Abstract:
Subependymomas of the spinal cord are rare tumors with very few cases described in the literature. They are biologically benign with low proliferative index hence postoperative prognosis is very good. Surgical removal is usually curative and no further adjunct treatment is needed after gross total tumor removal. We present a case of 37 year old male patient with an intramedullary subependymoma located in the thoracic region of the spinal cord. The tumor was totally excised with complete recovery.

Keyword:
spinal cord, intramedullary tumour, subependymoma

INTRODUCTION:
Subependymomas are slow growing tumors usually found in the ventricular system. They possibly account for less than 2% of all spinal cord tumors. These tumors are biologically benign with very low proliferation index. They are eccentrically located within the spinal cord, enabling complete tumor removal in most cases. We present a case of 37 year old male patient with an intramedullary subependymoma located in the thoracic region of the spinal cord.

CASE REPORT:
37 year old male presented with gradually progressive weakness of all four limbs. Examination revealed grade 3 power in all four extremities with diminished sensations below C5 with sphincter involvement. MRI revealed a well defined homogenous contrast enhancing intramedullary lesion at D1, D2 level with tumor syrinx above (upto C5) and below (upto D11) the lesion.
Fig. 1: MRI IMAGES OF THE PATIENT

(a) T2 weighted sagittal image  
(b) T1 weighted contrast image  
(c) axial images
showing a well defined homogenous contrast enhancing intramedullary lesion at D1, D2 level with tumour syrinx above (upto C5) and below (upto D11) the lesion.
Patient was assessed for surgery. Tumor approached through Posterior Midline Approach with C7-D3 Laminectomy done under GA. A myelotomy was done over the DREZ region, the syrinx cavity near the lower pole of the tumour was entered. There was a good plane of cleavage around the lesion. Gross total removal of the

Fig. 2: intraoperative photographs showing good plane of cleavage around the lesion and gross total removal of the tumour was done. Fig. 2(c) Fig. 2(d) Histopathology of the tumor revealed ependymal cells forming pseudorosettes in a fibrillary background – suggestive of subependymoma. Five months later, patient was walking without support and had regained continence.
DISCUSSION:

Spinal subependymomas are much less frequent than their intracranial counterparts, though they become symptomatically obvious quite early. These tumors are first recognized as a separate pathological entity by Scheinker in 1945. They are characterized by a distinctive microscopic appearance of cellular nests with intervening hypocellular fibrillary regions. Since the original description of spinal cord subependymomas by Boykin, et al., in 1954 approximately 40 more cases have been described in the literature and that too in the last two decades. To the best of our knowledge, our case is the 42nd case to be reported in English literature. Bret et al found in their review of 29 cases that this tumor accounts for approximately <2% of all spinal cord tumors and that the majority are located in the cervico thoracic region.

Review of literature performed by Sarkar C et al., revealed a mean age of 47.2 years and male predominance. They also found that the majority of tumors were intramedullary and were located in the cervical region. The cell from which subependymomas originate has been a subject of dispute since this tumor was recognized by Scheinker in 1945. He proposed the origin to be from the subependymal plate, which is also known as the “residual periventricular matrix layer.” In 1954 Boykin, et al., reviewed nine cases of subependymoma and they believed that these tumors originated from subependymal astrocytes in the walls of the ventricles or central canal of the spinal cord. Hence they called them “subependymal glomerate astrocytoma.” French and Bucy reviewed a series of three supependymomas from the septum pellucidum in 1948 and concluded that these were astrocytomas and not derived from elements of the subependymal plate. The situation was not further elucidated until the invention of electron microscope. In 1974 Fu, et al., in their electron microscopy examination found that the cells have ultrastructural features of both ependymal cells and astrocytic cells. Tissue culture also revealed two distinct cell lines of which one resembled ependymal cells and the other astrocytes.
On this basis they concluded that subependymoma was a variant of ependymoma and that the astrocytic component represented reactive astrocytic cells. In 1984, Moss\textsuperscript{10} studied four cases of fourth ventricular subependymomas by electron microscopy and found cells similar to ependymal glial precursor cells seen in the adult subependymal cell layer. He therefore considered that subependymomas were different from ependymomas and astrocytomas, probably arising from ependymal glial cells in the subependymal cell layer. Horstmann,\textsuperscript{11} in 1954 described a cell in the subependymal zone of the elasmobranch, the processes of which spanned the brain from the pial to the ventricular surface. He named these cells “tanyocytes” after the Greek word “tanyos” meaning “to stretch” and they have subsequently been found in many other species including mammals. They vary in their orientation in different species and even from region to region in the subependymal plate zone within the same species. It is interesting that tanyocytes have the ultrastructural appearance of both astrocytes and ependymocytes which are similar to the ultrastructural findings in subependymomas. In review of 43 ependymomas and 71 astrocytomas, Friede and Pollak\textsuperscript{12} found 11 spinal tumors which they considered had an appearance reminiscent of tanyocytes. From their histological description as well as the photomicrographs in the paper, however these do not appear to be subependymomas. Despite this the tanyocytes remains a strong contender for the cell of origin of subependymomas due to their similar ultrastructural appearances. The clinical features of the spinal subependymomas are similar to other intra medullary spinal tumors, with a mixture of upper and lower motor neuron findings together with progressive sensory dysfunction and early bladder and bowel involvement. Sarkar \textit{et al}\textsuperscript{4} on reviewing the literature found no difference on imaging studies between ependymomas and subependymomas. They reviewed the imaging findings of forty cases reported in the literature and found that computed tomography (CT) scan reported in eight cases showed spinal cord enlargement in three and cyst in one. Only two patients showed post contrast enhancement. MRI findings were available for 23 of the 40 reported cases and revealed segmental fusiform dilatation of the cord with low T1-weighted and high T2-weighted signal intensities. Contrast studies were available in 18 of these 23 cases. Ten of 18 cases showed enhancement with contrast, either well circumscribed sharply demarcated areas of homogenous signal enhancement or multiple nodular enhancements. They are biologically benign with low proliferative index hence post operative prognosis is very good. They are eccentrically located within the spinal cord, enabling complete tumor removal in most cases. Surgical removal is usually curative and no further adjunct treatment in the form of radiotherapy or chemotherapy is needed after gross total removal of the tumour. Radiotherapy given in patients with partial removal of tumour has shown no evidence of any efficacy.\textsuperscript{13} Prognosis thus determined largely by surgical factors. Norecurrence or CSF seedings have been reported till date.\textsuperscript{14}

\textbf{REFERENCES:}


8 French JD, Bucy PC. Tumours of the septum pellucidum. J Neurosurg 1948;5: 433-49.


