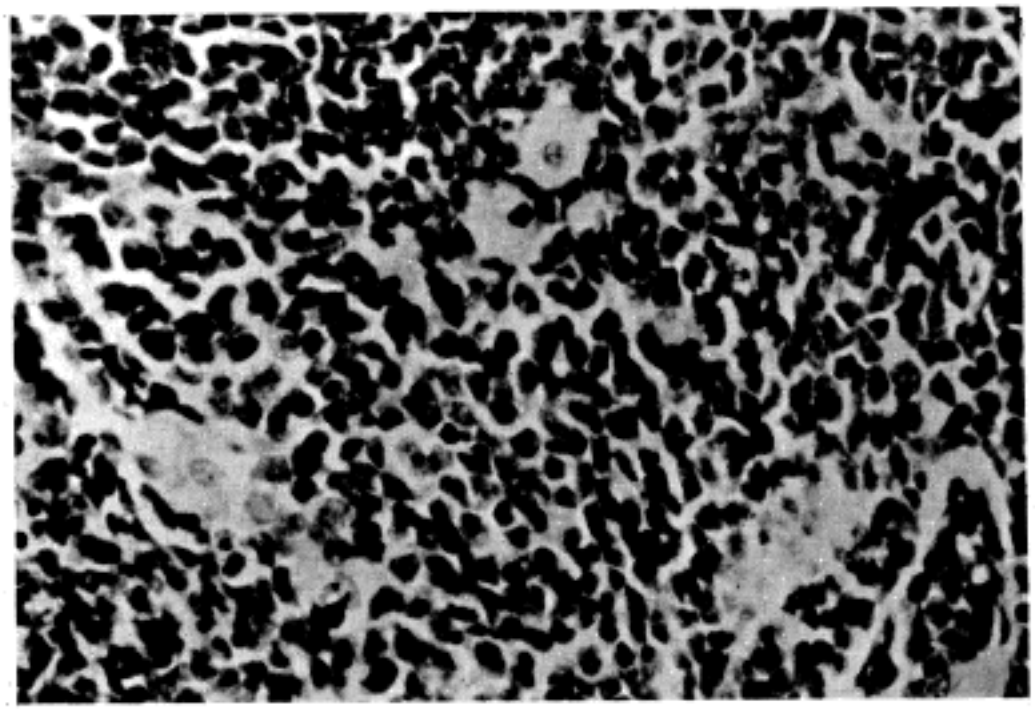

Fig. 2. Photomicrograph of retinoblastoma of the eyeball, showing solid sheets of undifferentiated hyperchromatic tumor cells with frequent mitoses. H&E, x100.

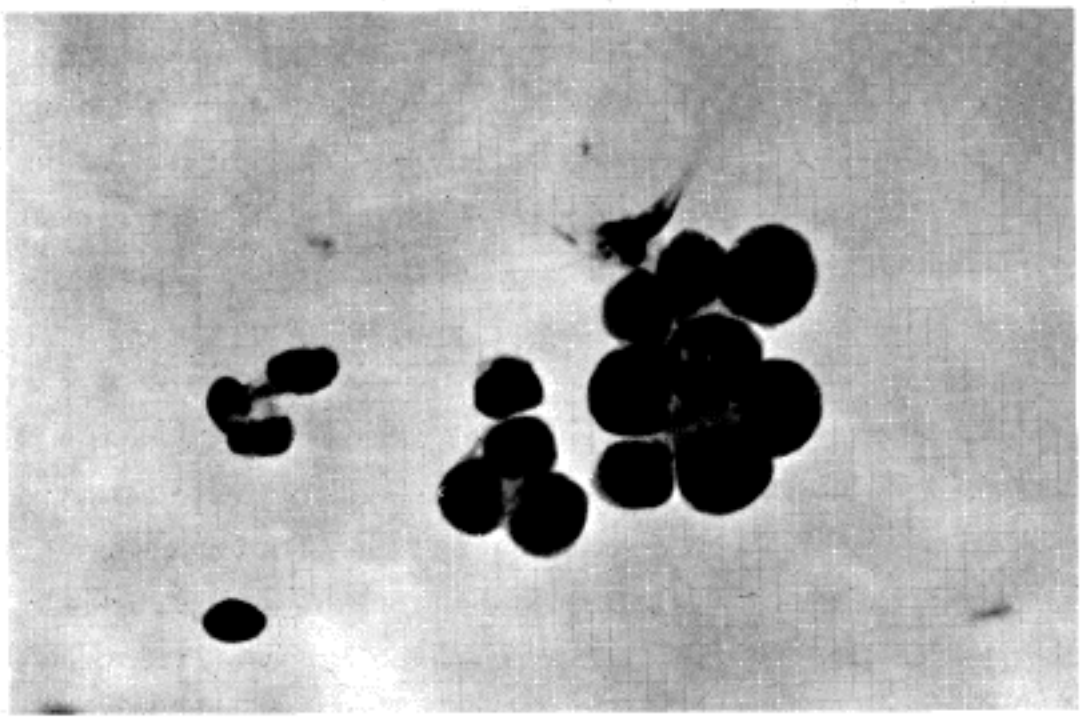

Fig. 3. Retinoblastoma cells in CSF. Clumps of small round dark cells with scanty cytoplasm are seen. Giemsa x1,000.

ing 5 to 7 um in diameter and round to ovoid. Although they tended to group no structure with central lumen forming rosette was seen. The nucleus was frequently round, rarely polygonal and relatively abundant in chromatin (Fig. 3). Fine chromatin clumpings were seen. No nucleolus was noted. The cytoplasm was scanty and basophilic. Eccentricity of the cytoplasm of tumor cell was different from lymphocyte although the size was approximately same. Mitoses were rarely found. The tumor cells showed similar feature with that was seen in enucleated specimen.

COMMENT

It is certainly unfortunate that this case lost the chance of early surgery. When the intraocular mass was detected on November 1986, the right eye enucleation should have been done. The surgery was delayed for 7 months, and by the time of the second visit to the hospital the tumor masses replaced the entire eyeball and more importantly the optic nerve was completely permeated by the tumor. The histology of tumor was also fairly undifferentiated type without any rosette formation.

It is easily presumed in this case that the tumor cells reached CSF through the optic nerve sheath and subarachnoid space to be disseminated through the cerebrospinal pathway.

The diagnosis of brain tumors through cytologic analysis of CSF proved to be a very important area of CSF cytology. Exfoliation of tumor cells is known to be dependent on whether or not the tumor has reached the subarachnoid space or the ventricular system. It seems also to be dependent on the type of tumor plus other factors such as quantity of CSF available, the location of the puncture and the preparation method[1].

Among the pediatric CNS malignancies the medulloblastoma and germinoma are two types of tumor that tend to exfoliate in CSF space[2]. With all other types of tumors, abnormal cells may seldom be definitively identified in the CSF[1~3]. The retinoblastoma is a very frequent tumor in childhood. However, up to now the tumor cells have been rarely found in CSF. In the past in this institution we have not experienced exfoliated retinoblastoma cells in CSF. It appears important to get familar with cytological features of retinoblastoma for the differential diagnosis from malignant lymphoma or other small cell malignancies.

참 고 문 헌

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＝국문초록＝

뇌척수액에서 검출된 망막모세포종

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중추신경계종양중 뇌척수액내로 종양세포가 파급되는 경우는 종종 있으나 망막모세포종은 아주 드물게 뇌척수액을 침범하는 것으로 알려졌다.

본 예는 4세 여아로서 망막모세포종의 진단이 내린후 7개월 동안 수술이 지연되었던 예로 수술당시 이미 안구 전체는 물론 시신경까지 완전히 미분화성 망막모세포종에 의하여 침윤되어 있었다. 이러한 수술 10일만에 시행된 뇌척수액 검사에서 안구종양 세포와 동일한 망막모세포종 세포가 개개로 혹은 세포 집단으로 나타났으며 이들은 그 크기가 작고 둥글고, 섬세하고 농염성의 핵질을 가지고 있었다.