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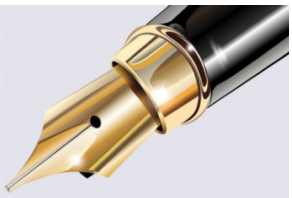

Tonsillectomy is one of the most commonly performed surgical procedures in children. The indications for tonsillectomy are recurrent tonsillitis, peritonsillar abscess and obstructive sleep apnoea (OSA). As a consequence of the improvement in antibiotic treatment during the last decades, the incidence of tonsillectomy due to recurrent tonsillitis is gradually declining, while OSA is slowly becoming a major indication for removal of hypertrophic tonsils in children. Tonsillectomy conventionally involves total removal of the tonsils, but partial tonsillectomy (also called tonsillotomy or intracapsular tonsillectomy) is becoming popular in treatment of OSA. Since tonsil has important immunological functions, it is more logical to resect only the obstructive tonsillar tissue and leave remnants in the tonsillar beds. Although it originated in the last decade of the 19th century, partial tonsillectomy became a relatively uncommon procedure until its re-emergence nearly 100 years later.

The first reference to the use of partial tonsillectomy as an alternative procedure for the treatment of OSA was described by Lantslov and Kovaleva in 1993. Proponents of partial tonsillectomy report lower risk of postoperative haemorrhage, significantly reduced pain and analgesia requirement, and earlier return to normal diet. However, it is as yet unclear whether or not re-hypertrophy of this remnant of the tonsils and/or tonsillitis reoccur in the long-term. Current evidence suggests that partial tonsillectomy is a safe and effective treatment for children with OSA. Furthermore, it has been found to have comparable results to total tonsillectomy in the improvement of OSA symptoms in children.

But the evidence base is limited by heterogeneity in study samples and surgical techniques as well as by differences in the operationalizing of partial tonsillectomy that preclude quantitative analyses. Future research to standardize partial tonsillectomy is important to promote comparability of findings with strong evidence.

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Anatomical Attributes of Zuckerkandl Tubercle

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Geetha Rani B G,[1] Soumya Vedavyasa,[1] Shri Hari B G,[2] Balachandra N[1]

ABSTRACT

Introduction

Thyroid diseases are different from many other diseases in the relative visibility a small swelling of the thyroid offers to the treating surgeon and the availability of medical and surgical treatments. Thyroidectomy remains the cornerstone of management in many thyroid swellings, yet ridden with many complications like nerve palsies and hypoparathyroidism. Hence, proficient knowledge is required in preserving the recurrent laryngeal nerve and the parathyroid glands in their vulnerable surgical site. An almost certain way to ensure integrity of these structures during surgery is to be aware of anatomical landmarks guiding towards their identification one of which is zuckerkandl tubercle, a less often described structure, arising from posterior margin of thyroid gland.

Materials and Methods

We examined 42 thyroid gland specimens from embalmed cadavers available for study & research purpose in the department of anatomy of our medical college. The incidence, size, shape, laterality of the zuckerkandl tubercle & its relation with recurrent laryngeal nerve as well as parathyroid gland were evaluated and analysed.

Results

Thirty out of the 42 thyroid specimen showed presence of Zuckerkandl tubercle as a irregular lateral projection from the posterior border of thyroid gland. Among them, 17 were on right side while 9 were on left side & 4 of them bilaterally present in the specimens.12/42(28.5%) of specimen showed superior parathyroid gland close to the location of Zuckerkandl tubercle. 29 out of 31 of the specimen showed ZT pointing at the RLN.

Conclusion

The zuckerkandl tubercle is an anatomical structure whose presence is important for locating recurrent laryngeal nerve & parathyroid glands and preventing injury during thyroidectomy. Knowledge of its variations gained from our study will help in the prevention of inadvertent nerve injuries during thyroidectomy.

Keywords

Recurrent Laryngeal Nerve; Zuckerkandl Tubercle; Superior Parathyroid Gland

Recurrent laryngeal nerve (RLN) palsy(14%), hypoparathyroidism(19.8%) are postoperative complications which are frequent causes for litigation following thyroidectomy.[1,2] Thyroidectomy, ranging from lobectomy to total thyroidectomy remains a tailor-made treatment option to most of the patients with thyroid swellings in India which carries a thyroid disease burden of over 42 million.[3] Complications of thyroidectomy have testified mighty improvements in success rates which used to be around 40%during 18thcentury to 90% in 20th century. Increasing success can be attributed to improvements in surgical techniques, anaesthetic and antiseptic facilities.[4] Nevertheless thyroidectomy is still abetted with post operative complications such as haemorrhage, parathyroid injury, recurrent laryngeal nerve palsy.[5] According to several studies, injury of RLN during thyroidectomy varies from 1.5% to 14%.[6] The main mechanisms of damaging the RLN during thyroidectomy are pressure, laceration, thermal damage, division, ligation, ischemia, and

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manipulation. Furthermore, lack of surgical plan during dissection and being oblivious to anatomical variations of thyroid gland are well-known reasons for iatrogenic damage of the RLN. The result is that 12.5% of patients suffer from temporary vocal cord paralysis while 3.8% patients will experience permanent paralysis. Clinical features extending from dysphonia-dysphagia-dyspnoea manifest depending on the extent injury which can get exaggerated in cases with pulmonary morbidity.[7,8] Characteristics of thyroid disease, anatomical variations in surgery site, landmarks for RLN identification are some important factors that may influence the complications, malpractice litigation, sometimes even survival of the patient.

Anatomists and surgeons differ considerably in their descriptions & landmarks for identifying RLN. Beahr's, Simons, Lores & recurrent laryngeal nerve triangles are all surgical landmarks bounded by carotid artery, inferior thyroid artery & trachea-oesophageal grove. Nevertheless, these often-described boundaries to locate the RLN, having fallen short of being consistent landmarks with the structures themselves presenting with different anatomical variations. Zuckerkandl tubercle is a normal extension of thyroid gland from its posterolateral margin. It serves as a valid & reliable landmark for identification of RLN during thyroid surgeries. Many a times, it is regarded as a bothersome mass causing increased pressure symptoms, also as a metastatic lymph node or even may get jumbled with parathyroid adenoma. It may cause persistent symptoms if left out during thyroidectomy and can be a site of persistent radio iodine uptake on radioactive scans, causing misinterpretations by unwary Surgeons /Radiologists. Although ZT is not rare infrequent finding during thyroid surgeries, many textbooks in surgery either do not mention it or is regarded as an unusual finding. Since the first report by Emil Zuckerkandl, few studies in surgical literature describe the ZT notably in pathological thyroid specimens & scarcely in normal thyroid tissue.

Parathyroid mobilization during thyroid surgery can cause transient or permanent hypoparathyroidism. Reported incidence range from 17.6% to 19.8%, many times due to failure of recognition and preservation these glands during thyroidectomy. Parathyroid glands are essential for maintaining calcium homeostasis. Previous literature indicates that when ZT is present, the superior parathyroid glands are always present above & inferior parathyroid glands are inferior to tubercle. Due to variable position of parathyroid glands & difficulty in identification, landmarks like RLN, ZT, inferior thyroid artery in lower pole of thyroid gland are considered as convenient landmarks.

While many studies have described the association between ZT and RLN, there are fewer studies reporting the anatomical relation between ZT and parathyroid gland especially in Indian population. Several studies have reported to establish the incidence and variation with sizes & shapes of zuckerkandl tubercle, but all these findings were observed during surgeries on already diseased thyroid gland where in a lateral projection from diseased gland might not represent a true tubercle. Years of teaching head & neck anatomy to Medical, Dental & Allied health students, we came across ZT in normal thyroid specimens with various anatomical & topographic features. Our objective is to study the incidence, size, shape, laterality of the zuckerkandl tubercle & its relation with recurrent laryngeal nerve as well as parathyroid gland.

Materials and Methods

We identified & dissected 42 embalmed head & neck specimens from the department of Anatomy, of our medical college. A midline incision was made in the neck followed by reflection of skin, superficial fascia with platysma & deep fascia. Infrahyoid muscles were identified in the midline & reflected to expose the thyroid gland. After removing the fascia from the thyroid gland & exposing the vessels & nerves supplying it, the borders & surfaces of thyroid gland were examined. Anterior border was defined as a sharp border ascending the isthmus & reaching the apex of thyroid lobe. Posterior border was identified as that part engulfing behind the oesophagus. Lateral border of thyroid gland was defined as most margin of anterior surface of thyroid gland in its anatomical position. Zuckerkandl tubercle was studied for its presence, side, size, its relation with recurrent laryngeal

Table I: Results

INCIDENCE	31/42 (71.42%)
Laterality	9 -Left 17 -Right 4-Bilateral
Shape	Irregular, nodular or elongated Lateral Projection
Relation with recurrent laryngeal nerve	29/31 (97.22%) posterior/medial
Relation with parathyroid gland	12/42(28.5%) Superior parathyroid gland

Table II: Incidence & Grading of ZT in different studies

	GRADE 0 (NOT SEEN)	GRADE 1 (<5 MM)	GRADE 2 (6-10 MM)	GRADE 3 (>10 MM)
Gauger et al (84%)	37%	18% (gd1,2)		45%
Pelizo et al (73.9%)	23%	8.6%	53.8%	14.4%
Sheahan et al (82.1%)	29% (gd0,1)	61.1%	37%	24%
Mehanna et al (64.5%)	30.1% (gd0,1)		29.8%	22.1%
Hisham&Aina (89.3%)	19.8% (0,1)		25%	55.2%
Irawati et al (90.5%)	9.5%	28.9%	50.5%	11.1%
Singh et al (87.86%)	23%	45%	36%	5%
Present study (72.2%)	22.1%	28.9%	50.5%	6.9%

nerve & parathyroid gland. The parathyroid gland found near the tubercle was confirmed with histopathological study & H& E staining.

Results

We have analysed 42 of thyroid gland specimens from embalmed cadavers available for study & research purpose in department of anatomy of our medical college. Thirty of the 42 specimens showed the tubercle (Table I) out of which 17 belonged to right side while 9 of them belonged to left side and 4 of them bilaterally present in the specimens. 12/42 (28.5%) of specimen showed superior parathyroid gland close to the location of Zuckerkandl tubercle. 29 out of 31 of the specimen showed ZT pointing at the RLN.About 50% of Zuckerkandl tubercle to be predominantly of grade II, i.e. between 6-10 mm in size (Table II), while 30% were grade I and 7% were grade III.

Discussion

Study of Thyroidgland anatomy & surgery started as early as 16th century during Roman Empire principally from Leonardo da Vinci.[6] Later the 18th century witnessed notable advances in thyroid surgery with great contribution from Kocher – acclaimed as Father of Modern Thyroid surgery.[10] The notable advances in surgical practice that occurred in the 1800s – 20th century resulted in changing the then perspective of thyroid surgery from a bloody and fearsome procedure to a modern and safe surgery. Otto Wilhelm made lung (1867) discovered & described a posterior horn of thyroid gland. Emil zuckerkandl (1906) coined the term posterior process glandulae thyroidae.[11] Gilmour was the first to describe the relation of the tubercle with recurrent laryngeal nerve. During subsequent centuries the tubercle received less attention & mention in research& conventional textbooks.[6, 11]

Table III: Laterality of Zuckerkandl tubercle in different studies

MEHANNA et al	**72.6% (right) 53.9% (left)**
Gurleyik & Gurleyik	**53/87(61%) (RIGHT)**
Sheahan	**71/10% (69.6%) (RIGHT)**
Irawati et al	**93% (RIGHT)**
Singh et al	**85.41% (RIGHT)**
Present study	**31/42 - 73.8% ZT (+)** **26/31 - 83.87%** **RIGHT 3/31 - 9.65%** **LEFT 2/31 - 6.45% B/L**

Table IV: ZT pointing at RLN in different studies

	MEDIAL	LATERAL	POSTERIOR	ANTERIOR
Gauger et al	**93%**	**7%**	**-**	**-**
Yun et al	**-**	**<10%**	**90%**	**0.5%**
Gilcarcedo	**-**	**-**	**95%**	**-**
Pradeep et al	**98%**	**-**	**-**	**-**
Our study	**6.25% (small tubercle)**	**None**	**93.75% (15/16)**	**None**

Thyroid gland originates as medial, lateral anlage. Medial anlage arises as endoderm evagination of pharyngeal floor of the branchial apparatus to form the main gland.[13] The lateral anlage – ultimobranchial body (4th, 5th pouch) is formed from the lateral part of the gland. Zuckerkandl tubercle arises from the site of fusion between the two anlages. Hence, thyroid tubercle of Zuckerkandl is a nodule arising from the postero lateral margin of thyroid gland, implying it to be a remnant of the ultimobranchial body.[13,14]

Several authors studied the Zuckerkandl tubercle and their variations in shape, size & laterality, nonetheless the studies were done on patients undergoing thyroid surgeries for any of their pathology; however, we conducted the same study in cadavers with thyroid gland without any pathology. Thirty of the 42 specimens showed the tubercle (Table I) out of which 17 belonged to right side while 9 of them belonged to left side and 4 of them bilaterally present in the specimens. Table III provides a comparison among different studies with respect to laterality of ZT. With the greater number of the Zuckerkandl tubercle being found on right side & a few also on left side of the neck, it serves as an important landmark on either side during surgery. Shape of the tubercle varied as nodular, elongated, or irregular.

ZT can be classified into three grades according to size: grade I <0.5 cm, grade II 0.5 to 1 cm, grade III >1 cm.[17] Table II provides a comparison of grades of presentation of ZT in various studies. Akin to the studies of Pelizo & Sheehan et al[17] we found about 50% of Zuckerkandl tubercle to be predominantly of gradeII, i.e. between 6-10mm in size, while 30% were grade I and 7% were grade III.

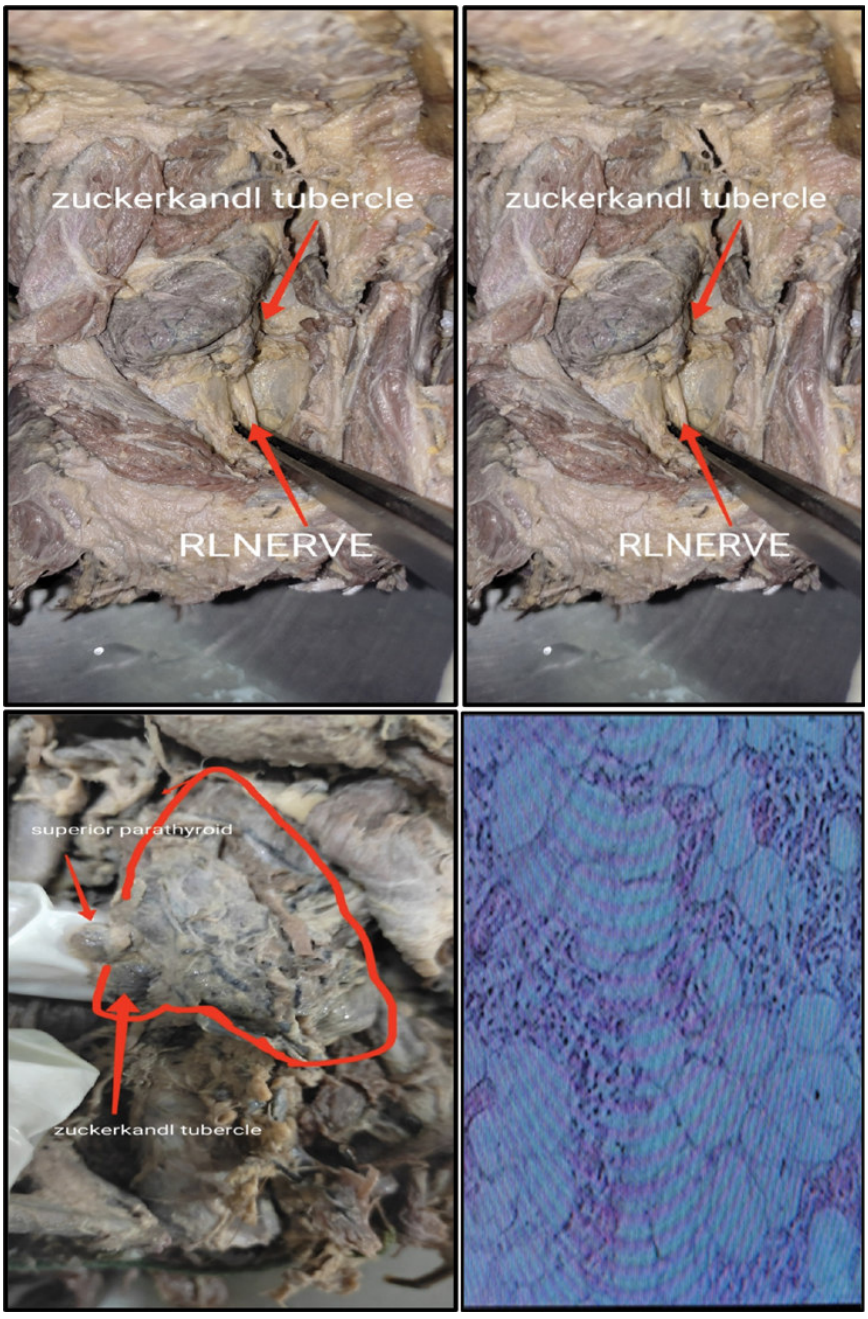

Fig. 1. Zuckerkandl Tubercles in our anatomy specimen and the histopathology of the identified superior parathyroid gland in relation to the tubercle.

As with the relationship of Zuckerkandl tubercle with recurrent laryngeal nerve, quite often we find variations in the medio–lateral relationship just like the physical features of the tubercle itself. Table IV gives a brief comparison of various study results to support the same. Gauger et al, Pradeep et al described the recurrent

laryngeal nerve to bear a medial relation with the tubercle[18,19] Yun et al; Gilarcedo et al related the nerve to have posterior relation to the tubercle. Gauger et al &Yun et al described the nerve even to be lateral to the tubercle however we did not encounter this relationship.[18,19] Thyroid gland being a midline structure, its protuberance Zuckerkandl tubercle & RLN are often situated behind it to enter the trachea-oesophageal grove. Therefore, posterior or posteromedial relation would be an appropriate description for the location for the nerve with the ZT tubercle. In our study, average distance between RLN and the ZT was 1.2 mm posteriorly or postero-medially. In the majority of specimen (79%), RLN was lying at d≤1 mm, making it a formidable landmark. Carlos reported the rare combination of the non-recurrent laryngeal nerve with Zuckerkandl tubercle - a rare anatomical variation of the RLN present in less than 1% of people. However, we have not encountered any of such cases in our studies.

While there are several studies on association of ZT with RLN, there are only few studies describing the relation between ZT & parathyroid in healthy population. Milzner described parathyroid glands in relation to thyroid vessels & capsule while Wang C reported 42% of inferior parathyroid glands in an anterior /posterolateral surface of thyroid gland, Hojaji F described relation of RLN & Parathyroid gland in cadaveric study.[22, 23]

In our study12/42 (28.5%) of specimen showed superior parathyroid gland close to the location of Zuckerkandl tubercle whichwere classically found near the poster lateral aspect of the superior pole approximately 1 cm superior to zuckerkandl tubercle. The findings were confirmed with histological section & staining (Figure 1). This constant relation with the tubercle is owing to the common origin & migration of both the structures from ultimobranchial body. However, the inferior parathyroid glands develops from 3rd pharyngeal pouch along with thymus hence, it were not observed near the tubercle & instead could have settled anywhere from lower pole of thyroid gland to mediastinum. Thus, the association of the tubercle with the superior parathyroid gland reaffirms its common origin from ultimobranchial body.

Conclusion

We found Zuckerkandl tubercle in thirty of our cadaveric studies as predominantly nodular-projectile, right sided, associated upwards with superior parathyroid gland & with a posteromedial relation to recurrent laryngeal nerve. Variations, such as those observed in this study, show that even with the most current knowledge of head and neck anatomy, Surgeons & Radiologists can still encounter rare anatomical changes that can sometimes make the surgical procedure a challenge.

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Main Article

Migraine Disorders - Prevalence and Disability Evaluation along with its Association with Sleep Quality among Undergraduate Medical Students

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Sai Lavanya Patnala,[1] Anu Mohandas,[2] Baby Shalini Muppalla,[1] Pavani Varma,[1] Snigdha Pattnaik,[1] Suditi Sharma,[1] Hamsa Priya Bhuchakra[1]

ABSTRACT

Introduction

Headache is a prevalent issue among medical students, stemming from academic pressures, clinical responsibilities, and emotional stressors, with implications for reduced academic performance and co-morbid psychiatric illnesses. Of particular concern is migraine, which may disrupt the acquisition of patient care skills. This study aimed to assess the prevalence of migraine, its associated disability, and contributing factors

Materials and Methods

This was a cross sectional study on prevalence of migraine, its disability, and contributing factors among 403 MBBS students through a cross-sectional analytical approach. Data encompassed sociodemographic details, perceived academic stress, headache characteristics via the Migraine Screening Questionnaire and Migraine Disability Assessment Questionnaire (MIDAS), and sleep quality evaluated using the Pittsburgh Sleep Quality Index (PSQI), analyzed with SPSS-24.

Results

Findings revealed a mean student age of 20.41 years, with females constituting 66%. Migraine prevalence stood at 12.2%, with 24.4% experiencing severe disability. Factors linked to migraine included gender, academic stress, comorbidities, and psychiatric conditions, with the latter emerging as an independent predictor. Notably, lack of sleep emerged as the primary trigger, followed by eye strain or excessive screen time.

Conclusion

This study underscores the significance of addressing migraine and poor sleep quality among medical students, highlighting the necessity of promoting good sleep hygiene, effective stress management, and the management of psychiatric comorbidities to bolster student well-being.

Keywords

Migraine Disorders; Prevalence; Disability Evaluation; Sleep Quality; Students, Medical; Undergraduate Medical Education

Headache disorders, characterised by recurrent headache, are among the most common disorders of the nervous system. According to the WHO, it is one of the ten most common causes of functional disability. Tension-type headache (TTH) is the most common primary headache disorder, with two types: episodic and chronic. Episodic TTH, affecting over 70% of some populations, occurs on fewer than 15 days per month, lasting hours to days. Chronic TTH, occurring more than 15 days per month, affects 1-3% of adults and is more disabling. TTH often begins in adolescence and is more common in women (3:2 ratio).[1] Other primary

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headache disorders include migraines and trigeminal autonomic cephalgias (TCAs).[2]

Migraine Disorder is recurrent, often life-long, and characterized by recurring attacks which include one-sided headaches of pulsating quality, moderate or severe intensity, aggravated by routine physical activity with duration of hours to 2-3 days. The most characteristic associated feature is nausea. Attack frequency is anywhere between once a year and once a week and in children, attacks tend to be of shorter duration and abdominal symptoms more prominent. Migraine most often begins at puberty and is more common in women, usually by a factor of about 2:1, because of hormonal influences.[1]

The pathophysiology of primary headaches is not fully understood. Migraine is believed to result from neurological dysfunction, subsequently involving cranial vessels and the trigeminal nerve. In tension-type headaches, overactivity in cervical or pericranial muscles may be due to trauma, poor posture, or anxiety.[3] In migraines, trigeminal afferents are activated by pannexin-1 channel opening, leading to caspase-1 activation and release of proinflammatory mediators. This triggers a cascade involving NF-kB (nuclear factor kappa-B) activation and its spread to trigeminal nerve fibres around vessels of the pia mater. This causes a series of cortical, meningeal, and brainstem events, provoking inflammation in the pain-sensitive meninges and resulting in headaches through central and peripheral mechanisms. This explains the cortical depression (causing aura), and prolonged trigeminal nociception, resulting in headaches.[4]

Headache is one of the most common complaints among medical students due to excessive exposure to physical, psychological and social stressors more than the general population.[5] Medical students are expected to navigate their career through a higher level of stress, performance pressure, longer duration of education and a strong responsibility towards their career.[6] The severity of headache is directly proportional to the negative impact caused by the headache which includes reduced academic performance, quality of life, impaired functioning, and comorbid psychiatric diagnosis.[3]

The relationship between sleep and headaches is bidirectional. Stress is a common trigger for headaches, while sleep is the most frequently reported relief. Poor sleep quality has been shown to increase headache impact, frequency, and severity, particularly in migraine and TTH patients. Changes in sleep patterns can trigger migraines, and sleep disorders are linked to increased migraine frequency.[7] Sleep is often reported as an effective relief for established migraines.[8] Headaches can impair medical students' academic performance, reasoning, and quality of life,[6] leading many to self-medicate and overlook the issue.

Although some studies have been done across the world, this topic has been under studied in South India, despite its high prevalence. This study is aimed to establish the prevalence of migraine in medical students, disability caused, factors determining its occurrence along with the impact of sleep quality.

Materials and Methods

A cross-sectional study was conducted in an undergraduate medical teaching institute in Telangana over a period of 6 months starting from April 2023. Study population included all the students of 1st to 4th year of MBBS and Interns of the teaching institute. Anyone who was unwilling to participate during data collection were excluded from the study.

Sample size: In a study conducted by Raju S and S G (2018)[9] among medical students in a tertiary care medical college and hospital in South India, the prevalence of migraine was noted to be 30%. Applying the formula for sample size calculation for cross sectional studies at 95% CI, with an absolute precision of 5%, the sample size was calculated as 323. A non-response rate of 10% was added and the final sample size was **355**

Sampling procedure : A list of all the students was prepared from each batch of MBBS students and interns. Random selection was done using computer generated random numbers.

Data collection method : After explaining to the students regarding the aim of the study and taking a written informed consent, the data collection was done through Google Forms. Google form contain the participant

information sheet, written informed consent, A pretested semi structured questionnaire, Migraine Screening-Questionnaire, Migraine Disability Assessment Questionnaire and Pittsburgh Sleep quality Index. After collecting the data the identified students having migraine or any form of primary head ache was guided for medical support from General Medicine department of AIMSR, Hyderabad.

Study tools:

1. A pretested semi-structured questionnaire including the identification details, sociodemographic details, perceived academic stress, self assessment on academic performance, details of head ache perceived by the student and health seeking behaviour
2. Migraine Screening-Questionnaire: MSQ is a Migraine screening tool with a favourable diagnostic validity, test-retest reliability, and internal consistency-as determined by the Cronbach's alpha.[10] The MS-Q is based on the International Headache Society (IHS) criteria for the diagnosis of migraine and can be easily administered. There are 5 questions. A score of zero was assigned to all negative responses and 1 for the positive response. A cut off of 4 and above was used as indicative of possible migraine
3. Migraine Disability Assessment Questionnaire (MIDAS): 5 question expressed as number of days in last 3 months affected by headache leading to loss of productivity, avoidance of leisure activities etc. This questionnaire quantifies the disability caused due to migraine
4. Pittsburgh Sleep quality Index (PSQI): 11 questions which assess the time of quality sleep frequency of troubled sleep, requirement of medicines to induce sleep etc over last 1 month. This questionnaire rates the quality of sleep

Ethical clearance: Written informed consent was from every student. Participant information sheet containing the objectives and outcome of the study was provided to study participants. Clearance has been taken from Institutional ethics committee for biomedical research. (EC/NEW/INST/1527/2023/04/052)

Statistical analysis: The data was entered to MS excel and the analysis done using SPSS version 24. Descriptive analysis was done to find the proportion of students having migraine, extent of disability and sleep quality. The quantitative variables were expressed as mean ± Standard Deviation. Bivariate analysis was done using chi square for categorical variables and student t test in case of comparison of means. P value <0.05 was taken as statistically significant. Multivariate logistic regression was done to find the predictors for migraine, to adjust for confounding factors. Strength of association was expressed as adjusted OR (95% CI).

Results

Sociodemographic details: The total number of responses received from medical students across all academic years was 403. Mean age of study participants was 20.41 years (SD = 2.08). Majority of the students 266 (66%) were females and the rest 137(34%) were males. Among the responses received, majority were 177 (43.9%) first year students, 86 (21.3%) were interns and the rest from other academic years were 140 (34.7%). Out of the 403 students, 13 (3.2%) had known psychiatric conditions like anxiety, depression. 17 (4.2%) had known comorbidities like Hypothyroidism, Asthma and PCOS. Long term use of medications like beta agonists, corticosteroids, OCPs, SSRIs, Triptans and Thyroxine sodium supplements were present among 6.9% of medical students. Majority 329 (81.63%) were day scholars residing at their own homes.

Headaches and its characteristics: Of the 403 respondents, 45 (11.1%) experienced headaches more than once a day, while the majority, 144 (35.7%), had headaches more than once a week. Only 9 students (2.2%) had no headaches in the past year. Most students (179, 44.4%) reported headaches lasting 2-3 hours, with moderate intensity in 235 (58.3%). The most common pain location was around the head (band-like) in 172 (42.7%), followed by one side of the head (20.1%). Associated symptoms such as aura, tearing, nausea, and vomiting were present in 49.1% of students. Among the

403 students, 10 (2.4%) had autoimmune conditions, 7 (1.6%) had previous head injuries, and 3 (0.6%) had seizures. Most respondents (65%) did not use medication for headache relief, while 35% self-medicated, primarily with Paracetamol (26.8%) and Ibuprofen-Paracetamol combinations (2.5%).

Prevalence of migraine, migraine disability and trigger factors : Out of 403 responses received, 49 (12.2%) screened positive for migraine according to MS-Q in accordance with the diagnostic criteria according to IHS (International Headache society) Mean MS-Q score is 1.30 (SD = 1.056).

Table I: Migraine Screening Questionnaire responses among medical students

MS-Q MIGRAINE SCREENING- QUESTIONNAIRE			
S. NO.	**QUESTIONS**	**RESPONSES**	
		YES	**NO**
1	**Do you have frequent or intense headaches?**	**310(76.9%)**	**93(23.1%)**
2	**Do your headaches that last more than 4 hours?**	**41(10.2%)**	**362(89.8%)**
3	**Do you usually suffer from nausea when you have a headache?**	**60(14.9%)**	**342(85.1%)**
4	**Does light or noise bother you when you have a headache?**	**43(10.7%)**	**360(89.3%)**
5	**Does headache limit any of your physical or intellectual activities?**	**70(17.4%)**	**333(82.6%)**

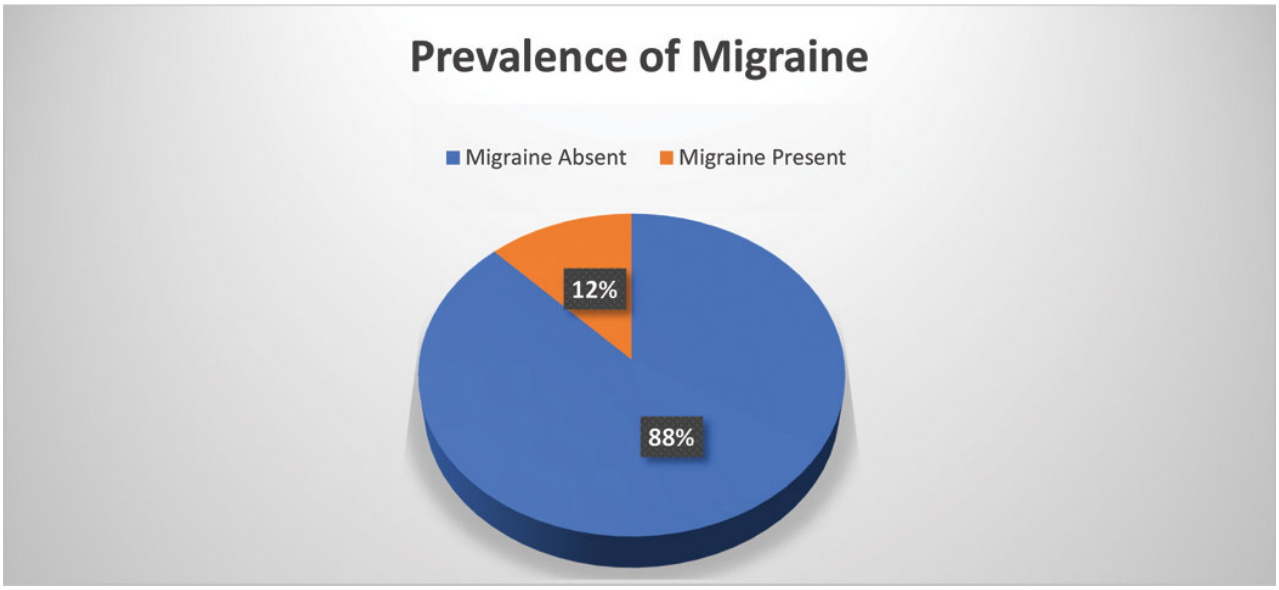

Fig. 1. Prevalence of possible migraine (MSQ score: e≥4)

Out of 49 students with migraine, 12 (24.4%) had MIDAS Grade IV or severe disability, 10 (20.4%) had MIDAS Grade III or moderate disability, 4 (8.1%) had MIDAS Grade II or mild disability and remaining 23 (46.9%) had MIDAS Grade I or had little or no disability. The average MIDAS score is 12.9 graded as moderate disability. Out of the 49 migraineurs, lack of sleep 40 (83.3%) was the most frequent trigger, followed by eye strain or excessive screen time 35 (71.4%), not drinking enough water 33 (67.3%) and stress 30 (61.2%).

Table II : Triggers of Migraine among Medical students

TRIGGERS	PRESENT	ABSENT
Lack of sleep	40 (83.3%)	9 (16.7%)
Eye strain/Excessive screen time	35 (71.4%)	14 (28.6%)
Not drinking enough water	33 (67.3%)	16 (32.6%)
Stress	30 (61.2%)	19 (38.8%)
Skipping meals/Fasting	27 (55.1%)	22 (44.8%)
Loud sounds/ Noisy environment	27 (55.1%)	22 (54.9%)
Too much sleep	25 (51%)	24 (49%)
Exposure to sun or bright light	25 (51%)	24 (49%)
Travelling	24 (48.9%)	25 (49.1%)
Hot/Humid weather	23 (46.9%)	26 (53.1%)
Neck Pain/ Fatigue	23 (46.9%)	26 (53.1%)
Skipping workout/Excess workout	17 (34.6%)	32 (64.6%)
Cold/Windy weather	17 (34.6%)	32 (65.4%)
Mood Changes	16 (32.6%)	33 (67.3%)
Onset before menstruation	13 (26.5%)	36 (73.5%)
Strong odour/Perfumes	13 (26.5%)	36 (73.5%)
Skipping medication	12 (24.5%)	37 (75.5%)
Chocolate & sugary foods	12 (24.5%)	37 (75.5%)
MSG/Salty food	4 (8.1%)	35 (91.9%)
Smoking/ Alcohol	3 (6.1%)	46 (93.9%)
Citrus fruits	1 (2%)	48 (98%)
Coffee	1 (2%)	48 (98%)
Cold items	1 (2%)	48 (98%)
Sexual activity	0 (0%)	49 (100%)

Factors associated with migraine in undergraduate medical students

Factors associated with migraine incidence was assessed with sociodemographic factors, perceived academic stress, self-satisfaction with academic performance, result of last exam given, any known comorbidities, any known psychiatric illness, long term medication use, poor sleep quality and, night time screen use using Chi Square test. Among these, gender, perceived academic stress, known comorbidities and long-term medication use were statistically significant. ($p<0.05$). In our study, 70% of the students were found to have poor sleep quality. Among those with poor sleep quality, 14.2% had migraine and 7.4% did not have migraine. Sleep quality was not found to be a significant factor.

Table III: Factors associated with migraine among medical students

VARIABLES	CATEGORY	MIGRAINE		CHI SQUARE	DF	P VALUE	OR (CI)
		PRESENT	ABSENT				
Age	>20 years	26 (15.1%)	26 (15.1%)	2.457	1	0.117	1.610 (0.884-2.933)
	<20 years	23(10%)	208 (90%)				
Gender	Female	39 (14.7%)	227 (85.3%)	4.589	1	0.032	0.458 (0.221-0.949)
	Male	10 (7.3%)	127 (92.7%)				
Perceived academic stress	Stressed/Very	3 (4.6%)	62 (95.4%)	4.129	1	0.042	3.256 (0.981-10.805)
	Less	46 (13.6%)	292 (86.4%)				
Self-satisfaction with exam performance	Yes	17 (16.2%)	88 (83.8%)	0.623	1	0.142	1.195 (0.405 to 3.527)
	No	32 (10.7%)	266 (89.3%)				
Result in the last exam	Pass	42 (12.7%)	290 (87.3%)	0.427	1	0.514	1.324 (0.569-3.082)
	Fail	7 (9.9%)	64 (90.1%)				
Known psychiatric condition	Yes	3 (23.1%)	10 (76.9%)	1.499	1	0.221	2.243 (0.595-8.452)
	No	46 (11.8%)	344 (88.2%)				
Known comorbidities	Yes	6 (35.3%)	11 (64.7%)	8.895	1	0.003	4.351 (1.532-12.360)
	No	43 (11.1%)	343 (88.9%)				
Long term medication use	Yes	10 (35.7%)	18 (64.3%)	15.632	1	<0.001	4.786 (2.064-11.099)
	No	39 (10.4%)	336 (89.6%)				
Night time screen use	Yes	45 (12.3%)	320 (87.7%)	0.105	1	0.746	1.195 (0.405 to 3.527)
	No	4 (10.5%)	34 (89.5%)				
Poor Sleep quality	Yes	40 (14.2%)	242 (85.8%)	3.608	1	0.57	2.057 (0.965-4.385)
	No	9 (7.4%)	112 (92.6%)				

Predictors of Migraine among Medical students

To find the predictors of migraine prevalence among undergraduate medical students considering the confounding factors bivariate logistic regression was done. All the variables which gave a p value <0.25 were included in model.Enter method was used to run the logistic regression command. Out of 7 variables included i.e., age, gender, perceived academic stress, self-satisfaction with performance in the last written exam, known psychiatric condition, known co-morbidities, long term medication use, one variables i.e., known psychiatric conditions ($p<0.05$) came to be significant predictors of migraine prevalence. It was found that medical students who had known psychiatric conditions were having 3.765 (1.355-8.858) times higher odds of having migraine compared to those students who had no known psychiatric conditions.

Table IV: Predictors of Migraine among Medical students

VARIABLES	REFERENCE CATEGORY	OR (CI)	P VALUE
Age	>20years (1)	1.1519 (0.80402.871)	0.198
	<20years (0)		
Self-satisfaction with performance in the last written exam	Yes (1)	0.656 (0.333-1.291)	0.223
	No (0)		
Gender	Female (1)	2.072 (0.982-4.370)	0.056
	Male (0)		
Known co morbidities	Yes (1)	0.480 (0.146-1.580)	0.227
	No (0)		
Known psychiatric conditions	Yes (1)	3.765 (1.355-8.858)	0.009
	No (0)		
PSQI	> 5 (1)	1.083 (0.975-1.203)	0.132
	< 5 (0)		

Discussion

In our study population consisting of 403 students, 97.8% of the participants have experienced a headache atleast once in their lifetime. Nearly ~43% had band-like headaches, characteristic of episodic tension-type headaches. This finding is similar to that of Bhattarai A M et al[6] study where the most common type of headache among medical students in Nepal was also TTH. Associated symptoms like aura, redness and tearing of eyes, nausea and vomiting were found in a small proportion of participants. 35% were found to self-medicate when headaches occur which was less than that described by Raju S and S G[9] and Menon B et al[11] and most common among them, 26.8% used Paracetamol to relieve headaches which was lesser than described by Oraby et al[12] and Bhattarai AM et al[6] but, consistent with the pattern of self-medication among students. According to our study, 12.2% of the students were found to have migraine which is less than the global prevalence of 14-15%. Our findings were most consistent with prevalence rates found in Lebanon[13] and was similar that found in Kathmandu Valley.[14] Lower prevalences were seen in studies conducted in China,[15,16,17] Saudi Arabia,[18] and Sudan.[19] Higher prevalence was seen in Kuwait,[20]

Egypt,[12] Pakistan,[21] and Palestine.[22] Higher prevalence was also seen in a study conducted in a similar geographical location by Menon B et al[11] in 2013 using similar tools and sample size, probably due to decreasing trend of headache prevalence over the last decade which can be associated with increase in health-seeking behaviours. Out of 12.2%, 79.5% had already been diagnosed by a physician which is significantly higher than those described in Oraby et al[12] study and Choudry H et al [(21)] study which might be due to moderate health care services in Egypt and Pakistan, compared to India. Twice as many females (14.7%) compared to males (7.3%) had migraine (p value=0.032). This is consistent with global values of higher prevalence in females compared to males.[23] This was also consistent with findings from similar studies by Bhattarai AM et al[6] Bindu Menon et al,[11] Oraby et al,[12] Shrestha O et al,[14] Osman Ali MM et al,[19] Choudry H et al,[21] and Anaya F et al[22] which showed female preponderance. Significant association was found between perceived academic stress and migraines in our study (p value = 0.042) and 61.2% of migraineurs described stress as a trigger. This is consistent with a global large-scale study on triggers conducted by L Kelman in 2007[24] where stress was found to be the most common trigger. Similarly, stress was identified as a common cause of headaches or trigger for migraines by Raju S and S G,[9] Bindu Menon et al,[11] Yang H et al,[15] Gu X et al[16] and Al-Hashel et al.[20] Bhattarai AM et al,[6] Aljaafari D et al,[18] and Anaya F et al[22] also described high proportion of exam related stress as a trigger in their studies. Other significant factors included known comorbidities (p value = 0.003) and long-term medication use (p value<0.001). A history of known psychiatric conditions like depression and anxiety was found to be a significant predictor of migraine incidence. This finding was similar to the Lebanese study[13] where anxiety and depression were found significantly associated with migraine. This is also consistent with an Italian review done by Antonaci F et al[25] which described that psychiatric comorbidity affects migraine evolution and may change treatment strategies, eventually modifying the outcome. Although poor sleep quality was not significant, lack of sleep was the most frequent trigger (83.3%) among migraineurs. This was also seen in studies by Bindu Menon et al,[11] Yang H et al,[15] Gu X et al,[16] Al-Hashel et al.[20] Other common triggers included eye strain or excessive screen time (71.4%) and not drinking enough water (67.3%). Using MIDAS severity scale, we found a relatively small proportion of students (24.4%) had Grade IV or severe disability which was less than that in Chahine et al[13] study probably due to different geographical and environmental conditions in Lebanon compared to those in our study despite similar sample sizes.

Our study aimed to establish the prevalence and disability caused by migraine in medical students which is valuable information to medical education systems and colleges to introduce necessary interventions to set more reasonable course schedules and create awareness among students regarding the importance of sleep hygiene, seeking help for mental health issues, adequately de-stressing with regular exercise and indulging in extracurricular activities.

Some limitations of the study include the inability to assess temporality due to its cross-sectional design, as well as the timing of data collection during exam season, which affected response rates and year-wise variation analysis; while known confounding factors such as stress, gender, coffee consumption, sleep disturbances, irregular meal patterns, smartphone use, long-term medications, and mental health conditions were considered, the potential for unknown confounders remains. Data collection was conducted via Google Forms instead of face-to-face interviews since most students were busy with exam preparations.

In conclusion, we found a 12.2% prevalence of migraine and a history of known psychiatric conditions was found to be a significant predictor. A female preponderance was also seen. Other significant factors included academic stress, history of co-morbidities and use of long-term medication. Among the migraineurs, lack of sleep, eye strain or excessive screen time, not drinking enough water, and stress were the significant triggers in this population. Headache is a very common disability and migraine attacks affect a significant portion of the population. Migraines are known to be quite disabling for

a person experiencing it, hindering their tasks/goals at hand. Our study, therefore, provokes at creating awareness among the general population regarding triggers that can help the affected population towards preventing an attack which could be by taking simple measures such as maintaining good sleep hygiene, monitoring their screen time, hydrating adequately, and participating in activities to manage stress and maintain holistic well-being; this becomes of increasing importance, especially in high-stress courses and jobs. Further research exploring various lifestyle measures to prevent the same can be explored and help optimize the prevention of headaches and migraines in a sustainable way.

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Main Article

The Emotional and Social Impact of Hearing Loss

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ABSTRACT

Introduction

Hearing loss affects not only auditory function but also significantly impacts a person's emotional and social functions. The purpose of this study is to assess the emotional and social handicap in patients presenting with hearing loss.

Materials and Methods

A cross-sectional, observational, descriptive study was conducted among 179 adult patients presenting with hearing loss at the otolaryngology outpatient department of a tertiary care hospital in Eastern India. A structured questionnaire was utilized to collect socio-demographic details and hearing loss characteristics. Pure-tone audiometry (PTA) was performed to determine the degree of hearing loss. The Hearing Handicap Inventory for Adults (HHIA) questionnaire was chosen to assess and quantify the self-reported social and emotional handicap.

Results

The study participants, aged 18 to 80 years (mean age 51.4), included 65.9% employed individuals and 49.2% who were married. Bilateral hearing loss was observed in 38%, while 43% had experienced hearing loss for 10–12 months. Pure Tone Audiometry revealed that 15.6% had mild, 18.4% moderate, 51.5% severe, and 14.5% profound hearing loss. HHIA scores indicated that 74.3% experienced a severe overall handicap, with 72.1% reporting significant social impairment and 76.5% emotional impairment. The social and emotional handicaps were significantly associated with sex, laterality of hearing loss, and symptom duration.

Conclusion

Hearing loss significantly affects both the social and emotional well-being. There is a need for tailored interventions which will address the audiological, social, and emotional needs.

Keywords

Hearing Loss; Deafness; Handicapped

Traditionally defined as 'a partial or complete inability to detect sounds,' hearing loss is now recognized as a widespread sensory impairment affecting communication. Recent studies show that, beyond impaired hearing, it also significantly impacts emotional health and social well-being. Hearing loss significantly affects daily life, often leading to social withdrawal due to embarrassment and communication difficulties. The emotional toll, including loneliness and frustration, frequently outweighs the social limitations.[1,2,3] Research shows that emotional distress from hearing impairment often surpasses the impact on social interactions.[4,5]

Hearing loss reduces quality of life, especially for those with profound impairment, and presents challenges beyond what audiometric tests capture.[6,7] Psychological distress, including insecurity, stress, and anxiety, further discourages social participation, leading to isolation.[5] Early identification and hearing aids can alleviate these issues,

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but many, especially those with unilateral loss, resist using them. Support and encouragement in adopting these devices, along with emotional guidance, counselling, reassurance are critical for better outcomes.[3,8,9]

This study aims to assess the emotional and social handicap associated with hearing loss among adult patients attending the ENT OPD of a tertiary care hospital in Eastern India. By examining the prevalence and severity of hearing loss, as well as its impact on emotional and social well-being, this research seeks to contribute to a better understanding of the challenges faced by individuals with hearing loss in this region and to inform the development of targeted interventions.

Materials and Methods

A cross-sectional, observational study was conducted among adult patients attending the Otorhinolaryngology Outpatient Department of tertiary care hospital from April 2024 to July 2024. Participant selection and assessment commenced only after approval from the Institutional Ethics Committee (IEC/NON SPON/2246/03/24). The sample size was 179, with the minimum required sample size calculated using the Cochrane formula: $n = (Z^2pq)/L^2$. In this formula, n is the sample size, Z is 1.96 for a 95% confidence interval, p is the prevalence of hearing handicap from a previous study (45.6%),[3] and the relative error was set at 15%. The final sample size was rounded to 169, but a total of 179 patients were assessed.

Systematic random sampling was used, with inclusion criteria of age over 18 and hearing loss lasting at least 3 months. Exclusion criteria included refusal to provide consent, hearing loss due to impacted wax, foreign bodies, furuncles, acute infections, known comorbidities, and recent surgery or invasive procedures within the last 3 months. All selected patients were clinically examined, with a thorough history and appropriate diagnostic tests conducted.

Assessment of Hearing Loss

The degree and laterality of hearing loss was inferred based on the pure-tone audiometry (PTA) report. The results were plotted on a standard audiogram to analyze the type and degree of hearing loss. This test is essential for diagnosing hearing impairment and guiding management strategies.[10]

Assessment of Social and Emotional Handicap

The self-perceived social and emotional handicap was assessed using the Hearing Handicap Inventory for Adults (HHIA) questionnaire, a reliable tool for evaluating the emotional and social impact of hearing loss. The 25-item questionnaire is divided into two subscales: emotional and social/situational. The emotional subscale addresses feelings related to hearing loss, while the social/situational subscale covers challenges in different listening environments. Scores help quantify the hearing handicap and guide intervention development.[11]

The researcher individually administered the HHIA, which consists of 25 questions scored on a 0–4-point scale. Total scores, ranging from 0 to 100, categorize hearing handicap from no perceived handicap (0-16) to significant handicap (above 42). The questionnaire was translated and validated in Bengali and Hindi.

Statistical Analysis

The collected data was compiled and statistically analyzed using Microsoft excel. To examine the relationship between hearing handicap and sociodemographic and clinical parameters, Spearman's correlation coefficient was employed. Additionally, the chi-square test was used to assess potential associations between handicap and gender. For all above analyses, statistical significance was set at p value < 0.05.

The Study was conducted after obtaining approval from the Institutional Ethics Committee and informed written consent. Patient privacy and confidentiality was maintained. Data security was assured.

Results

Table I: Distribution of Study population according to socio-demographic variables and hearing loss related characteristics. (n=179)

VARIABLES		NUMBER	PERCENTAGE
Sex	Female	58	32.4
	Male	121	67.6
	Hindu	115	64.2
	Muslim	61	34.1
	Others	1	.6
Address	Rural	114	63.7
	Urban	65	36.3
Education	Graduate	6	3.4
	Higher Secondary	16	8.9
	Illiterate	51	28.5
	Middle School	44	24.6
	Primary School	48	26.8
	Secondary	14	7.8
Employment	Employed	118	65.9
	Unemployed/Student	61	34.1
Marital status	Married	88	49.2
	Unmarried	91	50.8
Laterality of hearing loss	B/L	68	38.0
	U/L	111	62.0
Duration in months	3-4 months	23	12.8
	4-6 months	49	27.4
	7-9 months	30	16.8
	10-12 months	77	43.0

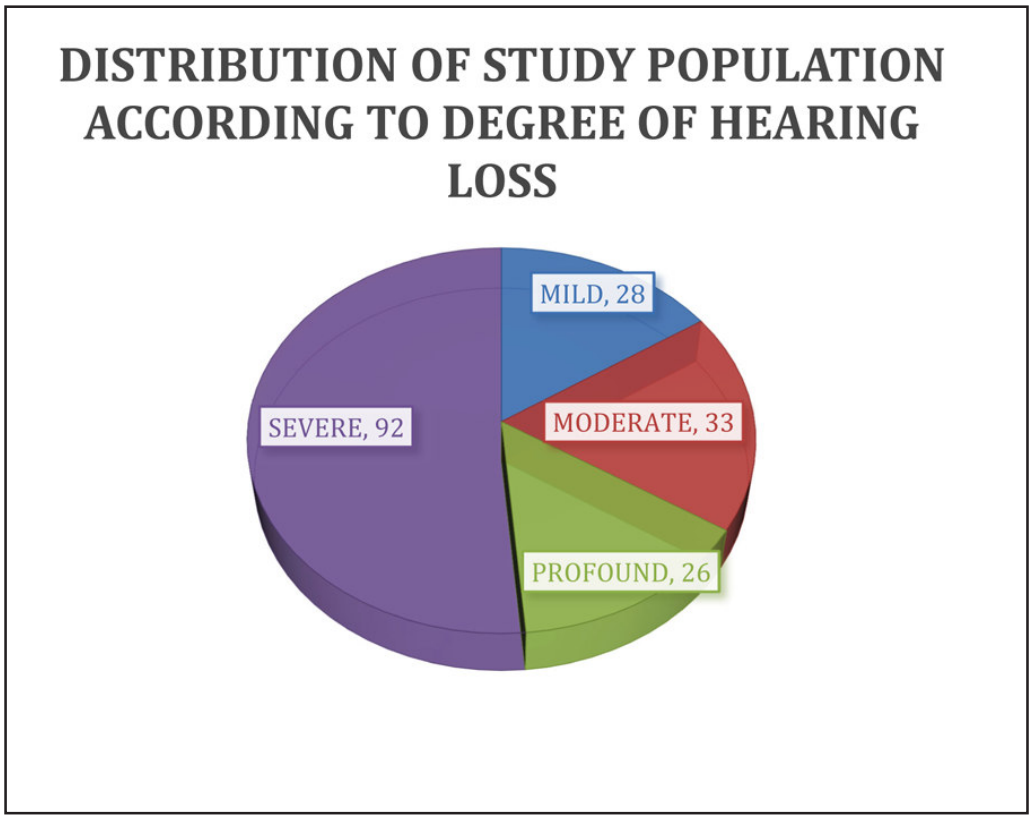

Fig. 1. Distribution of Study Population According to Degree of Hearing Loss (n=179)

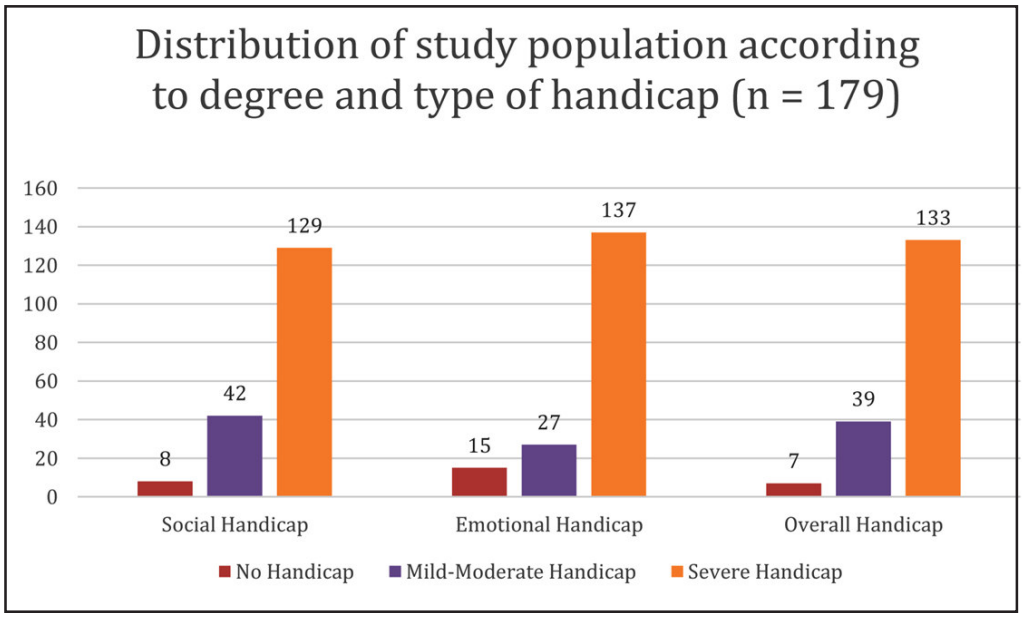

Fig. 2. Distribution of study population according to degree and type of handicap (n = 179)

Table II: Distribution of study population according to degree of social handicap and other variables (n = 179)

VARIABLES		DEGREE OF SOCIAL HANDICAP					
		NO HANDICAP	MILD TO MODERATE	SEVERE HANDICAP	TOTAL HANDICAP	CHI SQUARE VALUE	P VALUE
Sex	Male	7 (5.8%)	19 (15.7%)	95 (78.5%)	121 (100.0%)	13.186	<0.05
	Female	1 (12.5%)	23 (39.7%)	34 (58.6%)	58 (100.0%)		
Residence	Urban	1 (1.5%)	13 (20.0%)	51 (78.5%)	65 (100.0%)	3.062	> 0.05
	Rural	7 (6.1%)	29 (25.4%)	78 (68.4%)	114 (100.0%)		
Employment Status	Employed	5 (4.2%)	26 (22.0%)	87 (73.7%)	118 (100.0%)	0.476	> 0.05
	Unemployed	3 (4.9%)	16 (26.2%)	42 (68.9%)	61 (100.0%)		
Laterality Of Hearing Loss	Unilateral	6 (5.4%)	35 (31.5%)	70 (63.1%)	111 (100.0%)	11.97	< 0.05
	Bilateral	2 (2.9%)	7 (10.3%)	59(86.8%)	68(100.0%)		
Duration Of Symptoms	Upto 6 Months	25 (34.7%)	4 (5.6%)	43(59.7%)	72(100.0%)	9.372	<0.05
	6-12 Month	17 (15.9%)	4 (3.7%)	86(80.4%)	107(100.0%)		

Table III: Distribution of study population according to degree of Emotional handicap and other variables (n = 179)

VARIABLES		DEGREE OF SOCIAL HANDICAP					
		NO HANDICAP	MILD TO MODERATE	SEVERE HANDICAP	TOTAL HANDICAP	CHI SQUARE VALUE	P VALUE
Sex	Male	Male	6 (5.0%)	12 (9.9%)	103 (85.1%)	15.422	<0.05
	Female	Female	9 (15.5%)	15 (25.9%)	34 (58.6%)		
Residence	Urban	Urban	5 (7.7%)	8 (12.3%)	52 (80.0%)	0.739	> 0.05
	Rural	Rural	10 (8.8%)	19 (16.7%)	85 (74.6%)		
Employment Status	Employed	Employed	9 (7.6%)	17 (14.4%)	92 (78.0%)	0.432	> 0.05
	Unemployed	Unemployed	6 (9.8%)	10 (16.4%)	45 (73.8%)		
Laterality Of Hearing Loss	Unilateral	14 (12.6%)	23 (20.7%)	74 (66.7%)	111 (100.0%)	16.12	< 0.05
	Bilateral	1 (1.5%)	4 (5.9%)	63 (92.6%)	68 (100.0%)		
Duration Of Symptoms	Upto 6 Months	14(19.4%)	8(11.1%)	50(69.4%)	72(100.0%)	3.38	> 0.05
		6-12 Month	13(12.1%)	7(6.5%)	87(81.3%)	107(100.0%)	

Table IV: Distribution of study population according to degree of overall handicap and other variables (n = 179)

VARIABLES		DEGREE OF SOCIAL HANDICAP					
		NO HANDICAP	MILD TO MODERATE	SEVERE HANDICAP	TOTAL HANDICAP	CHI SQUARE VALUE	P VALUE
Sex	Male	4 (3.3%)	16 (13.2%)	101 (83.5%)	121 (100.0%)	17.147	<0.05
	Female	3 (5.2%)	23 (39.7%)	32 (55.2%)	58 (100.0%)		
Residence	Urban	2 (3.1%)	13 (20.0%)	50 (76.9%)	65 (100.0%)	0.425	> 0.05
	Rural	5 (4.4%)	26 (22.8%)	83 (72.8%)	114 (100.0%)		
Employment Status	Employed	4 (3.4%)	26 (22.0%)	88 (74.6%)	118 (100.0%)	0.253	> 0.05
	Unemployed	3 (4.9%)	13 (21.3%)	45 (73.8%)	61 (100.0%)		
Laterality Of Hearing Loss	Unilateral	6 (5.4%)	34 (30.6%)	71 (64.0%)	111 (100.0%)	16.359	< 0.05
	Bilateral	1 (1.5%)	5 (7.4%)	62 (91.2%)	68 (100.0%)		
Duration Of Symptoms	Upto 6 Months	5 (6.9%)	19 (26.4%)	48 (66.7%)	72 (100.0%)	4.950	>0.05
	6-12 Month	2 (1.9%)	20 (18.7%)	85 (79.4%)	107 (100.0%)		

A total of 179 patients, aged 18 to 80 years (mean age 51.44 ± 19.12, median 52.0), were included in the study. The demographic and hearing loss characteristics are detailed in Table I. Of the participants, 67.6% (121 out of 179) were male, only 3.4% were graduates, and 28.5% were illiterate. Employment was reported by 65.9%, and 49.2% were married. Bilateral hearing loss was present in 38.0% (68 out of 179), while 62.0% (111 out of 179) had unilateral hearing loss. Furthermore, 43% of participants had experienced hearing loss for 10 to 12 months.

Figure 1 illustrates the severity of hearing loss, categorized according to WHO classification, with audiometric thresholds measured at 500, 1000, 2000, and 4000 Hz. Hearing loss was classified as slight impairment (26 to 40 dB), moderate (41 to 60 dB), severe (61 to 80 dB), and profound (greater than 81 dB.[12]

Regarding audiological findings, 15.6% had mild hearing loss, 18.4% moderate, 51.5% severe, and 14.5% profound, as per Pure Tone Audiometry reports. Figure 2 depicts the classification of HHIA scores into "no handicap" (0–16), "mild to moderate handicap" (18–42), and "severe handicap."

In terms of overall handicap, 3.9% reported no handicap, 21.8% had mild to moderate handicap, and 74.3% had severe handicap. For social handicap, 72.1% reported significant impairment, 23.5% had mild to moderate impairment, and 4.5% had no handicap. Emotional handicap scores revealed that 76.5% had significant impairment, 15.1% had mild to moderate impairment, and 8.4% reported no handicap.

Tables II, III, and IV show the relationships between social, emotional, and overall handicaps with socio-demographic and hearing loss characteristics. Significant associations were found between the degree of social, emotional, and overall handicap and factors such as sex, laterality of hearing loss, and symptom duration.

Discussion

Developed in 1982 by Ventry and Weinstein, the Hearing Handicap Inventory for the Elderly (HHIE) consists of 25

questions and was one of the first tools designed to assess self-perceived hearing handicap in older adults, incorporating social and emotional components.[13] In 1990, Newman et al. modified three questions from the HHIE to create the Hearing Handicap Inventory for Adults (HHIA), making it more suitable for younger individuals.[13]

The HHIA has been widely utilized in studies involving patients with both unilateral and bilateral hearing loss.[7, 11,14,15] However, some authors[14,15] have found this questionnaire inadequate for assessing the handicaps experienced by patients with unilateral sensorineural hearing loss (USNHL). They argue that the HHIA contains very few questions specific to unilateral hearing loss and have added additional questions[14,15,16] to capture a more accurate representation of the handicap faced by these patients. Some studies have exclusively employed this tool on patients with USNHL[3,17]

Our study included participants aged 18 to 80, with both bilateral and unilateral deafness lasting more than 3 months. The results align with findings from various studies. For instance, a study by R. Sood among the Himalayan population[17] reported an overall mean score of 52.21 (SD 25.20, median 56). The social scale mean was 26.21 (SD 12.65, median 26), while the emotional scale mean was 25.97 (SD 13.82, median 26). In contrast, our study yielded an overall mean score of 65.98 (SD 24.9, median 78.00), with a social scale mean of 31.84 (SD 12.27, median 36.00) and emotional scores averaging 34.13 (SD 13.998, median 40.00).

In terms of overall handicap 21.8% of participants fell within mild – moderate category while 74.3% were categorized as significant, and the remaining participants reported in no handicap zone. For social handicap 23.5% were in the mild- moderate range and 72.1% experienced significant impairment. In the emotional handicap category, 15.1% were mild to moderate, while 76.5% reported significant impairment. A similar study conducted in South India[3] assessed psychosocial and auditory handicaps in patients with USNHL, revealing that 54.4% showed no handicap, 30.4% had mild to moderate handicap, and 15.2% had a severe handicap. This study also found that the mean emotional subscale score was significantly higher than the mean social subscale score. They did not observe any influence of age, sex, education, occupation, income, side of hearing loss, or duration of hearing loss on their findings. Even the study on Indian population of North India[17] no significant correlation of degree of handicap with age, duration, and degree of hearing loss.

Conversely, our study demonstrated a significant association between the degree of social, emotional, and overall handicap with factors such as sex, laterality of hearing loss, and duration of symptoms. Some research indicates that more educated and employed individuals may experience a higher degree of handicap due to greater social demands and interactions; however, our findings revealed no significant difference in emotional and social handicap (see Tables II and III). This may be attributed to the lower educational status and rural background of most participants. (Table I)

In the study by Dalton DS,[18] it was se 28% had mild, 24% had moderate to severe hearing loss. Severity of hearing loss was significantly associated with having a hearing handicap and with self-reported communication difficulties. Individuals with moderate to severe hearing loss experienced reduced quality of life, particularly in both physical and mental health components. In our study participants had hearing loss in the category 15.6% mild, 18.4% moderate, 51.5% severe, and 14.5% were in the profound hearing loss range. Although in our study we have not measured quality of life but the proportion of emotional, social, and overall severe handicap necessitates further study to measure quality of life in these population.

Another study by Nuesse T,[19] it was reported that Pure-tone hearing loss was the strongest predictor, accounting for 29% of variance in HHIE/A scores. Additional factors like frailty, mental health, and willingness to use hearing aids also significantly influenced self-perceived handicap. Thus, our study supports the conclusion[20] that hearing impairment negatively impacts well-being and is a major contributor to years lived with disability.

Conclusion

This study highlights the significant social and emotional challenges faced by individuals with hearing loss, revealing that a substantial proportion experience severe handicaps in both areas. The findings indicate that hearing loss impacts not only auditory function but also overall quality of life, leading to feelings of isolation, frustration, and emotional distress. Demographic factors such as sex, the laterality of hearing loss, and the duration of symptoms were strongly associated with the degree of social and emotional handicap, emphasizing the need for personalized interventions.

Effective rehabilitation must address both the social and emotional dimensions of hearing loss. Comprehensive strategies, including counseling, emotional support, and the use of hearing devices, are essential for improving overall well-being. Early identification and proactive management can prevent or alleviate the challenges associated with hearing loss, enhancing patients' quality of life.

Ultimately, this study underscores the importance of a holistic approach to managing hearing loss, integrating medical and psychological support to foster social engagement and emotional resilience. By prioritizing tailored interventions that address the unique needs of each patient, we can significantly enhance their ability to cope with the challenges posed by hearing loss and promote a more inclusive and supportive environment.

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Main Article

An Observational Study on Functional Outcomes of Tympanoplasty with Canal Wall Down Mastoidectomy in Chronic Otitis Media

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ABSTRACT

Introduction

Chronic active otitis media - squamous variety is a disease characterized by chronic inflammation of middle ear and mastoid air cells. Advantage of CWDM [Canal Wall Down Mastoidectomy] are complete removal of the disease. This study will focus on this advancement of gain in audiological function following canal wall down mastoidectomy with appropriate tympanoplasty and ossicular reconstruction.

Materials and Methods

It is an Institutional based descriptive observational study with the subjects having Chronic Otitis Media (squamous variety) in the age group of 12 to 65 years, who have been planned to undergo single stage reconstruction after CWDM. The results of pure tone audiometry done were analysed by SPSS (version 27.0)

Results

The most common age distribution of patients with chronic otitis media in 30-42 years (52.5%). The most common sex affected male (55%). In the pre-operative Air Bone Gap, number of patients in d" 25 decibel, 26-40 decibel and 41-60 decibel were 5, 33, 2 respectively whereas in post-operative it was 25, 15, 0 respectively. There was a gain of 6.899 decibel between pre-operative mean air bone gap & post-operative mean air bone gap.

Conclusion

CWDM is a safe and effective surgical procedure and is a preferred procedure in current otological practice. There was a gain in pre-operative and post-operative air bone gap. A modest closure of air bone gap can be expected helping the patient to achieve social hearing levels.

Keywords

Tympanoplasty; Audiometry, Pure-Tone; Mastoidectomy; Hearing loss; Otitis media: Cholesteatoma; Malleus; Incus; Prostheses; Cartilage

Hearing is one of the five senses. The ear is the one which functions not only as the hearing organ but also as a balancing organ. Proper hearing leads to an active and robust form of communication which may be hampered by various factors impending the hearing process.

One such pathology is Chronic active otitis media-squamous variety a disease characterized by chronic inflammation of middle ear and mastoid air cells with Cholesteatomas/ granulation causing erosion of the ossicular chain and middle ear cleft. Patients usually present with chronic or recurrent ear discharge which may be foul smelling and progressive hearing loss, which can eventually lead to thickening of the middle-ear mucosa and mucosal polyps consistent with the study by Meyerhoff et al on pathology of chronic otitis media.[1]

Chronic Otitis Media results from persistent atelectasis or tympanic perforation, recurrent infection, and chronic

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effusion. Granulation tissue may be soft or fibrous, contain cholesterol or haemorrhage, and may coexist with Cholesteatomas. Cholesteatomas are stratified squamous epithelial masses with exfoliated keratin.

There are four major theories that help explain the aetiology of this disease. The first is the squamous metaplasia theory, which suggests that inflammation causes the mucosal lining of the middle ear to become hyperproliferative. The second major theory postulates that squamous epithelium from the outer layer of the tympanic membrane migrates through a perforation through the drum and into the middle ear. Basal hyperplasia theory is the third theory, which assumes that basal cells of the tympanic membrane proliferate and move medially through the basement membrane into the middle ear. The fourth and final theory is the retraction pocket theory, So much so, in fact, that cholesteatoma resulting from a retraction pocket is named primary acquired cholesteatoma.[2,3] A secondary acquired cholesteatoma is formed by infection, trauma, or surgical manipulation causing implantation of skin into the middle ear through a defect in the eardrum.

Yorgancilar et al[4] published about complications are related to bony erosion or deformity that may involve the Scutum, ossicles, mastoid, tegmen tympani, sigmoid sinus plate, facial nerve canal, or lateral semi-circular canal (e.g., labyrinthine fistula) rare intracranial complications include meningitis, abscess formation, venous sinus thrombosis, and cerebrospinal fluid rhinorrhoea.

Other causes of conductive hearing loss in chronic otitis media (without Cholesteatoma) include ossicular erosion (e.g., incus, stapes), ossicular fixation and tympanosclerosis.

High resolution computed tomography is a useful imaging modality for cholesteatomas. It depicts the bony and soft tissue involvement of the mastoid–middle ear complex, associated ossicular/facial canal erosions and integrity of the tegmen tympani. However, it cannot differentiate between granulation/scar tissue and cholesteatomatous tissue.[5,6]

Magnetic Resonance Imaging with Diffusion Weighted Imaging can prevent unnecessary revision surgery in patients who are suspected of having recurrent or residual disease.[7] Restricted diffusion assists in distinguishing Cholesteatomas from other inflammatory masses (e.g., granulation)

The purpose of our study is to analyse the improvement in hearing or the functional outcome of tympanoplasty in canal wall down mastoidectomy in chronic otitis media using the available database of pure tone audiometry results.

Materials and Methods

An Institutional based descriptive observational study undertaken in a tertiary care hospital over a period of eighteen months (January 2021 – June 022). After obtaining due permission from the Institutional Ethics Committee and the hospital authority, the source of data was the hospital records.

Inclusion criteria: All patients with Chronic Otitis Media (squamous variety) in age group > 12years and < 65years, who have been planned to undergo single stage reconstruction after Canal Wall Down Mastoidectomy.

Exclusion criteria: Chronic Otitis Media mucosal type, Chronic Otitis Media with intra cranial complications, History of previous surgery or revision surgery, malignancy of external and middle ear, patients age < 12years or > 65years, sensorineural or mixed hearing loss.

Patient selection was done among those attending the Otorhinolaryngology outdoor or getting admitted in the Indoor department with diagnosis of Chronic Otitis Media (Squamous disease) willing to undergo Tympanoplasty with canal wall down mastoidectomy and all the patients during the study period fulfilling the inclusion and exclusion criteria were included in the study. Thus, a total of 40 patients were in the study.

Statistical analysis plan. The data from pure tone audiometry were entered into a Microsoft excel spreadsheet and then analysed by SPSS (version 27.0; SPSS Inc., Chicago, USA). Descriptive statistics were performed to find frequency, percentage and mean. The data were collected using predesigned schedule. The study variables were the age, gender, results of pure tone audiometry, air-bone gap.

Disease load of hearing loss estimated by World Health Organisation (2023).[8]

Over 5% of the world's population – or 430 million people – require rehabilitation to address their disabling hearing loss (including 34 million children). It is estimated that by 2050 over 700 million people – or 1 in every 10 people – will have disabling hearing loss.

Disabling hearing loss refers to hearing loss greater than 35 decibels in the better hearing ear. Nearly 80% of people with disabling hearing loss live in low- and middle-income countries. The prevalence of hearing loss increases with age, among those older than 60 years, over 25% are affected by disabling hearing loss.

Result

Table I: Pre-Operative Pure Tone Audiometry with groups

	PRE-OPERATIVE PURE TONE AUDIOMETRY LESS THAN OR EQUAL TO 25 = 1, 26 - 40 = 2, 41 - 60 = 3, GREATER THAN OR EQUAL TO 60 = 4				TOTAL
	≤25	26-40	41-60	>60	
CWDM with type III tympanoplasty with Partial Ossicular Replacement Prosthesis (PORP) (Group A)	0 (0%)	5 (38.4%)	7 (53.8%)	1 (7.8%)	13 (100%)
CWDM with type III tympanoplasty with cartilage (Group B)	0 (0%)	7 (38.9%)	10 (55.6%)	1 (5.5%)	18(100%)
CWDM with type IV tympanoplasty with Total Ossicular Replacement Prosthesis(TORP) (Group C)	0 (0%)	3 (33.3%)	4 (44.4%)	2 (22.3%)	9 (100%)
Total	0 (0%)	15 (37.5%)	21 (52.5%)	4 (10%)	40 (100%)

Table II: Pre-Operative Air Bone Gap

	PRE-OPERATIVE AIR BONE GAP			TOTAL
	≤25	26-40	41-60	
Canal Wall Down Mastoidectomy with type III tympanoplasty with Partial Ossicular Reconstruction Prosthesis (Group A)	1 (7.7%)	11 (84.6%)	1 (7.7%)	13 (100%)
Canal Wall Down Mastoidectomy with type III tympanoplasty with cartilage (Group B)	3 (16.7%)	15 (83.3%)	0 (0%)	18 (100%)
Canal Wall Down Mastoidectomy with type IV tympanoplasty with Total Ossicular Reconstruction Prosthesis (Group C)	1 (11.1%)	7 (77.8%)	1 (11,1%)	99 (100%)
Total	5 (12.5%)	33 (82.5%)	2 (5%)	40 (100%)

Table III: Post-Operative Pure Tone Audiometry

	POST OPERATIVE PURE TONE AUDIOMETRY				TOTAL
	≤25	26-40	41-60	>60	
Canal Wall Down Mastoidectomy with type III tympanoplasty with Partial Ossicular Reconstruction Prosthesis (Group A)	4 (30.8%)	6 (46.1%)	3 (23.1%)	0 (0%)	13 (100%)
Canal Wall Down Mastoidectomy with type III tympanoplasty with cartilage (Group B)	2 (11.1%)	13 (72.2%)	3 (16.7%)	0 (0%)	18 (100%)
Canal Wall Down Mastoidectomy with type IV tympanoplasty with Total Ossicular Reconstruction Prosthesis (Group C)	2 (22.2%)	4 (44.4%)	2 (22.2%)	1 (11.1%)	9 (100%)
Total	8 (20%)	23 (57.5%)	8 (20%)	1 (2.5%)	40 (100%)

Table IV: Post-Operative Air Bone Gap

	POST-OPERATIVE AIR BONE GAP		
	≤25	26-40	TOTAL
Canal Wall Down Mastoidectomy with type III tympanoplasty with Partial Ossicular Reconstruction Prosthesis (Group A)	9 (69.2%)	4 (30.1%)	13 (100%)
Canal Wall Down Mastoidectomy with type III tympanoplasty with cartilage (Group B)	10 (55.6%)	8 (44.4%)	18 (100%)
Canal Wall Down Mastoidectomy with type IV tympanoplasty with Total Ossicular Reconstruction Prosthesis (Group C)	6 (66.7%)	3 (33.3%)	9 (100%)
Total	25 (62.5%)	15 (37.5%)	40 (100%)

Discussion

Canal Wall Down Mastoidectomy is a safe and effective surgical procedure commonly performed for Chronic Otitis Media squamosal type of ear disease and is preferred procedure in current otological practice. Berenholz et al[9] retrospectively studied both partial and total ossiculoplasty in Canal Wall Down cases, Closure of the air-bone gap, complications with focus on hearing results in Canal Wall Down ossiculoplasty. The study revealed that the mean patient age at time of surgery was 38.6 years, with 22 (55%) male and 18 (45%) female

patients. Preoperative audiometric revealed an air-conduction Pure Tone Audiometry of 51.4 decibel, a Bone-conduction Pure Tone Audiometry of 22.0 decibel. Postoperative testing at 6 months revealed an Air conduction Pure Tone Audiometry of 39.1 decibel, Bone Conduction Pure Tone Audiometry of 21.9. In our study, the mean age with Standard Deviation was 35.875 ± 10.028. the age distribution of patients with chronic otitis media in the group 17-29 years was 14 (35%), 30-42 years were 21 (52.5%) and 43-59 years were 5 (12.5%). There was a gain of 6.899 decibel between pre-operative mean air bone gap & post -operative mean air bone gap.

Most commonly used technique of ossiculoplasty involves interposition of reshaped body of incus between stapes superstructure and malleus in cases with necrosis of incus. In our study we found out that the most common ossicular defects in order of frequency are necrosis of long process of incus, loss of incus with stapes superstructure and loss of all ossicles except stapes foot plate which bears resemblance to the outcome of the study conducted by Sanna et al.[10] In our study, stapes superstructure and isolated stapes foot plate were present in 31 and 9 patients respectively. To achieve optimum results, augmentation ossiculoplasty with Canal Wall Down Mastoidectomy is performed in single stage which involves increasing the height of superstructure stapes or stapes foot plate to the level of fallopian canal or above the canal. This technique is performed with the help of reshaped head of malleus or body of incus placed over stapes superstructure. In cases with absence of above bones either Partial Ossicular Reconstruction Prosthesis or piece of conceal cartilage with attached perichondrium may be used for augmentation.

A similar study involving single stage canal wall down tympanoplasty by Lucas Oscar[11] showed that a single-stage canal wall-down tympanoplasty is an appropriate treatment for acquired tympanomastoid cholesteatoma. We used Teflon Partial Ossicular Reconstruction Prosthesis (n = 13) and conceal cartilage with attached perichondrium in our study. In cases with absent stapes superstructure, we used Teflon Total Ossicular Reconstruction Prosthesis (n = 9) placed on stapes foot plate and conceal cartilage sandwiched between Total Ossicular Reconstruction Prosthesis medially and temporal fascia laterally. Another study conducted by Stupp et al[12] on experience with titanium implants in the middle ear in place of Teflon as used in our study Canal Wall Down Mastoidectomy with type III tympanoplasty with Partial Ossicular Reconstruction Prosthesis (Group A), Canal Wall Down Mastoidectomy with type III tympanoplasty with Cartilage (Group B) & also in Canal Wall Down Mastoidectomy with type IV tympanoplasty with Total Ossicular Reconstruction Prosthesis (Group C) showed that the titanium prostheses used proved to be excellent in terms of the material properties as well as in terms of operative handling, the postoperative healing of the implants and, last but not least, the functional hearing results.

In addition to an optimal prosthesis, for hearing success good surgical technique is necessary, which, in addition to safe rehabilitation and reconstruction, also takes into account the functional aspects. Similar study conducted by Kos et al[13] concluded that Canal Wall Down mastoidectomy an adequate solution for the treatment of chronic otitis with cholesteatoma or chronic otomastoiditis that is resistant to conservative treatments. The anatomic and functional results are satisfactory, and the rate of complications is acceptably low. A tympanoplasty can be performed simultaneously. Thus, for the large majority of patients, only a single intervention is required.

Another study conducted by Sheikh et al[15] showed that Ossicular Chain Discontinuity is a common complication. In small/central perforations, the chance of Ossicular Chain Discontinuity is 23%, while in large/subtotal perforations the chance nearly doubles (49.6%). High Air Bone Gap at 1,000 Hertz (>27.5 decibel) and 2,000 Hertz (>17.5 decibel) are the most reliable variables associated with Ossicular Chain Discontinuity. The number of ears with Air Bone Gap between 0 - 20 decibel is improved after surgery in all groups. The number of ears with Air Bone Gap located within 25-40 decibel hearing loss is improved after surgery in Group A.

However, there were considerable limitations while undertaking the present study. There are various factors that have been taken into consideration like age, gender

and ear effected does not depict disease prevalence and incidence in the general population as it only showcases the portion of the people attending the Otorhinolaryngology Outdoor Patient Department and even fewer of them undergoing the necessary treatment. The actual disease prevalence might be much more than anticipated.

Conclusion

Canal wall down mastoidectomy with tympanoplasty is a good surgical procedure for chronic otitis media with Cholesteatoma. A modest closure of the air bone gap can be expected helping the patient to achieve acceptable social hearing levels. These results suggest that the tendency of the postoperative mastoid aeration is dependent on the preoperative middle ear disease.

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The Teeth in the Nasal Cavity

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ABSTRACT

Introduction

Ectopic and supernumerary teeth are sparsely reported. Among the various reported sites, nasal cavity affection is even rarer. This results in easy overlook of such cases. However, it is pertinent to be aware of this entity as it can lead to considerable morbidity which gets relieved only with correct surgery. These patients may get tentatively diagnosed as chronic sinusitis and get wrongly treated with intranasal corticosteroids, systemic antihistaminics and antibiotics. Owing to its rarity and available literature tending to be in the form of case reports and small case series, every such case must be reported so as to create awareness about it and to facilitate a valid statistical analysis.

Case Series

We report a case series of 4 cases of supernumerary teeth that were present in proximity of nasal cavity. The authors of this case series wish to bring out that teeth in the nasal cavities are rare and unaccustomed entity and therefore, although, only 4 cases were encountered, it is pertinent to present these along with review of available literature along with the differential diagnoses.

Discussion

Supernumerary intranasal teeth are an un-accustomed entity. Despite that, it must be kept in mind whenever a unilateral nasal mass is encountered. It's clinical and radiological presentation is quite typical and clinches the diagnosis. Removal of ectopic teeth surely has a potential risk of complications which are preventable with precise planning. Understanding about this entity is, therefore, indispensable by the maxillofacial surgeons and otorhinolaryngologists.

Keywords

Supernumerary teeth; Mesiodens; Nose; Paranasal Sinuses; Ectopic Teeth

Supernumerary teeth (ST) affect 0.1% to 1% of the general population.[1] They are usually asymptomatic and get picked up on routine clinical evaluation or radio-imaging. It is known to affect various sites of maxillo-facial skeleton which includes palate, maxillary sinus, mandibular condyle, coronoid process, facial skin, orbital and nasal cavities.[2] This ectopic tooth eruption within the nasal cavity is a rare occurrence.[3] An intranasal supernumerary tooth is proposed to be an inverted mesiodens (supernumerary tooth in incisor region) growing into the nasal cavity floor.[4] Ectopic teeth are also radio-opaque.[5] So, a diligent clinical examination coupled with appropriate radio-imaging can easily help pick up this rare cause of treatable morbidity.

Case 1:

14 years old female reported for Orthodontic consultation for her malposed dentition. Upon history, frequent crusting

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of right nasal cavity and blockage were elicited. Clinical examination revealed a bony hard projection in right nasal cavity, not clearly visible on headlight examination (Fig 1a). Orthopantomogram (OPG) and Cone beam Computed tomogram (CBCT) were ordered, which revealed a supernumerary tooth mimicking maxillary canine which was partially erupted in the right nasal cavity (Fig 1b). Right maxillary canine was also impacted but the direction was labial with feasibility for orthodontic traction to bring the same in occlusion. The treatment plan devised included extraction of supernumerary tooth followed by surgical exposure of right maxillary canine with fixed mechanotherapy. Since the supernumerary tooth was partially erupted in the nasal cavity, a trans-nasal extraction was planned under general anaesthesia (GA) (Fig 1c). An endoscopic guided extraction was performed since the root of the canine was long measuring about 15mm delivering the tooth out (Fig 1d). Merocel pack was placed in right nasal cavity to ensure hemostasis which was removed on the following day.

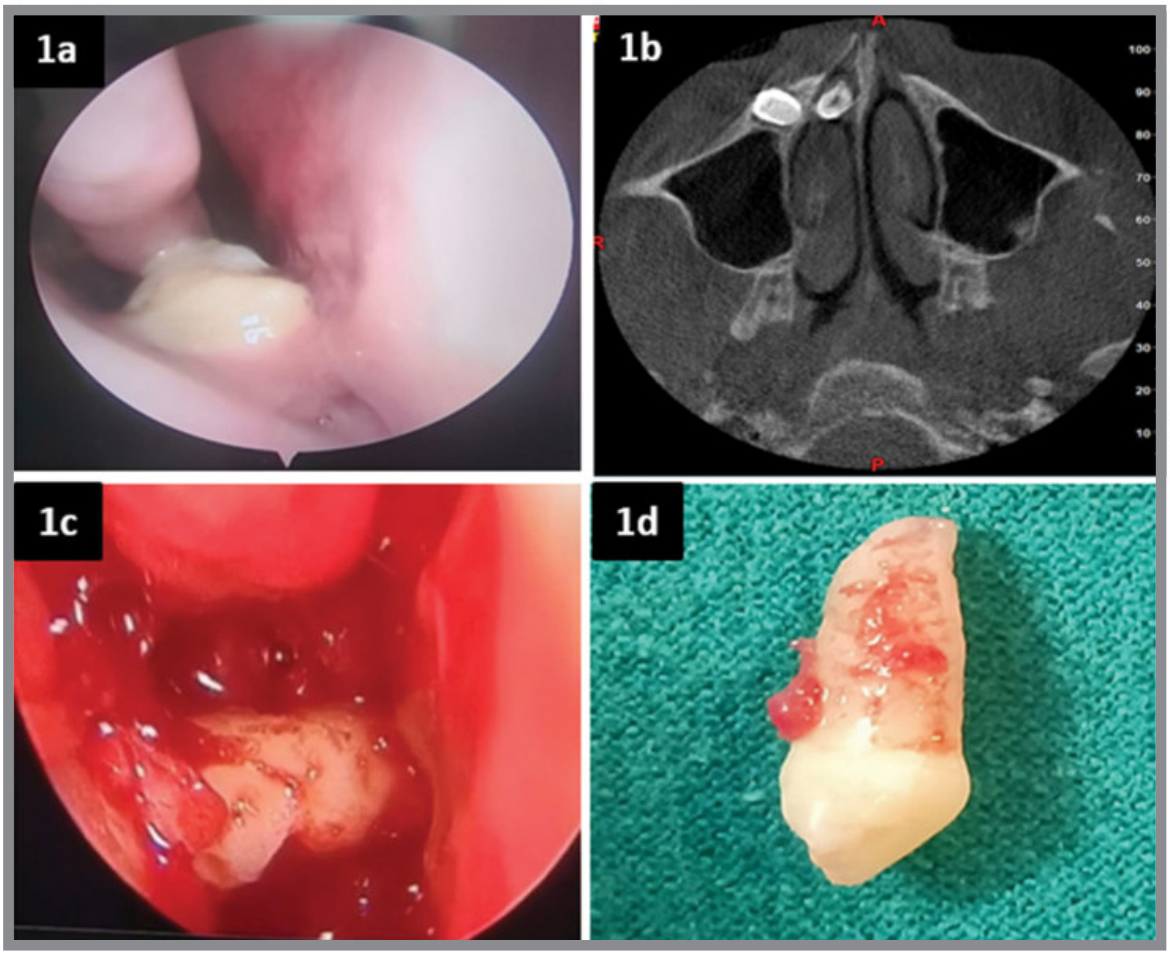

Fig. 1. (a) **Endoscopic view of partially erupted tooth in right nasal cavity**
Fig. 1. (b) **Non Contrast Computed Tomogram of face and paranasal sinuses (axial section) showing intranasal location of tooth**
Fig.1. (c) **Endoscopic view of luxated tooth in the right nasal cavity prior to its delivery**
Fig. 1. (d) **Extracted supernumerary tooth**

Case 2 :

30 years old male, renal transplant recipient, presented with discomfort in the upper labial sulcus region in the midline of 1 month duration. Clinical examination revealed missing upper left central incisor (21) and retained deciduous left lateral incisor. Radiovisiographic examination revealed missing 21 and a radio-opaque mass in the midline (Fig 2a). CBCT revealed a supernumerary tooth lying horizontally in antero-posterior direction above the palatal vault in relation to the nasal floor. There was associated radioluscency around the root apex suggestive of infection which was probably the cause of individual's discomfort. Treatment plan of intra-oral vestibular approach with elevation of nasal floor to expose and extract the ST under GA was made and executed accordingly (Fig 2b). Trans-oral guttering was done followed by tooth luxation (Fig 2c). Closure was done using mattress sutures (Fig 2d). Post-operative period was uneventful.

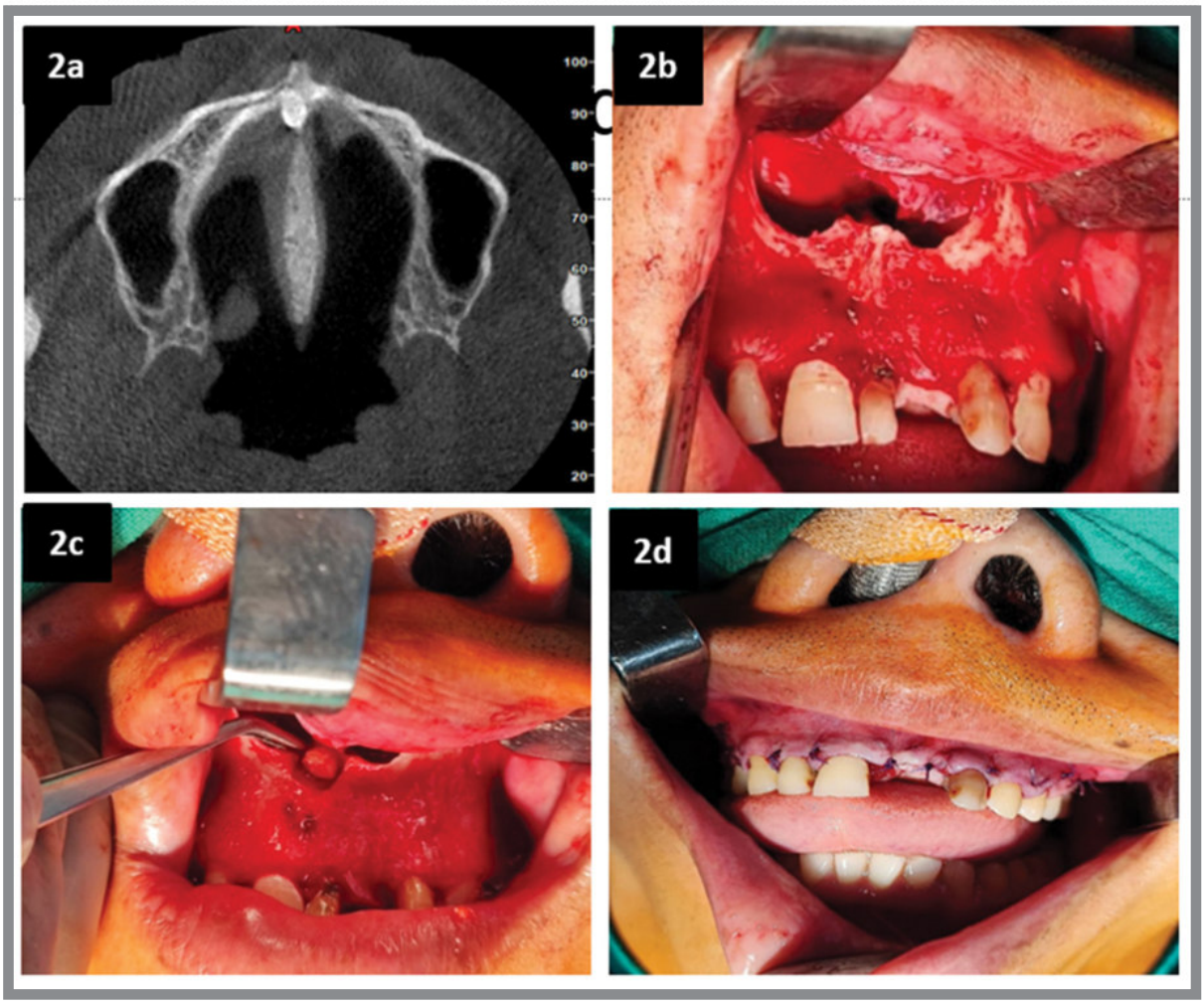

Fig. 2. (a) **Non Contrast Computed Tomogram of face and paranasal sinuses (axial section) showing centrally placed nasal tooth**
Fig. 2. (b) **Intra-oral vestibular approach with elevation of nasal floor to expose the tooth**
Fig. 2. (c) **Trans-oral guttering and luxation of tooth**
Fig. 2. (d) **Closure using mattress sutures**

Case 3 :

21 years old male referred from peripheral health centre for evaluation of mass in left nasal cavity. Upon clinical examination bony hard tissue was visualized. Radio-visiographic examination revealed the mass to be a mesiodens. Tran-nasal extraction of same was performed under local anesthesia. Anterior nasal pack was placed in nasal cavity for a day. Post-operative healing was uneventful.

Case 4 :

37 years old female reported with dull pain and fullness in relation to upper left labial vestibular region with missing left maxillary canine and retained deciduous left maxillary canine. CBCT revealed an impacted canine placed in proximity of left lateral wall of pyriform aperture along with a radiopaque mass suggestive of odontome. Case was managed under GA using envelope flap extending from right maxillary canine to left maxillary first molar for wide exposure. A gutter was created, odontomes were removed and impacted canine was sectioned for ease of delivery. However, the apical portion of the root got dislodged into nasal cavity and was lost from vision. Utilizing the wide exposure, nasal mucosa was elevated from anterior nasal spine to left lateral pyriform wall, the dislodged stump was visualized and retrieved. Post-op healing was uneventful.

Discussion

The commonest locus of supernumerary teeth is between the maxillary central incisors, known as mesiodens. This extra tooth is reported to have an atypical crown (cone-peg or triangular shaped) and may be found in a vertical, horizontal or inverted position. Mesiodens may occur singly or in pairs and may be erupted, impacted or inverted. It can grow and appear on the palate or may get inverted to enter the nasal cavity. The presence of ectopic tooth in the nasal cavity is a rare phenomenon.[6] Therefore, we aim to present 4 such cases managed by our team. Available literature shows that this entity has a female preponderance of around 2:1.[7] In our reported case series, an equal gender predilection is noticed which is different from the available literature.

The etiology of intranasal teeth is obscure and disputed. Researchers propose that they originate either from a third tooth bed which arises from the dental lamina close to the permanent tooth bud or by splitting of the permanent bud itself .[8] Another mechanism postulated is that they arise as a result of reversion to the dentition of extinct primates who had three pairs of incisors.[8] It is also believed by some that the ectopic growth is attributable to obstruction during eruption of teeth which is due to crowded dentition, persistent deciduous teeth or anomalous dense bone.[9] Other suggested causative variables are genetic predisposition, anatomical variations like cleft palate; rhinogenic or odontogenic infections; and displacement consequent to cyst or trauma.[9]

Intranasal supernumerary teeth may remain asymptomatic or produce a spectrum of symptoms and signs like unilateral nasal congestion or obstruction, recurrent epistaxis, headache, facial pain, cacosmia, foul smelling mucopurulent discharge, nasal crusts, nasolacrimal duct obstruction and external nasal deformity.[2] These cases may get complicated by development of rhinitis caseosa with septal perforation, naso-oral fistula and aspergillosis.[10] In our reported case series, the predominant symptoms are unilateral nasal blockage, frequent crusting, dull aching pain and sense of fullness around the labial sulcus.

The diagnosis of a nasal tooth is essentially clinico-radiological. Grossly, it may appear as a well differentiated tooth in the nasal cavity which may be covered with debris or granulation tissue. Radiographically they appear radio opaque with same attenuation as that of oral teeth. In computed tomogram (CT) (bone window) the pulp cavity is seen as a central radiolucency appearing as a spot or a slit depending upon the tooth's orientation.[11] The differential diagnoses offered for a nasal tooth are radiopaque foreign body; rhinolith; bony sequestra; exostosis; inflammatory diseases like syphilis, tuberculosis or fungal infection with calcification; benign tumors like hemangioma, osteoma, calcified polyps, enchondroma and dermoid; and malignancies like chondrosarcoma and osteosarcoma. The CT findings of tooth-equivalent

attenuation along with a central cavity within a lesion are highly suggestive and discriminating features that confirm of the diagnosis of intranasal tooth.[11]

An intranasal tooth should be addressed only when symptomatic. If asymptomatic, it must be radiologically observed.[12] The surgery involves extraction either transorally utilizing envelope flap or vestibular approach, transnasally or transpalatally which will cause alleviation of symptoms and prevents complications. Chronologically the most appropriate time for the surgical intervention is after the roots of permanent teeth have completely formed, to avoid injury during their development. If there is a bony socket visualized in the nasal floor, extraction may be extremely challenging. If the scenario is complicated by a concomitant osteomyelitis, an intraoral fistula or a septal deviation, then other approaches also encompassing debridement and septoplasty will be essential. In our experience it is always prudent to utilize the trans oral approach with lifting of nasal mucosa in case there is no breach of it, or when the tooth is large in size. The said approach provides wide exposure, direct visualization and ease of instrumentation. In trans- nasal extractions, endoscope should be utilized as it offers the advantages of better illumination and visualization, along with precise dissection, however constraint of space with limited instrumentation is a challenge with this approach.[13]

Conclusion

Supernumerary intranasal teeth are rare. Despite that, it must be kept in mind whenever a unilateral nasal mass is encountered. It's clinical and radiological presentation is quite typical and clinches the diagnosis. Removal of ectopic teeth surely has a potential risk of complications which are preventable with precise planning. Understanding about this entity is, therefore, indispensable by the maxillofacial surgeon and otorhinolaryngologist.

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Case Report

Paediatric Parameningeal Alveolar Rhabdomyosarcoma in the Nasal Cavity

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ABSTRACT

Introduction

Rhabdomyosarcoma is the second most common malignant soft tissue tumor, which is of skeletal muscle in origin. Alveolar subtype of rhabdomyosarcoma is commonly seen in 10-25 years of age. We present a rare case of alveolar rhabdomyosarcoma in a one-year-old child.

Case Report

A one-year-old boy presented with swelling and nasal discharge in the left nasal cavity of two months duration. Examination showed a smooth pink-coloured mass in the left nasal cavity arising from the lateral wall. Fine needle aspiration cytology, biopsy, imaging studies and immunohistochemistry were done and a diagnosis of alveolar rhabdomyosarcoma confirmed. Treatment was done by chemoradiation.

Discussion

Biopsy and immunohistochemistry are the gold standard investigations for rhabdomyosarcoma. It requires a multimodal treatment approach comprising surgery, chemotherapy, and radiotherapy.

Keywords

Rhabdomyosarcoma; Paediatric Malignancy; Para Meningeal; Alveolar; Nasal Cavity

Weber first described Rhabdomyosarcoma (RMS) in 1854. It is primarily a paediatric soft tissue malignancy that derives from mesenchymal cells associated with skeletal muscle differentiation.[1] Until 1946 histologic definition was not available, later Stout recognized the distinct morphology of rhabdomyoblasts.[2] It is a rare tumour with an overall incidence of 0.034 cases per 100000 population.[3] The most common sites of involvement of RMS are the head and neck, genitourinary tract, retroperitoneum, and extremities.[4] Regional lymphatic disease is seen in 8% of the affected patients and metastatic disease is present in 13%, the most common sites being the bone marrow, cerebrospinal fluid, peritoneal fluid, and lung.[5]

These tumours are categorized by the Intergroup Rhabdomyosarcoma Study (IRS) into embryonal, alveolar, pleomorphic, and mixed types. Embryonal type represents the most common in both children and adults, the alveolar type occurs primarily in the teenage and young adult populations.[6] We present a rare case of parameningeal alveolar rhabdomyosarcoma in the nasal cavity presenting in a one-year-old child.

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Case Report

A one-year-old boy presented with swelling and nasal discharge in the left nasal cavity of two months duration. On examination, a smooth pink-colored polypoidal mass was seen in the left nasal cavity possibly from the lateral wall pushing the inferior turbinate and septum to the opposite side. There was fullness in the left cheek area causing facial asymmetry [Figure1]. The left side gingivolabial sulcus was obliterated. No lymph nodes were palpable in the neck region.

Fig. 1. Mass seen in left nasal cavity and obliteration of left nasofacial fold.

Contrast-enhanced Computed Tomography (CECT) showed a well-defined lobulated lesion of 2.7*2.4*2.5cm in the left nasal cavity showing moderate heterogeneous central and rim enhancement, causing bony erosion of frontal process of the left maxilla, alveolar process of the maxilla at the level of left central and lateral incisors and also the left inferior turbinate. [Figure 2].

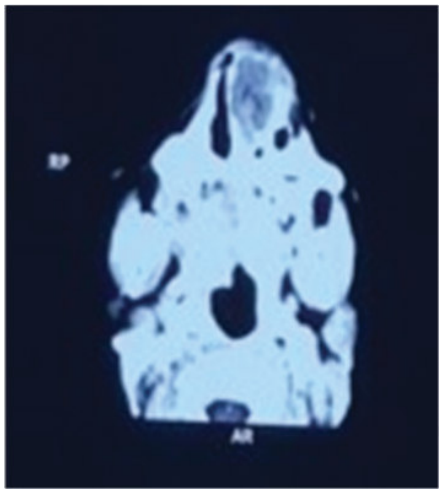

Fig. 2. CECT (axial cut) showed well-defined lobulation in the anterior aspect of the left nasal cavity

Fine needle aspiration cytology (FNAC) of the lesion showed small round cells arranged as clusters with occasional rosette formation [figure 3]. Later an incisional biopsy of the mass was done and it showed sheets of small round blue cells with hyperchromatic nuclei and cytoplasm with varied morphology including nests, trabeculae, and stroma showing fibro myxoid areas giving alveolar pattern [figure 4]. The histopathology report was suggestive of rhabdomyosarcoma.

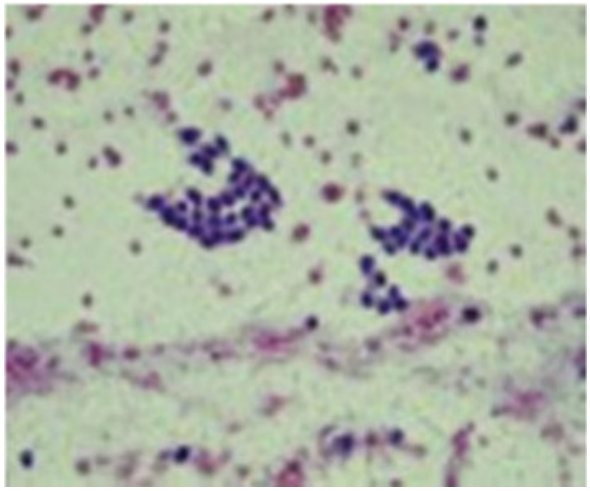

Fig. 3. FNAC using Papanicolaou stain (100X magnification) showed small round cells arranged as clusters with occasional rosette formation.

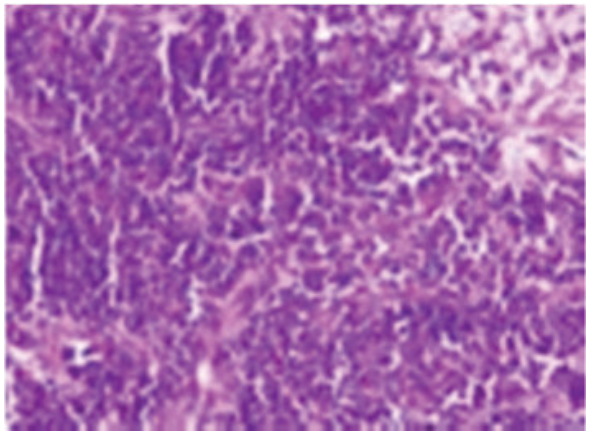

Fig. 4. Histopathological analysis of the hematoxylin and eosin-stained material showed clusters of small round blue cells [100X magnification]

Diagnosis of parameningeal alveolar rhabdomyosarcoma was confirmed with immunohistochemistry (IHC)which was strongly positive for tumor markers like Desmin, Myogenin, and CD99. A metastatic workup done by Technetium-99 Methylene diphosphate bone scan showed no metastasis.

He was referred to the Pediatric Oncology Department, and the proposed treatment plan was a combination of chemotherapy and external beam radiotherapy. Surgery was refused by the parents, even though a multimodal treatment including surgery was advised. There was a considerable reduction in the tumour size after 4 cycles of chemotherapy and radiation therapy with improvement in the general well-being of the child.

Discussion

RMS more commonly occurs in children aged between 1-4 years and 10–14 years.[7] The incidence of RMS is 1.5 times higher in males than females and its incidence has risen over the past 3 decades by an average annual increase of 1.16%.[8]

Within the head and neck region, RMS is divided into three types based on anatomical distribution: orbital, parameningeal and nonorbital. Parameningeal type involves pterygopalatine, infratemporal fossa, paranasal sinuses and middle ear. These are associated with poor prognosis. The alveolar type occurs primarily in the teenage and young adult population with a prognosis worser than embryonal type.[9] Our patient was a one-year-old boy with left parameningeal alveolar type RMS in the nasal cavity which is rare in this age.

Incisional biopsy showed small round cells with scanty cytoplasm, clumped chromatin, arranged as small nests with fibrous septae involving alveolar pattern with a non-distinct histological presentation making it difficult to diagnose the subtypes. This diagnostic dilemma was overcome by IHC testing. So, it's a challenge to diagnose RMS, both clinically and histologically, due to its versatile appearances. IHC has provided diagnostic techniques that add value to the histologic diagnosis of RMS, with anti-desmin staining in 94%, 77% positive for desmin and 78% positive for muscle-specific actin.[8] Here the IHC was strongly positive for Desmin, Myogenin, and CD99, and got a confirmatory diagnosis of alveolar RMS. Most alveolar tumors are strongly positive for myogenin, whereas embryonal tumors often exhibit positivity to a lesser degree, which agrees with the IHC results of the present case.[10,11]

Staging of RMS is commonly based on the IRS classification, which incorporates the extent of disease with metastases and surgical results. It was also recommended by the Intergroup Rhabdomyosarcoma Study Group (IRSG) that staging systems for this disease require ongoing analysis to confirm prognostic correlation with stage. Risk stratification of children with RMS is done utilizing the tumor, node, metastasis (TNM) staging (I to IV) and clinical groupings based on embryonal versus alveolar subtypes. Further they are classified into low-risk (TNM stage I embryonal/clinical stage I–III, TNM stage II–III embryonal/clinical stage I–II), intermediate-risk (TNM stage II–III/clinical stage III, nonmetastatic alveolar) and high-risk (metastatic any subtype). This child is categorized as intermediate risk due to alveolar subtyping in histopathology.

A multidisciplinary approach to the management of RMS with surgery, radiotherapy, and chemotherapy has improved the prognosis in the current medical literature reporting a five-year survival rate of 74–77%.[1,2] Patients with alveolar RMS present with regional and distant metastases and have a higher recurrence rate and poorer survival than patients with the embryonal or botryoid subtype.[12] Infiltration of the skull base and the presence of a residual tumor after primary therapy have also been associated with an unfavorable clinical course.[13] This child got induction chemotherapy with vincristine, actinomycin and cyclophosphamide (VAC regime) followed by radiation therapy. Surgery is indicated to debulk the tumor and should be done when not associated with functional or cosmetic deformity.

Conclusion

Alveolar RMS is unusual in children of age less than 2 years and more common in teenagers. The involvement of parameningeal sites is clinically significant because it

carries the risk of involvement of the skull base and/or intracranial extension, which confers para meningeal RMS a poorer prognosis. Metastasis is a very poor prognostic factor in RMS, decreasing the survival rate from 40% to 5%, so it is of the utmost importance to detect metastasis at the earliest. In this report, we highlight the importance of maintaining a high index of suspicion for uncommon pediatric malignancy in children with unilateral sinus symptoms and the paramount importance of immunohistochemistry in fetching the final diagnosis, which helps in proper management of the tumor. An increased awareness among otorhinolarygologists will help in early detection and timely intervention for this condition.

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Case Report

An Ancient Schwannoma of Hard Palate

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ABSTRACT

Introduction

Schwannomas are the most common benign nerve sheath tumours arising from Schwann cells. Intraoral schwannomas are rare and most common site and in oral cavity hard palate is a very rare site.

Case Report

Here we present a 16 year old boy who presented with a hard palate swelling of 6 month duration. Cytology was negative and completely excision was done. Histopathology proved as ancient schwannoma. He was followed up for 1 year with no signs of recurrence.

Discussion

Any schwannoma with the histologic degenerative changes and cytologic atypia is known as ancient schwannoma. Treatment of this neoplasm is surgical excision with very low rate of recurrence. Malignant transformation has not been described for the ancient variant of schwannoma.

Keywords

Neurilemmoma; Hard Palate; Recurrence; Ancient Schwannoma

Schwannomas are the most common benign nerve sheath tumours arising from Schwann cells. They are typically solitary, well-encapsulated, and slow-growing. They can occur along various nerves, including motor, sensory, sympathetic, and cranial nerves, except for the optic and olfactory nerves which lack schwann cells.[1]

25-40 % of cases are seen in head and neck region.[2] Intraoral schwannomas are rare and most common site in oral cavity is base of tongues, other areas include buccal mucosa ,lip , hard palate and gingiva.[3]

A rare variety of schwannoma is ancient schwannoma which exhibits calcification, cystic degeneration, haemorrhage, myxoid stroma, pleomorphism and nuclear hyperchromatism. Since it bears resemblance with malignancy, it is easily misdiagnosed as malignancy.[4]

Based on previous systematic review on oral ancient schwannoma, it is revealed that average age of occurrence is in second or third decade . There is a female preponderance with male to female ratio of 1:2.[5]

Primary hard palate schwannoma are rare and among that ancient schwannoma of hard palate is quite rare and very few cases have been reported in the literature till date. Here we present an interesting case of ancient schwannoma of hard palate in a 18 year old boy.

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Case report

An 18-year-old male presented with a painless swelling on the right side of his hard palate for 6 months duration. This case is reported after getting an informed consent from patient for publication. The patient developed a small swelling on his palate which was the size of a peanut, 6 months back, it gradually progressed to the current size.

The patient's medical and family history was non-contributory. He did not give history of any recent episodes of high-grade fever, pain or difficulty while swallowing solids/ liquids or any significant weight loss in the recent past.

On examination there was a solitary swelling of size 4x2x2cm on the right side of the hard palate and was covered with a smooth healthy mucosa. On palpation- the surface of the swelling was smooth, and it was firm in consistency, non-tender, with no local rise of temperature.

Fig. 1. Pre operative picture showing lesion on the right side of hard palate

Contrast enhanced Commuted Tomography of Nose and Para nasal sinuses showed a well defined subtly enhancing soft tissue attenuating lesion seen arising from the right side of posterior hard palate measuring 2.1x1.5x1.8cm with mild scalloping of the underlying palate and maxilla.

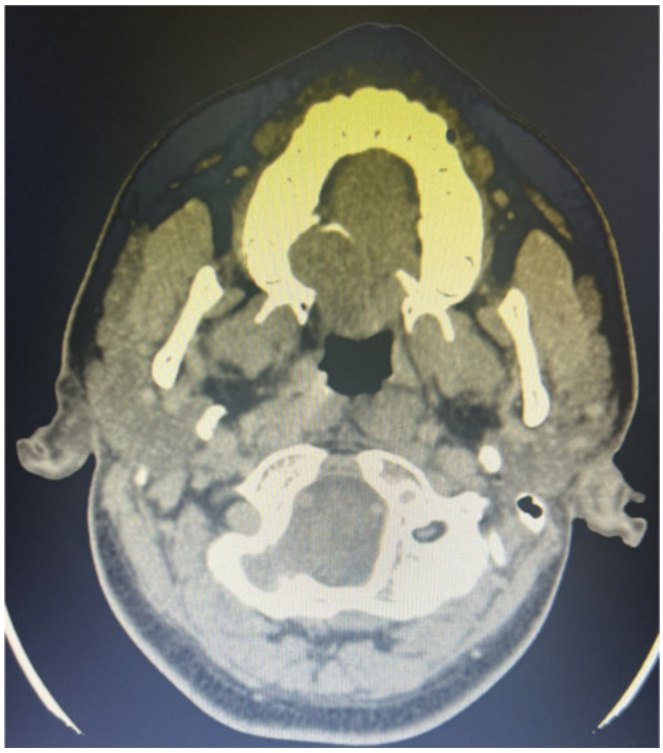

Fig. 2. Showing subtly enhancing lesion on the right side of the palate

Additionally, few subcentemetric level IB lymph nodes were noted with maintained fatty hila. Fine needle-aspiration was performed, it was very painful and no evaluable tumour tissue was obtained.

Based on these data, the most likely diagnosis was considered as palatal tumor originating in minor salivary glands, and complete excision was planned.

The tumor was finally excised via an intraoral approach under general anaesthesia. A linear incision was made anterior to the swelling and posteriorly based mucosal flap was elevated. Tumour was well encapsulated and easily separated from the mucosa. The tumor was separated from the adjacent palatal tissues by careful blunt dissection and complete removal was then accomplished by resection en bloc. The nerve of origin could not be identified.

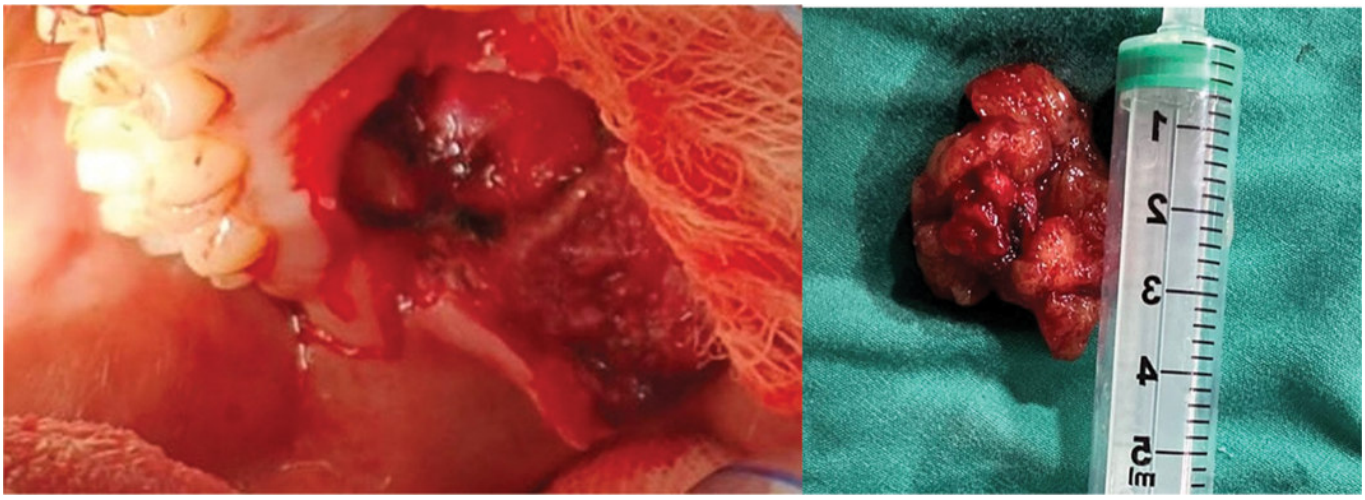

Fig. 3 & 4. Intraoperative picture showing well defined lesion after mucosal elevation and gross specimen

The underlying bone surface was smooth and showed no evidence of compressive resorption. The postoperative period was uneventful.

On gross examination, the resected specimen consisted of a well-circumscribed mass measuring 3.5x2.2x1.2cm. Outer surface appears nodular, cut surface showed a well defined grey white lesion with an area of haemorrhage. Microscopic examination revealed fragments of tissue showing compact hypercellular Antoni A areas and myxoid hypocellular Antoni B areas. Cellular areas showed nuclear palisading around fibrillary process. The cells were narrow, elongated and wavy with taped ends interspersed with collagen fibres. Few areas showed cystic degeneration, haemorrhage and thick-walled blood vessels. Histopathology was suggestive of Ancient schwannoma.

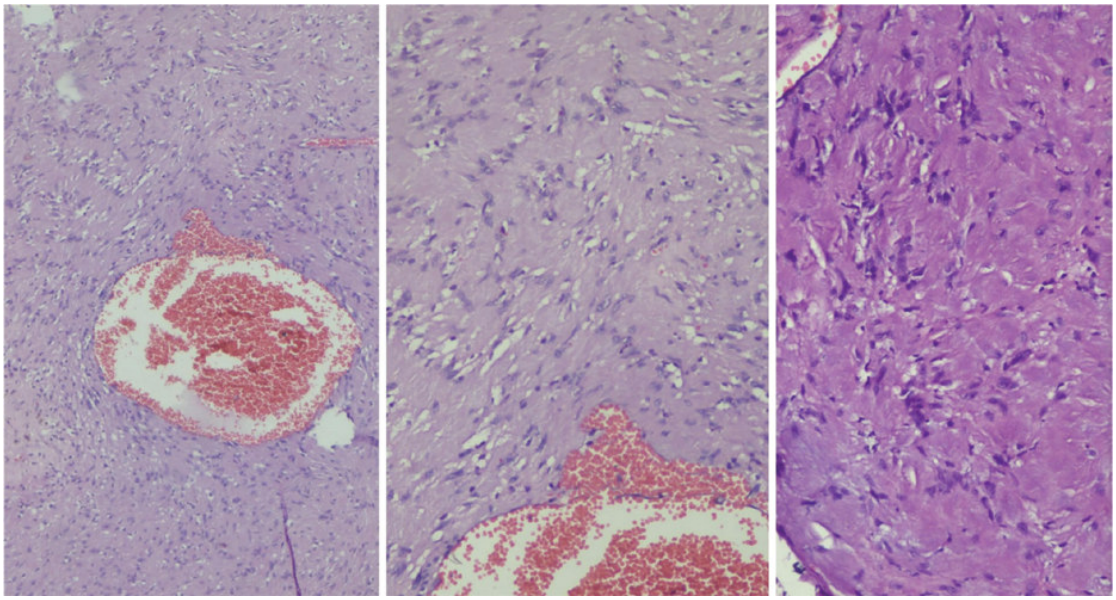

Fig. 5. Histopathology showing Antony A and Antony B cells and degeneration Stain used is eosin and hematoxylin at 10x,20x &20x magnification respectively

Discussion

Schwannoma is also called as neurinoma, neurilemmoma and perineural fibroblastoma.[6] Based on histopathology, five schwannoma variants have been described :common, plexiform, cellular, epithelioid and ancient schwannoma.[7] Ancient schwannoma is one of the rare variant of schwannoma, which has slow growth. The term 'ancient' was proposed to describe a group of neural tumour showing degenerative changes, diffuse hypocellular areas, nuclear hyperchromasia and marked nuclear atypia.[8]

Ancient schwannoma was first described by Eversole and Howell. It was first reported in thorax in 1951 by Ackerman and Taylor.[9] They are rare benign encapsulated tumour of protracted indolent growth , ancient schwannoma denotes extracranial schwannoma, which are solitary and grow to large size.[10]

Intraoral schwannomas are more commonly seen in soft tissues more commonly in tongue. Study conducted by Gallo et al, out of 157 cases reported 45.2% cases involved tongue. Wright and Jackson reported on 146 cases intraoral schwannomas ,among them 52% involved the tongue.[11] Most of the intraoral schwannomas are located in tongue or floor of mouth, hard palate being a rare location.[12]

Atolaiby et al evaluated all neural neoplasm in the oral cavity , which constitutes to 0.2% of all oral specimens. Out of all oral neural specimens, ancient schwannoma accounts for only 0.7% , reflecting the rarity of this pathology.[13]

Most of these patients are asymptomatic and hence they present with long duration and large size. They can experience pain, dysphasia or neurological alteration by the compression of the nerve in case of large sized tumors.

Although according to literature it is long standing and present with large size tumour, our patient presented with only 6 month history of swelling in the hard palate with no other symptoms. Due to short span of presentation with large swelling, differential diagnosis we considered were palatal tumour arising form minor salivary glands and different connective tissue tumours.

Histopathologically schwannoma appears to be made up of two distinct areas: dense areas (Antoni A): These areas contain uniform, elongated cells (spindle cells) with pink cytoplasm (eosinophilic) and oval nuclei. Loose areas (Antoni B): These areas are less populated with cells and have a jelly-like appearance (myxoid). Ancient schwannomas are characterized by degenerative changes, including increased deposition of matrix, perivascular hyalinization, ectatic vessels with thrombus, cystic degeneration, and cellular atypia with paucity of mitosis. These changes are attributed to the long duration of the schwannoma. This altered structure can make diagnosis difficult under a microscope because the usual features of benign nerve sheath tumours may be missing or unclear.[12, 14]

Due to nuclear atypia and hyperchromasia it is often misdiagnosed as malignancy. Dahl in 1977 reported that , out of 11 cases ancient schwannoma, 6 were mis-diagnosed as sarcoma .It has also been misdiagnosed with myxoid neurofibroma and nerve sheath myxoma.[15]

Cytology study by fine needle aspiration of the swelling was done but it did not yield any valid material similar to the first reported case of ancient schwannoma as these lesions have diffuse hypocellularity they are difficult to diagnose by fine needle aspiration cytology.[14, 16]

Contrast enhanced CT scan and MRI are often helpful for diagnosis and also for evaluating the site and extent of the lesion , but exact origin of schwannoma is difficult to know preoperatively. CECT nose and pns was done to our case which revealed subtly enhancing soft tissue arising from posterior part of hard palate and HPE correlation was suggested. MRI was not done in our case. Excisional biopsy was done. According to literature also complete excision of lesion and preservation of the nerve of origin is the expected treatment.[12] Treatment of this neoplasm is surgical excision with very low rate of recurrence.[17, 18]

Malignant transformation has not been described for the ancient variant of schwannoma so far. Although recurrence rate is low, patients have to be kept on regular follow up. This case highlights the importance of recognizing the histologic degenerative changes and cytologic atypia that can be seen in this tumor. By being

familiar with these features, oral pathologists can avoid misdiagnosis and unnecessary treatment.

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Case Report

Ossifying Fibroma with Coexistent Squamous Cell Carcinoma in Maxilla

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ABSTRACT

Introduction

Ossifying fibroma is a rare benign bone lesion characterized by gradual development and asymptomatic presentation, typically affecting craniofacial bones in individuals, particularly females, during their second to fourth decades of life. The concurrent occurrence of oral squamous cell carcinoma (OSCC) with ossifying fibroma is exceedingly rare, with only one previous case reported.

Case Report

We describe a 71-year-old male presenting with a gradually enlarging swelling in the oral cavity, initially treated five years prior for a mandibular fracture. Clinical examination revealed a large swelling in the right maxillary area, and imaging showed a radiolucent lesion with expansile characteristics. Histopathological analysis of the excised tissue initially suggested a benign fibro-osseous lesion. However, upon recurrence, a further biopsy revealed a coexistence of ossifying fibroma and well-differentiated squamous cell carcinoma in the previously affected palatal region.

Discussion

The simultaneous presence of ossifying fibroma and OSCC is extremely rare. This case underscores the importance of thorough diagnostic evaluation and highlights potential associations between trauma and tumor development. Further research is needed to elucidate the relationship between these lesions and improve diagnostic and therapeutic approaches for such rare occurrences.

Keywords

Fibro-osseous Lesion; Maxillary Sinus; Ossifying Fibroma; Oral Squamous Cell Carcinoma

Ossifying fibroma is an uncommon benign bone lesion characterized by its gradual development, asymptomatic presentation, and predilection for affecting craniofacial bones. It is particularly seen in females, during the second and fourth decades of life.[1,2] The simultaneous presence of Oral squamous cell carcinoma (OSCC) with ossifying fibroma is exceedingly rare, and to the best of our knowledge with only one documented case reported by Karube et al.[3] This case report presents a similar co-occurrence of lesions in a 71-year-old male patient.

Case Presentation

Seven months back, a 71-year-old gentleman presented to the hospital with complaints of swelling inside his oral cavity that had developed gradually over the past year. He gave a history of a traumatic fracture of the mandible 5 years back which was treated by internal fixation. Clinical examination revealed a 5 x 3 x 2 cm swelling in the right maxillary area (Fig. 1), extending from the lateral aspect of the nose to the infraorbital region with granular swelling on the palate with erythematous surfaces. The expansion of the swelling had led to enlargement of the buccal cortical plate, obliteration of the vestibule, and distortion of the nasolabial fold.

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Fig. 1. Clinical picture of the initial presentation of the lesion in the oral cavity with a palatal ulcer.

OPG revealed a radiolucent lesion in the right upper jaw (Fig. 2), and he underwent excision under GA at that time. Histopathological examination of the excised tissue revealed a cellular spindle cell neoplasm with low mitotic activity supporting the diagnosis of a benign fibro-osseous lesion.

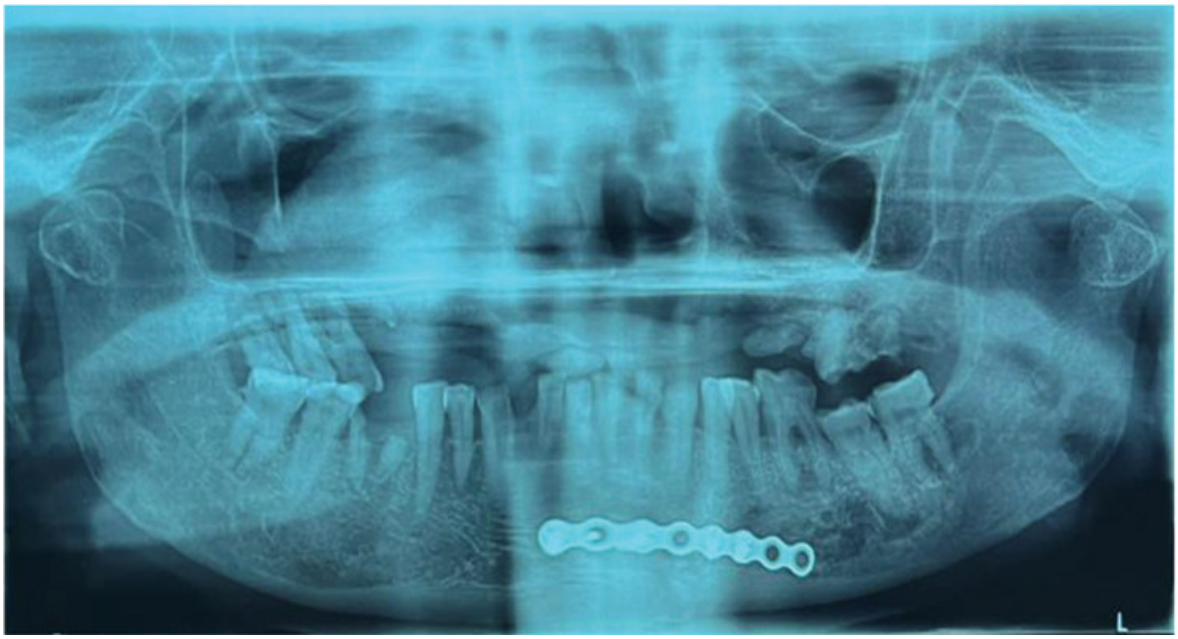

Fig. 2. OPG showing radiolucent lesion in right maxilla.

Now he has presented again with, swelling on the right side of the face. Intraorally, a 4 x 4 cm swelling was identified on the hard palate anteriorly in the prior excision scar region, exhibiting tenderness, a hard consistency, and granular and erythematous surface characteristics. Contrast-enhanced computed tomography (CECT) revealed bony expansion with lytic areas and ground glass attenuation in the right maxilla, extending into adjacent regions. The lesion displayed an expansile pattern involving the anterolateral and posteromedial walls of the right maxillary sinus (Fig. 3). A soft tissue component extended into various surrounding structures, notably the premaxillary soft tissue, gingival mucosa, gingivobuccal sulcus, and gingivolabial sulcus.

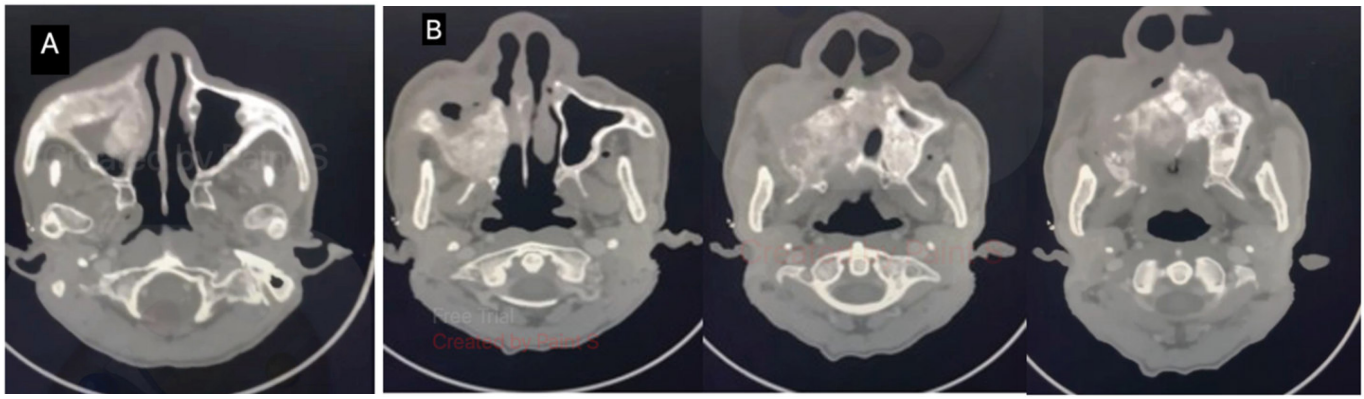

Fig. 3a. CT Axial sections of the face showing an expansive ground glass attenuating lesion involving the anterolateral, posteromedial wall of the right maxillary sinus, canine fossa, and canine eminence of the maxilla.

Fig. 3b. Ill-defined lytic lesions involving posterolateral maxilla with extensive soft tissue component -likely coexisting squamous cell carcinoma.

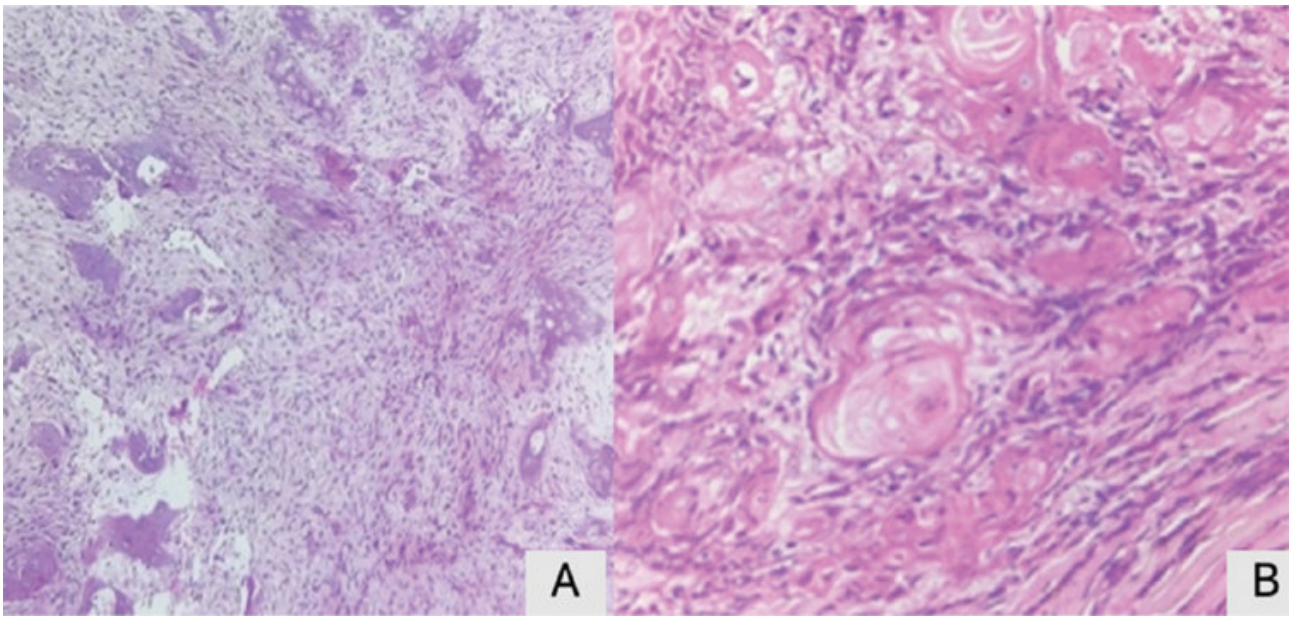

Fig. 4a. H and E stain (10X) Photomicrograph shows tumor epithelial islands invading into connective tissue.

Fig. 4b. H and E staining (40 X) Photomicrograph shows bony trabeculae dispersed in cellular stroma.

An incision biopsy revealed the following: The dysplastic, stratified squamous epithelium was observed overlying a fibrous connective tissue stroma. Epithelial cells showed proliferation into the superficial lamina propria as nests and islands, accompanied by focal chronic inflammatory cell infiltration (Fig. 4A). An area of hypercellular connective tissue with irregular bony trabeculae containing osteocytes and occasional giant cells was identified (Fig. 4B). Moderate vascularity and the presence of mucus lobules and salivary gland acini were observed. Based on the histopathological analysis, the mucosal lesion was diagnosed as a benign ossifying lesion with superficial epithelial features consistent with well-differentiated squamous cell carcinoma. The coexistence of a squamous cell carcinoma over a palatal ossifying fibroma is a very rare occurrence and hence presented here.

Discussion

Lesions like ossifying fibroma occur when normal bone tissue is replaced by fibroblasts and collagen fibers, with altering amounts of mineralized material.[4] The origin of ossifying fibroma can be attributed to various factors such as uncontrolled multiplication of periodontal ligament (PDL)cells, metaplastic process arising in connective tissue fibers or steered by a fault in the tissue induction process, trauma, periodontitis, or previous extractions.[4] The frequent location of these lesions is the mandibular premolar-molar area and only 30% of cases are in the maxilla.[1,4] The maxillary ossifying fibroma is prone to recurrence and is more aggressive. [5] Ossifying fibroma are seen in imaging as round or oval well-defined, expansile mass with a corticated border and a variable degree of central density. [6] Previous research has shown that the radiographic borders of ossifying fibroma appear relatively smooth, well-defined, and mostly corticated. The lesion exhibits a regular contour and tends to show concentric growth within the medullary section of the bone, expanding outward in all directions.[7]

In the maxilla, ossifying fibroma most often appears in the canine fossa and zygomatic arch area. The clinical presentation of these lesions can range from being relatively inert to displaying aggressive behavior.[8] The lesion is usually asymptomatic at discovery.[7] However, the growth of cemento-ossifying fibroma can produce a noticeable swelling and slight deformity, with the displacement of teeth being an early clinical indicator.[9] Central cemento-ossifying fibromas usually present as solitary and well-defined lesions. Initially, they present as radiolucent lesions without any apparent internal radiopacities. As the tumor progresses, noticeable calcification occurs, causing the radiolucent area to be flecked with opacities, ultimately transforming the lesion into an extremely radiopaque mass.

The coexistence of ossifying fibroma and OSCC, in this case, is exceptionally rare; this may be the second case in the literature.[3] Both cases have co-existential squamous cell carcinoma and maxillary ossifying fibroma. As ossifying fibroma is a mesenchymal tumor, there has been speculation that the presence of squamous cell carcinoma, in this case, could be linked to trauma or other stimuli. However, the exact etiology of the coexistence of ossifying fibroma and squamous cell carcinoma remains uncertain and must be examined by accumulating additional cases to establish a definitive understanding. This synchronous occurrence adds complexity to both diagnostic and therapeutic approaches.

Thorough histopathological examination and immunohistochemical analysis remain crucial in elucidating the unique characteristics of such rare entities and guiding appropriate treatment strategies.

Conclusion

This case highlights the uncommon convergence of ossifying fibroma and squamous cell carcinoma within the maxilla, a scarcely documented phenomenon in the medical literature.

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