

**Case of Radiation Induced Microcystic Meningioma- A Case Report****Dr. Nilesh Potdar<sup>1</sup>, Dr. Suresh Kumar S<sup>2</sup>, Dr. Bhavadasan K<sup>3</sup>**<sup>1</sup>PG 3<sup>ND</sup> yr, Department of Neurosurgery, Amala Institute of Medical Sciences, Amalanagar, Thrissur, Kerala, India<sup>2</sup>Associate professor, Department of Neurosurgery, Amala Institute of Medical Sciences, Amalanagar, Thrissur, Kerala, India<sup>3</sup>HOD, Department of Neurosurgery, Amala Institute of Medical Sciences, Amalanagar, Thrissur, Kerala, India**\*Corresponding author**

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**Abstract:** Microcystic meningiomas is a distinct morphological variant of meningiomas, characterized by loose texture and microcysts with formation of large extracellular spaces containing edematous fluid. We reported a case of microcystic meningiomas in 37 year old male patient had underwent radiotherapy for treatment of NHL 22 Years back. The tumor showed diffuse immune histochemical reactivity for VIMENTIN, EMA, S-100 protein, ultrastructure study confirmed the meningiomatous nature of tumor. Radiation exposure would be one of the etiological factors along with genetic instability and patient required multimodality of treatment along with regular surveillance.

**Keywords:** Intracranial; Meningioma; microcystic.

**INTRODUCTION**

The meningiomas are tumors derived from arachnoid cells [1], and its origin linked to idiopathic genetic changes, predisposing diseases and radiotherapy induction.

Microcystic meningiomas have been described as distinct variant of meningiomas, they are characterized by the formation of numerous large extracellular microcystic spaces containing edematous fluid, and by the stellate and vacuolated appearances of tumor cell, with occasionally large hyperchromatic and pleomorphic nuclei. Their unusual histopathological appearances may lead to confusion with astrocytomas, hemangioblastomas and angioblastic meningiomas [2].

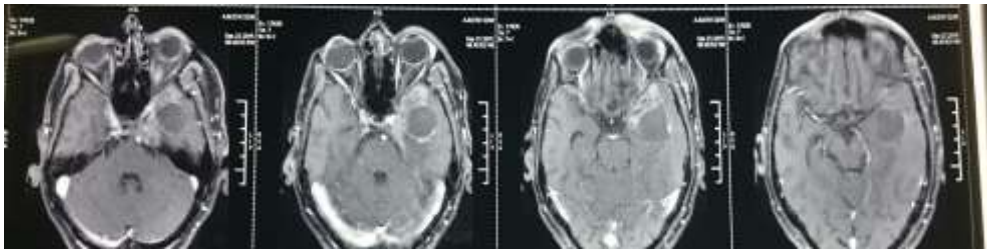
The meningiomas are tumors that may arise after cranial irradiation, used to the scalp or intracranial lesions. Only ionizing radiation has been identified as the etiologic agent related to the occurrence of these neoplasms [3, 4]. The role of head trauma, viral infections and sex hormones has not been established. The appearance of a lesion (new or progressive) a few years after the completion of radiation therapy for primary neoplasms may represent recurrence of the cancer, radiation necrosis or, rarely secondary neoplasms [5, 6].

We report a case, 37 year old male patient who was initially treated with radiotherapy for NHL. Clinically we suspected gliomas or radiation induced necrosis but after histopathological and immunohistopathologically it was diagnosed as microcystic meningiomas.

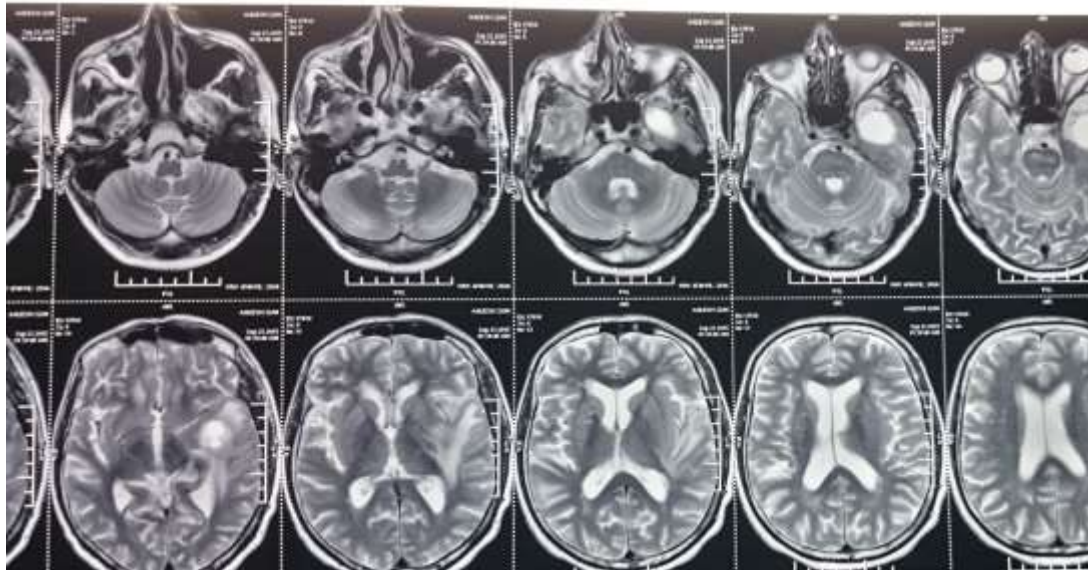
**CASE REPORT**

A 37 year old male patient, who was treated for NHL 22 years back with radiation and chemotherapy. He was presented with history of left sided headache and giddiness, no h/o seizure vomiting, LOC, no history suggestive of any focal neurological deficit and cranial nerve involvement. Patient had left lateral rectus palsy, other neurological examination were unremarkable. MRI T2W showed, mild homogeneously enhancing lesion involving left cavernous sinus. There is thickening and enhancement of adjacent dura mater, Lesion showed diffusion restriction, and T2 mixed signal intensity lesion involving left anterior temporal lobe, the anterior component shows multiloculated T2 hyperintense areas. Posterior cystic component of the lesion shows fluid levels. Post contrast sequence shows heterogeneous enhancement of the lesion with diagnostic possibility of radiation induced tumor, glioma, radiation necrosis. On these findings patient was operated for left temporal craniotomy and decompression of tumor done under G.A. with operative finding showing left temporal lobe tumor having cystic portion, After decompression the yellowish coloured fluid let-out and tumor has a clear plane to temporal lobe. Near total excision done and tumor was firm to soft, very vascular and suckable in areas. The medial portion of tumor left behind and cauterized as very vascular in nature and encasing the vital structure cavernous sinus. Histopathological report showed predominantly meningotheial tissue with microcystic areas with immunohistopathologically positive for EMA, VIMENTIN; negative for CK, LCA, CD 34 AND MIB; feature confirm meningotheial

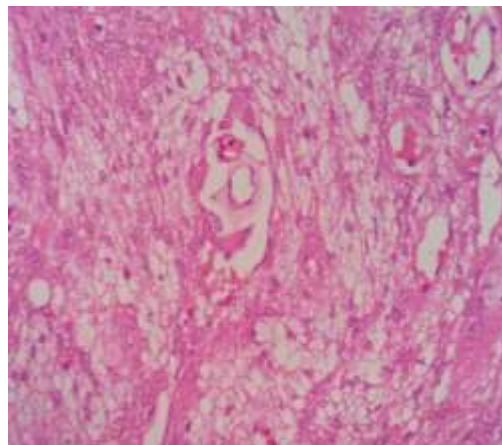
nature of tissue s/o of microcystic meningiomas post radiotherapy. operative period was uneventful patient referred for



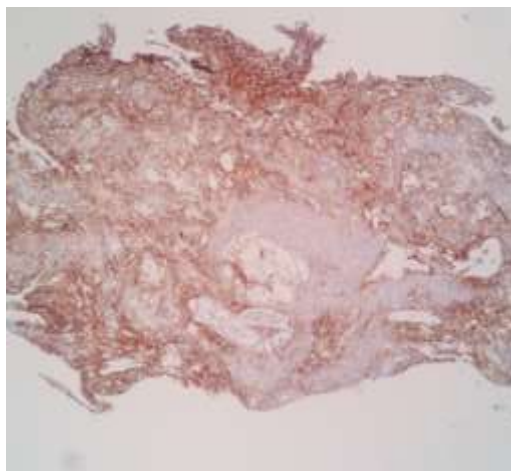
**Fig-1: CT brain contrast image showing**



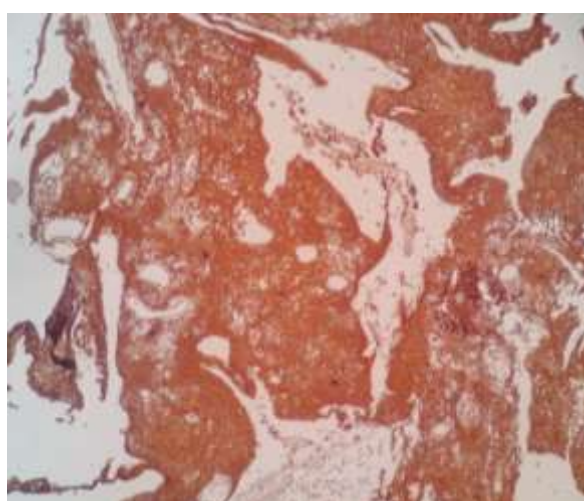
**Fig-2: MRI T2 W image showing left temporal tumor**



**Fig-3: H &E staining showing microcystic space**



**Fig-4: Ema Positive**



**Fig-5: Vimentin Positive**

## DISCUSSION

According to the Finnish Cancer Registry, the overall meningioma incidence rates were 1.6 for men and 5.5 for women per 100,000, and only 17% of meningiomas occurred in patients younger than 50 years of age [7]. Microcystic meningiomas have recently been recognized as an unusual morphological variant of meningiomas, they have been classified as a distinct subgroup of meningiomas in the WHO classification of central nervous system tumor [8].

Grossly, microcystic meningiomas are well delimited, with a smooth bosselated or lobulated external surface. The structure is usually soft and spongy. The cut surface discloses a yellowish light brown homogeneous and a glistening appearance. Hemorrhage and necrosis are never found [9].

Microscopically, these tumors show numerous cystic spaces filled with edematous fluid and are lined by stellate-shaped meningothelial cells. Some areas show the conglomerations of smaller cystic spaces which create a vacuolated, myxoid and loosely reticular

appearances [8]. Foci of nuclear pleomorphism are occasionally noted, but this finding does not indicate aggressive behavior [9]. The tumor shows occasionally typical meningiomatous whorls [8]. Meningiomas demonstrated concurrent mesenchymal and epithelial differentiation as shown by their consistent and reliable immunohistochemical positivity for EMA, VIMENTIN [10]. S-100 protein can be found focally in many meningiomas [11]. Immunohistochemistry of microcystic meningiomas is not different from other types of meningiomas, tumor cells are positive for EMA and VIMENTIN and negative for cytokeratin, S-100, GFAP. Our case showed the same IHC result [8].

The pathogenesis of these tumors is unclear, but radiation exposure may be the causative factor. It is well known that radiation treatment induces genomic instability and manifests itself in induction of chromosomal aberrations, aneuploidy, gene mutations and amplifications, microsatellite instability, and cell death [12, 13]. Further, prominent hypomethylation during X-ray exposure, subsequent genome instability, and resultant recruitment of repair machinery

contributing significantly to carcinogenesis have been reported in different tissues [14, 15]. observation suggests that radiation treatment induces changes in the methylation patterns in an oxidative damage-independent fashion among meningioma cells. DNA methylation was found to be one of the determinants of  $\gamma$  radiation-induced gene expression [16] and ultra violet B (UVB) radiation induced DNMT activity to silence tumor suppressor genes, thereby supporting tumor growth [17], which perhaps suggests a complex network of epigenetic events that can be initiated by ionizing radiation.

With the increasing number of survivors of leukemia and the lymphomas and increasingly long follow-up periods, the old assumption of the rarity of secondary brain tumors should now be reconsidered. The accumulation of meningiomas among patients treated in the early era of leukemia and lymphomas treatment could imply an increasing incidence in the future [18].

The assumption of irradiation being the most important risk factor for almost all secondary malignancies has been widely accepted. Unlike meningiomas, which are characterized by a long latency period, gliomas tend to occur within 5 years after the treatment [19].

Although there are strongly predisposing factors such as radiation therapy, the significance of individual characteristics and genetic factors should not be ignored. The fact that meningiomas and the other Secondary malignant neoplasms developed in the same patients suggests a genetic susceptibility of these patients to developing cancer [20].

The importance of recognizing this lesion lies in the differential diagnosis from other central nervous system tumors with a myxomatous appearance [2]. Myxomatous schwannoma can be distinguished by positive staining schwannomas can be distinguish by positive staining for S-100 protein and negativity for EMA. Loose fibrillary cytoplasm simulate pilocystic astrocytomas, which can be distinguished by immunostaining with anti-Gfap Chordomas Would Shows Positive Staining For Cytokeratin And s-100 protien careful distinction should be given to metastatic carcinomas in view of nuclear pleomorphism. the absence of mitotic figure occasional meningotheial whorls are important feature distinguishing from a metastatic carcinoma, hemangioblastomas shows focal positive for S-100 protein and GFAP, but negative for EMA. Abundant blood vessels with marked hyalinization mimick angiomatous or angioblastic meningiomas, which show positive staining for vimentin but negative for EMA [9, 10].

These patients can be manage by complete surgical excision of tumor with regular follow-up to

watch for the recurrence of tumor. Fractional radiotherapy and radiosurgery are used after surgery for incomplete resection of meningiomas.

## CONCLUSION

Microcystic meningiomas are an unusual, but distinct morphological variant of meningiomas which are clinically and immunohistochemically similar to conventional meningiomas.

They have to be distinguished from other lesion of similar histology, radiation exposure would be the one of the etiological factor along with genetic instability. Patient may require multimodality of treatment along with regular surveillance.

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