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Complete Surgical Resection Without Using Navigation &Monitoring Tools in a 4 Case Series of Lateral Intra Ventricular Meningioma.

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Abstract: *Intraventricular meningioma comprises 2% of all intracranial meningioma. Morbidity rates as high as 40% in these cases have a direct correlation with the late presentation after the tumours have attained a substantially large size. This case series reports 4 cases of ventricular meningioma, their surgical approaches without using navigation & monitoring tools and their favourableoutcomes.*
Keywords: *Intraventricular meningioma, surgical resection.*

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I. Introduction

Intra ventricular meningioma are uncommon intracranial brain tumours comprising about 2% of intracranial meningiomas.[1] Usually asymptomatic till it attains a big size, posing a surgical challenge to the neurosurgeon thereby making the morbidity rate a high number of 40%.[2] Management of intra ventricular meningioma is a formidable task. In the literature several approaches have been meticulously documented.[3,4,5,6,7,8]In this modern era many sophisticated and expensive tools are utilised to monitor excision of the tumour. In our 4-case series we report how we managed surgically without navigation tools and intraoperative monitoring devices. Our approach in all these cases was the superior parietal lobule route, with complete excision of intra ventricular meningioma without any mortality.

Objectives: The objective of this case series is to present 4 cases of intra ventricular meningioma encountered in a span of 15 years of neurosurgical experience and discuss about the demographic findings, clinical presentations, surgical approaches, postoperative complications and favourable outcome of treatment, without using navigation and monitoring tools.

II. Methods

A retrospective review of 4 cases of intra ventricular meningioma encountered in 15 years of neurosurgical experience was carried out. Surgical approach in all the cases was via superior parietal lobule and with complete excision of the tumour. Surgical management was done without using neuronavigation and other monitoring devices.Histopathological diagnosis was meningioma.

Case 1: A 40 year lady presented with increasing headache from last 10 days associated with vomiting, giddiness, generalised weakness and loss of appetite. From last 1 to 2 years there was history of on and off headache. There were no history of other comorbid conditions such as Diabetes & Hypertension. On neurological examination, there was no motor and sensory deficits. Visual fields was intact. Radiological investigation was done using Computed tomography (CT scan plain & contrast) **(Figure1a, 1b, 1c, 1d)** and Magnetic Resonance Imaging (MRI**) (Figure 2a, 2b)**. CT scan revealed a hyperdense mass (size 3.5 cm x 4 cm x 4.5 cm) in the right lateral ventricle which was enhancing homogenously on contrast, with small specs of rim calcification towards the medial side, mild hydrocephalus with ipsilateral posterior horn and temporal horn trapped and there was midline shift. MRI revealed a ventricular mass surrounded by CSF which was isointense on T1 and isointense to hetero on T2, well enhancing on contrast associated with sequestration of temporal and posterior horn and mild dilatation of ventricular system. The picture was consistent with meningioma. After

taking due informed consent and explaining the risks associated with the surgery, patient was scheduled for elective surgery.

Surgical technique:Under general anaesthesia, patient was placed in a slightly elevated supine position, using a head ring and tilting it towards the left side. A "C" shaped right parietal scalp incision was given and temporo parietal craniotomy was performed. Dura was opened in a horse shoe shaped manner and reflected towards the midline. Cortiectomy is done over the superior parietal lobule. To release the trapped CSF, tumour was slightly lifted. Tumour was found to be well circumscribed, lobulated, firm in consistency, whitish, filling the trigone with extension into temporal horn and having attachment to the choroid plexus with feeders from anterior choroidal vessels.Complete removal of the tumour was done with preservation of important neuroanatomic structures. Dura was closed in a water tight fashion to prevent CSF leakage. There were no intraoperative complications. The patient was not put on elective ventilator support. First postoperative day a check CT scan revealed a large right frontal extradural hematoma with mass effect and blood inside the ventricles. No residual tumour and no hydrocephalus was seen.**(Figure 3a)** Patient was put up again as an Emergency case for evacuation of frontal extradural hematoma on. A frontal craniotomy was done to evacuate the hematoma. Intra operatively no obvious bleeders were seen, except for oozing from the dural surface. She was put on elective ventilator support for 24 hours and then weaned off. A check CT scan was done the next day which showed complete evacuation of frontal extradural hematoma **(Figure 3b**). During the postoperative period patient had focal seizure with secondary generalisation which was controlled with anticonvulsant drugs. Histological finding was **Fibroblastic meningioma**. She was discharge on 7th postoperative day. She remained asymptomatic at subsequent follow up periods of 1 month, 2months, 6 months, 1year and 3 years. CT scan taken at 2 month & 3 years are shown in **Figure 4a (**persistent dilatation of posterior horn but opening up of sulcus)&**Figure 4b** respectively. During follow up she was on anticonvulsant drugs and was seizure free. Karnofsky performance scale (KPS) ratings were done before and during follow up.

Case2: A 46 year lady presented with increasing headache and vertigo from last 1 month without signs of raised intracranial pressure. Neurologically there were no abnormal findings. Investigation with Computed tomography (CT scan) and Magnetic Resonance Imaging (MRI) revealed an intraventricular mass suggestive of intra ventricular meningioma. Surgical approach was via the superior parietal route. Complete resection was achieved without any postoperative complications and was discharge on 5thpostoperative day. Histopathogical (HPE) diagnosis was **Fibroblastic Meningioma**. Follow up for one year with KPS scoring was done.

Case3: A 20 year boy presented with increasing headache and vomiting from 2-3 weeks without any motor or sensory deficits. Radiological investigation with Computed tomography (CT scan) and Magnetic Resonance Imaging (MRI) was done. The lesion was suggestive of intra ventricular meningioma with trapped posterior horn. Complete excision was done approaching via superior parietal lobule. Subsequent discharge was on 5th day. HPE finding was **Fibroblastic Meningioma.** KPS score was done at all follow up visits up to one year.

Case 4: A 25 year lady presented with worsening headache from last 1 week though present off and on from last 2-3 months. On neurological examination there was no motor and sensory deficits. Radiological investigation with Computed tomography (CT scan) and Magnetic Resonance Imaging (MRI) was done. CT scan revealed a hyperdense mass in the right lateral ventricle and was found enhancing homogenously on contrast. Mild hydrocephalus with ipsilateral posterior horn dilatation was also seen. Intra ventricular mass was suggestive of meningioma. Surgical approach was through superior parietal lobule and tumour was removed completely. Patient was discharge on 6th postoperative day. HPE finding was **Meningothelial Meningioma**. One year's follow up was done with KPS scoring.

Table 1: Demographic findings, Clinical features, Surgical, Laterality, Histopathological examination (HPE) findings with average KPS score.

Case	Age/Sex	Signs &Symptoms	KPS	Laterality	SA	HPE	Complications	Follow up KPS score
1	40/F	Headache Giddiness	90	Right	SPL	FM	Seizure, extradural hematoma	90
2	46/F	Headache, Giddiness	100	Right	SPL	FM	Nil	100
3	20/M	Headache, Vomiting	100	Right	SPL	FM	Nil	100
4	25/F	Headache	100	Right	SPL	MM	Nil	100

KPS- Karnofsky performance scale, SA- Surgical Approaches, SPL- Superior parietal lobule, HPE- Histopathology examination, FM- Fibroblastic Meningioma, MM- Meningothelial Meningioma

III. Result

All 4 cases had large tumours of more than 3 cms in diameter except one with more than 4 cms. A female predominance of 3:1 was seen. The mean age was 32.5 years. Laterality of the intra ventricular tumour meningioma was on the right side in all the cases. Clinical presentation was that of raised intracranial pressure. All had long standing on and off headache with progressive worsening. None had visual field defects. Surgical approach was through superior parietal lobule route in all the 4 cases, and complete excision of the tumour was successful in all the cases without any mortality. No postoperative external ventricular drain was used. No postoperative complications was encountered in 3 cases, except for one 40 year old female patient who developed right sided frontal extradural hematoma & seizure. In this complicated case, long term follow up was done for 3 years, while the rest had follow up till one year. Average KPS score was 100 in all the cases except one at 90. Histopathological diagnosis was **fibroblastic meningioma** in 3 cases and **meningothelialmeningioma** in one case.

IV. Discussion

All cases had symptoms of headache for a long duration. Whether to screen all cases of on and off headache using CT scan remains a topic of much debate, in order to make an early diagnosis. Intra ventricular meningioma amount to 0.5 -5 % of all cranial meningioma[1]. It is seen that lateral ventricular meningioma comprises of 80%, third ventricular meningioma 15% and fourth ventricular meningioma 5%.[9,10] Among intra ventricular meningioma the trigone is the commonest site. Intra ventricular meningioma at the trigone was detected during autopsy and was put on record by Schaw et al. [11] The origin of the tumour is from the arachnoid of choroid plexus and the membrane of the vessels in the lateral ventricle.[12] Usually when it is diagnosed the tumour has assumed a significant size due to slow growth of the benign lesion which is compensated by the room of accommodation. [13] Surgical removal is accompanied with considerable morbidity and complications. The important adjacent structures like speech and visual pathway fibres are in close proximity. Nevertheless, complete excision remains the conventional standard treatment.[14]The standard management aims for complete resection with minimal complications. The modern use of navigation tools and intraoperative monitoring devices have been suggested.[15] In resource limited settings, these modern equipments are not available and it is imperative to rely on anatomic details, and interpretation of radiological imagings. Approach to the lesion are many but the most preferred is parietal via superior lobule [16]. In very large tumours it is advisable to go for piece meal resection than to remove in toto so as to minimize brain retraction. The complications which are usually associated with this surgery are edema, seizure and haematoma. **Superior parietal approach** involves incising the cortex giving a direct route to the trigone and also accessing medial & lateral regions of trigone. Complications like visual field defect have been reported.[17] It is said to increase the risk of postoperative seizure. A series comparing the approach of transcortical and transcallosal approach failed to substantiate the findings.[18]**Lateral approaches** involve entering through the inferior temporal gyrus. Complications like apraxia, speech deficits, visual field are reported. [19]**Posterior transcallosal approach** is usually associated with disconnection syndromes resulting from posterior callostomy.[20] **Parieto-occipital sulcus approach** does not damage the optic radiations, and is not associated with language deficits. Advantage is the free window towards the splenium and posterior callosum. Disadvantages are the complications involved with the sitting position during operation and brain retraction.[21] I have chosen the Superior Parietal approach for all the 4 cases reported in this case series for two main reasons. Firstly, the distance to be traversed in order to access the tumour for the purpose of removal is minimal in this approach. Secondly, it provides comfort during operation for the neurosurgeon with the aim of complete resection without causing deficits. These cases were managed without modern tools like intra operating monitoring devices and navigation. Complete resection of the tumours without mortality was achieved.

V. Conclusion

Intra ventricular meningioma are unusual tumours of intracranial brain tumours. Usually diagnosed late, total removal is feasible if combined with careful planning and knowledge of neuroanatomy. Superior parietal lobule approach was successful even without the navigation tools.

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Conflict of interest: No conflicts of interest.

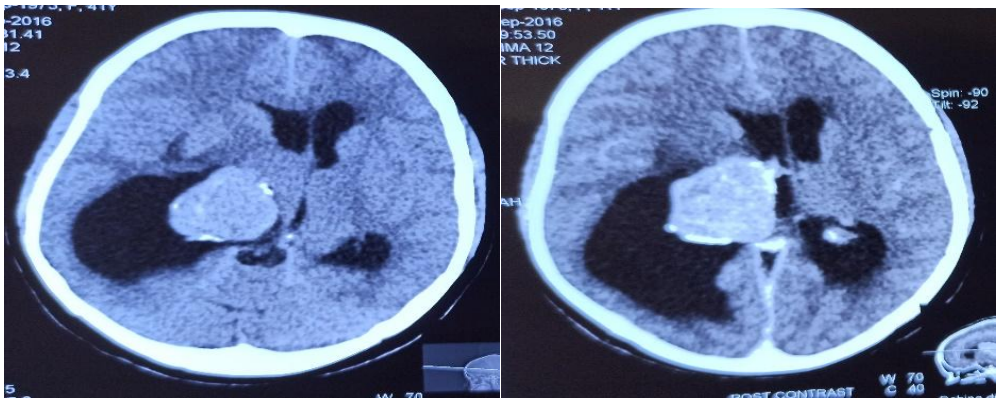


Figure 1a (Preop CT plain scan of ventricular meningioma), 1b (Preop contrast scan)

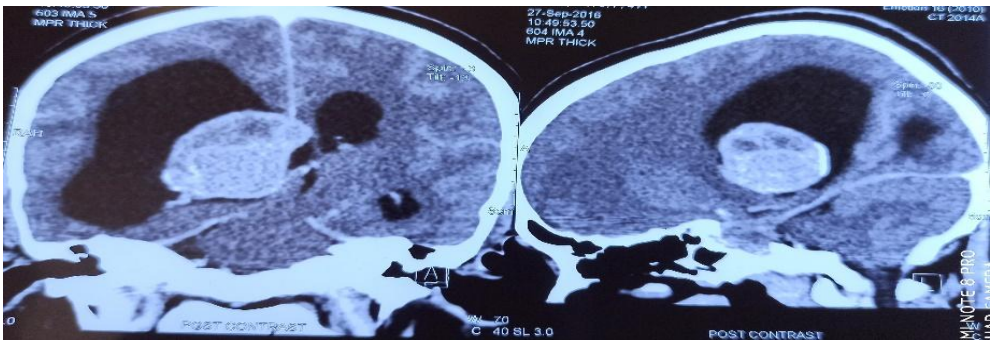


Figure 1c (Coronal), Figure 1d (Sagittal) of intraventricular meningioma

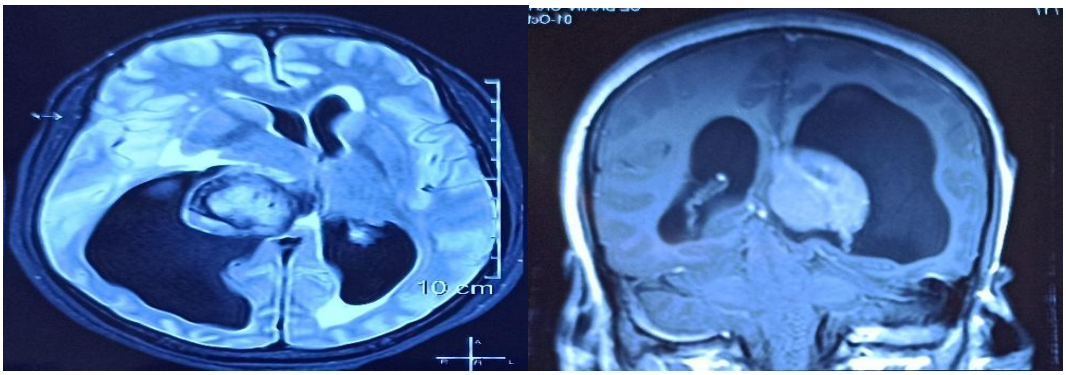


Figure 2a (MRI axial view), Figure 2b (MRI Coronal view) of Intra ventricular meningioma

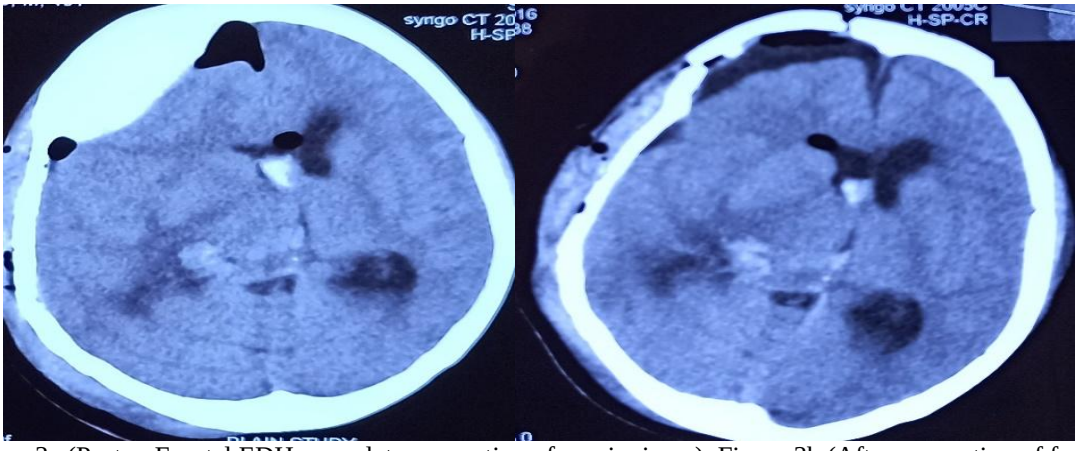
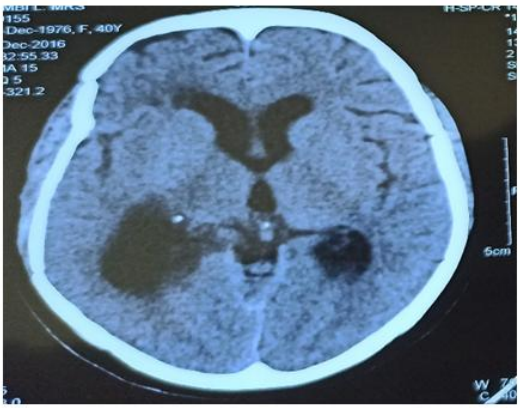


Figure 3a (Postop Frontal EDH, complete evacuation of meningioma), Figure 3b (After evacuation of frontal EDH)



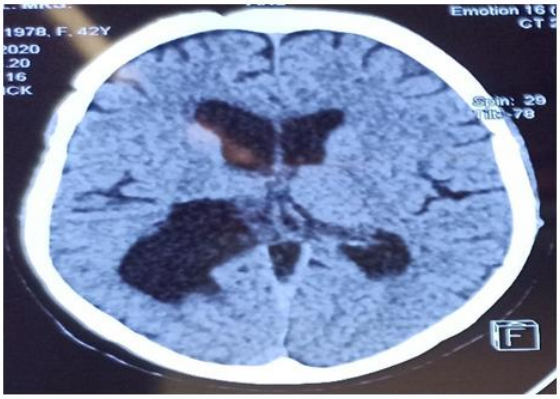


Figure 4a (Follow up scan at 2months), Figure 4b (Follow up scan at 3year)

References

[1]. Baldi I, Engelhardt J, Bonnet C, etal. Epidemiology of Meningioma. Neurochirurgie. 2014.
[2]. Bhatoe HS, Singh P, Dutta V. Intraventricular Meningioma: a clinicopathological study and review of the literature. Neurosurg Focus. 2006; 20(3):E9.
[3]. Nakamura M, Roser F, Bundschuh O, etal. Intraventricular Meningioma: a review of 16 cases with reference to the literature. Surg Neurol. 2003; 59(6):490-503.
[4]. Guidetti B, Delfini R, Gagliardi FM, etal. Meningioma of the lateral ventricles. Clinical, neuroradiologic, and surgical considerations in 19 cases. Surg Neurol.1985; 24(4):364-370
[5]. Lyngdoh BT, Giri GY, Behari, etal. Intraventricular Meningioma: surgical challenge J ClinNeurosci. 2007; 14(5):442-448.
[6]. Jun CL, Nutik SL. Surgical approaches to intraventricularmeningiomas of the trigone. Neurosurgery. 1985; 16:416-20.
[7]. Kempe LG, Blaylock R. Lateral-trigonalintraventricular tumours. A new approach. ActaNeurochir (Wien) 1976; 35:233-42.
[8]. Le Gars D, Lejeune JP, Peltier J. Surgical anatomy and surgical approaches to the lateral ventricular meningioma. Adv Tech Stand Neurosurg.2009; 34:147-87.
[9]. Fusco DJ, Spetzler RF. Surgical considerations for Intraventricular Meningioma. World Neurosurg.2015; 83(4):460-461.
[10]. Ma J, Cheng L, Wang G, Lin S. Surgical management of meningioma of the trigone area of the lateral ventricle. World Neurosurg. 2014; 82:757-69
[11]. Schaw A. Fibrous tumour in the lateral ventricles of the brain. Bony deposits in the arachnoid membrane of the right hemisphere. Trans PatholSoc London 1853; 5:18-21.
[12]. JiSoo Moon, SeungHeon Cha, Won Ho Cho. Lateral Ventricular Meningioma presenting with Intraventicularhaemorrhage. Brain tumour Res Treat. 2019 Oct; 7 (2): 151-55.
[13]. Olivecrona H, Tonnis W. Handbuch der neurochirurgie. Vol 4. Berlin, Heidelberg, New York: Springer 1967.p.175-77.
[14]. D Angelo VA, Galarza M, Catapano D, Monte V, Bisceglia M, Carosi I. Lateral Ventricles tumours: surgical strategies acoording to tumour origin and development- a series of 72 cases. Neurosurgery 2005; 56 (Suppl I):S36-S45.
[15]. Daniel A O, Alexandra G, Ferenc J. Neuronavigation in the surgical management of brain tumours: current and future trends, Expert review of Medical Devices, 2012; 9 (5):491-500.
[16]. Fornari M, Savoiardo M, morello G, Solero L. Meningiomas of the lateral ventricles. Neuroradiological and surgical consideration in 18 cases. J Neurosurg 1981; 54:64-74.
[17]. Li XZ, Zhao JZ. Operation of lateral ventricular meningiomas of the trigone. Zonghua Yi XueZaZhi, 2006; 86:2321-3.
[18]. Milligan BD, Meyer FB. Morbidity of transcallosal and transcortical approaches to lesion in and around the lateral and third ventriclkes: A single- institution experience. Neurosurgery.2010; 67:1483-96.
[19]. Nayar VV, De Monte F, Yoshor D, Blacklock JB, Sawaya R. Surgical approaches to meningiomas of the lateral ventricles. ClinNeurolNeurosurg. 2010; 112:400-5.
[20]. Nishizaki T, Ikelda N, Nakano S, Okamura T, Abiko S. Occipital inter-hemispheric approach for lateral ventricular trigone meningioma. ActaNeurochir(Wien) 2009;110:740-3.
[21]. Yasargil MG, Abdulrauf SI. Surgery of intraventricular tumours. Neurosurgery.2008; 62 (Suppl 6):1029-40.

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