CASE REPORT

A case of tanycytic ependymoma with review of the literature

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ABSTRACT

Tanycytic cells are common progenitor cells of both ependymal cells and astrocytes. It is commonly seen in pediatric population but all ages are affected. The common location of intracranial ependymoma is the fourth ventricle. We report an adult female who presented with intrathecal mass posterior to Lumbar 1 and Lumbar 2 intervertebral disk spaces. She underwent thoracic-lumbar (T12, L2-L3) laminectomy with excision of the intramedullary tumor. The tumor was dissected down to the tip of the conus medullaris and it was gross total resection of tumor. Final pathology confirmed portions of a moderately hypercellular neoplasm composed of bland, uniform cells with small round nuclei, stippled chromatin and abundant eosinophilic cytoplasm that in some areas forms long fibrillary processes. She was not offered any adjuvant radiation treatment. In conclusion it is very important to distinguish from diffuse astrocytoma, which usually cannot be totally excised. Tanycytic ependymomas usually carry better prognosis as compared to other variant of ependymomas and astrocytomas. The objective of our case report is to document the radiological and typical ependymal features of the neoplasm and to increase awareness in oncology community.

Key words: tanycytic, ependymoma, neuroectodermal tumor.

INTRODUCTION

The tanycytic ependymoma is an extremely rare, primitive neuroectodermal tumor, arising from the ependymoglial cells or tanycytes. The origin of ependymoma is a matter of debate but overall scientists believe it arises from cell called radial glia, which is the stem cell of tanycytic and glia cells.[1] Although these tumors often appear histologically low grade according to the World Health Organization (WHO) classification scheme but flow cytometry results and clinical behavior may be more typical of high grade neural tumours. Treatment of ependymomas is controversial since there are no randomized, controlled trials on which optimum therapeutic approach can be based. As per English literature, tanycytic ependymomas should be managed in the same way as "ordinary" ependymomas, since there is no current evidence suggesting that these tumors differ in terms of biological behavior.[2] However increased awareness of this transitional form of intramedullary ependymoma among neurosurgeons, oncologists and pathologists may avoid unnecessary surgical approaches and postoperative treatment. As of now, standard of treatment is surgical resection. Role of radiation and chemotherapy is still evolving.

CASE REPORT

A 59-year-old lady in good health had been having

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issues with pain in both lower legs since June 2011. Since she was an artist by occupation and had long standing hours she attributed it to fatigue. She had no other associated symptoms so did not seek medical attention. The patient had a fall in September 2012 at her work place injuring her head and upper neck area. CT scan of the head and spine did not show any radiological abnormality or any bone fracture or injury except for some degenerative changes at C6, C7 (cervical 6 and 7) vertebrae level. Patient went home with prescription for pain killers. In mid-November 2012 she presented with lower abdominal pain to local emergency room. Her blood work was normal. She had tenderness in left lumbar area on deep palpation. No other abnormality was found on thorough physical examination. The working diagnosis was renal colic. She had a computerized tomography scan renal protocol done to rule out renal calculi but imaging did not show any major pathological features in the abdominal viscera or pelvic area except for sigmoid diverticulitis and cholelithiasis. In December 2012 patient experienced few episodes of urinary incontinence as well as occasional bowel incontinence. No neurological deficits were reported except for the new onset of back pain. She was sent by her Family doctor to a chiropractor who was very uncomfortable working on her back after hearing that she had urinary and bowel incontinence. He suggested that the patient should go to the emergency room. The patient underwent an x-ray of the chest and lumbar spine. In the lumbar spine there were some arthritic changes in Lumbar 3-5 vertebral bones. CT scan of the chest did not show any abnormalities in lung or mediasti-

num. However, in the CT scan of the abdomen and pelvic on the sagittal reformation images there was note made of faintly seen intrathecal mass posterior to Lumbar 1 and Lumbar 2 intervertebral disk space (Fig .1).

Figure 1, MRI, lumbar spine on T2 weighted image showing mass in lumbar spine measuring 1.6 x 1 cm biaxial with craniocaudal length of approximately 2.5 cm. About 2 cm above this there was a questionable secondary satellite nodule 0.5 cm in the left dural sac. No additional pathological enhancement seen.

This mass had no other significant features. Other organs were normal. Magnetic resonance imaging (MRI) of the lumbar spine was done which confirmed an enhancing ill-defined intradural and suspected extra-axial mass at the level of the conus medullaris. Diagnostic considerations included drop metastasis, ependymoma and lymphoma. This measured 1.6 x 1 cm biaxial with craniocaudal length of approximately 2.5 cm. About 2 cm above this there was a questionable secondary satellite nodule 0.5 cm in the left dural sac. No additional pathological enhancement was seen. The patient was taken to the operating room on urgent basis in early 2013 underwent thoracic-lumbar (T12, L2-L3) laminectomy with excision of the intramedullary tumor under SSEP (Sensory Evoked Potential Responses) monitoring. The tumor was dissected down to the tip of the conus medullaris and it was taken out in toto. The frozen section came back as ependymoma. Final pathology confirmed portions of a moderately hypercellular neoplasm composed of bland, uniform cells with small round nuclei, stippled chromatin and abundant eosinophilic cytoplasm that in some areas forms long fibrillary processes. Vague perivascular pseudorosettes were present. Necrosis, increased mitotic activity, clear cell morphology is not seen. Papillary architecture and myxoid stroma are not identified. These cells show diffuse staining with GFAP. Focal areas showed dot-like staining with electromyography activity test. The cells were negative for Synaptophysin. Ki67 shows a low proliferative index. Overall this is consistent with an ependymoma, tanycytic type WHO Grade 2 (Fig. 2).

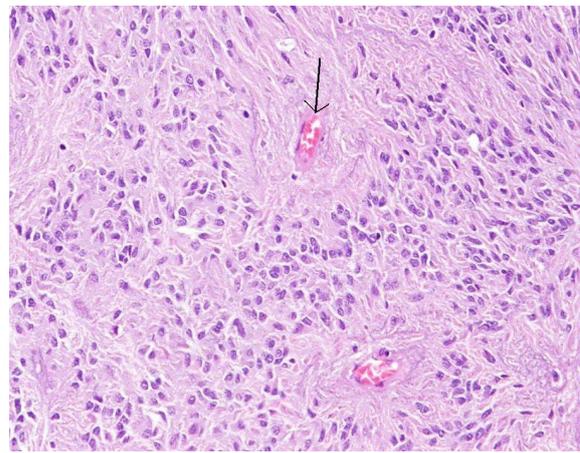In postoperative period patient did very well.

Figure 2, Pathology slide showing micrograph (H&E, 400 x original magnification) hyper cellular neoplasm composed of bland, uniform cells with small round nuclei, stippled chromatin and abundant eosinophilic cytoplasm that in some areas forms long fibrillary processes. Vague perivascular pseudorosettes are present.

Post-operative MRI revealed no residual tumour. At six months follow up patient had no urinary or bowel incontinence. Her lower backache had also subsided. Brain and spinal lumbar Magnetic resonance imaging did not show any recurrence (Fig. 3).

Figure 3, MRI, lumbar spine, on T2 weighted image showing no recurrence.

DISCUSSION

Ependymomas are glial tumors which are known to show ependymal differentiation. As per WHO (World Health Organization) classification, ependymomas are divided in three major groups: subependymoma (WHO grade I), myxopapillary ependymoma (WHO grade I), ependymoma (WHO grade II), and anaplastic ependymoma (WHO grade III). Conventional (WHO grade II) ependymomas, including the tanycytic variant, generally present as centrally situated intramedullary tumors within the thoracic/cervicothoracic cord[3] whereas spinal subependymomas more often arise as eccentric masses.[4]

In children, ependymal tumors occur most commonly within the fourth ventricle (posterior fossa), followed by supratentorial locations, the latter including both a mix of primarily intraventricular and intra-

parenchymal-centered tumors and a tendency toward anaplasia (WHO grade III).[5] Cortical ependymoma represents a rare type of supratentorial ependymoma that occurs in the superficial cortex of young adults, is often associated with seizures, tends to be low grade, and is curable by resection.[6] The origin of ependymomas is a matter of debate in literature. There seems to be an agreement that the ontogeny of ependymoma is radial glia, which is the stem cell of tanycyte and glia. Some believe it arises from subependymal glia, astrocytes of the subependymal plate, ependymal cells and a mixture of astrocytes and ependymal cells.[7] Studies suggested that tumors with histomorphologic and ultrastructural characteristics similar to tanycyte also include pilocytic astrocytoma, myxopapillary ependymoma, astroblastoma, and subependymoma.[8]

Conventional ependymomas (WHO grade II) make up the bulk of ependymal tumors, and multiple distinctive morphologic variants are recognized.[9] At the most biologically aggressive end of the spectrum are anaplastic ependymomas, given a WHO grade III designation, whereas subependymoma and myxopapillary ependymoma are both WHO grade I lesions and tend to behave in a more indolent manner.[10] The prototypical location of myxopapillary ependymoma is the region of the conus medullaris/cauda equina/filum terminale; infrequently, these may arise at other cord levels, intracranial sites (both intraparenchymal and intraventricular), and subcutaneous sacrococcygeal areas.[11] Ependymal tumors are composed of a number of distinct tumor categories, all definable by their unique histologic appearance. Common features shared by the majority of these lesions include sharp demarcation from surrounding tissue and perivascular pseudorosettes.[12] Conventional ependymomas typically present as moderately cellular glial tumors; unlike infiltrative astrocytomas and oligodendroglial tumors, ependymomas show distinct demarcation from the surrounding brain parenchyma. The cells composing ependymomas may display variable cytomorphologic characteristics, some exhibiting elongated fibrillary glial-type properties, whereas others display more epithelioid features that are reminiscent of ependymocyte ventricular lining cells.

A review of the cases reported in the literature shows that tanycytic ependymomas occurs more often in the spinal cord.[13] As it can resemble pilocytic astrocytoma and schwannoma, tanycytic ependymomas should be differentially diagnosed to exclude some of the benign spindle cell tumors of the central nervous system.[14] Histological differential diagnosis includes spindle-shaped neuroepithelial tumors, such as pilocytic astrocytoma, fibrillary astrocytoma and schwannoma. Histologic grading (grade II vs. grade III) has been found to significantly correlate with overall and/or recurrence-free survival in most ependymoma series[15] but not all.[16] Recent studies aimed at identifying prognostically significant histopathological parameters found that ependymomas

harboring 2 or more of the following features were strongly correlative of shortened event-free survival and grade III designation: elevated mitotic index, hyper cellularity with nuclear hyperchromasia and/or pleomorphic, endothelial proliferation, and palisading necrosis.[17] By immunohistochemistry, elevated Ki67 proliferation index likewise correlates well with anaplastic ependymoma status and aggressive biologic behavior.[18] Detection of cyclin D1 or telomerase has also been found to correlate with poor prognosis. In literature there is lot of information regarding genetic studies in this subset of patients. Genome-wide screening studies of ependymomas have detected regions of gain on chromosomes 1q, 5q, 7q, 9, 12, and 15 as well as losses on chromosomes 6q, 16,17p, and 22.[19] Of note, a significant proportion of ependymomas will have no detectable alterations, and those tumors that do appear to not share one common genetic signature. Instead, there is strong evidence to support the concept that ependymomas represent multiple genetically distinct tumor subsets in terms of patient age, site of occurrence, and biologic potential.[20] For example, chromosome 22q loss is frequently detected in adult spinal ependymomas especially tanycytic variety and may also be found in some intracranial ependymomas. Many tanycytic ependymomas harbor concomitant mutation of NF2, a protein 4.1 family member; this is not the case for intracranial ependymomas with 22q deletions.[21] In contrast, intracranial ependymomas are more likely to show loss of 4.1B (formerly DAL-1; 18p11.3), a related structurally homologous protein 4.1 family member, and losses of 4.1B and 4.1R (1p32-33) are more frequent in paediatric, intracranial, and anaplastic tumor subsets.[22] Whereas a large volume of molecular information is available on grade II and III ependymomas, but comprehensive molecular characterization studies of subependymomas and myxopapillary ependymomas are lacking. Both WHO grades II and III (anaplastic) ependymomas may metastasize along CSF (craniospinal flow) pathways in the subarachnoid space to seed other spinal and intracranial regions[23]; rare extracranial metastases have been described;[24] Although myxopapillary ependymomas don't typically metastasize/disseminate in the adult population, their paediatric counterparts exhibits a significant rate of dissemination through the CSF (craniospinal flow) pathways.[25] Although subependymomas do not exhibit metastatic potential, they may recur on rare occasions.[26] The long-term prognosis for tanycytic ependymomas is the same or slightly better than for other ependymoma subtypes. The current management includes gross total resection followed by radiological surveillance. Repeat resection or radiation treatment will be recommended in the event of recurrence. Overall, adequacy of tumor excision has proven to be a reliable predictor of both recurrence-free and overall survival in patients from all age groups with intracranial ependymomas. Demonstration of

tumor invasion from a microscopic standpoint on the original resection specimen may be an indicator of poor prognosis.[27] The vast majority of first recurrences are at the site of the resection cavity, and radiation therapy may enhance recurrence-free survival in those tumors that are incompletely excised.[28] Adjuvant chemotherapy appears to be less beneficial.[29]

CONCLUSION

Tanycytic ependymomas are an uncommon fibrillary variant of ependymomas with typical pathological characteristics. Tanycytic ependymomas carries better prognosis as compared to other variant of ependymomas. The objective of our case report is to document the radiological and typical ependymal features of the neoplasm and to increase awareness in oncology community.

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