



Pseudomeningocele - A Complication of Translabyrinthine Approach

Vivek Sasindran^{1*}, Dominic Anto² and Melwin Tom¹

¹Department of ENT, Pushpagiri Institute of Medical Sciences and Research Centre, Tiruvalla, Kerala, India

²Department of Neurosurgery, Pushpagiri Institute of Medical Sciences and Research Centre, Tiruvalla, Kerala, India

*Corresponding Author: Vivek Sasindran, Professor, Department of ENT, Pushpagiri Institute of Medical Sciences and Research Centre, Tiruvalla, Kerala, India.

Received: September 24, 2020

Published: October 16, 2020

© All rights are reserved by Vivek Sasindran, et al.

Abstract

Translabyrinthine approach is widely used to access Cerebellopontine angle tumours owing to its excellent exposure in non-serviceable hearing ear. Pseudomeningocele is a complication most commonly associated with this approach. This case report highlights the need for customized management for each case, with conservative line of management as the first step.

Keywords: Pseudomeningocele; Vestibular Schwannoma; Otolaryngology-Neurotology

Introduction

Different approaches described in literature for cerebellopontine angle (CPA) tumours- translabyrinthine (TL), retrosigmoid, middle cranial fossa (MF) or retrolabyrinthine retrosigmoid.

Translabyrinthine approach performed in patients with preoperative lack of serviceable hearing. Cerebrospinal fluid (CSF) leak is the 2nd most common complication and a major contributor to the healthcare expenditure for patient. Lateral variant of CSF leak/pseudomeningocele mostly seen with translabyrinthine (54%) approach. Medial leak/CSF otorrhoea mandates surgical correction. There are no standard protocols for managing lateral leaks. This article intends to share our experience with pseudomeningocele.

Case Report

First case, 37 year male, with lower cranial nerve (LCN) schwannoma-right CPA abutting pars nervosa of jugular foramen with mass effect, hydrocephalus, profound hearing loss and ataxia. He underwent TL for tumour excision, developed pseudomeningocele and CSF leak through the surgical site on postoperative day (POD)1 (Figure 1).

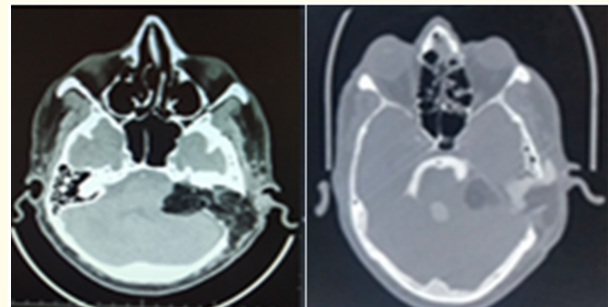


Figure 1: Pseudomeningocele.

Lumbar drain (LD) inserted the same day and removed on POD5. Computed Tomography (CT) on POD8 revealed pseudomeningocele at surgical site, hence LD re-inserted. The reduced swelling reappeared on occluding the LD indicating high CSF pressures persisting, thecoperitoneal shunt done on POD16. Six weeks postoperatively patient developed fever and medial CSF leak, seen on CT cisternography-CSF filling the right middle ear cavity (Figure 2).

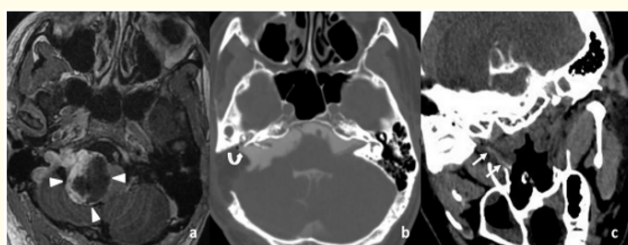


Figure 2: Medial CSF leak.

He underwent blind sac closure of external auditory canal (EAC) with plugging of eustachian tube (ET) opening. Post excision of LCN schwannoma, dysphagia with cricopharyngeal spasm relieved with botox injection. Persistent aspiration with fluid intake due to unilateral vocal cord palsy, secondary to high vagal lesion, managed with medialization thyroplasty with arytenoid rotation, improving his symptoms and voice quality.

Second case, 54 year male, with left vestibular schwannoma (VS), profound hearing loss, obstructive hydrocephalus with dilated ventricles (Figure 3 and 4).

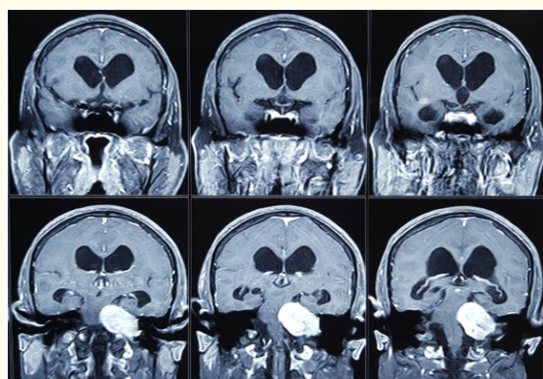


Figure 3: Obstructive Hydrocephalus- coronal.

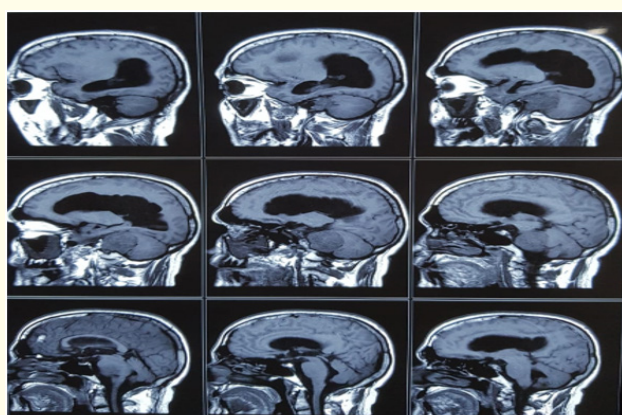


Figure 4: Obstructive hydrocephalus - sagittal.

He underwent TL excision of tumour. Re-admission on POD12 for pseudomeningocele at surgical site, managed conservatively. Lumbar puncture and CSF drainage done same day. Four weeks postoperatively, developed CSF otorrhoea. He underwent blind sac closure of left EAC and plugging of ET.

Discussion

Translabyrinthine approach described by House and Luetje. Common complications are CSF leak, meningitis, facial nerve paresis, headache, disordered vestibular compensation, cerebellar and brain stem injuries and vascular complications. The advances in diagnostic tools, anaesthetic care, microsurgical techniques and intraoperative monitoring significantly helped in early diagnosis, reduced neurological morbidity and perioperative mortality without compromising the radicality of tumour resection.

Earlier 20% chances of CSF leaks reduced by modifications in surgical procedure to 2% -30% for suboccipital (SO) craniotomy, but the average leak rate is 10% [1]. Independent of the approach, postoperative dural defects and bone defects can allow extravasation of CSF from subarachnoid space into extracranial surgical site and pneumatized portions of temporal bone. Unfortunately, these fistulae are difficult to identify/rectify intraoperatively leading to increased risk of meningitis and increased cost burden to the patient.

CSF leakage can be classified as medial (via petrous air cells or labyrinth) or lateral variant (wound leak/pseudomeningocele) [2]. The difficult to manage are the medial variants that require revision surgery and leak closure. Various studies showed tumor size and surgical approach as the factors affecting postoperative type of CSF leak.

Medial CSF Leak best reduced by meticulous sealing of opened air cells following internal auditory canal (IAC) opening. MRI/cisternography best in localizing the pathway. Blind sac closure as per Dr. Mario Sanna’s technique ensured complete exenteration of the mastoid air cells, ET plugging with bone wax, soft tissue and multi-layer closure with regular follow up.

Lateral CSF leak, commonly with translabyrinthine (54%), whereas rhinorrhea common in cases of the suboccipital (68%) and middle fossa (70%) approach as per Mangus., *et al* [3]. Wound leak prevention by watertight multilayer-tissue closure technique, with a preferred primary suture of duramater and use of muscle, fat, tissue glue and pressure dressing for several days, found to reduce incidence of leaks.

Pseudomeningocele is characterized by extradural accumulation of CSF at the post-operative site, contained by intact skin and subcutaneous tissue. It can be painful or be associated with focal or diffuse neurologic deficits. These lesions can lead to wound break-

down, development of CSF fistula, intracranial hypotension, aseptic meningitis and even death. They can spontaneously resolve making it difficult to decide on the timing of treatment. Factors implicated in its development are hydrocephalus, poor surgical closure of dura, subarachnoid scarring, infection.

Communicating hydrocephalus observed in relation to VS at presentation, which was associated with elevated CSF protein levels and accumulation of tumor debris in the CSF, interferes with CSF absorption. Some attributed narrowing of the sigmoid sinus (SS) where it crosses craniectomy defect as a cause for increased CSF pressure leading to CSF leaks. Jugular venous narrowing responsible for spontaneous CSF leak, resolved after stenting. Hence, venous sinus stenting rapidly gaining acceptance as a safe, reliable alternative to CSF diversion procedures in some instances of raised intracranial pressure (ICP) [4]. CSF diversion procedures for raised pressures depends on type of hydrocephalus. Communicating hydrocephalus predominantly relieved by shunting procedures-Lumboperitoneal/Thecoperitoneal (LP) shunt, preferred, reduced the cranial CSF pressure same as ventriculoperitoneal (VP) shunt.

Persistent air cells leads CSF to flow from the relatively high ICP system (7 - 15 mmHg) to relatively low pressure systems of ET, middle ear space or dehiscence in periosteal or skin layers. With an increase in CSF pressure common in POD, CSF needs an outlet, if low-pressure systems are sealed, it leaks into subcutaneous locations.

There is little evidence in literature to support the timing of resolution. An average of 7 - 14 days, with a significant proportion of surgeons persisting much longer before changing management [5]. If patient is suffering from pain, cannot lie comfortably, fluid leak, increasing size, wound needs to be revised sooner. While a stable pseudomeningocele is unlikely to act as nidus for infection, CSF leak increases relative risk of meningitis by 10.2 times.

The study projects the need for diagnosing raised ICP pre-operatively in patients undergoing TL and its correction, thereby preventing development of pseudomeningocele. MR Venography-study of choice for detecting raised ICP which leads to CSF leaks. It provides details of sigmoid sinus, jugular venous system preoperatively with no additional cost burden, thus helping to assess the venous system and CSF status.

Conclusion

An adequate pre-operative ICP assessment helps in proper staged management of any CPA tumour excision through translabyrinthine approach preventing CSF leaks especially pseudomeningocele, thereby patient's morbidity, hospital stay and cost burden.

Key Clinical Message

Pseudomeningocele, a complication commonly encountered with translabyrinthine approach, has no standard protocols for its

management. The case report highlights the need for tailored management of individual cases.

Author Contribution

Dr. Vivek Sasindran - Professor, ENT surgeon who is the Chief Surgeon.

Dr. Dominic Anto - Professor, Neurosurgery who did the post-operative neurological management and tackled the complication together with the ENT surgeon.

Dr. Melwin Tom - Junior Resident, assisted the Chief surgeon intraoperatively and in post operative care.

Conflict of Interest

There are no conflicts of interest.

Financial Disclosure

No aids were obtained for this study.

Bibliography

1. Selesnick SH, *et al.* "The incidence of cerebrospinal fluid leak after vestibular schwannoma surgery". *Otology and Neurotology* 25 (2004): 387-393.
2. Betka J, *et al.* "Complications of microsurgery of vestibular schwannoma". *BioMed Research International* (2014): 315952.
3. BD Mangus, *et al.* "Management of cerebrospinal fluid leaks after vestibular schwannoma surgery". *Otology and Neurotology* 32.9 (2011): 1525-1529.
4. Higgins JN, *et al.* "Headache, CSF Leaks, and Pseudomeningoceles after Resection of Vestibular Schwannomas Efficacy of Venous Sinus Stenting Suggests Cranial Venous Outflow Compromise as a Unifying Pathophysiological Mechanism". *Journal of Neurological Surgery Part B* 80.06 (2019): 640-647.
5. Tu A, *et al.* "Management of postoperative pseudomeningoceles: an international survey study". *Child's Nervous System* 30 (2014): 1791-1801.

Assets from publication with us

- Prompt Acknowledgement after receiving the article
- Thorough Double blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- High visibility of your Published work

Website: www.actascientific.com/

Submit Article: www.actascientific.com/submission.php

Email us: editor@actascientific.com

Contact us: +91 9182824667