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Endoscopic excision of a lateral ventricular epidermoid—A case report of a novel technique



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ABSTRACT

INTRODUCTION: Epidermoids of the lateral ventricle are relatively rare tumours. As these tumours are soft and relatively avascular, they appear to be ideally suited for endoscopic surgical excision. At present the instruments available are specifically designed for endoscopic intra ventricular surgeries, limitations being inability to rapidly debulk the tumour and achieve adequate haemostasis. We present a case of lateral ventricular epidermoid that was excised endoscopically using a system originally designed for endoscopic disc surgery.

PRESENTATION OF CASE: We describe a female patient who presented with recurrent headache and occasional episodes of vomiting since 6 years. Preoperative diagnosis of lateral intra ventricular epidermoid was made with the help of an Magnetic resonance imaging (MRI) of the brain. Intraoperatively, an incision was made over the right Kocher's point and a 2.5 cm dural opening was made following a small craniotomy and the Destaudau endoscope was introduced. A 30° scope and gentle manipulation were used to view the ventricular cavity and ensure near total excision of the tumour. Here we record this novel technique.

DISCUSSION: Lateral intra-ventricular tumours are usually approached through a trans-cortical or intra hemispheric approach, under microscope. The use of endoscopes have been largely restricted because of non-availability and relative difficulty in controlling troublesome bleeding, incase of vascular tumours.

CONCLUSION: A multi portal endoscope that allows use of routine pituitary instruments would enable the surgeon to achieve haemostasis effectively and, in our opinion, should be a viable alternative to microscope for excision of intra ventricular tumours.

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1. Introduction

Intra-ventricular epidermoids are relatively rare tumours occurring most commonly in the fourth ventricle. Epidermoids of third and lateral ventricle are less commonly seen. Being avascular and easily de-bulked, these are lesions that may be ideally treated by endoscopic excision. We present a case of a lateral ventricular epidermoid that was excised endoscopically.

2. Case report

A 53 year old lady presented with complaints of recurrent headaches for 6 years with worsening of headaches and associated episodes of vomiting since two months. The patient was investigated with a computed tomographic (CT) scan of the brain, that

revealed a hypo dense mid line non-enhancing lesion occupying both lateral ventricles with associated dilation of both lateral ventricles. Diffusion weighted series on Magnetic resonance imaging (MRI) showed increased attenuation (Fig. 1) of the lesion suggestive of an intra-ventricular epidermoid.¹¹

3. Instrumentation

The Destaudau endoscopic spine system (Storz) has been designed and routinely used for endoscopic lumbar disc surgery. It utilizes a trocar, sheath and hand held working channel with 3 ports for the endoscope, suction and a working channel, respectively. Unlike endoscopic systems designed for intra-ventricular use, it has no inbuilt irrigation system, however we had connected an irrigation line to the suction apparatus via a 3 way valve to allow alternative use of irrigation and suction as and when needed (Fig. 2).

4. Operative procedure

The patient was positioned supine with the neck mildly flexed. A 3.5 cm incision was made in the coronal plane, centred over the

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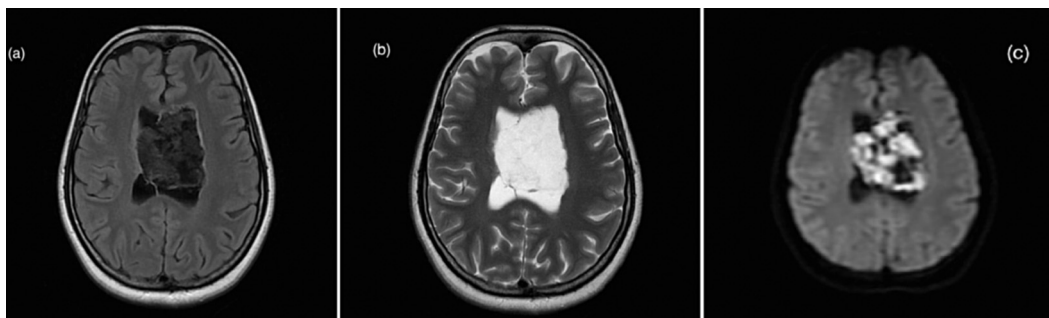


Fig. 1. (a–c) T1, T2 and diffusion weighted images of the fourth ventricular tumour (preoperative).

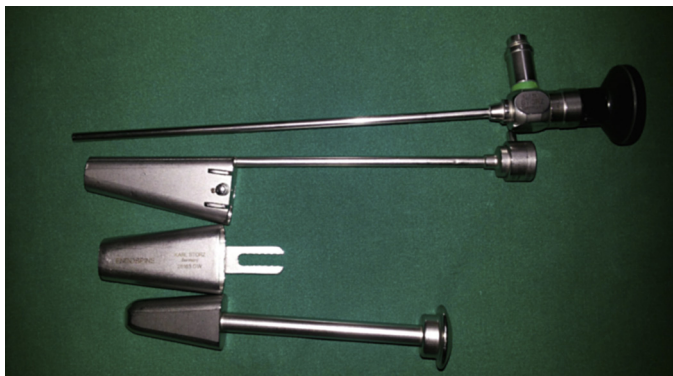


Fig. 2. The Destadeau endoscopic spine system (Storz).

right Kocher's point, and a 3 cm × 2 cm mini-craniotomy was performed. After opening the dura a 2.5 cm cortical incision was made to allow the trocar with sheath to be introduced to a predetermined depth of 4 cm based on the preoperative scans.

The trocar was removed and the working channel was introduced using a 0° scope, the suction was then introduced separately and a near total excision was achieved using instruments used for endoscopic pituitary surgery.

A 30° endoscope and gentle manipulation were used to view the ventricular cavity and ensure complete tumour excision. Most of the capsule could be excised however part of the capsule, densely adherent to the ventricle wall and veins, was left behind. The foramen of monro, bilaterally, appeared to be partly occluded by the adherent capsule and adhesions (Fig. 3B).

An irrigation line was connected to the suction via a three way valve, however irrigation was used sparingly to minimize the risk of possible chemical ventriculitis. Surprisingly, we found that the ventricle collapsed after decompression and the irrigation required was minimal.

In view of the doubtful patency of the foramen of monro, the possibility of a ventriculo-peritoneal shunt or external ventricular drain was considered intraop, but deferred.

Post-operatively the patient had a mild left hemiparesis (Grade 4-) that improved rapidly. The patient was ambulated after 24 h, following a post-operative scan (Fig. 4), which showed gross total excision of the tumour. Medications were stopped on the 3rd postop day, however on 8th post-operative day the patient complained of increased headache and had one episode of vomiting and was noted to have ataxia. MRI scan revealed dilatation of the lateral ventricles (Fig. 4), hence the patient underwent ventriculo-peritoneal shunt, placed through the initial cortical incision. Postoperatively the patient was completely relieved of her symptoms and was discharged without any neurological deficits.

5. Discussion

Lateral intra-ventricular tumours are usually approached through a trans-cortical or intra hemispheric route with decompression or excision of the lesion being done under microscope.^{8,9} Open microsurgical decompression is still considered the gold standard for intra ventricular tumours.

The use of endoscopes to excise intra ventricular tumours have been largely restricted to excision or fenestration of cystic lesion, particularly colloids cyst. Excision can be reliably attempted only in relatively soft avascular tumour of less than 2 cm in diameter.^{1–3}

The cavernous nature of the dilated ventricular system and the need to negotiate a small foramen combined with relatively minimal cortical injury appears to make endoscopic excision of ventricular tumours a logical option. However, endoscopic excision of ventricular tumours are limited by the lack of instruments which allow rapid debulking and a coagulation system to achieve effective haemostasis in the event of significant bleeding.⁷

The inability to rapidly debulk and excise the lesion, prolongs the duration of surgery and increases the fatigue and manipulation related parenchymal trauma. Additionally, the prolonged CSF drainage may lead to ventricular collapse and irrigation associated morbidity.

At present two specialized debulking tools are available for endoscopic usage. The Ortel ultrasonic aspirator system,⁴ which is designed to fit in to the GAAB endoscopic system and the neomyriad system, which utilizes variable suction with a cutting aspiration system.^{5–7}

Both systems, however, do not address the issue of achieving effective haemostasis and the problem associated with prolonged suction and irrigation still persist.

Working in a CSF filled space presents some problems. Firstly, the presence of small quantity of blood causes significant difficulty in visualization. Secondly, the use of continuous suction to clear the field could lead to collapse of the ventricle, leading to subdural or extradural haematoma formation, but may also distort the anatomy and reduce the working space available. Lastly, using large quantity of irrigation fluid, to maintain a clear field of vision and prevent ventricular collapse, can cause over distension of the ventricle and cause haemodynamic and electrolyte imbalance.¹⁰

Cappabianca et al.² have described a case in which a balloon dilator was used to create a cortical corridor to the lateral ventricles. This passage was then kept open with a thin retractor and an endoscope was used to excise the lesion using standard micro instruments and bipolar coagulation.

In our procedure we have used the Destadeau endoscopic system that is routinely used for lumbar disc surgery. The system used a trocar-sheath system which allowed the scope to be gently introduced through a small cortical incision to a predetermined depth based on the MRI/CT scan. Once the scope entered the lateral

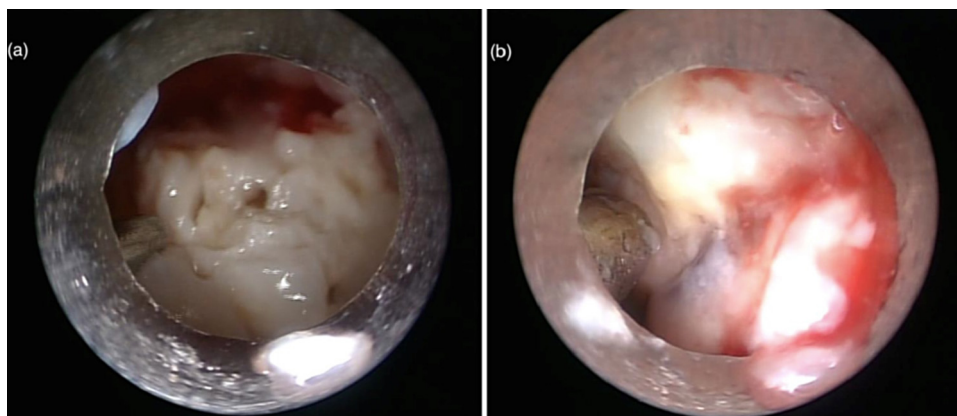


Fig. 3. (A) Intraoperative endoscopic images of the intra ventricular lesion. (B) Partly occluded foramen of monro.

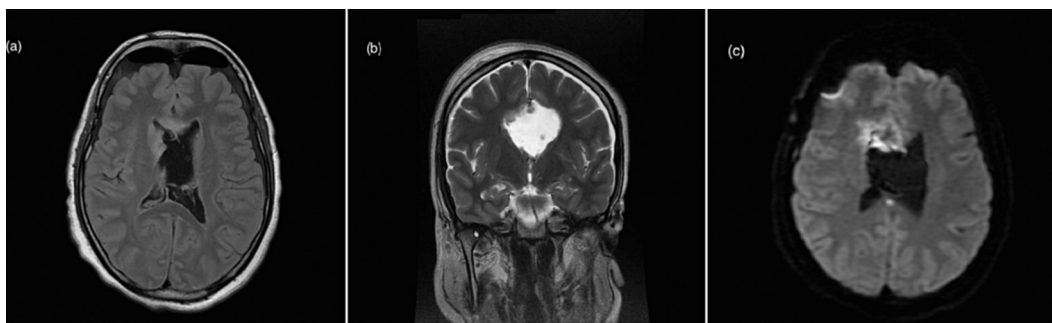


Fig. 4. (a–c) T1, T2 and diffusion weighted images of the fourth ventricular tumour (post operative).

ventricle, it helped to visualize the tumour with minimal cortical trauma.

Visualization of the tumour and ventricular cavity was excellent and the suction port and working channel allowed tumour excision and haemostasis to be performed with relative ease. A 30° endoscope and gentle manipulation of the working channel allowed the cavity to be examined to ensure gross total excision of the tumour.

A three way valve connected to an irrigation system was connected to the suction apparatus to allow intermittent irrigation. We restricted the use of irrigation as it may potentially increase the risk of chemical ventriculitis. The restriction of irrigation did not interfere with the surgical excision neither did it lead to significant ventricular collapse.

In retrospect, it would have been better to do a ventricular diversion procedure at the time of the tumour excision itself, especially as the foramen of monro was not completely open, thus avoiding a second surgery.

The Destadeau system is designed to be placed through the para-spinal muscles to access the lumbar disc hence the trocar system is an oval and bulky sheath that allows easy passage through the muscles. We feel a specially designed lighter conical system may easily be developed, which would cause less cortical injury during introduction and manipulation during surgery.

A significant problem which remains, is that the working sheath system is not compatible for angled and curved instruments, hence a planned placement and gentle manipulation of the working channel is essential to access all areas of the tumour.

6. Conclusion

A multiportal endoscope system that allows use of routine pituitary instruments and enables the surgeon to achieve haemostasis

effectively, in our opinion, would be a viable alternative to microscopic excision of intra ventricular tumours.

The trocar working channel should ideally be conical and lighter, with the ports being placed closer together, to allow for a smaller cortical incision.

As instruments are introduced through the straight working channel, it is not possible to use angled instruments, hence access to “hard-to-reach areas” of the tumour will essentially need gentle manipulation of the entire working channel and the use of angled endoscopes.

This system would be of use only in lateral ventricular tumours with hydrocephalus and would not be of much use to access the third ventricle.

7. Open microsurgery vs. endoscopy

Though open microsurgical decompression/excision is considered the gold standard for intra ventricular tumours, the use of endoscopes have increased due to the relatively avascular nature of epidermoids and need for a smaller cortical incision to insert the sheath. Endoscopic approach does have its fallacies that include (a) steep learning curve, (b) poor visualization in vascular tumours, (c) difficulty in angulation in case of extensive tumours, (d) patients with no hydrocephalus, (e) need for CSF diversion, and (f) lack of instruments for rapid debulking and achieving haemostasis. However stringent patient selection can avoid most of these complications and provide excellent outcome in the right subset of patients.

Conflict of interest

None.

Funding

None.

Ethical approval

Consent has been taken from the patient.

Author contributions

Dr. Rajesh Nair, Dr. Pradeep Tripathi – Data collection and writing up.

Dr. Rajesh, Dr. Vinod – Analysis of data.

Dr. Arjun Shetty, Dr. Sunil – Revision.

Dr. Arjun Shetty – Final approval.

References

- Mohanty A. The current role of endoscopes in intracranial tumor surgery. *J Neurosci Rural Pract* 2013;**4**(January–March (1)):3–5.
- Cappabianca P, Cinalli G, Gangemi M, Brunori A, Cavallo LM, Divitiis E de, et al. Application of neuroendoscopy to intraventricular tumors. *Neurosurgery* 2008;**62**(February Suppl (2)):575–97, discussion 597–8.
- Qiao H, Souweidane MM. Purely endoscopic removal of intraventricular brain tumors: a consensus opinion and update. *Minim Invasive Neurosurg* 2011;**54**:149–54 [PubMed].
- Ontel J, Krauss JK, Caab MR. Ultrasonic aspiration in neuroendoscopy test results with a neo tool-technical note. *J Neurosurg* 2008;**109**:908–11.
- Albright A, Okech H. Use of Nico Myriad device for tumor and cyst removal in a developing country. *Childs Nerv Syst* 2012;**28**:599–604.
- Dlouhy BJ, Dahdaleh NS, Greenlee JD. Emerging technology in intracranial endoscopy-application of Nico myriad. *Neurosurg Focus* 2011;**30**:E6.
- Mohanty A, Thompson BJ, Patterson J. Initial experience with side cutting aspiration system in pure neuroendoscopic excision of large intraventricular tumors. *World Neurosurg* 2013;**80**(Nov 5):655, e15–21.
- Coufflen G, Walsh A, Simpson D, Jeeves M. Comparison of effect of transcortical and transcallosal removal of intra ventricular tumours. *Brain* 1980;**103**:773.
- Shucart WA, Stain BM. Transcallosal approach to the anterior ventricular system. *Neurosurgery* 1978;**3**:339.
- Tanaka Y, Sangitra K, Kobayashi S, Takemae T, Hegde AS. Subdural fluid collections following transcortical approach to intra- or paraventricular tumours. *Acta Neurochir (Wien)* 1989;**99**(1–2):20–5.
- Hakyemez B, Aksoy V, Yeldiz H, Ergin N. Intracranial epidermoid cysts: diffusion-weighted, FLAIR and conventional MR findings. *Eur J Radiol* 2005;**54**(2): 214–20.

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