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(North Eastern Branch of the Association of Otolaryngologists of India)

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Journal of Otolaryngology and Head & Neck Surgery(North Eastern Branch of the Association of Otolaryngologists of India) is an open-access, peer-reviewed periodical dedicated to bridging the gap between clinical experience and global medical literature. It focuses on the understanding and management of various pathologies and diseases affecting the ear, nose, throat, head, and neck. The journal explores recent advancements and research in diseases, health, and medical science through robust, evidence-based clinical research studies. Positioned as a vital resource for postgraduate students, consultants, and healthcare professionals, the journal serves as a repository of clinical insights with an international perspective. Its readership includes otolaryngologists, head and neck surgeons, ENT nurses, as well as scholars and academicians across fields like medicine, trauma, and surgery.

The journal aims to foster the analysis of clinical data from centers worldwide, utilizing standardized protocols to develop a globally accepted consensus on managing disorders within the field of otorhinolaryngology.

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The Journal of Otolaryngology and Head & Neck Surgery(North Eastern Branch of the Association of Otolaryngologists of India) is started from the year 2025 and will be published three times a year. Each issue is dedicated to a specific topic of special interest within the fields of otorhinolaryngology, head, and neck surgery, providing focused and comprehensive insights for its readers. This journal will be in Print Format.

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The Journal features clinical research on current practices in otorhinolaryngology, audiology, speech pathology, head and neck oncology, plastic and reconstructive surgery, and related specialties.

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Journal of Otolaryngology and Head & Neck Surgery

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MESSAGE

Journal of Otolaryngology and Head & Neck Surgery (North Eastern Branch of the Association of Otolaryngologists of India) is the official publication of North Eastern Branch of the Association of Otolaryngologists of India (NEBAOI). Its a new journal and it will be fully peer-reviewed fulfilling all the Journal requirements to be indexed. There will be three issues in a year – April, August, and December issues. The Journal's mission is to publish clinically relevant information and research work in otolaryngology, head and neck surgery that can be used by clinicians and scientists to improve patient care and public health. The Journal is an ideal forum for otolaryngologists, and Head and Neck Surgeons to showcase their clinical and research work globally. The Journal of Otolaryngology and Head & Neck Surgery (North Eastern Branch of the Association of Otolaryngologists of India) is made a fully open-access journal so that there will be increased visibility and readership, potential for greater citations, wider collaboration opportunities, and compliance with funder mandates, ultimately accelerating knowledge sharing and fostering a more inclusive research environment.

Each subspecialty is assigned a section editor who is a leading authority in the area. The journal's editorial team is committed to providing science-driven, peer-reviewed articles conforming to the strict international process and editorial standards expected by the scientific community. Therefore, inviting everyone to submit their research work to the Journal.

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Evaluating the Diagnostic Accuracy of Tympanometry and High-Resolution CT in Otosclerosis: A Retrospective Comparative Study

Siddharth Manoj[1], Advait Bhuran[2], Rashmi Hansdah[3], Vidhu Sharma[4], Sarbesh Tiwari[5], Kapil Soni[6], Amit Goyal[7]

Received on: 13 March 2025; **Accepted on:** 31 March 2025; **Published on:** 07 April 2025

ABSTRACT

Background: Otosclerosis is a progressive disease causing stapes fixation and conductive hearing loss. While tympanometry and high-resolution computed tomography (HRCT) are commonly used for diagnosis, their accuracy varies. This study evaluates the diagnostic performance of these modalities individually and in combination, using intraoperative findings as the reference standard.

Methods: A retrospective analysis of 40 patients who underwent exploratory tympanotomy for suspected otosclerosis was conducted. Preoperative tympanometry and HRCT findings were compared to intraoperative confirmation. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. McNemar's test assessed statistical significance.

Results: Tympanometry had high sensitivity (78.13%) but low specificity (50%), whereas HRCT had lower sensitivity (43.75%) but higher specificity (62.6%). Combining both improved specificity (75%) but reduced sensitivity (37.5%). PPV remained high (85.7% for the combined test), indicating substantial predictive value when both tests were positive. However, NPV was consistently low, limiting their reliability in ruling out otosclerosis. Statistical analysis showed no significant change in diagnostic accuracy when combining tests.

Conclusion: Tympanometry is helpful for screening, while HRCT aids in confirmation. However, neither test, alone nor in combination, reliably excludes otosclerosis due to low NPV. Preoperative HRCT interpretation should involve experienced radiologists, and emerging imaging techniques may enhance diagnostic accuracy.

Keywords: Conductive Hearing Loss, High Resolution Computed Tomography, Otosclerosis, Tympanometry.

INTRODUCTION

Otosclerosis is a disorder of bony remodelling in which the otic capsule endochondral bone, which is dense, is replaced by spongy bone, which later hardens and leads to fixation of stapes.[1] These patients usually present with conductive hearing loss with intact tympanic membrane; however, sometimes sensory component can be seen when the cochlea or round window is involved. Preoperative evaluation includes clinical examination, audiological evaluation with Pure Tone Audiometry (PTA), and Tympanometry routinely with optional radiological evaluation with Resolution Computed Tomography (HRCT). The reduction in compliance identified as As type of curve in tympanometry and Carhart's notch in PTA are recognised as common signs in otosclerosis and are routinely performed in all cases as they are non-invasive compared to HRCT, which involves radiation exposure.[2] While the sensitivity of HRCT in diagnosing otosclerosis ranges from 45-75% in different studies,[3-4] it is being performed in various centres routinely as a pre-operative mode of investigation. This study aims to assess the ability of HRCT to predict otosclerosis with and without in conjunction with audiological modalities.

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METHODOLOGY

A retrospective chart review was performed for adult patients with Suspected Otosclerosis who underwent Exploratory Tympanotomy over 5 years, between January 2020 and December 2024, at a tertiary care hospital in Western Rajasthan (Department of Otorhinolaryngology, All India Institute of Medical Sciences, Jodhpur).

Data were collected using Hospital records. Patients were deemed eligible for inclusion if they were 18 years of age or older and underwent Exploratory Tympanotomy following both preoperative Tympanometry and HRCT temporal bone scan. Patients were excluded if there was no Tympanometry, preoperative HRCT scan, or had a history of chronic suppurative otitis media, prior ear surgery, ipsilateral temporal bone trauma, or congenital middle or inner ear anomalies.

Surgical Technique: The surgeries were performed under 2 senior specialists in the department by Endaural or Postaural approaches. The ossicular chain was palpated to check for mobility. If the Stapes was found to be fixed, stapedotomy was performed. In other cases, respective management was performed.

Analysis of Radiologic Interpretation - A dedicated high-resolution CT temporal bone scan with 0.6 mm axial slice thickness through the temporal bone without contrast was ordered. The scans were then reviewed in a Clinico-radiological meeting between the operating surgeons and a senior radiologist with particular interest in Neuroradiology.

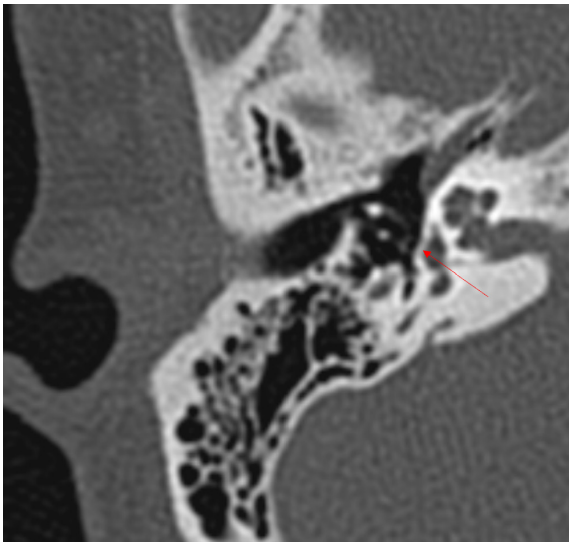

Figure 1: High Resolution Computed Tomography (HRCT) Temporal Bone demonstration demineralisation at stapes foot plate (Fissula ante fenestrum)

RESULTS

Demographic Characteristics - The average age of patients at the time of surgery was 40.0 ± 10.2 years (range 18 to 59 years). 20 patients (50 %) were female, and 20 were male (50%), representing a 1:1 ratio.

Laterality Data - Left and right ears were affected at similar rates, with 46% and 54% involvement, respectively. Bilateral disease occurred in 60%, and the remaining 40% had unilateral involvement.

Among the 40 patients, A type of curve was found in 29 (72.5%) patients, and other curves were found in 11 patients (Table 1). 17 out of 40 patients were reported to have sclerotic foci in pre-operative HRCT (42.5%) (Table 3). Intraoperative, 32 patients (80%) were found to have stapes fixation, and the rest 8 were not found to have stapes fixation (Table 1 & 3). 14 patients (35%) showed positive findings in both (As type curve in Tympanometry and sclerotic foci in HRCT) (Table 5). The sensitivity, specificity, Positive Predictive Value (PPV), and Negative Predictive Value (NPV) were calculated for Tympanometry (Table 2), HRCT (Table 4) individually and for both (Table 6).

From these tables, we can see the decrease in Sensitivity and increase in Specificity when the tests are combined. To check the significance of this change, McNemar's Test was applied. The critical value was χ^2 (1.67) < 3.84 for specificity and χ^2 = 0 for sensitivity, which suggests that the observed change is not significant for the sample size of 40.

Table 1: Tympanometry vs Intra-operative Finding

	Otosclerosis Present	Otosclerosis Absent	Total
As Type curve on Tympanometry	25	4	29
Other curves on Tympanometry	7	4	11
Total	32	8	40

Table 2: Tympanometry vs Intra-operative Finding – Statistical Analysis

Sensitivity	78.13%
Specificity	50%
Positive Predictive value	86.21%
Negative Predictive value	36.36%

Table 3: HRCT vs Intra-operative finding

	Otosclerosis Present	Otosclerosis Absent	Total
HRCT Could detect	14	3	17
HRCT Couldn't detect	18	5	23
Total	32	8	40

Table 4: Tympanometry vs Intra-operative Finding – Statistical Analysis

Sensitivity	43.75%
Specificity	62.6%
Positive Predictive value	82.35%
Negative Predictive value	21.75%

Table 5: HRCT + Tympanometry vs Intra-operative finding

	Otosclerosis Present	Otosclerosis Absent	Total
Both Tests Positive	12	2	14
Both Tests Negative	20	6	26
Total	32	8	40

Table 6: HRCT + Tympanometry vs Intra-operative Finding – Statistical Analysis

Sensitivity	37.5%
Specificity	75%
Positive Predictive value	85.7%
Negative Predictive value	23.1%

DISCUSSION

The study evaluates the diagnostic performance of Tympanometry, High-Resolution Computed Tomography (HRCT), and their combined use in detecting otosclerosis, using intraoperative findings as the reference standard. The results demonstrate the strengths and limitations of each modality.

1. Tympanometry vs. Intraoperative Findings

Sensitivity: 78.13% → Tympanometry can correctly identify stapes fixation in 78.13% of cases.

Specificity: 50% → Tympanometry can misclassify 50% of patients without stapes fixation.

Positive Predictive Value (PPV): 86.21% → A positive As-type curve on tympanometry strongly suggests stapes fixation.

Negative Predictive Value (NPV): 36.36% → A non-A tympanometry curve does not reliably exclude stapes fixation. This suggests Tympanometry is highly sensitive but moderately specific in diagnosing otosclerosis. The high PPV suggests that if an As-type curve is present, there is a strong likelihood of otosclerosis. However, its low specificity and NPV mean that an alternative tympanometry result does not reliably rule out the disease, leading to false negatives.

2. HRCT vs. Intraoperative Findings

Sensitivity: 43.75% → HRCT can detect stapes fixation in only 43.75% of confirmed cases.

Specificity: 62.6% → HRCT can rule out stapes fixation in 62.6% of cases.

PPV: 82.35% → A positive HRCT finding strongly suggests stapes fixation.

NPV: 21.75% → A negative HRCT does not exclude stapes fixation.

Interpretation:

HRCT has lower sensitivity compared to tympanometry, meaning it misses more cases of otosclerosis. This is much the same as reported in US populations[4] and much lesser than mentioned in European populations.[5] However, it has higher specificity, reducing the number of false positives, but it is still lower than mentioned by Kanzara et al.[6] The PPV is high, meaning a positive HRCT scan strongly supports otosclerosis. However, its low NPV indicates that a negative scan does not reliably exclude the condition.

3. Combined Tympanometry + HRCT vs. Intraoperative Findings

The combined assessment improves specificity (75%) but at the cost of reducing sensitivity (37.5%). This means that while the test is better at avoiding false positives, it misses more true cases of otosclerosis. The high PPV (85.7%) suggests that if both tests are positive, otosclerosis is very likely.

However, the low NPV (23.1%) indicates that if both tests are negative, otosclerosis still cannot be ruled out confidently.

OVERALL CLINICAL IMPLICATIONS

Tympanometry alone is more sensitive but has lower specificity. It is useful for screening otosclerosis, but its false positive rate limits its standalone diagnostic value.

HRCT alone is less sensitive but has higher specificity. It is better at confirming otosclerosis rather than detecting it.

The combined assessment improves specificity but significantly reduces sensitivity. While it minimizes false positives, it misses more true cases, making it less reliable for ruling out otosclerosis.

The difference in radiological reporting was also discussed between well-trained and less-trained individuals, which demands the review of radiology by a senior radiologist.[7] We impel on the need for a discussion between the surgeon and radiologists before the surgery for better clarification. The usage of densitometry and other quantitative measures, as mentioned by Sha et al,[8] should also be under consideration for better outcomes from HRCT.

CONCLUSION

Neither HRCT nor tympanometry alone is sufficient for the preoperative diagnosis of otosclerosis. For screening otosclerosis, Tympanometry alone is more effective. For confirming otosclerosis, HRCT or the combined test is preferred. For ruling out otosclerosis, none of the tests reliably exclude the condition due to their low NPV. However, HRCT remains useful in atypical cases, complex anatomical variations (overlying facial nerve, aberrant stapedial artery),

and revision surgeries, while tympanometry serves as a valuable. Advances in imaging techniques, machine learning-assisted analysis, and standardized radiological interpretation may enhance preoperative detection in the future.

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Submental Flap in Small but Reconstructive Mandated Oral Cavity Lesions

Chanmiki Sayoo

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ABSTRACT

In this era of microvascular reconstruction, where the practise of microvascular surgery is widely practised by many surgeons, reconstruction with free flap has become mandatory in most of the head and neck oncological procedures. However, due to its difficult learning curve and time-consuming nature, free flaps are not routine surgery for many surgeons. The success of free tissue transfer surgery is not solely determined by the surgeon's skills alone. Age and operative time can cause medical complications, if not surgical complications, and hence can lead to free flap failure.

There are some lesions where local and regional flaps still hold their value as a good substitute for free flaps. The submental flap is one such flap. Though the utility and safety of the submental flap in oncological surgery has been questioned by many, with proper case selection and proper technique, the submental flap is still good and safe in oral cavity reconstruction.

The purpose of this paper is to present a series of 13 patients who had undergone reconstruction with submental flaps after resection of their primary tumours in the oral cavity.

Key words: Oral cancer, reconstruction, submental flap

INTRODUCTION

Cancer of the oral cavity includes cancer of the lips, hard palate, soft palate, retromolar trigone, front two-thirds of the tongue, gingiva, buccal mucosa, and floor of the mouth.[1] Globally, oral cancer is the sixth most common cancer.[2] In India, around 77,000 new cases and 52,000 deaths are reported annually, which is approximately one-fourth of the global incidence. As compared to the West, 70% of oral cancers in India are detected in the advanced stage (American Joint Committee on Cancer, Stage III and IV). Due to this late detection, the overall five-year survival rate is only around 20%. However, with early detection (stage I or II), the five-year survival can increase from 50% to 80%.[4]

The management of oral cancer includes surgery, radiotherapy, and chemotherapy. Surgery remains the primary treatment approach.[5] Surgery involves removal of a tumour with a margin of at least 1-1.5cm along with neck dissection accordingly.[6]

Resection of the tumour usually leaves a surgical defect that mandates reconstruction for cosmetic and functional purposes. Options for reconstruction include split-thickness skin graft, loco-regional flap, and free flap. Skin grafts may be useful for superficial defects but have their limitations. Regional flaps (pectoralis major, dectopectoral, lattisimus dorsi) are the most reliable flaps but have the disadvantage of being too bulky and may not match the required result. Other flaps, like nasolabial and platysma, have been used, but they are unreliable or of limited versatility in terms of coverage of oral cavity defects.[7]

Free flaps such as radial forearm and anterolateral thigh flaps have become the reconstruction of choice in the majority of medium to large defects in the oral cavity. However, they need trained personnel and microsurgical set up and are usually associated with increased surgical time, which may lead to medical complications after surgery.[8]

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Over the last few years, the submental flap has gained popularity for reconstruction in oral cavity defects.[9] The operative time and hospital stay are shorter compared to the gold standard radial forearm free flap and do not require highly trained personnel and microsurgical set up. These factors make the submental flap a reconstruction of choice in properly selected cases.

PATIENTS AND METHODS

A total of 13 patients, 5 females and 8 males, were operated on for squamous cell carcinoma of their oral cavity by a single surgeon from January 2020 to December 2024. The patients' age ranges from 32 years to 60 years. The site of the tumour location is shown in table 1:

Table 1:

Location of tumour	Number of patients
Tongue	4
Floor of mouth	1
Angle of mouth	1
Buccal mucosa	4
Lower lip	2
Alveolus of mandible	1
Total	13

The size of all these tumours at the time of operation was not more than 4 cm (TNM Staging T2), and none of them had lymph nodes radiologically at the submental region (Level Ia). All the tumours are lateralised, and none of them are located at or crossing the midline.

SURGICAL TECHNIQUE

The patient was made to lie supine with a shoulder extension. A pinched test was performed to delineate the maximum width of the flap. The elliptical island incision marking is made under the submental area, as shown in Fig 1. The length of the flap can extend from one angle of the mandible to the other, depending on the requirement. The approach to harvest a submental flap has been described differently by different authors, but the one that is described here is the approach that is routinely used by the author of this article.

The incision is made as shown in Fig 2 (red line). The subplatysmal flap is then elevated, preserving the marginal mandibular branch. Dissection continued with careful dissection of the submandibular gland by avoiding injury to the common facial vein. Bipolar cautery with a pointed tip is recommended at this stage, as monopolar cautery can cause thermal damage to the submental vessels. Branches of the facial artery to the submandibular gland are ligated, and the gland is then removed. The pedicle of the flap can be seen after removing the submandibular gland, as shown in Fig 3.

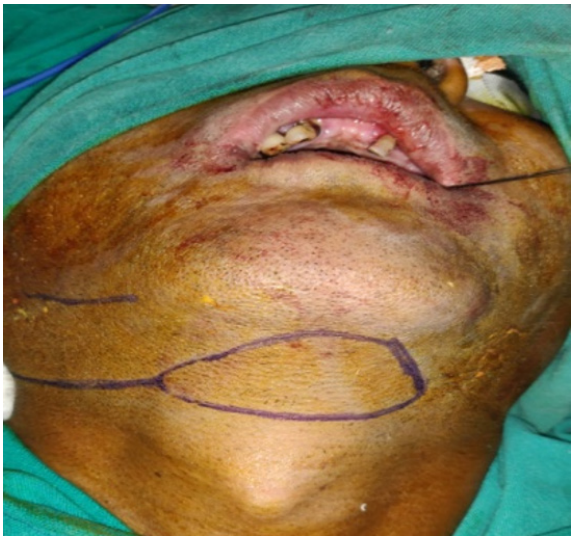


Figure 1: Marking

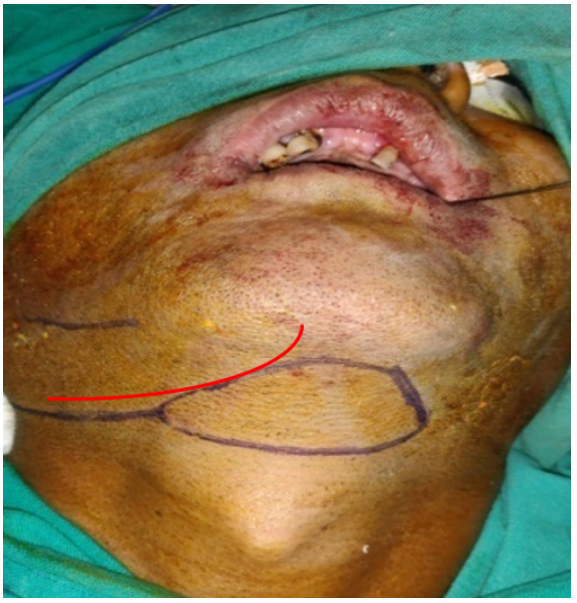


Figure 2: Incision marking

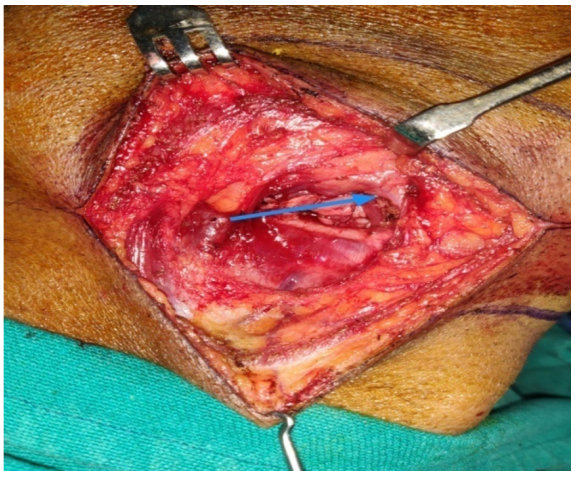


Figure 3: Pedicle shown by arrow

The next step is to extend the incision by following the marking 1.5 cm below the mandible at the midline. Dissection is then continued from the other end of the flap till the contralateral anterior belly of the digastric muscle is seen. The anterior belly of the ipsilateral digastric muscle is then divided from its mandibular attachment and separated from the mylohyoid muscle below and opposite digastric muscle (anterior belly) as shown in Fig 4. A stay suture is then placed between the edge of the flap and the anterior belly of the digastric muscle to prevent unnecessary shearing of the flap. Dissection is then continued towards the pedicle, keeping the muscle and skin as one unit. The digastric muscle is then divided from its common tendon, and the flap is ready and tested for its viability, as shown in Fig 5. The flap can now be transferred into the oral cavity either beneath the mandible, where tunnelling has to be done by removing the mylohyoid muscle, or above the mandible.

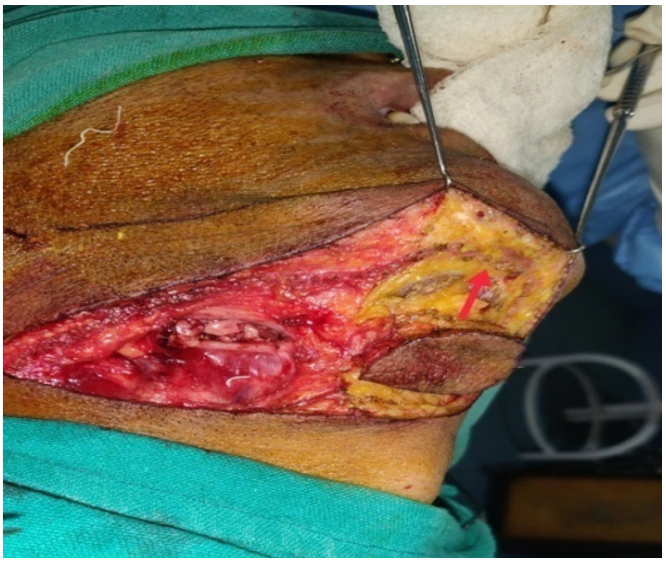


Figure 4: Red arrow indicates mid line between anterior belly of digastric muscle

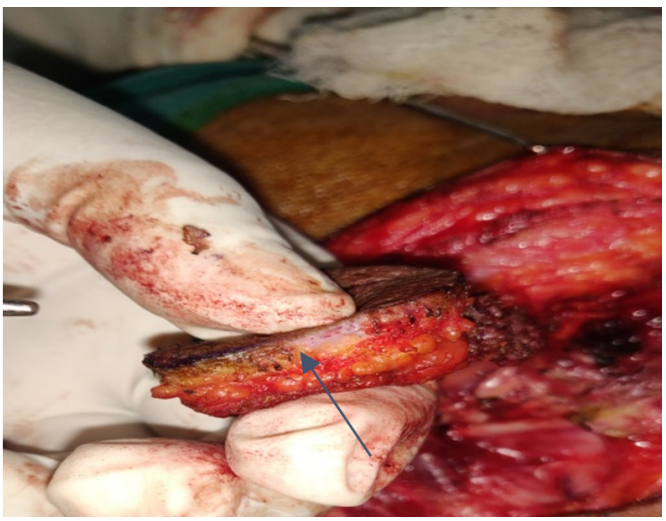


Figure 5: Flap tested for its viability by cutting the edge

RESULT

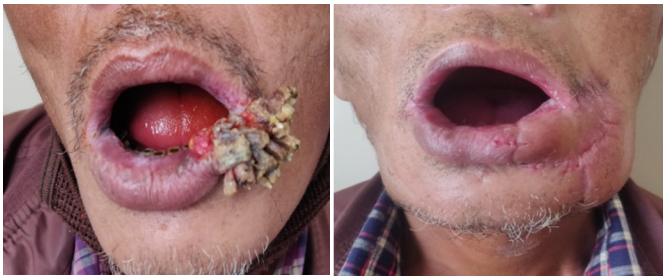
All patients underwent one-stage resection of the primary tumour, neck dissection, and reconstruction of the surgical defect with the submental flap. The site of the primary lesions are mentioned in Table 1. Selective neck dissection removing lymph nodes of level I to III were performed in 9 patients and other 4 patients (Tongue as primary lesion), lymph nodes clearance of level I to IV was done. In all the patients, the flap was of ipsilateral to the primary tumour. In six patients, the pedicle was on the left side, and in seven patients, the pedicle was on the right side.

The average operative time to harvest the flap was 30 minutes. The presence of the pedicle does not cause hindrance or delay the neck dissection duration.

In all the patients, the flap was successfully harvested. Postoperatively, two patients experienced venous congestion of the flap on the next postoperative day. The flap eventually necrosed in these two patients and was discarded; one was buccal mucosa, and the other was the angle of the mouth. The buccal mucosa defect was left to granulate, and the angle of mouth defect was closed by Abbe-Estlander flap on the fourth postoperative day. In all other patients, the flap was viable till the latest date of follow-up.

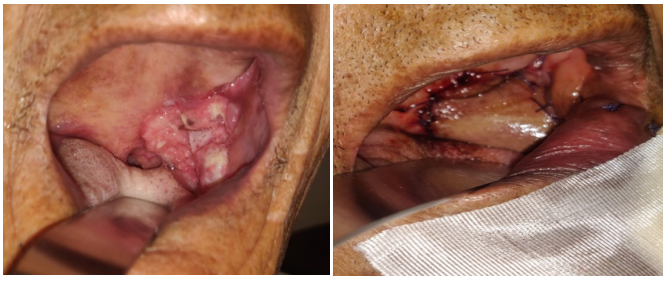
The profile of the two patients that experienced failure of the flap was, one was a fat lady with thick subcutaneous fat that requires reconstruction for her defect in buccal mucosa. In the other patient, the flap was transposed to the angle of the mouth defect over the mandible without tunnelling or removing the subcutaneous tissue of the skin over the mandible.

Some of the pre-, intra-, and post-operative lesions are shown below in figures 6, 7, and 8:



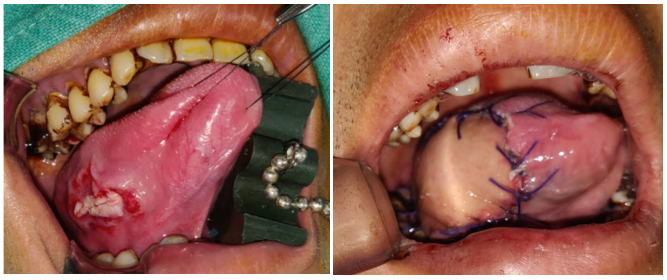
Pre operative Post operative

Figure 6: Growth Lower lip



Pre operative Post operative

Figure 7: Growth Buccal



Pre operative Post operative

Figure 8: Growth Tongue

DISCUSSION

The submental flap was first reported in 1993 by Martin et al.[10] It is based on the submental artery, a constant branch of the facial artery. The short duration of harvesting, well vascularised and non-sophisticated requirement of microsurgical set has made this flap a good choice in most of the reconstruction in oral cavity. In non-oncological cases, this flap has found its wide application.

The submental flap could be classified according to blood supply as a pedicled flap, free flap, or perforator flap and, according to the composition of the flap paddle, as a myocutaneous or osteocutaneous flap.[11] The submental pedicle flap can be pedicled inferiorly, i.e., orthograde variant, or superiorly, i.e., reverse flow variant. The orthograde variant is based on the facial artery, and the reverse flow variant relies on the anastomosis between the external and internal carotid arteries via the angular artery. In this series, the author has used the orthograde variant in all the cases.

The inclusion of the anterior belly of digastric muscle with the flap is controversial. Yetman[12] and Magden et al[13] found that the main submental artery courses beneath the anterior belly of digastric muscle in most specimens. However, there is also a superficial branch that runs above the digastric muscle. Indeed, the survival of the flap has not been affected by omitting the muscle.[14] In this series, the author has included the anterior belly of the digastric muscle with the flap in all the cases. Including the muscle with the flap may certainly increase the viability of the flap, but in some cases, it may cause difficulty in transposing the flap to the oral cavity due to its added thickness. To increase the perforating vessels and venous drainage, part of the mylohyoid muscle can also be included with the flap.

Chow et al.[15] reported partial loss of 2 out of 10 flaps. Marten et al.[16] reported loss of one flap in 11 non-irradiated patients. The latter author recommended avoiding using this flap in a patient who had received radiotherapy to the neck. In this series, there was a complete loss of two flaps. From the author's experience, factors that can contribute to the loss of the flap include: thick neck or thick subcutaneous tissue, compression of the pedicle beneath or over the mandible. Proper tunnelling beneath or above the mandible can prevent compression of the pedicle.

There has been concern in the literature about the oncological safety of this flap as harvesting this flap can compromise the lymph node clearance or may result in the spreading of the tumour to the recipient area. However, dissection in the subplatysmal plane, as recommended by Chow et al., would minimise the chance of inadequate clearance or tumour spread. Amin et al. prescribed the complete lymph node dissection before flap harvesting and recommend that this flap should be avoided in clinically positive node.[17]

In this series, 5 patients underwent adjuvant radiotherapy after surgery. The reason for adjuvant radiotherapy was perineural invasion in the final histopathological finding in 3 patients, depth of invasion more than 5mm in one patient, and level II node positive in one patient. Till the last follow-up, the flap in all the patient who received or didn't receive radiotherapy is viable except in those two patients who had loss of flap in immediate post op day, and as far as the last follow-up is concern there is no sign of recurrent disease in both the primary and the neck.

CONCLUSION

Due to the long duration of surgery and highly trained surgeon required for free flap reconstruction, the submental flap still holds its value in small defect reconstruction in the oral cavity after resection of early-stage tumours. Proper case selection is necessary before choosing the submental flap for reconstruction.

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Etiological Distribution of Vertigo in Otorhinolaryngology Outpatient Department in a Tertiary Care Center: An Observational Study in North Eastern Indian Population

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ABSTRACT

Objective: To study the various etiologies of vertigo in the patient population presenting to the Otolaryngology Outpatient Department in a tertiary center in North Eastern India.

Materials and Methods: Our current study included 213 participants who presented to the ENT Outpatient Department in a tertiary institute in North Eastern India with complaints of giddiness or vertigo during the period from April 2024 to December 2024. Required clinical data was collected by verification of medical records maintained in the vertigo clinic. And etiologic distribution for vertigo was also studied.

Results: Of the 213 patients studied, 62.79% were females, and 37.21% were males. The median age range of the population was 45-60 years.

The etiologies for vertigo prevalent in the study population were: Benign Paroxysmal Positional Vertigo (BPPV) (34.74%) Vestibular Migraine (26.29%), Meniere's Disease (18.3%), Central vertigo (5.16%), Labyrinthitis (3.38%), Vestibular Neuronitis (2.81%) and a spectrum of other rare etiologies. A few cardiovascular and functional causes of giddiness were also identified.

Conclusion: BPPV involving the posterior semicircular canal is the most common etiology of vertigo in the study population. Vestibular Migraine and Meniere's Disease respectively represented the second and third common etiologies. A few rare peripheral vestibular, neurological, and cardiovascular causes were also identified.

Key words: Vertigo, Giddiness, Vertigo clinic, BPPV, Etiology

INTRODUCTION

Giddiness is one of the most common symptoms to come across in patient populations visiting Otolaryngology, Neurology, and General Medicine clinical practice. It includes various spectrum of diagnoses and encompasses various terminologies like light headedness, dizziness and vertigo. 3-7% of the patients in the general population experience vertigo according to available literature; while 15-30% of patients experience so called 'giddiness'.[1] A number of physiological systems are to be evaluated for this vague symptomatology of giddiness.[2] Due to this, patients with giddiness tend to get shuttled between different Out-Patient Departments before coming to a definitive diagnosis, which materializes the definitive treatment. Considering the debilitating nature of this symptom, earlier diagnosis and earlier initiation of treatment are mandatory. The concept of 'vertigo clinic' has evolved over years to bring this wide spectrum of vertigo under a single arm to facilitate early diagnosis and treatment. Giddiness can occur due to simple correctable causes like hypoglycemia, anemia to complex tumors involving the cerebellopontine angle.

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Usually, the diagnosis of vertigo traverses the path of history taking, which encompasses detailed analysis of the individual episode of giddiness to characterize the duration of each episode, pattern of giddiness, triggers, exacerbating factors, and associated symptoms. There is a need to evaluate the various diagnoses of vertigo in specific population groups to channel the patients to specialists for their optimal benefit.

MATERIALS AND METHODS

Study Participants

Our current study included 213 participants who presented to the ENT Outpatient Department with complaints of giddiness or vertigo during the period from April 2024 to December 2024.

Exclusion criteria were those patients with a known history of neurological disorders leading to disequilibrium or gait imbalance like ataxias, Parkinsonism, and those patients who are bedridden with complaints of giddiness in whom neurotological examination and positional tests are difficult to perform.

Permission to use their medical records for study purposes was taken from all the patients involved. The study was started after clearance from the Institute Ethical Committee.

Data Collection

A detailed clinical history of the participants was obtained to characterize the diagnosis. Further evaluation was done by thorough neurotological evaluation with positional tests and audio vestibular tests including: Pure Tone Audiogram (PTA), Vestibular Evoked Myogenic Potential (VEMP), Videonystagmography (VNG) and Electrocochleography (ECochG) and radiological imaging (High Resolution Computed Tomography (HRCT) of the temporal bone and magnetic Resonance Imaging (MRI)of the Brain) whenever necessary. Etiological diagnoses were derived based on a detailed clinical discussion of the scenario in the Vertigo clinic by experts in Neurotology considering the validated diagnostic criterion published in literature. Data required for this study was obtained from the registers maintained in the ENT OPD under Vertigo Clinic.

RESULTS

Our study was an observational study to look into the various etiological diagnoses for vertigo in the study population who were evaluated for vertigo/giddiness in the Vertigo clinic.

213 participants were included in the study. The study population belonged to a wide age group ranging from 9 years to 74 years, with the median age range at presentation being 45-60 years.

The study population had a gender distribution of 62.79% females and 37.21% males; the female to male ratio was 1.68:1.

Various diagnostic causes attributing to vertigo were made by thorough history taking, Neuro-otological examination, positional tests specific for semicircular canals, combined with audio vestibular investigations like Pure Tone Audiogram (PTA), Vestibular Evoked Myogenic Potential (VEMP), Videonystagmography (VNG) and ECochG with added radiological evaluation whenever warranted.

Table 1: summarizes the various diagnoses that could be arrived at with the available armamentarium in our clinical setting.

Table 1: Various diagnoses of Vertigo/giddiness in our study population

Sl No.	Diagnosis	No. of patients (n=213)
1	BPPV)	74
2	Vestibular Migraine	56
3	Meniere's Disease	39
4	Central Neurological causes	11
5	Labyrinthitis	7
6	Vestibular Neuronitis	6
7	Orthostatic Hypotension	6
8	Others*	14

*Others include rare causes of vertigo that came across in our study group like: Combination of Meniere's Disease and Vestibular Migraine (3), Autoimmune Inner Ear Disease (2), Cardiologic causes (2), Combination of BPPV and Vestibular Migraine (1), Post mastoid surgery (2), Stress Induced (1), Cervical Spondylosis (1), Vestibular Paroxysmia (1), Functional (1) and 4 undiagnosed.

As summarized in the table, BPPV) was the most prevalent etiology for vertigo in our study population and was found in 34.74% of our patients. Posterior Semicircular Canal (PSCC) BPPV was the most common in the study population; 2 patients also had Lateral Semicircular Canal BPPV. This was followed by Vestibular Migraine in 26.29% of the patients. These two were clinical diagnoses but were supplemented with a few audiovestibular tests for academic and research purposes.

The third most prevalent cause for vertigo in the study population was Meniere's disease, which could be attributed to 18.3% of patients. Beyond these three main diagnoses, few patients had varying combinations of these as in 3 patients on evaluation were found to have Meniere's disease superimposed with Vestibular Migraine, while one patient had BPPV superimposed with Vestibular Migraine.

Eleven cases (5.16%) of central vertigo were evaluated and referred to the Neurology clinic. These were all patients who presented with a history of varying severity of giddiness with a history of events resembling a Transient Ischemic Attack (TIA).

Labyrinthitis (Seven patients) (3.38%) and Vestibular Neuronitis (Six patients) (2.81%) together contributed to 6.1% of our Vertigo diagnosis. These were followed by other rare vestibular causes of vertigo like Autoimmune ear Disease, Post- Mastoid Surgery, and Vestibular Paroxysmia.

Cardiologic causes were also identified in two patients who presented with syncopal attacks, and one patient with functional vertigo was diagnosed as well. (Fig.1)

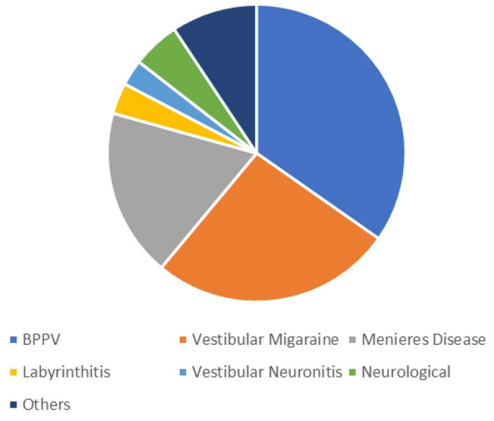

Fig 1: Pie diagram showing the etiological distribution of vertigo in the study population.

DISCUSSION

Vertigo and giddiness are terms used sometimes interchangeably to represent one of the most common clinical symptoms that is evaluated in Otolaryngology clinics. The spectrum of vertigo includes various diagnoses about vestibular, central neurological, cardiovascular, and functional causes.

In our study, attempts were made to do a broad assessment of the etiology of vertigo in the patient population in North Eastern India. The diagnostic strategies adopted were detailed symptomatic analysis based on a thorough clinical history, along with neurotological examination supplemented by audio vestibular tests (PTA, VEMP, VNG, and ECochG) and Magnetic Resonance Imaging (MRI) whenever required.

The results of the current study coincided with the available literature on the etiological factors of vertigo.

The age group that attended the vertigo clinic belonged to a wider age range, but the majority were in the age range of 45-60 years (40%). In a study by Alexander et al., 46.7% of the study population belonged to the age group of 45-60 years, which goes along with the age distribution in our study population.3 But this is in contrast to the findings in many other studies were that older populations (>60 yrs) are most predisposed to symptoms of dizziness.[4] This difference could be attributed to the quality of life and health care in the reference western population and the importance given to neurocognitive problems in older adults. The etiology of vertigo in the majority of our study population was BPPV involving the Posterior Semicircular canal. Vestibular migraine caused the majority of vertigo symptoms in the younger age group in our study population (patients less than 45 years). A multiparametric analysis on the relation of onset of vestibular migraine with age-related factors by Michele Ori et al. states that the mean age of patients diagnosed with vestibular migraine was 38.2+/-9.6years.[5] This could be correlated with the rapid reduction in the onset of symptoms related to Migraine beyond the age of years.[6]

26.6% of the peripheral vertigo is attributed to BPPV.[7] And BPPV remains the predominant cause for vertigo in the age group of 40- 60 years with no gender preponderance in a study by Anirban Ghosh et al.[8] Our study findings also correlated with this pre-existing literature. Most of these patients had idiopathic BPPV. We had 1 case of secondary BPPV, which presented in combination with Vestibular Migraine.BPPV diagnosis was clinical based on a thorough history eliciting onset of vertigo with positional changes of the head and detailed positional tests. Dix Hall pikes test was the diagnostic positional maneuver performed as PSCC- BPPV is the most common, although all the three semicircular canals can be involved by BPPV. These patients were effectively treated with Epley's maneuver.[9]

The second predominant etiology for vertigo contributing to 26.29% of the study population was Vestibular Migraine. The diagnostic criteria were laid by the International Barany Society.[10] which includes: Moderate to severe vestibular symptoms each lasting for 5 mins to 72 hours for at least 5 times;[11] Current or previous history of migraine with or without aura according to the International Classification of Headache Disorders (ICHD3),[12] A minimum of 50% of the episodes of vestibular events are associated with one or more features of migraine like unilaterality, pulsatile nature of headache, moderate to severe intensity of pain which is aggravated by intense lights and noise and associated with visual aura;[13-15] And the episodes cannot be attributed to any other vestibular diagnosis.[15]

As described in literature, in our study population also, headache was a meagre symptom that becomes only obvious on probing or retrospective analysis of clinical history.[16] Symptom-based treatment was advised for these patients.

18.3% of our patients were diagnosed with Meniere's Disease. Meniere's Disease with Vestibular Migraine was also diagnosed in two patients. Meniere's Disease was diagnosed in our patients based on the criteria for diagnosis of definitive Meniere's disease by a collaborative work among the Equilibrium Committee of the AAO-HNS, the Japan Society for Equilibrium Research, the EAONO, the Korean Balance Society, and the Bárány Society by 2014.[17]

The criteria for diagnosis of Definite Meniere's Disease comprises of spontaneous vertigo episodes lasting for 20 minutes to12 hours, with PTA proven unilateral sensorineural hearing loss in the low to medium frequencies before, after or during the vertigo episode, and these symptoms of hearing loss, tinnitus or ear fullness are fluctuating in nature and no other vestibular symptoms can explain these symptoms.[18-23]

In patients with Meniere's Disease, in addition to clinical history and Pure Tone Audiometry, Electrocochleography was used as a supplementary confirmatory investigation in our study population.[24]

Other peripheral causes of vertigo identified in the current study include: Labyrinthitis, Vestibular Neuronitis, Vestibular Paroxysmia, Autoimmune Inner Ear Disease, and Post mastoid surgeries. These were relatively rare as in any etiological study for the causes of vertigo. Neurological and cardiovascular causes could also be identified. A few unidentified cases of vertigo also remained a challenge in our study.

Limitations of the study:

The study duration was not long enough to incorporate a larger sample size that would have better represented the patient population in North Eastern India. A detailed analysis of gender and age group predisposition to various etiological factors of vertigo could not be performed in the current study. Detailed symptomatic analysis of each etiological diagnosis could not be described in detail in our study. Optimal audio vestibular diagnostic tests were only performed for diagnosis of the etiologies described due to resource limitations.

In-depth analysis of etiological correlation with age group at presentation and gender and correlation of symptomatology and audio vestibular parameters with the diagnosis are the scopes for expansion of the current study.

CONCLUSION

Vertigo is a common, sometimes debilitating symptom in patients presenting to Otolaryngology clinics in Northeastern India. BPPV is the most commonly identified cause of vertigo followed by Vestibular Migraine and Meniere's disease in our study population. There was no significant gender predilection in our study population, and vertigo was more prevalent in the age group of 45-60 years. Rare causes of peripheral vertigo should also be kept in mind in unsolvable cases. However, even with a complete clinical and diagnostic armamentarium, a few cases of vertigo remain undiagnosed. An open thought process to consider neurological and cardiovascular causes is sometimes mandatory for complete etiological evaluation of vertigo.

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The Wandering Obstruction: A Case of Migratory Foreign Body in the Pediatric Airway

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ABSTRACT

Introduction: Aspiration of foreign body in the pediatric population is a common yet potentially fatal event, particularly in those under three years of age. Due to their natural tendency to explore objects orally, infants and toddlers are at an increased risk of airway obstruction. This report highlights a case of a migratory foreign body in the airway, emphasizing the diagnostic and management challenges encountered.

Case Report: A 1-year-old male presented with a cough and respiratory distress persisting for three days. Despite initial treatment with antibiotics and oxygen support at an outside hospital, his condition did not improve. Although no clear history of foreign body aspiration was given, further questioning revealed a prior choking episode. Clinical examination suggested left bronchial obstruction, but HRCT thorax unexpectedly showed an isodense right main bronchus foreign body. Intraoperatively, rigid bronchoscopy revealed a large, smooth-surfaced Sitaphal seed lodged in the left main bronchus, indicating migration. Successful removal was achieved despite the retrieval challenges, and the child recovered well postoperatively.

Conclusion: This case underscores the importance of maintaining a high suspicion for foreign body aspiration in children with unexplained respiratory distress. Migratory airway foreign bodies can present with dynamic clinical and radiological findings, necessitating careful preoperative assessment and intraoperative preparedness. However, the gold standard procedure for diagnosis and management of aspirated foreign body is Rigid bronchoscopy.

Keywords: Bronchoscopy, Foreign Body Aspiration, Airway Foreign Body

INTRODUCTION

Aspiration of foreign body in the pediatric population is not infrequent in its presentation. Foreign body aspiration is the commonest cause of accidental death in children under 3 years of age. Hence, the infant and toddler with sudden onset respiratory distress has to be met with a high degree of suspicion for a foreign body in the airway. The tendency in young children to explore using their mouth puts them at risk for an impacted foreign body in the aerodigestive tract. Tracheobronchial system foreign bodies seem to cause more complications than in other anatomical sites.[1] Owing to the wide variety of possible foreign bodies, the clinical presentation and history can vary greatly. The most common location of the foreign body within the airway has been identified from meta-analysis to be in decreasing frequency for the following locations: bronchus (right more frequent than left side), trachea, larynx, and lung.[2] The role of taking high-resolution computed tomography (HRCT) Thorax is also debatable. This report is on a case of a migratory foreign body bronchus and the associated diagnostic challenges.

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CASE REPORT

A 1-year-old male kid was referred to the pediatric casualty with a history of cough and sudden onset respiratory distress

for 3 days. The child had been treated with antibiotics and started on oxygen via high-flow nasal canula as he was not maintaining saturation on room air. The mother gave no history of foreign body aspiration. She hasn't witnessed any choking episodes or vomiting episodes recently. There had been no previous similar history or hospital admission. Child was born by normal vaginal delivery as a term baby with good APGAR scores at birth. On examination, the child was tachypneic, with increased respiratory effort. There was no cyanosis or stridor. He was maintaining saturation on oxygen by bubble cPAP. Subcostal and intercostal retractions were noted. Auscultation revealed reduced air entry on the left. A chest X-ray was taken, which came out to be normal (Figure 1). On suspicion of the foreign body in left bronchus, HRCT thorax was taken. To our surprise, the CT revealed an isodense foreign body lodged in the right main bronchus (Figure 2). We examined the child again and found that the air entry was now reduced on the right side. Just before Rigid Bronchoscopy, on repeat auscultation child had reduced air entry that was noted on the left side. On bronchoscopy, a black foreign body with a smooth surface (Sitaphal seed) was noted completely obstructing the left main bronchus (Figure 3). Removal was done using with help of optical forceps with some difficulty owing to the smooth surface and the large size of the foreign body relative to the airway (Figure 4). On check scopy, no more foreign bodies were visualised on either bronchus. Immediately following removal, the air entry became equal bilaterally. The child was discharged after 2 days in good health.

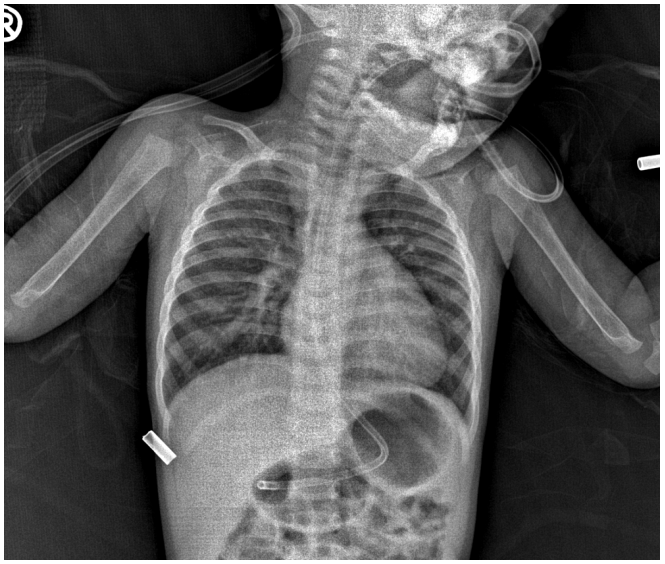

Figure 1: X-ray AP view of chest showing no abnormalities

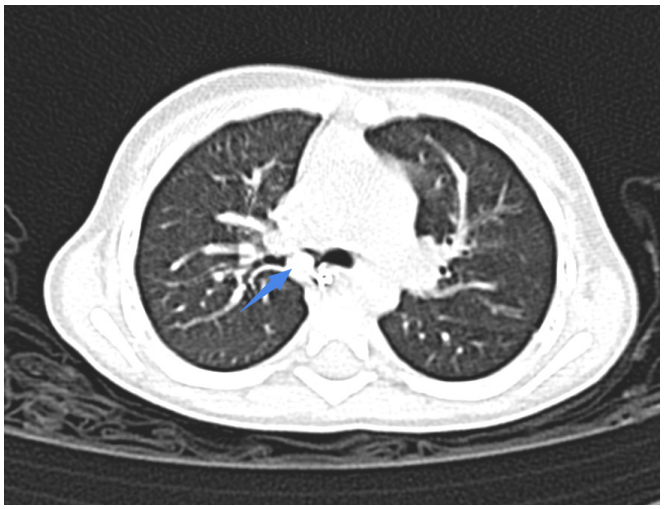

Figure 2: HRCT Thorax axial cut, showing a hyperdense (? foreign body; Blue arrow) in right Main bronchus

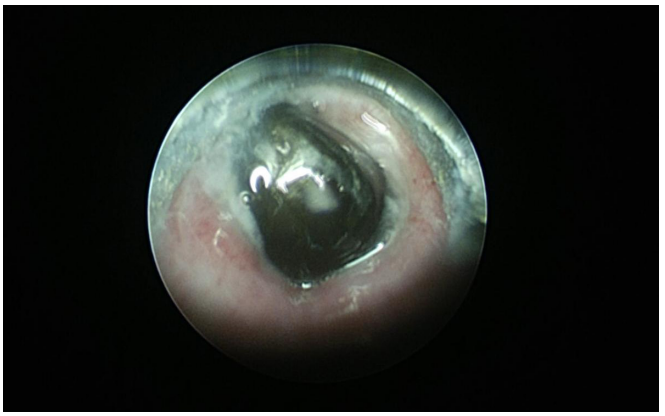

Figure 3: Foreign body visualized in left main bronchus

Figure 4: Foreign body (Sitaphal seed)

DISCUSSION

Inhaled foreign bodies are most frequently observed in kids under the age of three.[3] A wide range of foreign bodies has been documented, with organic materials being more prevalent than inorganic ones in this age group.[4,5] The history may involve a witnessed foreign body in the mouth or, in some cases, no apparent foreign body presentation in a young child, which can lead to a delayed diagnosis. Symptoms and signs of foreign body inhalation include choking, coughing, hoarseness, difficulty breathing, wheezing, increased respiratory effort, cyanosis, asphyxiation, and even death. In almost 40% of cases, the diagnosis was made after 24 hours.[6] Decreased air entry on one side of the chest on auscultation gives a diagnostic clue as to the site of obstruction. Radiographic

findings on chest films will often be normal (11%–26%).[7] Classical finding in x-ray of chest is hyperinflation of the same side lung due to the 'ball-valve' effect. The sensitivity and specificity of X-ray for airway foreign bodies have been calculated to be 73% and 45%, respectively.[8] Computed tomography is a highly sensitive investigation for identifying a foreign body within the airway. However, considering HRCT for a 1-year-old child has got risk of sedation and may require mechanical ventilation during the investigation. A low threshold for diagnostic bronchoscopy must be maintained so that the asymptomatic foreign body or occult foreign body is not missed.

In the case that we encountered there was also a delay in the initial diagnosis of the foreign body at an outside center due to an absent history of foreign body ingestion and confusion with infective etiology. This highlights the importance of a good history and examination as primary tools in diagnosis. When the child was presented to us, leading questions with a high degree of suspicion helped point us in the right direction. Any sudden onset respiratory difficulty in a young child warrants a differential diagnosis of inhaled foreign body in the physician's mind. The auscultation at presentation showing unilateral reduced air entry also aided the diagnosis, while the chest radiograph was normal. Fernandez emphasized that the sensitivity of clinical examination and auscultation (90%) is much higher compared to a chest X-ray. Computed tomography (CT) is an effective non-invasive tool for aiding diagnosis and determining the requirement of an invasive procedure. While it is not recommended as a gold standard for diagnosing tracheobronchial foreign bodies, it can add value in more challenging cases, as it provides superior visualization of foreign bodies compared to plain radiography. CT scans are especially helpful in detecting radiolucent or soft-density foreign bodies.[9]

However, the further developments in our case go on to point out that while imaging aids in diagnosis, the surgeon doing the bronchoscopy must be prepared for surprises on the OT table. In this case, the larger size of the foreign body relative to the 1-year-old's airway kept it from sliding into smaller distal airways, while its smooth contour (Figure 4) meant easy movement from one bronchus to the other. While the CT showed a right-sided foreign body, intraoperatively, we encountered the obstruction in the left primary bronchus. The smooth contour also meant difficulty in its retrieval. This necessitates robust pre-operative and intra-operative preparedness from the surgeon as well as the anaesthetist. For the surgeon, good instruments and experienced hands are paramount to an uneventful foreign body removal. For the anaesthetist, experience dealing with paediatric airways will help them afford the surgeon sufficient time for a difficult case as well as for thorough examination of the airway bilaterally.[10] For this reason, while bronchoscopy must be done without undue delay, the level of urgency depends on the condition of the patient and the resources available at hand. If a child presents during an evening with a history of possible foreign body inhalation and is well, it is reasonable to delay bronchoscopy until the morning if that will afford better resources.[11]

CONCLUSION

Early diagnosis of a tracheobronchial foreign body in a child with respiratory distress is possible with good clinical evaluation and imaging. Rigid bronchoscopy gives the definitive diagnostic and therapeutic option and should be considered at a low threshold for suspected cases. This case goes to show us that in the numerous varied presentations of inhaled foreign bodies, a migratory foreign body bronchus should also be considered and anticipated when there are varying clinical and imaging findings, as demonstrated in this case.

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CASE REPORTS

Approach to a Case of Otogenic Cerebellar Abscess

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ABSTRACT

Chronic otitis media (COM) is a common ear infection leading to multiple intracranial and extracranial complications. But with the advent of antibiotics, the rate of complications has reduced. Intracranial complications are a dreaded result of such infections, and the rarity of such complications has rendered their treatment a rarity, often reported as isolated case reports. Here we would like to discuss a case of a 20 year old male with cerebellar abscess due to Chronic Otitis Media (COM), along with postauricular abscess and post aural discharge which was treated surgically with mastoid exploration along with concurrent neurosurgical intervention followed by medical management with antibiotic and anticoagulant coverage with complete recovery of the patient. The patient was observed to have a complete recovery with no residual abscess. Three months postoperative follow-up of the patient revealed a healed mastoid cavity with an intact neotympanum. Even though rare and moribund, when treated properly, patients recover completely.

KEYWORDS: otogenic cerebellar abscess, intracranial complication, chronic otitis media, mastoid exploration, multidisciplinary approach.

INTRODUCTION

Chronic otitis media (COM) is a persistent ear infection that leads to various complications, including cerebellar abscess. This is a rare but serious complication of COM.[1] Studies have shown that, in developing countries, the incidence of otogenic intracranial complications, including cerebellar abscess, is still high.[2-3] Children are particularly vulnerable to these complications and also are at a higher risk of developing intracranial abscesses.[2] The incidence of otogenic cerebellar abscess is low, with a reported rate of 0.2-0.8% of all intracranial abscesses.[4] The management of otogenic brain abscesses is a complex process that requires a multidisciplinary approach.[5] In many cases, it involves a combination of surgical and medical management, including craniotomy and mastoidectomy.[6] In recent years, concurrent craniotomy and mastoidectomy have been on trend for the treatment of otogenic intracranial abscesses.[6]

CASE REPORT

In this case, a 20-year-old male came with complaints of left ear discharge and hearing loss for 4 years with recent onset of painful left-sided postaural swelling for 1 week, which ruptured 2 days later, with yellowish, purulent, foul-smelling discharge. The discharge from the left ear was similar in characteristics. The patient also complained of headaches with no history of fever, seizures, or loss of consciousness. On examination, the patient was conscious and well-oriented and had stable vitals.

On local examination, the right ear was normal. The left postauricular region was swollen with multiple pus-discharging sinuses, with erythema of surrounding skin. There was a local rise of temperature with the presence of tenderness. On examination of the left external auditory canal, granulation tissue was noted covering the whole of the tympanic membrane. On pure tone audiometry (PTA), the left ear had 90 dBHL, with profound mixed hearing loss with normal hearing on the right ear.

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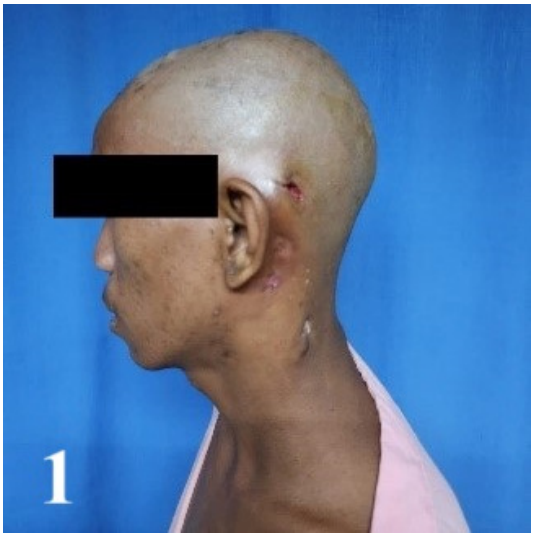

Figure 1: Shows preoperative image of the patient's postaural region with postaural sinus

The patient was incidentally found to be diabetic on admission with a random blood glucose of 221 mg/dL and HbA1c = 7.7%. The patient was started on Regular Insulin along with empirical antibiotic coverage for his primary symptoms.

Pus from the left postaural region reported the presence of Proteus mirabilis sensitive to most of the antibiotic groups. All routine blood investigations were carried out, which revealed an elevated total leucocyte count of 13000/cumm with hemoglobin of 12.8 g%. Other investigations were within normal limits.

The patient was planned for an urgent contrast-enhanced computed tomography (CECT) head and neck, which revealed a hypo-enhancing collection centred in the mastoid segment of the left temporal bone with intracranial extension into the posterior cranial fossa, causing buckling of the underlying cerebellar hemisphere.

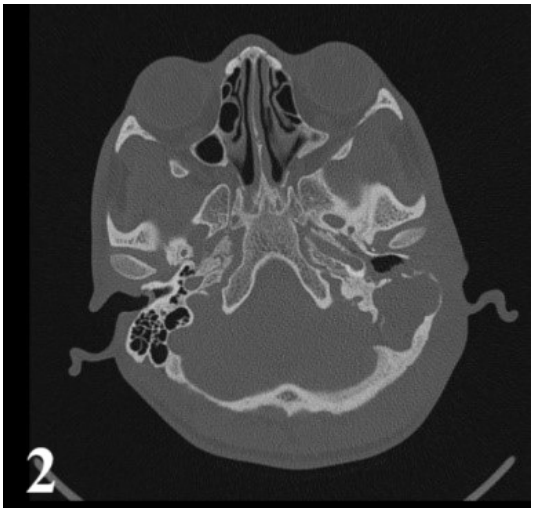

Figure 2: This shows a cut section of CECT of the temporal bone showing left-sided mastoid abscess communicating to the posterior cranial fossa

After 3 days of conservative management of his primary symptoms and control of blood sugar levels, the patient was taken up for exploration of the mastoid with consultation with the neurosurgery department. Left Modified Radical Mastoidectomy (MRM) with type IV tympanoplasty with conchomeatoplasty was done along with cerebellar abscess drainage and drain placement in the same sitting. Intraoperatively, cholesteatoma was seen extending from the mastoid antrum posteriorly up to the cerebellum, inferiorly to the tip of the mastoid. The Dura of the cerebellum was exposed along with the temporal lobe. The Tegmen plate and facial canal were found to be dehiscent, along with the posterior external auditory canal wall. All ossicles were absent except the footplate of stapes.

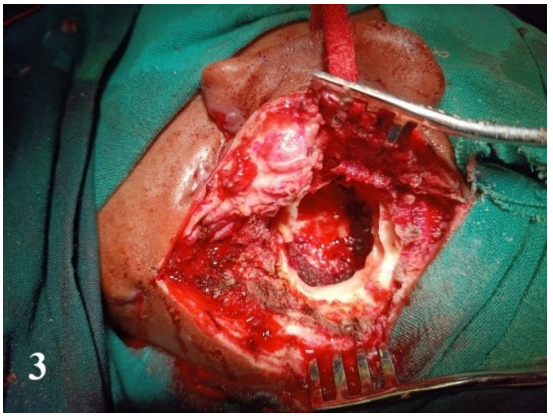

Figure 3: Shows an intraoperative image exposing the dura of cerebellum

Postoperatively, the patient was given antibiotics based on the culture and sensitivity report. The drain was removed on the third postoperative day. Regular dressing was done with all aseptic and antiseptic precautions, and gradually, the healing was noted in 2 weeks after surgery.

Figure 4: This shows an image of the patient's left postaural region surgical scar with an indwelling drain on postoperative day 2.

A Contrast-Enhanced Magnetic Resonance Imaging (CE-MRI) of the brain was done on POD 15, which revealed post-MRM status with soft tissue density suggestive of gelfoam kept intraoperatively.

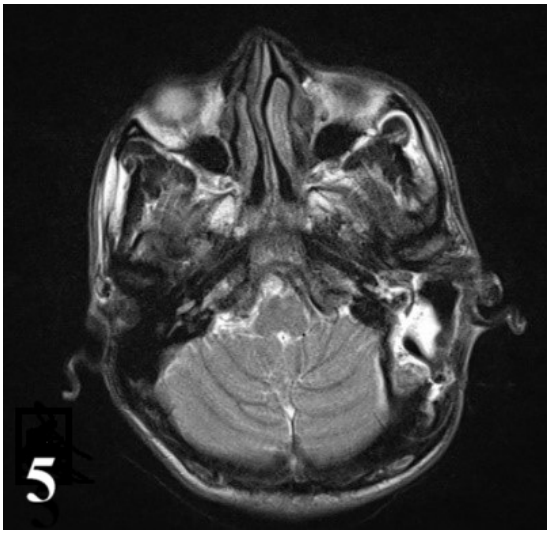

Figure 5: Shows a cut section of postoperative CE-MRI brain showing soft tissue density suggestive of postoperative cavity filled with gelfoam and temporalis muscle.

The patient was discharged on POD 17 on oral antibiotics. The patient was reviewed on OPD basis 1-month post-discharge, in which the patient was symptomatically better with intact neotympanum on operated ear. PTA was repeated 3 months after surgery, which showed an improvement of 22 dBHL on the operated side.

DISCUSSION

COM is a common disease that, when untreated, can cause both extracranial and intracranial complications. Cerebellar abscess is a rare but potentially life-threatening complication of COM. According to a study by Sharma et al., of 12 years of experience in a single institute, intracranial (IC) complications occurred in 2.3–4% of cases before the antibiotic era. With antibiotics and new surgical techniques, the complications have been greatly reduced to 0.15–0.04 % with an incidence of otogenic cerebellar abscess of 0.2-0.8% of all intracranial abscesses.[4,7] Mortality decreased from 25% to 8 %.[7]

COM can be due to bacterial or fungal infection in the middle ear.[7] Otogenic cerebellar abscess is thought to be caused by the spread of infection from the middle ear to the brainstem or cerebellum through the cranial nerve foramina.[8] Previous literatures have reported that brain abscess is more commonly located in the cerebrum, i.e temporal lobe, than in the cerebellum. However, recent studies, for instance, reported by Dubey and Larawin et al., found that otogenic brain abscesses are more commonly seen in the cerebellum.[1]

In cases of cerebellar abscess, patients may present with signs of increased intracranial pressure, such as headache, nausea, vomiting, altered sensorium, ataxia, nystagmus, and other neurological deficits.[3,10] In our case, the patient presented with a long-term history of left ear discharge associated with decreased hearing, for which he did not take any treatment previously. The patient came following complications in the form of a left postaural abscess and severe headaches for 1 week.

The diagnosis of an otogenic cerebellar abscess is based on a combination of clinical examination, imaging studies, and microbiological analysis.

Culture and sensitivity tests of ear discharge or brain abscess aspirates are important to identify the causative organism and guide in the selection of antibiotics.[6] In a study, 41 patients with otogenic brain abscesses were examined, which reported the most commonly found microorganism as Proteus.[9] Similarly, in our case, in post-aural abscess pus sent for culture, the growth of Proteus mirabilis was noted.

CT and MRI are the most commonly used radiological investigations.[1] With a diagnostic rate of 92.75%, a CT scan is very helpful in the diagnosis of otogenic intracranial complications.[1]

The treatment of otogenic cerebellar abscess requires surgical intervention along with antibiotic coverage. Mastoidectomy and drainage of the middle ear are usually performed to remove the source of the infection, and craniotomy may be needed to drain the abscess.[6] The choice of antibiotics should be guided by culture and sensitivity results, and the treatment should be adjusted as necessary based on the patient's clinical response.[10] Our patient, after 2 days of conservative management with empirical antibiotic coverage, was taken up for surgery and Left Modified Radical Mastoidectomy along with cerebellar abscess drainage was done.

The necessity of immediate mastoidectomy (within 24 to 48 hours) with neurosurgical drainage of the abscess is emphasized by some authors to reduce mortality and enhance the treatment effects of antibiotics.[1]

The type of causative organism, the extent of the infection, and the patient's immune status affect the outcome of the disease and its management. Full recovery is seen in the majority of the patients with appropriate treatment, but permanent neurological sequelae may occur in some cases.[1]

CONCLUSION

Otogenic cerebellar abscess is a rare but serious complication of COM. The management of this condition requires a prompt and coordinated approach that involves surgical intervention with neurosurgical intervention and intraoperative assistance, antibiotics, and drainage of the infected site. The incidence of COM and its associated complications remains high in many developing countries, highlighting the need for improved public health measures and better access to medical care. The exact pathophysiology of otogenic cerebellar abscess is still not fully understood, and there is a need for further research in this area.

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Identifying Inverted Papilloma: An Important Consideration in Nasal Polyposis

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ABSTRACT

Inverted papillomas comprises only 0.4% to 7% among all sinonasal tumors and commonly presents as red, bulky, unilateral, vascular mass and sometimes associated with the presence of polyps. Though benign, it is given special attention because of its increased incidence of recurrence, with a property to cause destruction locally and, in long-standing cases, its association with carcinoma. Its presentation can be very similar to chronic rhinosinusitis with nasal polyposis or an antro-choanal polyp; therefore, it can be misdiagnosed if high clinical suspicion is not kept in mind. Out of the three cases in this series, one case was initially diagnosed as chronic rhinosinusitis with nasal polyposis, a second case was diagnosed as antro-choanal polyp based on clinical, radiological, and pre-operative biopsy reports, and the third case was diagnosed as inverted papilloma with synchronous squamous cell carcinoma after the preoperative biopsy report. The need to bear in mind the possibility of inverted papilloma, although rare in differential diagnosis of nasal polyposis, is stressed because it necessitates a more complete surgical procedure to avoid recurrence and achieve a better outcome.

Keywords: Inverted papilloma, polyposis, antro-choanal polyp.

INTRODUCTION

Inverted papillomas are benign neoplasm arising from the pseudostratified ciliated columnar epithelium, which lines the nasal cavity and paranasal sinuses. It is called inverted papilloma because of its histologic characteristic of inversion through the surface epithelium originating from the schneiderian membrane. It is a rare benign sinonasal epithelial tumour categorized under sinonasal Schneiderian papilloma.[1]

Inverted papillomas constitute only about 0.4% to 7% of all sinonasal tumors.[2] It is known to have a male preponderance, with the presenting age group at 50's.[2]

Though benign given its nature of destruction locally, increased incidence of recurrence, and its association with carcinoma, it distinguishes itself from other sinonasal tumours.[3] Given these features, complete excision of the tumour becomes a necessity.

It can have varied presentations; many times, it can have symptoms mimicking chronic rhinosinusitis with nasal polyposis, or sometimes it can mimic antro-choanal polyp as seen in our cases.

We would like to emphasise the varied presentations of Inverted Papilloma and to keep in mind the differential of Inverted papilloma in any cases presenting with nasal polyposis.

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CASE SERIES

Case 1

A lady in her 60s came to the ENT Head and Neck Surgery Department with complaints of prolonged right-sided nasal blockage, which was not improving with medical treatment. Diagnostic nasal endoscopy (DNE) showed extensive polyposis filling the entire nasal cavity, extending to the choana and hanging in the oropharynx behind the uvula (Fig. 1a). A computed tomography (CT) scan showed that soft tissue density was filling the entire nasal cavity, the maxillary sinus on the right side. It was also seen to involve the choana completely and extend into the oropharynx; it was

reported as right antro-choanal Polyp (Fig. 1b). Preoperative biopsy reported as inflammatory polyp. She was planned for endoscopic sinus surgery.

Given the intraoperative findings wherein, polypoidal tissue occluded the right middle meatus and the right maxillary sinus was filled with tissue which were friable and it was found adherent to the wall of the maxillary sinus. She underwent endoscopic medial maxillectomy to obtain complete removal of the mass. The post-operative histopathological report was interpreted as Inverted papilloma- squamous type.

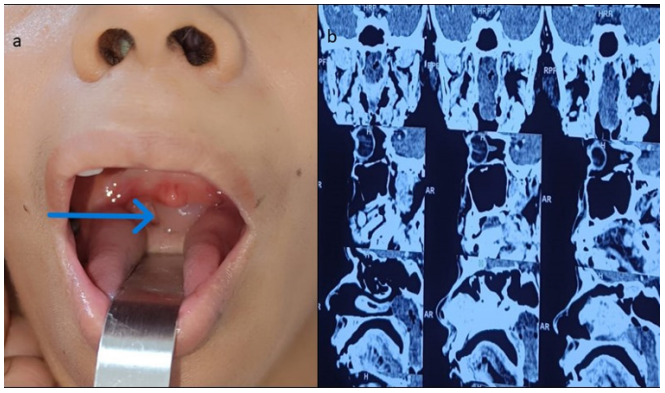

Fig. 1: (a) Blue arrow showing polypoidal mass behind the uvula hanging in the oropharynx; (b) CT coronal and sagittal view showing soft tissue density in the nasal cavity extending to the choana and hanging in the oropharynx

Case 2

A gentleman in his 60s came to the ENT Head and Neck Surgery Department with complaints of persistent left-sided nasal blockage, nasal discharge, occasional epistaxis, and headache for more than 2 years. Nasal endoscopic examination showed pale polypoidal tissue filling the entire left nasal cavity and septal perforation due to some previous surgery 10 years back, a document of which was not available (Fig-2a). We proceeded with CT nose and paranasal sinuses (PNS), showing soft tissue density in the nasal cavity, ethmoid sinus, and frontal sinus (Fig-2b). Preoperative biopsy report was suggestive of inflammatory polyp. Intraoperatively, the polypoidal tissue was arising from the frontal sinus region. He underwent left endoscopic sinus surgery, and given the involvement of the frontal sinus, Draf 2a was done for complete removal of the tumour. Histopathological examination reported as Inverted papilloma. 6 months follow- up showed no recurrence.

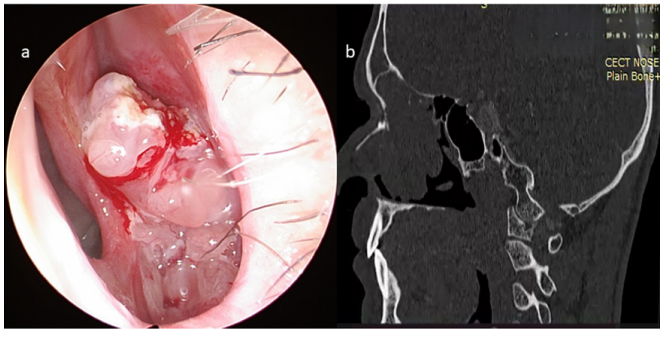

Fig. 2: (a) Intraoperative polypoidal mass seen on the left nasal cavity; (b) CT Nose and PNS Sagittal view showing soft tissue density in the nasal cavity, ethmoid sinus and frontal sinus.

Case 3

A gentleman in his 30s came to the ENT Head and Neck Surgery Department with complaints of persistent bilateral nasal blockage, mass protruding out of the nose, nasal discharge, occasional epistaxis, anosmia, and headache for more than 6 years. He also complained of palatal bulge with ulceration, which occurred 2 months back. On examination, bilateral mucoid discharge was present in the nasal cavity, with a reddish-gray lobulated mass filling the entire nasal cavity. On palpation, it was more firm than inflammatory polyp, and it bled on touch. On oral cavity examination, there was a hard palate bulge with ulceration over the bulge. Preoperative biopsy from the nasal cavity showed inverted papilloma, and the biopsy from the lesion over the hard palate was reported as squamous cell carcinoma. The patient was advised for a total maxillectomy, but the patient was lost to follow-up.

DISCUSSION

Sinonasal Inverted papillomas (IPs) are mostly known to have a unilateral presentation. It usually presents as a reddish-grey, firm mass, which is firmer than polyp and has an interesting "raspberry" aspect.[1] Usually, on probing, IPs are generally friable and bleed on touch. However, not all cases may have a unilateral presentation as stated above; occasionally, it may present as chronic rhinosinusitis with polyposis or bilateral polyposis, or bilateral nasal mass with palatal bulge.[2-4]

It is more commonly seen arising from the lateral wall of the nose, maxillary sinus, ethmoidal sinus, sphenoid sinus, and rarely from the frontal sinus.[5] Despite their generally benign look, inverted papillomas can behave aggressively in certain areas. These lesions can even destroy bone or spread outside the nasal cavity, infiltrating nearby tissues. In long-standing cases, malignant transformation is associated in 5%-15%.[6] Synchronous carcinomas have been reported to be between 1.7% and 56%.[5]

In cases of high clinical suspicion, not only Computed Tomography (CT) but the addition of Magnetic Resonance Imaging (MRI) is needed as CT has drawbacks wherein it cannot differentiate calcifications from trapped or altered bone from inflammatory polyps with retained debris; however for bony extent, CT stands as the gold standard. The specificity of CT is about 20%, and its sensitivity is only roughly 69%.[7] At this point, MRI is more helpful since it has a higher contrast resolution, making it easier to differentiate between inflammatory lesions and inverted papillomas. Better tumour delineation of adjacent soft tissues is another benefit of MRI. Therefore, MRI is especially useful in complex instances or when a differential diagnosis needs to be made, even if CT is frequently employed.

For the diagnosis of inverted papillomas, histologic investigation is still the gold standard, particularly when a lesion seems suspicious. Inverted papillomas are uncommon, however, they can appear in bilateral polyps that appear normal at first glance.[8] To rule out an inverted papilloma, any unilateral or uncommon polyps should be examined histologically. However, in some cases, if deeper preoperative biopsies are not taken, the report might come out as inflammatory polyps.

Numerous factors, such as the tumour's location, size, histological characteristics, surgical approach, and aftercare, can affect the recurrence of inverted papillomas following surgery. The most important cause of recurrence is incomplete excision, which frequently results from removing only a portion of the lesion, misdiagnosing the tumour as an inflammatory disease, or failing to get a sufficient biopsy before surgery, in such a case a careful planning for a second-staged surgery should be done to guarantee the eradication of any leftover tumor tissue.

Given its high recurrence rate and malignant association, it is therefore advised to perform a complete local excision using either an endoscopic technique or a lateral rhinotomy. According to recent studies, which include systematic reviews and a meta-analysis, the endoscopic method is typically preferred over open surgery since it is less invasive and more effective.[9-10]

CONCLUSION

Given the varied clinical presentation of inverted papillomas, the lack of definitive CT findings, and the possibility of preoperative biopsies indicating inflammatory polyps, it is crucial to maintain a high clinical suspicion. If there is a strong suspicion of inverted papilloma, an MRI should be obtained for better characterization of the lesion. The most important cause of recurrence is incomplete excision, which frequently results from removing only a portion of the lesion, misdiagnosing the tumor as an inflammatory disease in such cases, in such a case a careful planning for a second-staged surgery should be done to guarantee the eradication of any leftover tumor tissue leading to reduce future chance of recurrence.

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An Anterior Neck Lipoma Mimicking Thyroid Swelling: A Case Report

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ABSTRACT

Introduction: Lipoma arises from adipose cells, which are benign, mesenchymal tumors. They can be present all over the body, and around 13% are located in the head and neck region, but rarely occurs in the anterior aspect of the neck.

Case report: A 25-year-old woman presented with swelling in the anterior part of her neck. The swelling clinically resembled a thyroid swelling. But on evaluation, it turned out to be a lipoma. Surgical excision of the swelling was done.

Conclusion: Lipoma presenting in the anterior part of the neck is rare. It usually mimics a thyroid swelling. Evaluation with imaging and Fine needle aspiration cytology (FNAC) leads to proper diagnosis and helps in appropriate intervention.

Keywords: Lipoma, swelling, neck

INTRODUCTION

Lipomas are benign, mesenchymal neoplasms frequently arising from the abnormal proliferation or accumulation of adipocytes.[1] Approximately 13 % of lipomas are located in the head and neck region, the posterior triangle of the neck being the most common site of cervical lipomas.[2] However, these are very rare in the anterior neck. As these are slow-growing tumours, the majority of anterior neck lipomas are asymptomatic and rarely cause pressure symptoms.[3] These usually mimic benign thyroid swellings due to their location.

CASE REPORT

A 25-year-old woman presented with a swelling in the anterior part of her neck, which came to her notice in the last seven months. She had no complaints of pain, difficulty in swallowing, breathing difficulty, or voice change. The patient reported the mass to be increasing in size. She had no symptoms suggestive of hypothyroidism or hyperthyroidism. Clinical examination revealed an anterior neck swelling of 7 × 6 × 2cm in size, non-tender, soft in consistency, and freely mobile (Fig. 1). The lower border of the swelling was palpable above the suprasternal notch. Swelling did not move with deglutition or on protrusion of the tongue. The patient was evaluated further with Ultrasonography (USG) of the Neck and Fine Needle Aspiration Cytology (FNAC) of the swelling, both of which were suggestive of lipoma. Hematological investigations were normal. The thyroid profile revealed an euthyroid status.

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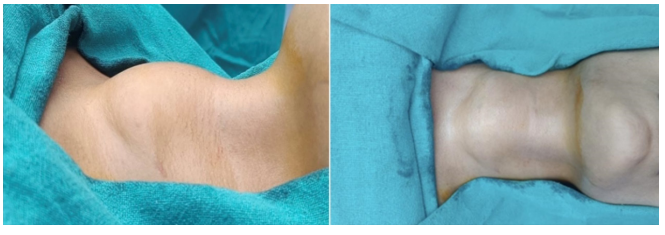

Fig. 1: Clinical picture of the patient showing the anterior neck swelling in lateral view and from the top

The patient was taken up for surgery. After local anesthesia infiltration, a transverse shin crease incision was made over

the most prominent part of the swelling. Fatty swelling was identified in the subcutaneous plane and delineated all around (Fig. 2). Swelling was delivered out in toto and sent for histopathology. The neck wound was closed in layers. The histopathological examination (HPE) report revealed the mass as lipoma.

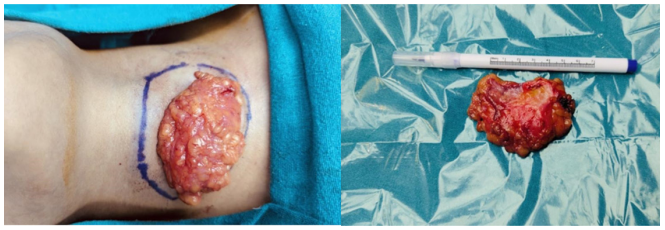

Fig. 2: Intraoperative picture of lipoma dissected out all around and the post-operative specimen.

DISCUSSION

Lipomas are composed of adipose tissue that can occur anywhere in the body. Lipomas are classified into subcutaneous type, subfascial type, or intermuscular type.[4] They are slow-growing benign tumors, commonly located in the posterior neck in the subcutaneous tissue layer, external to the superficial cervical fascia.[5] Confinement to the subcutaneous plane and slow-growing nature of this swelling result in the asymptomatic nature of anterior neck lipomas.[6]

Our patient had a rare presentation of lipoma involving the anterior part of the neck. It is gradually progressive, painless, and not compressing any vital structures, thereby not distorting normal neck anatomy. Clinically, the swelling extended from the upper thyroid cartilage to the suprasternal notch, looking like a thyroid swelling. This swelling exactly resembled a thyroid swelling, except for it did not move with deglutition. Like the majority of benign colloid goiters, the patient was asymptomatic but wanted surgery for cosmetic reasons.

For any anterior neck swelling, USG of the neck with an FNAC should be the investigations lined up for a proper diagnosis. A thyroid profile is also performed as the majority of these arise from the thyroid gland. However, the good old teaching that all anterior neck swellings are not thyroid swellings should never be underscored.

CONCLUSION

Lipomas are benign mesenchymal tumors that arise from adipose tissues. Lipomas in the anterior part of the neck are rare and usually mimic thyroid swelling. Adequate preoperative evaluation leads to a definitive diagnosis, thereby helping in surgical excision and providing good cosmesis with no functional impairment.

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REVIEW REPORT

Atypical BPPV An Often Confusing Entity: Review of Literature

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ABSTRACT

Benign Paroxysmal Positional Vertigo (BPPV) is not an uncommon disorder involving the vestibular system, which is associated with recurrent attacks of vertigo and nystagmus and aggravated by positional change of the head. The "Barany Society diagnostic criteria for BPPV" includes vertigo or dizziness associated with a change in position along with positional nystagmus, and if these features are absent, we classify them as atypical BPPV. Lately, various forms of atypical BPPV have emerged, including cases with no nystagmus in typical positions, intense short-lasting nystagmus in different head positions. The phenomenon of "canal switch," where otolith from one semicircular canal shifts into another, has been proposed to explain the occurrence of paradoxical nystagmus. This review aims to provide a comprehensive overview of the possible origins of eye movements in all three semicircular canals and explore the different forms of atypical BPPV, contributing to a deeper understanding of this enigmatic condition.

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is typically characterized by vertigo and nystagmus, which is triggered by changes in head position. It often occurs when otoconia (calcium carbonate crystals) become dislodged from the otolith macula and go into one of the semicircular canals. These otoconia move with changes in head position, causing abnormal fluid movement (endolymph flow) in the canal. This results in the deflection of the cupula, which alters the activity within the affected canal, producing vertigo and visible nystagmus. This process is known as canalolithiasis.[1] In rare cases, BPPV can occur when otoconia are displaced and adhere to the cupula of a semicircular canal rather than floating freely. In this situation, the otoconia respond to gravity, leading to vertigo and nystagmus. This phenomenon is referred to as cupulolithiasis.[2]

Currently, as per the Barany's society the diagnostic criteria of benign paroxysmal positional vertigo (BPPV) consist of recurrent attacks of positional vertigo or dizziness which is induced by change in head position, there will be associated positional nystagmus in the direction of the canal stimulated with various maneuvers, each attack lasting for few minutes,[3] anything not fitting in this criteria were considered atypical BPPV.

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In the past years, many atypical BPPVs have been found, wherein either no nystagmus was found in otherwise normal-provoking head positions or instances of paradoxical, intense transient nystagmus were found in different head positions. Atypical BPPV was an unexplained phenomenon until recently, when theories of "canal switch" have been put forward, which says that paradoxical nystagmus happens when debris from one canal shifts into another during head positioning.[4] Our goal in this review article is to provide a complete framework for the possible origins of eye movements across all three semicircular canals by summarizing these possibilities and various forms of atypical BPPV.

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METHODS FOR EXAMINATION

During the examination of patients with BPPV, based on the symptoms and the most common predictable canal involved, the examiner should perform positional maneuvers to confirm the canal involved.

For posterior canal, Dix-Hallpike maneuver is the diagnostic maneuver wherein, the patient is made to sit, and head is turned to 45 degrees to the side which is to be examined, the patient is made supine with head hanging below the edge of the bed, if posterior canal is stimulated an up-beating torsional nystagmus is elicited on the side which is examined. For anterior canal, head hanging maneuver is done wherein the patient has to lie supine with the head hanging below the edge of the bed, if anterior canal is stimulated a down-beating torsional nystagmus will be elicited, anterior canals can also be checked using Dix-Hallpike maneuver, we only need to see the beat pattern of the nystagmus whether it is down-beating or not. For the lateral canals, a supine roll test is done wherein the patient will be made to lie supine, and head is flexed, and the head is turned 90 degrees to the side tested; a horizontal nystagmus is elicited with the fast beating component towards the side of the canal stimulated.[3]

TYPICAL BPPV NYSTAGMUS PATTERNS

Posterior semicircular canal canalolithiasis

Positional nystagmus, which is triggered by the Dix-Hallpike maneuver or Semont diagnostic maneuver-side lying maneuver, after a delay of few seconds typically consists of a combination of torsional upbeating nystagmus. This nystagmus usually lasts for less than a minute.[5]

Posterior semicircular canal cupulolithiasis

Here, the nystagmus elicited from Dix-Hallpike maneuver or semi Dix-Hallpike maneuver is same with that of posterior canal canalolithiasis, except that the duration of the nystagmus lasts more than a minute in cupulolithiasis[6] there is yet another hypothesis to this which we shall see below.

The horizontal semicircular canal canalolithiasis

Positional nystagmus, which is triggered by the supine roll test after a transient delay or with the absence of latency, typically beats horizontally[7] toward the side on which the head is turned. This nystagmus generally lasts for approximately less than one minute.[8]

The horizontal semicircular canal cupulolithiasis

Positional nystagmus, which is triggered by the supine roll test after a transient delay or with the absence of latency, typically beats horizontally[7] in the direction of the upper ear when the head is turned to the left or right side. This nystagmus generally lasts less than one minute.

The anterior semicircular canal canalolithiasis and cupulolithiasis

This is seen very rarely, and various hypothesis has been brought forward, it is hypothesised that during sleep, debris in the common crus may shift into the ampullary end of the long arm, another possibility is that during the Dix-Hallpike maneuver, dislocated debris could immediately fall onto the cupula, particularly in cases of anterior cupulolithiasis, causing an apogeotropic down-beating nystagmus with a minimal torsional component.[9] In cases of anterior semicircular canal (SCC) involvement, a minimal torsional fast-phase nystagmus may occur, with the fast phase beating toward the affected ear when the patient is in the Dix-Hallpike position. Therefore, the direction of the torsional component, rather than the side of the Dix-Hallpike test, indicates which side is affected.

ATYPICAL NYSTAGMUS ARISING IN THE ANTERIOR AND POSTERIOR SEMICIRCULAR (VERTICAL CANALS)

BPPV without nystagmus and posterior semicircular canal positional downbeating nystagmus

The usual typical BPPV is associated with nystagmus and acute vertigo within few seconds after positioning. It has been found that in some cases, patients with symptoms of vertigo will get aggravated vertigo during positional maneuvers like Dix-Hallpike and supine head roll test, but they will not elicit nystagmus, it has earlier been named as subjective BPPV and it is not yet characterised under typical BPPV. Various authors have come forward with their hypotheses to explain this phenomenon. Oas et al. considered it as the “short arm canalolithiasis”, wherein the debris freely moves in the short arm, causing vertigo while getting up during Dix-Hallpike maneuver only on the side where the canal is affected, but no nystagmus is elicited.[10] Cambi and Vannucchi brought forward a variant of atypical BPPV wherein they suggested that positional down-beating nystagmus can also be seen in cases of posterior canal; earlier it was known that down-beating nystagmus was only associated with anterior canal.[11-12] The hypothesis put forward by them was that the debris lies in the highest part of the long arm of the canal at the start of the Dix-Hallpike maneuver. It is theoretically possible for otoconia to become dislodged without migrating into the common crus of the superior and posterior semicircular canals or horizontal canal. Rather, the otoconia can shift in the direction of the posterior utricle, specifically the posterior canal ampulla.

Depending upon their action—whether they go freely or cling to the cupula—and the exact location of the posterior semicircular ampulla (this can be varied), the effect might be that there is neither nystagmus nor there is a reduction in the nystagmus when the patient is moved from sitting to Dix-Hallpike position. This situation could explain clinical conditions like “subjective BPPV” or peripheral positional down-beating nystagmus cases.[4] If this theory is embraced, as

difficult to verify or negate as it is, it may lead to the discovery of two more variations of the classical forms of BPPV.

Debris, when stuck to the cupula, deflects it. This will result in either no. nystagmus in Dix-Hallpike position or an apogeotropic downbeat nystagmus might. Develop in this position, which can be provoked by a bilateral Dix-Hallpike maneuver (and is possibly increased when the diseased ear is in the downward position). If there is a torsional element within the nystagmus, it will beat towards the opposite ear.

Posterior semicircular canal cupulolithiasis

Debris, when attached to the cupula, causes it to deflect. This will lead to either no nystagmus in the Dix-Hallpike position or an apogeotropic downbeat nystagmus that may develop in this position, which can be triggered by a bilateral Dix-Hallpike maneuver (and may be more pronounced when the affected ear is in the lowest position). If there is a torsional component in the nystagmus, it will beat toward the opposite ear.

Debris, when it binds to the cupula, deflects it. This will result in no. Nystagmus on the Dix-Hallpike position, or an apogeotropic downbeat nystagmus, can occur in this position and is provoked by a bilateral Dix-Hallpike maneuver (and perhaps more intense with the affected ear in the most inferior position). If the nystagmus has a torsional component, it will beat toward the other ear.

The Posterior semicircular canal short arm canalolithiasis

Since the debris is moving away from the short arm, no nystagmus is evoked when the patient is in the Dix-Hallpike position. However, on sitting up, the patient will suffer from vertigo or a sensation of body sway, usually in the diagonal vertical planes corresponding to the right anterior-posterior (RALP) or left anterior-right posterior (LARP) semicircular canals. In both posterior canal cupulolithiasis and posterior short arm canalolithiasis, an intense vegetative reaction, like nausea and perspiration, has been reported following repeated position maneuvering. The reaction is remarkably disproportionate because there was no nystagmus.[4]

ATYPICAL NYSTAGMUS ARISING IN THE HORIZONTAL SEMICIRCULAR CANALS

The Horizontal semicircular canal short arm canalolithiasis

Hypothetically, suppose debris were to fall into the short arm of the horizontal semicircular canal. In that case, it is expected to enter into the cupula, which will lead to nystagmus in the horizontal plane, which will be apogeotropic (that means, eye beating in the direction opposite to the side of head turn). While doing a supine roll in the opposite direction, the debris may move out, so no nystagmus would be expected during the contralateral supine position. While this scenario is commonly seen after Epley or Semont maneuvers, no prior studies have suggested this mechanism involving the short arm of the horizontal semicircular canal. Other researchers have explained this nystagmus pattern and have attributed it to an unusual initial positioning of the debris in the long arm of the horizontal semicircular canal.[13]

ATYPICAL NYSTAGMUS ASSOCIATED WITH SWITCHING OF CANAL

The Posterior semicircular-horizontal semicircular canal switch

Following Epley or Semont maneuvers, canal switch is not an uncommon phenomenon. Here, debris from the horizontal semicircular canal can move into the posterior semicircular canal and vice versa, which will result in characteristic nystagmus, which is characterised by atypical nystagmus — initially originating from the affected canal and then shifting to the secondary canal. The most frequent pattern seen is the transition from posterior semicircular canal canalolithiasis to horizontal semicircular canal canalolithiasis. In these cases, the debris appears to be large enough that it doesn't dissolve during its journey through one canal, out of it, and into the next.[14]

The Horizontal semicircular ipsicanal switch

Hypothetically, in the horizontal canal, short arm canalolithiasis can switch over or transition to canalolithiasis of the long arm while doing a supine roll test if the debris moves from the short arm to enter into the vestibulum and finally enter the long arm, or vice versa fro long arm to short arm is also possible. This would cause the direction of nystagmus to reverse when the patient repeatedly rotates their head in the supine position to the lateral side with the affected ear facing downward.[14]

Previously, Nuti et al. proposed an alternative theory for this unusual nystagmus,[15] suggesting that it involves debris initially located in an atypical position. Previous researchers explained this phenomenon as a conversion of canalolithiasis to cupulolithiasis.[16] However, horizontal ipsicanal switch as a potential explanation has been first described by Büki et al.[14]

Atypical nystagmus associated with atypical positioning

For completeness sake, manifestations of two common atypical nystagmus have been outlined, providing clues for diagnosis. Firstly, the nystagmus that occurs during the lying-down position, from sitting position to supine during examination. This is because of the sinking of the debris, which was initially located in and around the ampulla or sometimes in the cupula of the horizontal canal leading to horizontal nystagmus, which can sometimes be confused with spontaneous nystagmus. Second, down-beating nystagmus that occurs during sitting up from lying position in patients

with acute posterior canalolithiasis, which might confuse posterior canalolithiasis, usually has an up-beating type of nystagmus.[14]

OCCURRENCE OF VARIANTS

Studies have shown that the right labyrinth is more commonly involved in cases of canalolithiasis.[17] However, it remains unclear whether this observation applies solely to canalolithiasis or also to cupulolithiasis. This preferential involvement still needs to be confirmed through new epidemiological studies that incorporate the updated criteria (such as no nystagmus seen during Dix-Hallpike position in hypothetical posterior cupulolithiasis, if the scientific community accepts these criteria). This issue highlights a broader point about epidemiological studies: if new hypothetical mechanisms are to be generalized, additional research should be conducted. Vestibular migraine is one such example wherein it can overlap with BPPV even in the absence of nystagmus. A study by Jeong et al.[18] is yet another good example where 100 patients diagnosed with idiopathic BPPV were recruited, but it was found that 84 patients had typical symptoms of BPPV, but no nystagmus was seen; they were found either to have a posterior short arm canalolithiasis or cupulolithiasis.

In regards to unilateral end organ involvement, the posterior semicircular canal and ampulla are more prone for debris getting trapped in comparison to the anterior semicircular canal and ampulla. Typical BPPV, where debris must reach the openings of the long arms, may be less common than vestibulolithiasis, where debris simply sinks into the posterior short arm and moves there. The higher frequency of classical BPPV could be due to the utricular macula being nearly horizontal in an upright position, making detachment less likely. However, when the patient is lying down in the supine position (with the utricular surface vertical or upside down), the orifices are positioned below the utricular macula, facilitating debris dislodgement.

CONCLUSION

In conclusion, atypical BPPV is a common and often challenging condition to diagnose, especially when atypical presentations arise. The hypotheses presented here suggest that atypical BPPV may be more frequent than currently recognized, with certain cases displaying either no nystagmus or atypical nystagmus patterns. While these theories are not directly provable at this stage, they are in line with the evolving understanding of the various forms of BPPV that have been observed over time. If accepted in the future, these insights could significantly ease the diagnostic process, preventing cases without nystagmus or with unusual nystagmus patterns from puzzling clinicians. This paper aims to encourage further discussion and research into these atypical forms of BPPV, which, despite their complexity, can be easily treated once correctly identified, offering relief to patients who suffer from this often distressing condition.

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