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West Bengal

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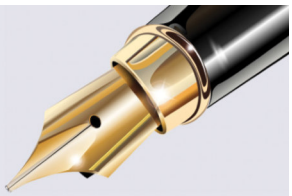

Modern medicine has progressed immensely to increase life expectancy of humans and also to improve the quality of life they live. But Antimicrobial resistance (AMR) seriously threatens to undo most of the benefits bestowed upon mankind by modern medicine. Infections are the most common ailments which modern medicine can claim to cure fully. AMR makes infections more difficult to treat. Medical therapeutics like surgery, chemotherapy become more hazardous due to AMR. There is evidence to suggest that no new antibiotics are in the pipeline and there is an urgent need to stem the juggernaut of AMR.

in 2019, bacterial AMR was directly responsible for 1.27 million deaths and contributed to 4.95 million deaths globally. As is common with most modern-day hazards, AMR hits middle- and low-income groups the hardest. But the effects of AMR are experienced all over the world across all income groups.

Drug-resistant pathogens develop as a result of overuse and misuse of antimicrobial agents in humans and animals. Among known factors responsible for the development of AMR are dearth of clean water, sanitation and hygiene for animals and humans, poor infection control and disease prevention in residences, healthcare facilities and farms, lack of access to quality vaccines and medicines, knowledge gap, poor legislation relevant to tackling AMR.

In 2022, the Global Antimicrobial Resistance and Use Surveillance System (GLASS) report raised serious concerns about rising resistance among prevalent bacteria. 42% of E Coli isolates were resistant to 3rd generation cephalosporins and 35% of Staphylococcus aureus isolates were resistant to methicillin in the study done across 76 countries globally. Klebsiella pneumoniae has also showed increased resistance to commonly used antibiotics.

Antimicrobial resistance leads to increased use of last resort antibiotics which in turn leads to resistance towards those antibiotics. Hence there is emergence of infections which are literally untreatable. The Organisation for Economic Cooperation and Development (OECD) have projected a twofold increase in resistance to last-resort antibiotics in 2035, compared to 2005. These figures point towards a need for stringent surveillance of antibiotic prescription and use worldwide. Foolproof antibiotic stewardship can ensure rational use of antibiotics.

Even the seemingly harmless fungi are now posing a threat to human population due to resistance to common antifungals. Candida auris is an invasive fungal infection which has become multi drug resistant and poses a serious threat.

HIV infection has always been difficult to treat. To add insult to injury, changes in HIV genome have led to reduced potency of anti-retroviral drugs. To continue the fight against the menace of HIV it is important to identify such resistance and employ optimal measures to counter such infections.

Another serious concern is the emergence of multi-drug resistant tuberculosis (MDR-TB). Second line drugs are still effective in tuberculosis resistant to Isoniazid and Rifampicin, but they are more expensive and toxic and also carry the risk of emergence of more serious drug resistance in future. Patients who show resistance to second line anti-tuberculars are virtually incurable and only 40% of such patients actually accessed treatment in 2022.

Malaria has scoured certain regions of the world for many centuries. Artemisinin based combination therapies (ACTs) are mostly used in endemic countries. But several countries are reporting partial resistance of Plasmodium falciparum to Artemisinin or a partner drug since 2001. Though newer ACTs are still efficacious, further spread of the resistance can make malaria a major public health menace.

Few tropical diseases are there like leprosy, African trypanosomiasis and helminthic infestations where the emergence of drug resistance has threatened programs to control, eliminate and eradicate these diseases.

AMR is a multifactorial problem and requires intense and targeted co-ordination among different federal sectors for alleviation. One Health is a concept of integrated approach towards health of man, animals and the environment. This approach in AMR aims to gather stakeholders from different sectors to interact and act in unison to design, implement and monitor strategies to control AMR at multiple levels and in turn, gain health and economic dividends.

Several nations came together during the 2015 World Health Assembly with a One Health approach against AMR and adopted a Global Action Plan (GAP) on AMR. GAP was later endorsed by leading world bodies like Food and agriculture Organization of the United Nations (FAO) and World Organization for Animal health (WOAH, formerly OIE) and the United Nations Environment Program.

The Who works unitedly with Food and Agriculture Organization of the United nations(FAO), the UN Environment Program(UNEP) and the the World Organisation for Animal health(WOAH) to coordinate the One Health global response to AMR. FAO, WHO, UNEP and WOAH are known as the Quadripartite. By hosting a joint secretariat of the quadripartite, WHO established multi-stakeholder engagement in AMR, leading to establishment of the Global Leaders Group on AMR, premiering in 2020, the Multi-Stakeholder Partnership Platform, launched in 2022, and several technical working groups.

In March 2022, United Nations General assembly resolution a/RES/76/257 established a second High-level Meeting on AMR to be held in 2024. In collaboration with the Quadripartite Organizations supported by the Global Leaders Group. Permanent Representatives of Barbados and Malta have been requested by the president of the General assembly to co-facilitate the high-level meeting, which will facilitate nations to commit towards control of AMR and to set up targets to achieve the same. The Quadripartite Joint Secretariat and Global Leaders Group is working with co-facilitators to integrate the human, animal, agriculture, food and environment sectors.

High level Global Ministerial Conferences on AMR were held in the Netherlands in 2014 and 2019 and in Oman in 2022, leading to the Global action Plan, the AMR Multi-Partner Trust Fund and ground-breaking multisectoral AMR targets. A fourth such conference will be hosted by the Kingdom of Saudi Arabia in 2024.

World AMR Awareness Week (WAAW) is a global campaign aimed to raise awareness among the general populace, One Health stakeholders and policymakers. It is observed from 18-24 November every year by the WHO since 2015.

178 countries have adopted national action plans aligned with GAP by the end of 2023. It is essential for all countries to establish multisectoral AMR governance and should have monitoring mechanisms to track progress, identify challenges and report periodically. TrACSS (Tracking AMR Country Self-Assessment Survey) was launched in 2016 to track progress in AMR national action plan implementation. Results are available at www.amrcountryprogress.org.

WHO has also developed the people-centered approach to address antimicrobial resistance and WHO core package of interventions to support national action plans. Prevention of infections and universal access to health services for quality diagnosis and appropriate treatment are the crux of this endeavour.

WHO launched the Global Antimicrobial Resistance and Use Surveillance System (GLASS) in 2015 to incorporate data from surveillance of AMR in humans, surveillance of the use and consumption of antimicrobials, and to integrate this data in the One Health sectors including the food chain and the environment. WHO strives to provide support to low and middle-income countries in fighting AMR.

WHO developed the first WHO bacterial priority pathogens list in 2017 and updated this in 2023, and published the WHO fungal priority pathogen list in 2022 to guide research and development of new antimicrobials.

In the latest annual review, WHO identified only 17 antibiotics in clinical development against WHO bacterial priority pathogens but only 6 of them were classified as innovative.

WHO works closely with organizations such as the Global Antibiotic Research & Development Partnership (GARDP), the AMR Action Fund, and the Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator (CARB-X) to support research and development for antimicrobials, vaccines and diagnostic tools.

To preserve the efficacy of antimicrobial medicines, health professionals have to be properly trained to follow evidence-based guidelines for prescription. This is called the Antibiotic Stewardship Programme which is set up by different nations under the guidance of WHO. It is a very cost-effective method to optimize use of antimicrobials, improve patient outcomes and reduce AMR and health care-associated infections.

The WHO developed the AWaRe (Access, watch, Reserve) classification of antibiotics to reduce inappropriate use of antibiotics. The WHO AWaRe antibiotic book provides concise, evidence-based guidance on the choice of antibiotic, dose, route of administration, and duration of treatment for more than 30 of the most common clinical infections in children and adults in both primary health care and hospital settings.

We as health professionals should pledge to rationalise use of antibiotics to preserve them for the future and to make this planet a safer place to live. It is also our duty and responsibility to increase awareness about antimicrobial resistance in the general population.

Dr Saumitra Kumar
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Prevalence of Chronic Otitis Media and Its Associated Hearing Impairment among School Going Children

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ABSTRACT

Introduction

Chronic Otitis Media (COM) is one of the common diseases of the ear, particularly in children which causes significant impact in speech, cognitive, educational and psychological development. In this study we aimed to determine the prevalence of COM and associated hearing impairment among school going children aged 5 to 15 years.

Materials and Methods

This was a cross sectional study conducted in the Department of ENT, between September 2018 to August 2020. The study procedures involved completing a questionnaire, otoscopic examination, tuning fork test and audiometric test.

Results

A total of 525 school children were examined for COM and associated hearing impairment. Total 57 (10.8%) cases of COM were detected with male predominance (6.1% vs 4.8%). Unilateral disease was seen in 77.2% and 26.3% had active disease. Around 98.2% had tubotympanic type of disease. This study revealed statistically significant association of COM with parent illiteracy, overcrowding, swimming in local pools and recurrent respiratory tract infections.

Conclusion

Health education through school health program, improvement of socioeconomic status and health facilities should be used in early detection and management of this disease thereby reducing the prevalence of COM.

Keywords

Chronic Otitis Media; Hearing Impairment; Prevalence; School Children

Chronic otitis media (COM) is persistent inflammation of the middle ear or mastoid cavity, characterised by recurrent or persistent ear discharge over 2 to 6 weeks through a perforation of the tympanic membrane.[1] It is one of the most common community health disorders of children in many developing countries including India. Its incidence has been reported to depend on race and socio-economic factors. Overcrowding, poor living conditions, poor hygiene, lack of breast feeding, impaired immunologic status, frequent upper respiratory tract infections, passive smoking and inadequate or unavailable health care have been suggested as a basis for the widespread prevalence of COM in developing countries.[2] In children, undetected hearing loss can impact and cause significant delay in speech, cognitive, educational and psychological development.[3] It was also found that complications of COM were commonest in the first two decades of life.[4] Many of these complications could probably have been

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prevented by early identification and treatment of the pre-existing COM.

In developing countries there is a differential prevalence of COM among the different socio-economic strata of the community and it varies from 4% to 33.3% whereas the prevalence is less than 1% in USA and UK. Now a days, with the advent of antimicrobial therapy and the improvement of health care system, the incidence and prevalence of COM have been markedly decreased in developing countries.[5] The present study was aimed to determine the prevalence of COM and its associated hearing impairment among school going children.

Materials and Methods

This cross sectional study was conducted in the Department of ENT & Head and Neck Surgery between September 2018 to August 2020. All school going children aged between 5 and 15 years old attending ENT OPD with ear complaints irrespective of gender, religion, mode of presentation, duration of illness and severity of condition were included in the study. Children parents / guardian unwilling to give informed consent, children who were unable to participate due to illness, children who had recent treatment for an ear infection, children with traumatic perforation of tympanic membrane & children with cleft palate and congenital anomaly were excluded from the study.

Ethical approval was obtained from the Institutional Research Ethics Board (Ref.No.A/206/REB-Comm (SP)/ RIMS/2015/513/131/2018). After taking written informed consent from the parents/guardians, the entire study sample underwent detailed history taking, clinical ENT examination, otoscopic examination and audiological examination and their parents were interviewed regarding their education, income, housing, total family members and health practices regarding COM.

All the collected data were coded and entered in a proforma and data analysis were performed using software SPSS version 21 (SPSS Inc.,USA). Statistical analysis were performed with the appropriate statistical tests for categorical values. A p-value of 0.05 or less were considered statistically significant.

Results

Total 525 school children age ranged from 5 to 15 years were enrolled in this study. Over half of the children (n=296, 56.4%) were boys. A total of 57 children had COM, either in one or both ears. The prevalence of COM was 10.8%. Among 57 children, 32 were boys and 25 were girls (Table I) with M:F ratio of 1.3:1. Mean age of children was 11.4 years with Standard Deviation (SD) ± 2.64.

Table I: Distribution of children by gender (n=57).

GENDER	NO OF CHILDREN (%)
MALE	32 (56.1)
FEMALE	25 (43.9)

Table II: Distribution of different type and site of COM among affected children (n=57).

SIDE OF COM	TYPE OF COM		TOTAL (%)
	TUBOTYMPANIC (%)	ATTICOANTRAL (%)	
RIGHT	29 (50.9)	0	29 (50.9)
LEFT	14 (24.6)	1 (1.8)	15 (26.4)
BOTH	13 (22.7)	0	13 (22.7)
TOTAL	56 (98.2)	1 (1.8)	57 (100.0)

Among them 56 (98.2%) were tubotympanic type and only 1 (1.8%) were atticoantral type (Table II). Around 26.3% were active COM (Table III).

Table III: Distribution of active and inactive COM (n=57).

COM	NO OF CHILDREN (%)
ACTIVE	15 (26.3)
INACTIVE	42 (73.7)
TOTAL	57 (100.0)

Degree of hearing impairment (DHI) in the affected ear was found in 23 (40.4%) of the 57 children. Of the 23 children with COM, 26.3% had mild hearing impairment in the affected ear in one or more of the frequencies, while 14.0% suffered from moderate hearing impairment. No children had severe or profound hearing impairment. In the 23 children with DHI, conductive hearing impairment was predominant (n=20, 86.9%), 3 children (13.1%) had sensorineural hearing impairment (Table IV).

It has been shown that COM was more prevalent (14.9%) among the children of the illiterate parents than literate one. The relation between the parental education and the prevalence of COM was found statistically significant (p=0.001). Overcrowding (more than 2 families per house) and URTI (>3 times per year) both significantly increased the risk of COM. Most of the children in this study (48.2%) used to take bath in pond, canal or river water. It was shown that children who used to bath in pond or river water were affected more by COM (17.8%) than that of tube well users (4.4%). As the risk of COM increases, school performance decreases (Table V).

Table IV: DHI among children with COM (N=57)

DEGREE OF HI	NO OF CHILDREN (%)
NORMAL (0-25dB)	34 (59.7)
MILD (26-40dB)	15 (26.3)
MODERATE (41-60dB)	8 (14.0)
SEVERE (61-80dB)	0 (0)
PROFOUND (>81dB)	0 (0)
TOTAL	57 (100.0)

Table V: Associations between COM status and Social characteristics (N=57)

SOCIAL CHARACTERISTICS		PROPORTION OF COM		P VALUE
		YES	NO	
PARENTS ILLITERACY	YES	46 (14.9%)	263 (85.1%)	0.001
	NO	11 (5.1%)	205 (94.9%)	
OVERCROWDING	YES	48 (17.4%)	228 (82.6%)	<0.001
	NO	9 (3.6%)	240 (96.4%)	
SWIMMING IN LOCAL POOLS	YES	45 (17.8%)	208 (82.2%)	<0.001
	NO	12 (4.4%)	260 (95.6%)	
URTI (>3 TIMES/YEAR)	YES	38 (16.3%)	195 (83.7%)	0.001
	NO	19 (6.5%)	273 (93.5%)	
SCHOOL PERFORMANCE	POOR	32 (15.0%)	181 (85.0%)	0.015
	GOOD	25 (8.0%)	287 (92.0%)	

Discussion

The findings are essential in addressing the burden of this clinical problem, in developing better ear care for children, and in contributing to meeting the Millennium Development Goals for improving child survival.

COM is one of the common community health problems of childhood in all developing countries. It is more common in children of rural community where health facilities are least available.[6] In this cross sectional study among the 525 school going children, total 57 cases of COM were detected and the prevalence of COM was 10.8%. Its ratio in other regions of India as revealed by previous studies varies from 6.1% by Parvez A et al,[7] 5.1% by Parmar SM et al.[8] This higher prevalence of COM in our study can be due to poor socio economic status as well as due to lower educational status of the parents.

No significant relationship was found between residence and the prevalence of COM, in contrast to several reports that have indicated a higher prevalence of COM among rural children. The study conducted by Parvez A et al[7] in Aligarh, India interviewed and examined 630 primary school children in rural and urban areas and found a prevalence of 7% COM among rural children compared to only 1.8% of urban children. The fact that children in urban areas are more likely to have better access to health care than children in rural areas could explain this.

In this study, regarding COM, 29 (50.9%) children had right sided COM, 15 (26.4%) had left sided COM and 13 (22.7%) had bilateral COM as listed in table 2, of which 56 (98.2%) of COM were tubotympanic type and rest of other (1.8%) had atticoantral type. This result is consistent with other studies done by Basak B et al.[9] This study also revealed that 26.3% had active COM similar to the study done by Ologe FE et al[10] which was 27.7% and Audhikari P et al[11] which was 26.0%.

The risk factors for COM are many.Poverty, overcrowding, inadequate housing and poor hygiene are known to contribute to high rates of COM. The four factors found to have the strongest association with COM in this study were parental illiteracy, recurrent respiratory tract infection of more than three times per year, swimming in local pools, overcrowding of more than 2 families per house. A study by Muftah S et al[12] also identified recurrent respiratory tract infections, illiteracy as the independent risk factor of COM. It is crucial that these factors be considered in developing any management or intervention programmes for COM in children.

Regarding the parental education of the children in this study, 64.2% of their parents were illiterate. It was shown that COM was more prevalent (14.9%) among the children of illiterate parents. The relation between the parental education and the prevalence of COM was statistically significant ($p \leq 0.001$) (OR 3.3, 95% CI 1.7 – 6.4). This finding mimics with a study done among the children of the rural areas of Bangladesh by Mazharul S et al[13]. Moreover, parental education has got direct relation with personal hygiene, health consciousness, nutrition, treatment seeking practice and other factors that influence overall health of the children. Most of the children in this study were from medium sized family (52.6%). It was shown that COM was more prevalent (17.4%) among the children from that group. The relation between the overcrowding and the prevalence of COM was statistically significant ($p \leq 0.001$) (OR 5.2, 95% CI 2.7 – 11.7).

Most of the children in this study used to bath in the pond, canal or river (48.2%). It was shown that children who used to bath in pond or river water were affected more by COM (17.8%) than that of tube well users (4.4%). There was a statistically significant association between bathing habit and COM ($p \leq 0.001$) (OR 4.7, 95% CI 2.4 – 9.1). Bathing in the polluted water of the ponds, rivers or canals allows the contaminated water to enter into nose and nasopharynx and frequently infect the middle ear cleft and also enter the middle ear through the pre-existing pathology or perforation of the tympanic membrane which cause the ear chronically infected before it had time to heal. There was a statistically significant association between URTI (>3 times per year) and COM ($p \leq 0.001$) (OR 2.8, 95% CI 1.6 – 5.0). Lower socio

economic group, poor housing which are less ventilated, humid and less hygienic all these predispose to URTI and subsequent COM. This was supported by Bellad SA et al.[14]

An important finding of this study was quite a sizeable population becomes deaf due to discharging ears occurring secondary to mismanaged or neglected URTI like common cold, tonsillitis and adenoiditis or at times due to bare negligence of the parents either due to poor economic condition or due to illiteracy, indicating that children with COM are more likely to develop substantial amount of hearing impairment. In the children found to have DHI, conductive hearing impairment was observed in 86.9%. Most of these children had either mild or moderate hearing impairment (26.3% & 14.0%). No cases of severe and profound hearing impairment were identified. This confirms that COM can induce DHI. A detailed hospital based case control study from Rohit BJ et al[15] found an overall rate of 77% for hearing impairment in both ears in children with CSOM, the majority of whom had conductive loss. The level of hearing impairment among children with COM is similarly high in other developing countries. A study in Dhaka, Bangladesh by Islam MR et al[16] examined 160 cases of COM children and found hearing impairment in 117 (73.1%) children with COM, which was conductive in 89.5% of cases. These findings indicate that COM and its association with hearing impairment continue to be a common health problem in low resource settings. Improving the health services and providing good access to health care among children in such communities is necessary to decrease the burden of illness.

Conclusion

This study shows that the prevalence of COM was 10.8% among school going children. Factors like parental illiteracy, overcrowding, swimming in local pools, recurrent respiratory infection have been identified as being responsible for this high prevalence. The burden of COM in the children studied indicates high level of DHI. Regular screening of primary school children to identify cases of COM, primary ear care, immunization, health education, improvement of socio-economic status and health facilities will be helpful in reducing the prevalence of chronic suppurative otitis media and deafness.

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Main Article

A Prospective Observational Study to Establish a Correlation Between Tinnitus and Hearing Loss

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ABSTRACT

Introduction

The prevalence of tinnitus in adults with hearing problems is very high (59 - 86%). Both tinnitus and sensorineural hearing loss can occur when there is damage throughout the auditory pathway from the inner ear to auditory cortex. Our aim of the study was to evaluate the prevalence of hearing loss in patients with tinnitus and to assess the association between tinnitus and hearing loss.

Materials and Methods

This prospective observational study was conducted for 12 months between May 2022 and April 2023. 60 patients of both the sexes >15 years of age presenting with tinnitus in one or both ears were included in our study. Mentally ill and/or intoxicated patients were excluded. After clinical examination patients underwent Pure Tone Audiometry - average was calculated across 500, 1000, 2000, 4000 Hz in terms of air conduction, bone conduction and air bone gap. Hearing loss was classified as conductive, sensorineural and mixed types. Tinnitus pitch and loudness matching was done for which opposite ear was taken as test ear. In cases of bilateral tinnitus with equal intensity, right ear was taken first as test ear. In case of bilateral tinnitus with unequal intensity, ear with higher intensity tinnitus was tested first. Sensation level of tinnitus was calculated by subtracting the hearing loss threshold from tinnitus loudness in decibel.

Results

In our study the mean age was found to be 44.20± 17.01years, with a male preponderance, and maximum number of cases complaining of left sided tinnitus. In an attempt to find a correlation between tinnitus and hearing loss, in right and left ears separately, 'P' value calculated to be <0.001.We also attempted to find a correlation between highest hearing loss and tinnitus loudness. We found that relative coefficient, 'r' being 0.309 on right side and 0.270 on left side. 'P' value on right is 0.097 and on left is 0.117.

Conclusion

Since most of the cases of tinnitus also complaints of hearing loss, so it is necessary to identify a relation between the two. If a relation between tinnitus and hearing can be identified, it helps to identify the pathophysiology, which will further be helpful to plan the line of management. There are very limited number of studies conducted. Our study suggests a definite relation between tinnitus and hearing loss though there is no statistically significant correlation found between tinnitus loudness and highest hearing loss in the same ear.

Keywords

Tinnitus; Hearing Impairment

The prevalence of tinnitus in adults with hearing problems is very high (59 - 86%), and it is estimated that tinnitus is present in 50% of patients with sudden hearing loss, 70% with presbycusis and 50 - 90% with noise-induced hearing loss.[1,2]

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Both tinnitus and sensorineural hearing loss can occur when there is damage throughout the auditory pathway from the inner ear to auditory cortex. Tinnitus might be coded in the auditory cortex in three presumed ways. One - that tinnitus originates from an increase in spontaneous activity which could be a result of several different excitatory and inhibitory changes from the brainstem. Second - that tinnitus represents an increase in synchrony across nerve fibres. Third - that tinnitus originates from reorganization of the central auditory system after hearing loss.[3]

Hearing loss, specifically the extent of high-frequency impairment in the worse ear, is one of the main predicting factors for tinnitus.[1,4] Conductive hearing loss seems to be a separate factor,[1,5] and noise exposure has been correlated with tinnitus as well.[1,6] Tinnitus is also experienced by those with normal hearing; 18% of tinnitus patients were reported to have normal hearing.[1,5]

Although tinnitus is normally associated with hearing loss, air-conduction levels at 1000 and 4000 Hz were equal to or less than 25 dB HL for 18% of sample in a study by Stouffer and Tyler. Thus, some patients had relatively normal hearing up to 4000 Hz, and the communication handicap resulting from their hearing loss was minimal. These patients may respond to tinnitus maskers better than they do to hearing aids.[5]

There are many difficulties which tinnitus sufferers share with hearing impaired listeners. Both feel that their particular symptom has contributed to difficulties in listening to speech, music, environmental sounds and in auditory localization. Both groups also complain about difficulties at work, family problems, loneliness, insecurity and irritability. Barcham and Stephens found that majority of hearing-impaired respondents had problems associated with work, whereas in tinnitus group work problems were ranked 16th most difficulty.[7]

Men seem to report a higher prevalence, although the difference is not so large (6.6% in men and 5.6% in women).[8] In children, prevalence is in hearing impaired children, but interestingly, only 3% complained of this spontaneously.[8,9]

Hearing loss is a risk factor for tinnitus and even tinnitus patients with normal audiogram might have restricted cochlear damage or hearing loss at frequencies above 8 KHz, which is not detected by normal clinical audiometry. The tinnitus sensation and the frequency range of hearing loss are related, when subjects match their tinnitus pitch to a pure tone, most of the matches are at frequencies at which hearing is impaired. When subjects are asked to judge the contribution of comparison tones to their tinnitus sensation, the resulting spectra span wide frequency ranges that correspond to the frequencies where hearing loss is present. However, not all patients with hearing loss develop tinnitus, as demonstrated by the higher prevalence of hearing loss compared to tinnitus.[10]

George F Reed did a study of audiometric evaluation of 200 patients with tinnitus. Pure tone audiometry and tinnitus matching was done in all the patients. 87% of the patients described the tinnitus as being constant. 53% of the patients were aware of decreased hearing while 92.5% were found to have decreased hearing (more than 10dB at 500, 1000, and 2000 Hz) when tested audiometrically. It is interesting to note that Venters et al reported tinnitus occurred without deafness in 7.5% of cases.[11] This is exactly the same result as George F Reed found in their study. In this study George F Reed also found deafness in 10% was conductive, in 83.5% sensorineural and mixed in 6.5%.[12]

Loudness matching procedures for measuring tinnitus "intensity" usually yield figures of less than 10dB SL for more than half of the subjects tested. In other words, complaining subjects who say that their tinnitus is disturbing appears to be matching external sounds which would be judged by most other people as "quiet".[12]

In a review of assessment procedures for tinnitus McFadden noted several measurement problems.[13] He points out the error of thinking that near-threshold intensities cannot be perceived as loud or that annoyance is a function of loudness. Moreover, an internal sound might behave differently in response to a weak external sound in its ability to produce annoyance. He quotes the finding that a constant external sound can gradually lose its masking effect over a tinnitus through the course of about 30min of continuous listening.[13,14] In contrast, the masking threshold remained fairly constant for an external

sound of intensity less than 10dB SL. Further a tinnitus localized in one ear can be effectively masked by sounds presented to the other. The sound intensities required for contralateral masking do not appear to differ significantly from ipsilateral masking levels.[13,15]

Since the well-known Heller and Bergman experiment, it is widely believed that tinnitus is a common subaudible physiological phenomenon of the normal auditory system. In their study, 94% of apparently normal hearing individuals experienced tinnitus when placed in a soundproof room for 5 mins.[16,17]

Tucker et al also investigated the effect of silence on the perception of tinnitus in 120 normal hearing young adults. Each person was seated in the sound booth and given instructions for the "listening experiment" for a period of 2 mins. No acoustic signal was presented, but auditory activation was strongly activated again, and tinnitus-like sounds were perceived in 64% of listeners.[17, 18]

Materials and Methods

Our aim of the study was to evaluate the prevalence of hearing loss in patients presenting with tinnitus coming to our institute and to assess the association between tinnitus and hearing loss. 60 patients of both the sexes >15 years of age presenting with complaints of tinnitus in one or both ear were included in our study. Mentally ill and/or intoxicated patients were excluded from our study. This prospective observational study was conducted for 12 months between May 2022 and April 2023.

The 38 male and 22 female patients were aged between 15 yrs to 80 yrs. Patients presenting with complaint of unilateral or bilateral tinnitus with or without hearing loss or any audiological symptoms, irrespective of duration of tinnitus were taken in the study.

After complete otorhinolaryngological examination patients underwent pure tone audiometry. We used automatic Diagnostic Shree Electronics Audiometer Aryan 5000A for pure tone audiometry and tinnitus pitch matching which could measure up to 8000 Hz. A pure tone average was calculated across 500, 1000, 2000, 4000 Hz.For each ear air conduction, bone conduction and air bone gap was calculated. Accordingly, type of hearing loss was estimated between conductive, sensorineural and mixed type.Tinnitus pitch and loudness matching was done for which opposite ear was taken as test ear. In case of bilateral tinnitus with equal intensity, right ear was taken first as test ear. In case of bilateral tinnitus with unequal intensity, ear with higher intensity tinnitus was taken first as test ear. Sensation level of tinnitus was then calculated by subtracting the hearing loss threshold from tinnitus loudness in decibel. After audiological tests and tinnitus matching we tried to assess whether there is any relation between tinnitus and hearing loss.

Results

Our study, "A prospective observational study to establish a correlation between tinnitus and hearing loss" was conducted in the Department of ENT of our institute from May 2022 to April 2023. 60 patients were selected for the study that had complaints of tinnitus with or without any other ENT complaints. All patients underwent complete ENT examination followed by pure tone audiometry and tinnitus matching for pitch and loudness. The aim of our study was to find a correlation between hearing loss and tinnitus.

The patients selected in our study were above 15 years of age.There was no upper limit for age. Out of 60 patients 5 (8.3%)were in the age group of 0-20 years, 22 (36.7%)in 21-40 years group, 22 (36.7%) in 41-60 years group and 11 (18.3%)in 61-80 years age group.On analysis, the mean age of these groups was 44.20 ± 17.01 with minimum age being 15 years and maximum being 80 years.Among 60 patients, 23(38.3%) were female and 37 (61.7%) were male patients.Out of all 60 patients, 27(45%) experienced tinnitus in left ear while 20(33.3%) experienced on their right side. Bilateral tinnitus was noted in 13 patients.

On audiometry, it was found that air conduction mean on right ear is 45.97dB with a standard deviation of

18.68dB and the mean on left side is 45.16dBwith a standard deviation of 21.66dB. The bone conduction mean on right side is calculated to be 24.21dB with standard deviation of 15.56dB and on left side it was 25.18dBwith standard deviation of 15.83dB.The mean of A-B gap was evaluated on right to be 21.76 ± 10.56dB and on the left to be 19.89 ± 9.47dB. (Table I)

Table I: Pure tone audiometry results

	SITE OF TINNITUS	
	RIGHT	LEFT
	MEAN ± SD	Mean ± SD
N	33	40
Air conduction (dB)	45.97 ± 18.68	45.16 ± 21.66
Bone conduction (dB)	24.21 ± 15.56	25.18 ± 15.83
A-B gap (dB)	21.76 ± 10.56	19.89 ± 9.47

Conductive hearing loss is noted in 6(18.2%) on right side and 7(17.5%) on left side. While sensorineural loss noted in 6(18.2%) on right side while 11 (27.5%) cases had left sided sensorineural hearing loss. Mixed loss is seen in 12 (36.4%) patients on right and 10 patients (25%) on left patient. Patients with normal hearing too experienced tinnitus 9 (27.3%) on right and 12 (30%) on left.

Pitch matching of tinnitus was done and it was noted that 18.2% on right and 2.5% on left tinnitus were matched for narrow band sound. 2 (6.1%) patients on right and 4 (10%) on left were matched at 250Hz, none on right and 3(7.5%) on left were matched at 500Hz, at 1000Hz 1(3%) was matched on right and 6(15%) on left. At 2000Hz matching was found in 3(9.1%) on right and none on left. At 4000 Hz 2 (6.1%) were matched on right and 7 (17.5%) on left. 11(33.3%) in right and 6(15%) in left were matched at 6000Hz. At 8000 Hz 5(15.2%) on right and 6 (15%) on left were matched. Wide band noise noted 3(9.1%) on right and 6(15%) on left. (Table II)

Table II: Pitch matching

PITCH MATCHING	RIGHT	LEFT
NB	6 (18.2%)	1 (2.5%)
NIL	0 (0%)	1 (2.5%)
250 HZ	2 (6.1%)	4 (10%)
500 HZ	0 (0%)	3 (7.5%)
1000 HZ	1 (3%)	6 (15%)
2000 HZ	3 (9.1%)	0 (0%)
4000 HZ	2 (6.1%)	7 (17.5%)
6000 HZ	11 (33.3%)	6 (15%)
8000 HZ	5 (15.2%)	6 (15%)
Wide band	3 (9.1%)	6 (15%)
Total	33 (100%)	40 (100%)

Sensation level of tinnitus loudness was noted in dB. In 1(1.7%) case with left sided tinnitus no match was found. In 1(1.7%) case with right sided tinnitus SL was found to be 5dB. 10dB SL found in 4(6.7%) cases on right side and 5(8.3%) cases on left. 15dB SL seen in 12(20%) on right and 15 (25%) on left.. 20dB SL seen in 7(11.7%) on right and 8 (13.3%) on left. 25dB SL seen in 6(10%) on right and 8 (13.3%) on left. 30dB SL seen in 3(5%) on right and 2 (3.3%) on left. 40dB SL seen in 1 (1.7%)case on left side. (Table III)

In an attempt to find a correlation between tinnitus and hearing loss, following data was revealed. In RE, 2 (100%) cases had tinnitus at 250 Hz with maximum hearing loss at the same frequency.1 (100%) case had tinnitus at 1000Hz and matched with at the same frequency with maximum hearing loss. At 2000Hz out of 3 cases no relation was observed. At 4000Hz in 2 (100%) cases, relation was found. At 6000 Hz 7 (63.6%) cases, relation was observed. In 4 (80%) relation was observed at 8000Hz. 'P' value calculated to be<0.001. (Table IV)

Table III: Loudness matching

SENSATIONAL LEVEL IN DB	RIGHT		LEFT	
	N	%	N	%
Nil	0	0.0%	1	1.7%
5 dB	1	1.7%	0	0.0%
10 dB	4	6.7%	5	8.3%
15 dB	12	20.0%	15	25.0%
20 dB	7	11.7%	8	13.3%
25 dB	6	10.0%	8	13.3%
30 dB	3	5.0%	2	3.3%
40 dB	0	0.0%	1	1.7%

Table IV: Relation between maximum hearing loss pitch and tinnitus matching pitch for RE

RE FREQUENCY AT WHICH MAXIMUM HEARING LOSS NOTED	RE PITCH MATCHING								
	250Hz FREQUENCY (%)	1000Hz FREQUENCY (%)	2000Hz FREQUENCY (%)	4000Hz FREQUENCY (%)	6000Hz FREQUENCY (%)	8000Hz FREQUENCY (%)	NB FREQUENCY (%)	Wide Band FREQUENCY (%)	P VALUE
250Hz	2 (100%)	0 (0%)	0 (0%)	0 (0%)	4 (36.4%)	1 (20%)	0 (0%)	0 (0%)	< 0.01
1000Hz	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4000Hz	0 (0%)	0 (0%)	2 (66.7%)	2 (100%)	0 (0%)	0 (0%)	2 (33.3%)	2 (66.7%)	
6000Hz	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7 (63.6%)	0 (0%)	1 (16.7%)	0 (0%)	
8000Hz	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	0 (0%)	4 (80%)	3 (50%)	1 (33.3%)	
Total	2 (100%)	1 (100%)	3 (100%)	2 (100%)	11 (100%)	5 (100%)	6 (100%)	3 (100%)	

On left ear, at 250Hz no correlation was seen. At 500Hz, out of 3 cases 2 (66.7%) cases the correlation was seen. At 1000Hz in 2(40%) out of 5 cases correlation was seen. At 4000Hz in 5 (71.4%) cases correlation was observed out of 7 cases. At 6000 Hz correlation was observed in 4(66.7%) out of 6 cases. In 3 (50%) correlation was seen at 8000Hz. The 'P' value is <0.001. (Table V)

Table V: Relation between maximum hearing loss pitch and tinnitus matching pitch for LE

LE FREQUENCY AT WHICH MAXIMUM HEARING LOSS NOTED	RE PITCH MATCHING								
	250Hz FREQUENCY (%)	500Hz FREQUENCY (%)	1000Hz FREQUENCY (%)	4000Hz FREQUENCY (%)	6000Hz FREQUENCY (%)	8000Hz FREQUENCY (%)	NB FREQUENCY (%)	Wide Band FREQUENCY (%)	P VALUE
250 Hz	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (33.3%)	
500 Hz	4 (100%)	2 (66.7%)	2 (40%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
1000 Hz	0 (0%)	0 (0%)	2 (40%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2000 Hz	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (16.7%)	0 (0%)	0 (0%)	< 0.01
4000 Hz	0 (0%)	1 (33.3%)	1 (20%)	5 (71.4%)	0 (0%)	2 (33.3%)	0 (0%)	2 (33.3%)	
6000 Hz	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4 (66.7%)	0 (0%)	0 (0%)	0 (0%)	
8000 Hz	0 (0%)	0 (0%)	0(0%)	2 (28.6%)	2 (33.3%)	3 (50%)	1 (100%)	1 (16.7%)	
Total	4 (100%)	3 (100%)	5 (100%)	7 (100%)	6 (100%)	6 (100%)	1 (100%)	6 (100%)	

In both ears we attempted to find a correlation between highest hearing loss and intensity of tinnitus. No significant relation was identified in this case in either ear with relative coefficient, 'r' being 0.309 on right side and 0.270 on left side. 'P' value on right is 0.097 and on left is 0.117, showing insignificant correlation. (Table VI)

Table VI : Relation between highest hearing loss and sensation level of tinnitus

		RE SENSATION LEVEL IN DB	LE SENSATION LEVEL IN DB
Highest hearing loss in RE	r	0.309	
	P value	0.097	
Highest hearing loss in LE	r		0.270
	P value		0.117

Discussion

The patients selected for our study were in the age group of 15-80 years. Of these, maximum number of cases were (36.7% each) in the age group of 21-40 and 41-60 years. The mean age was found to be 44.20± 17.01years.

Similar age distribution was reported by George F Reed et al in 1959 in their study, where they found maximum number of cases (25%) in the age group of 20-50 years.[12] Kafka in his study of 25 cases found the greatest number of patients between 40-78 years.[12]

The results differ from a study by Richard S Tyler (1983) where the average age was 60.7 years with SD of 13.1.[7]

In the current study, out of 60 patients, 23 (38.3%) were female and 37(61.7%) were male, showing a male preponderance. Heller AJ has mentioned that men seem to report a higher prevalence of tinnitus than women, although this is not a large difference (6.6% in men versus 5.6% in women, according to the Canadian study). This may be related to higher hearing thresholds in the male population.[19] Reed F George in his study found equal distribution in both sexes.[12]

In our study, of the 60 patients, maximum number of cases 27 (45%) patients complained of left sided tinnitus. Heller AJ has mentioned that tinnitus is 1.5 times more likely to occur in the left ear.[12] Axelson Alf in his study (1989) found that for both men and women it was more

common on left side. That is in his study he reported 62% females and 68% males had left sided tinnitus which is in agreement to our study.[6] Although most of the studies have not given any suggestive reason for left sided tinnitus.

In our study, we did pure tone audiometry for all the cases and estimated air conduction, bone conduction and A-B gap for each ear. It was found that the mean air conduction on right side is 45.97 ± 18.68dB and for left ear is 45.16± 21.66dB. The mean of bone conduction on right side is 24.21 ± 15.56dB and on left side is 25.18 ± 15.83dB. The A-B gap calculated on right with a mean of 21.76 ± 10.56dB on right and on left is 19.89 ± 9.47dB.

Erlandsson et al (1992) in their study also had similar findings. In their study pure tone average thresholds were 26.3dB and 27.4dB for right and left respectively. Also they found 41% of cases were with left sided localization and 32% right sided localization.[19]

The study revealed that in the study population most common type of hearing loss is mixed (36.4% on right and 25% on left) followed by normal (27.3% on right and 30% on left), sensorineural (18.2% on right and 27.5% on left). Least common was conductive loss (18.2% on right and 17.5% on left). Unlike our study, Reed F George et al in their study found 10% conductive, 83.5% sensorineural and 6.5% mixed.[12]

In most cases, tinnitus pitch was found to be of high frequency. Maximum number of Cases had pitch matching in 6000Hz (33.3% on right and 15% on left), followed by 8000Hz (15.2% on right and15% on left) and 4000Hz (6.1% on right and 17.5% on left). Pan Tao et al (2009) in their study found that average pitch was 4968 Hz with 50% of cases had tinnitus at 8000Hz or above. Reed (1960) and Vernon (1987) found that most of the patients have their pitch match frequency around and above 3000Hz. Stouffer and Tyler (1990) observed that patients typically rated their tinnitus as being high pitched. Meikle (1995) reported that the pitch match frequency in 33% patients was between 3500 and 6499 Hz.[3] Meikle et al 2003 reported that 75% of the patients matched their tinnitus pitch at orabove 4000 Hz. The median pitch for the entire group of 1519 patients was 6000 Hz.[20] Our finding is in agreement with all the previous studies. Pitch matching may differ based on type and perspective of tinnitus but different types of tinnitus was not considered in our study and hence no comment is possible in this regard.

In our study, we calculated the sensation level in dB of the tinnitus and found that most cases had tinnitus in SL 15dB (20% on right and 25% on left) followed by 20dB (11.7% on right and 13.3% on left). Meikle et al(2003) reported 70% of the loudness matches are at or below 6 dB SL, and 84% are below 9 dB SL. Reed F George et al (1960) reported that in their study 69% of cases were below 10dB SL.

In cases with right ear tinnitus, it was found that 100% cases had a definite relation between tinnitus pitch match and frequency at which maximum hearing loss is seen at frequencies 250Hz, 1000Hz and 4000 Hz. At 6000Hz, in 63.6% cases relation was observed. At 8000Hz, in 80% cases relation was observed. The p value calculated to be<0.001.In cases with left ear tinnitus, the relation between tinnitus pitch and frequency of maximum hearing loss is seen to be 100% at 250Hz, 66.7%at 500Hz, 40% at 1000Hz, 71.4% at 4000Hz, 66.7% at 6000Hz, 33.3% at 8000Hz. The 'P' value calculated to be <0.001. Konig et al (2006) studied 71 patients who had moderate to severe high frequency noise induced hearing loss. They found that there was association between tinnitus and edge frequency of audiogram[3].

In our study, we made an attempt to find a relation between tinnitus loudness and highest hearing loss in the same ear. We found that relative coefficient, 'r' being 0.309 on right side and 0.270 on left side. 'P' value on right is 0.097 and on left is 0.117, showing insignificant relation.Reed F George (1960) also stated in his study that objectively determined loudness of the patients' tinnitus had no apparent relation to the amount of audiometrically determined hearing loss or deafness.[12]

Conclusion

Since most of the cases of tinnitus also complaints of hearing loss, so it is necessary to identify a relation between the two. If a relation between tinnitus and hearing loss can be identified, it helps to identify the

pathophysiology, which will further be helpful to plan the line of management. There have been a very few studies before in this field, but the results have been varied. The treatment of chronic tinnitus is multimodal. Along with different sound therapy, different physical interventions like TENS, Laser therapy, Acupuncture therapy, TMD treatment, biofeedback etc are also being practised to improve tinnitus. But sound therapy with tinnitus masking or tinnitus retraining therapy alone is currently an advanced and effective treatment for subjective tinnitus. Our study concludes that there is a definite relation between maximum hearing loss pitch and tinnitus matching pitch though there is no statistically significant correlation found between tinnitus sensation level and highest hearing loss in the same ear.

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Fat Graft Myringoplasty versus Chemical Cauterization in Small Tympanic Membrane Perforation: A Comparative Study

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ABSTRACT

Introduction

Tympanic membrane perforation is mostly due to infection, trauma or post tympanostomy tube insertion. A variety of autografts have been used for closure of tympanic membrane perforation such as perichondrium, temporalis fascia, cartilage fat, platelet rich plasma, and chemical cauterization.

Materials and Methods

A Prospective, Comparative and Randomized study was done. Eighty five Patients visiting E.N.T Outpatient department at tertiary care center were selected fulfilling the inclusion criteria and exclusion criteria.

Results

Out of 43 patients in fat graft myringoplasty, the surgery was successful in 39 (90.70%) patients. However, the success rate in chemical cauterization was found to be 88% (in 37 out of 42 patients). Overall success rate is 89.40% (in 76 out of 85).

Conclusion

Fat graft myringoplasty and chemical cauterization are strongly recommended for closure of small tympanic membrane perforations; however multiple sittings are required for chemical cauterization.

Keywords

Fat Graft; Chemical Cauterization; Myringoplasty

Tympanic membrane perforation is mostly due to infection, trauma or post tympanostomy tube insertion.[1] Long standing tympanic membrane perforation may cause hearing loss, middle ear infection and cholesteatoma formation even if the size of tympanic membrane perforation is small. Also persons with tympanic membrane perforations cannot participate in water sports or may be unfit for skilled jobs such as air pilot, scuba diving, military services etc. Therefore, repair of tympanic membrane perforation is required regardless of size of perforation.[2] A variety of autografts have been used for closure of tympanic membrane perforation such as perichondrium,[3,4] temporalis fascia,[5] cartilage,[5,6] fat,[7] platelet rich plasma,[4] and chemical cauterization.[8,9]

Temporalis fascia is the most common material used for closure of medium and large tympanic membrane perforation. Use of fat as graft material was first introduced by Ringenberg in 1962. Fat is an active material, it has angiogenic and survival factors like monobutyrin, prostaglandins, interleukins, cytokines and tumor necrosis factors which restores, repairs the fibrous layer and promotes revascularization which is essential for success of free flap.[11] Chemical cauterization using silver nitrate helps in breaking up fibrous band, promotion of granulation tissue and new tissue formation at the margin of perforations.[13] In this study, we evaluated the

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success rate of closure of small tympanic membrane perforation in fat graft myringoplasty and chemical cauterization by otoscopic examination and hearing improvement in fat graft myringoplasty and chemical cauterization by audiological assessment as well as comparison between two.

Materials and Methods

A Prospective, Comparative and Randomized study study was carried out in the Department of Otorhinolaryngology at tertiary care centre, during a period of 22 months. Eighty five Patients visiting E.N.T Outpatient department were selected fulfilling the inclusion criteria (aged 15 to 50 years with small tympanic membrane perforation involving one quadrant or 25% area of pars tensa or upto 4mm diameter, dry perforation for at least 6 weeks, perforation for at least 3 months, small residual perforation, healthy middle ear mucosa, conductive hearing loss not exceeding 30db) and exclusion criteria (active ear discharge, mixed hearing loss, or sensorineural hearing loss, associated middle ear cavity pathology (cholesteatoma, ossicular pathology, retraction pocket), tympanic membrane with tympanosclerosis, atrophic area or pars flaccida retraction, marginal perforation, sinusitis / history of allergy, pregnancy). Patients were randomly divided into two groups (minimum of 40 patients in each)

Group A: fat graft myringoplasty [Fig.1-4]

Group B: chemical cauterization [Fig. 5-7]

Fig. 1. Showing fat graft harvesting from ear lobule

Fig. 2. Showing freshening of tympanic membrane perforation

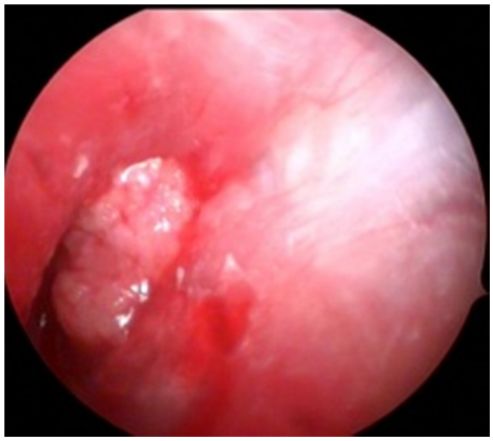


Fig. 3. Showing plugged fat graft in tympanic membrane perforation

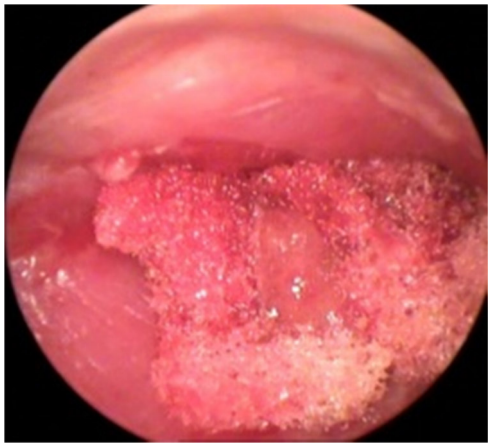


Fig. 4. Showing gel foam around fat graft

Fig. 5. Showing application of 50% trichloroacetic acid using probe

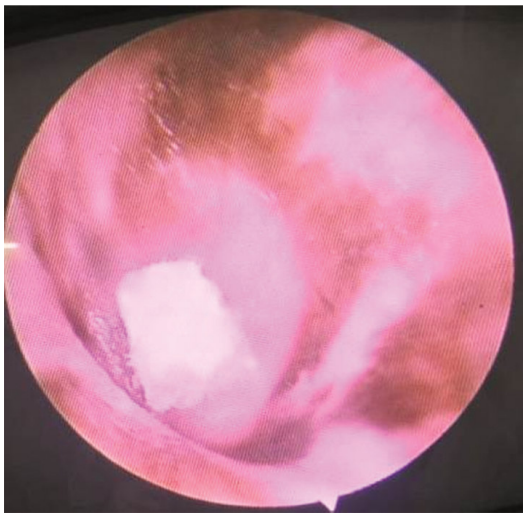


Fig. 7. Showing gel foam kept over tympanic membrane perforation

Pre operative investigations - Pure Tone Audiometry, Examination under Microscope / X-ray mastoid (whenever required), Routine investigations for taking patient under local anaesthesia were done.

After obtaining written and informed consent from the patients, detailed medical history taken & clinical examination done. Site (quadrant) of perforation recorded. Size of perforation was considered small if tympanic

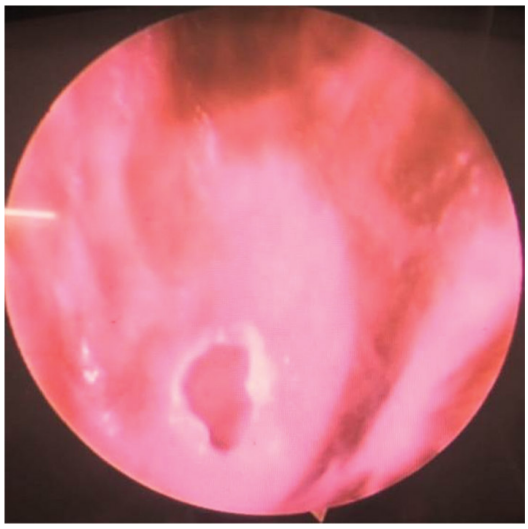


Fig. 6. Showing blanched tympanic membrane margins

membrane perforation involves one quadrant or 25% area of pars tensa. Relevant hematological, radiological and audiological assessment done. All patients were followed up weekly for 1st month, biweekly for 2nd and 3rd month.

Results

Out of 43 patients in fat graft myringoplasty group, 2 patients had Pre-op ABG ≤10dB, 25 had ABG of 11-20dB, 16 had ABG of 21-30dB, whereas among 42 patients of chemical cauterization group, 2 had Pre-op ABG d"10dB, 24 had ABG of 11-20dB, and 16 patients had Pre-op ABG of 21-30dB whereas among 42 patients of chemical cauterization group, 2 had Pre-op ABG ≤10dB, 24 had ABG of 11-20 dB, and 16 patients had Pre-op ABG of 21-30 dB [Table: I, II]. In the present study, patients who underwent fat graft myringoplasty had Pre-op mean ABG of 18.7dB and Post-op 3rd month mean ABG of 5.8dB patients who underwent chemical cauterization had Pre-op mean ABG of 18.5dB and Post-op 3rd month mean ABG of 5.8Db [Table: I, II]. Out of 43 patients in fat graft myringoplasty, the surgery was successful in 39 (90.70%) patients [Table: III, IV]. However, the success rate in chemical cauterization was found to be 88% (in 37 out of 42 patients). Overall success rate is 89.40% (in 76 out of 85) [Table: III, IV].

Table I: Showing mean ABG at Pre-op and Post-op 3rd month in fat graft myringoplasty group

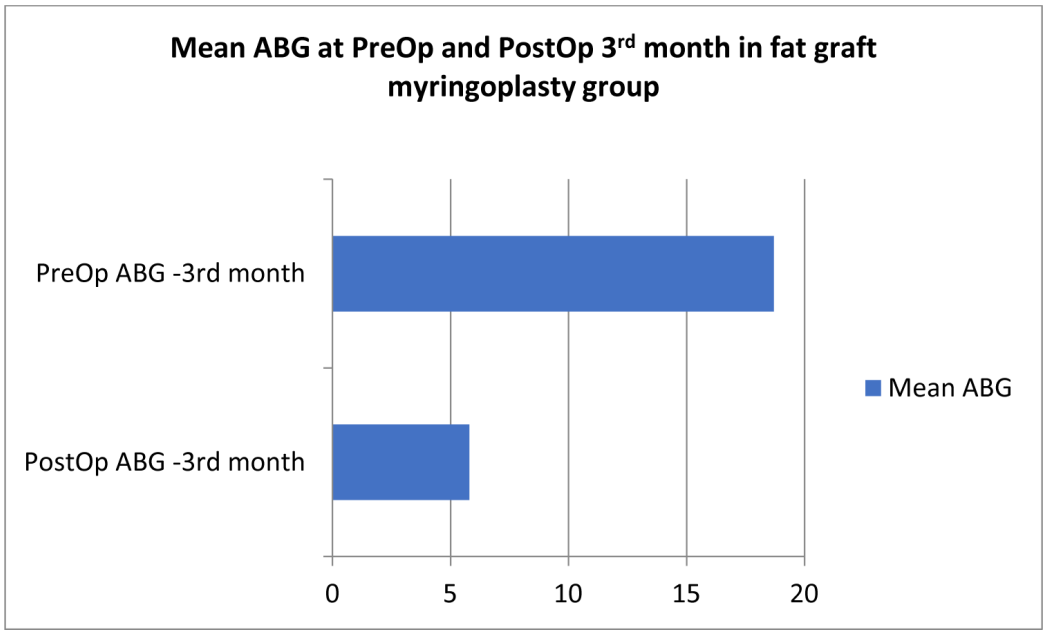


Table II: Showing comparison of Pre-op and Post-op 3rd month mean ABG in chemical cauterization group

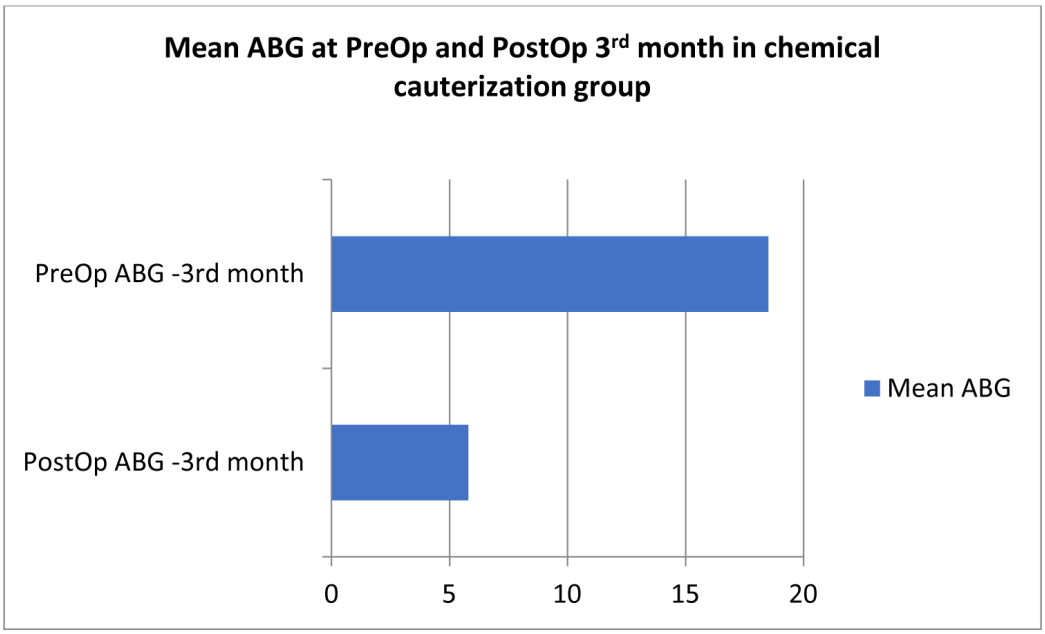


Table III: Showing Post-op anatomical success rate of the two groups

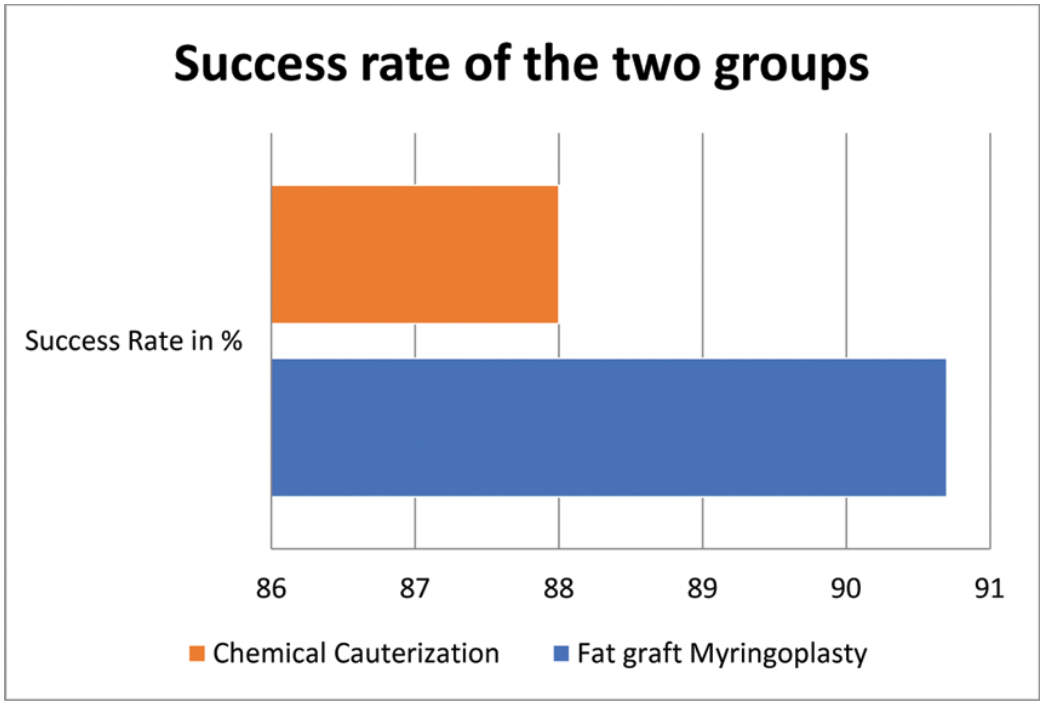
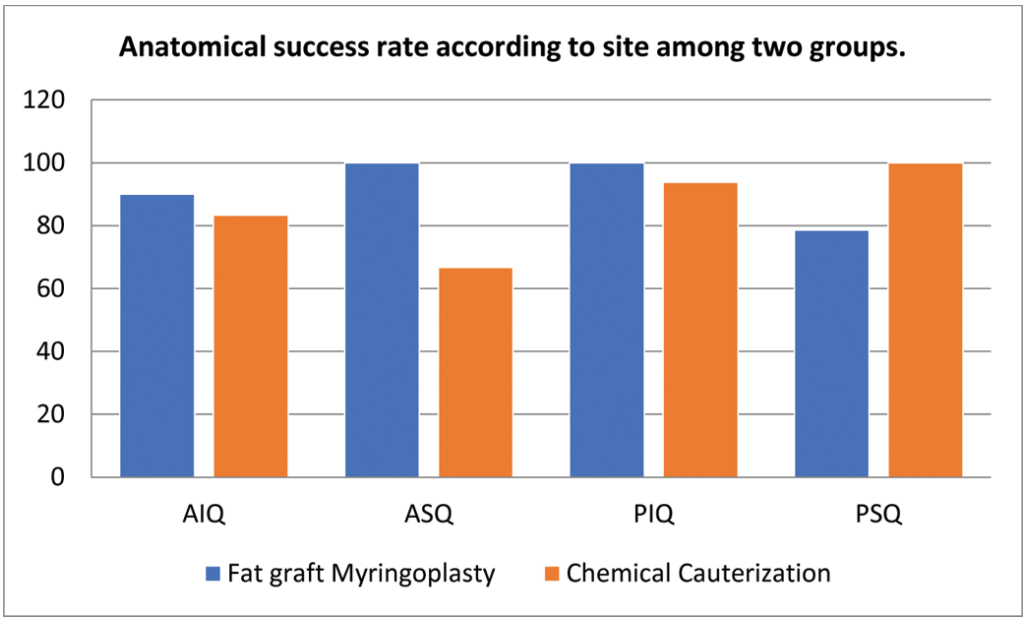


Table IV: Showing anatomical success rate according to site among two groups.



Discussion

In the present study 27.1% had tympanic membrane perforation involving AIQ, 12.9% in ASQ, 34.1% in PIQ, and 25.8% in PSQ. No statistical significance could be established between the two study groups in relation to the site of perforation. Debnath et al[4] and Kim et al[5] found no difference in success rate when comparing anterior perforations with posterior perforations whereas Acar et al[6] found that posterior perforation had significantly lower healing rate in their study.

Out of 43 patients in fat graft myringoplasty group, 2 patients had Pre-op ABG ≤10dB, 25 had ABG of 11-20dB, 16 had ABG of 21-30dB, whereas among 42 patients of chemical cauterization group, 2 had Pre-op ABG ≤10dB, 24 had ABG of 11-20dB, and 16 patients had Pre-op ABG of 21-30dB. Thus, no statistically significant difference was observed in the two groups with regard to Pre-op ABG.

In the present study, patients who underwent fat graft myringoplasty had Pre-op mean ABG of 18.7dB and Post-op 3rd month mean ABG of 5.8dB. There was statistically significant improvement in mean ABG postoperatively in the fat graft myringoplasty group (p value 0.001). and patients who underwent chemical cauterization had Pre-op mean ABG of 18.5dB and Post-op 3rd month mean ABG of 5.8dB. There was statistically significant improvement in mean ABG Postoperatively in the chemical cauterization group (p value 0.001). Overall postoperative mean ABG gain of fat graft myringoplasty group was 5.8±6.2dB and chemical cauterization group was 5.8±5.5dB. Thus, both procedures have similar outcomes.

Whereas, In the study done by Debnath et al (2013), the mean pre-op, the mean post-op and the mean gain was 33.83 ± 4.41, 17.83 ± 2.84 and 16 ± 4.02 respectively for the fat graft myringoplasty group whereas the mean pre-op, the mean post-op and the mean gain was 24.66 ± 2.03, 16 ± 2.03 and 8.66 ± 3.69 respectively for the group that underwent chemical cauterization. The result shows that Fat plug myringoplasty had better post-op gain.[15]

Mandour et al (2018) in his study reported Pre-op mean ABG 20.76db (18.95-22.57), Post-op mean ABG 6.64dB (5.69-7.58) and mean gain 14.12dB (12.99-14.99) at 3 months for closed perforation for PRP fat myringoplasty.[6]

Han et al (2021) reported Pre-op mean ABG 15.9 ± 8.7 db, Post-op mean ABG 11.0 ± 8.4 dB and the mean gain 4.9 ± 4.2 dB for fat myringoplasty.[3]

Diaz et al (2020) reported mean Pre-op ABG, mean Post-op ABG and mean hearing gain of 30.2, 10.2 and 20dB respectively in fat myringoplasty group.[4]

Out of 43 patients in fat graft myringoplasty, the surgery was successful in 39 (90.70%) patients. However, the success rate in chemical cauterization was found to be 88% (in 37 out of 42 patients). Overall success rate is 89.40% (in 76 out of 85). Anatomical outcome i.e., successful closure of tympanic membrane perforation was compared between the two groups. Though the success rate was higher with fat graft myringoplasty versus chemical cauterization, but statistical significance could not be established in either group. Debnath et al in their study found 90.9% and 83.33% success rate with fat plug myringoplasty and chemical cauterization respectively which is also seen in this study.[15]

Ko et al (2022) reported 96.8% success rate with fat plug myringoplasty.[16] Kim et al (2021) reported 90% success rate for fat myringoplasty which was similar to our study.[1]

In a study by Ajaiy et al reported 83.3% success rate,[10] Han et al reported 89.6% success rate [3]and Mandour et al reported 88% success rate[6] for fat myringoplasty respectively.

Conclusion

Fat graft myringoplasty and chemical cauterization are equally effective in closing small tympanic membrane perforations. They are simple to perform, less time consuming, cost effective with minimal patient morbidity and significant hearing improvement. Hence, we conclude both fat graft myringoplasty and chemical cauterization are strongly recommended for closure of small tympanic membrane perforations; however multiple sittings are required for chemical cauterization.

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Main Article

Comparison between ELISA and PCR for Detection of Epstein-Barr Virus in Children with Acute Cervical Lymphadenitis

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ABSTRACT

Introduction

Among viruses, Epstein Barr Virus is an important cause of acute cervical lymphadenitis. The clinical features of acute Epstein-Barr virus infection overlap those of a variety of other infectious and non-infectious diseases so reliable laboratory tests are important to not only confirm but aid in the differential diagnosis. The aim of the present study was to investigate and compare the diagnostic utility of EBV DNA detection as an adjunct to serological diagnosis of primary EBV infection.

Materials and Methods

In this hospital based cross sectional study 30 patients below 18 years of age with acute cervical lymphadenitis were included. Comparison between ELISA and PCR for detection of Epstein - Barr virus in children with acute cervical lymphadenitis was done. EBV IgM and IgG-ELISA was done for the qualitative determination of IgM and IgG class antibodies against Epstein-Barr virus Viral Capsid Antigen (VCA) in serum samples and Real-time PCR (by using RTP Pathogen Kit) was done for qualitative determination of EBV DNA.

Results

EBV RT-PCR was negative in serum samples of all 30 patients. EB virus could not be detected by RT-PCR in all seropositive cases. There was no significant difference found between genders in the results of EB Virus serology, and that of EBV RT PCR (p value was >.05).

Conclusion

The use of RT- PCR for EBV DNA detection resulted in an increase in reliability of diagnosis of primary EBV infection, enhancing overall diagnostic efficacy. Our study proves that serological antibody could be positive for EBV in many patients either because of cross reactivity with other viruses or past infection with EBV.

Keywords

Epstein Barr Virus; EBV IgM; PCR; EBV DNA; Cervical Lymphadenopathy

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Acute cervical lymphadenitis is frequently encountered by otorhinolaryngologists in day-to-day practice. Cervical lymphadenitis is defined as an acute symptomatic enlargement of the cervical lymph nodes. Lymphadenitis particularly refers to lymphadenopathies that are caused by inflammatory process. However, the terms lymphadenitis and lymphadenopathy are often used interchangeably. Most common etiologies of lymphadenopathy are infections,

tuberculosis, neoplasia, autoimmune diseases, iatrogenic causes and miscellaneous conditions[1].

In paediatric population cervical lymphadenitis is a common problem. According to a study cervical lymphadenopathy affects around 90% of children aged 4 to 8 years.[2] In the paediatric population, most common cause of lymphadenopathies is infectious aetiology.[3] Acute viral lymphadenitis is the most common form of reactive lymphadenitis and typically develops following URTI. The common viruses involved are Epstein-Barr virus, Adenovirus, Cytomegalovirus, Rhinovirus, Coxsackie virus A and B, Parainfluenza, & Influenza virus.[4] Viral upper respiratory tract infection usually causes acute bilateral cervical lymphadenitis. Pyogenic bacteria such as staphylococcus aureus or streptococcus usually causes acute unilateral cervical lymphadenitis.[5]

Among viruses, Epstein Barr Virus is an important cause of acute cervical lymphadenitis. Epstein-Barr virus (EBV) was first discovered in year 1964 by Epstein and Barr in cells isolated from Burkitt's lymphoma. EBV infection is highly prevalent worldwide, with more than 90% of the adults being infected with the virus. EBV is a member of the herpes virus family (HHV4) and is a double stranded DNA virus. There are two types of EBV, EBV-1and EBV-2. The oral route is the primary route of the EBV transmission. However, it has been reported that organ transplantation and blood transfusion can lead to EBV spread.

Most of the primary EBV infections in children are usually asymptomatic.[6] Most common acute presentation of EBV infection is a febrile viral upper respiratory illness. Similar to other herpes viruses, following a primary infection, the EBV has a latency phase where it infects epithelial cells, enters the circulating B lymphocyte, and persists for the life in a latent state.[7] The incubation period of symptomatic primary EBV infection is about six weeks. EBV infection is associated with the many diseases, including infectious mononucleosis, Burkitt's lymphoma, Hodgkin lymphoma, nasopharyngeal carcinoma.[8] In addition, this virus has been linked to a wide range of diseases such as post transplant lymphoproliferative diseases, gastric carcinoma, systemic lupus erythematosus, chronic fatigue syndrome, rheumatoid arthritis, thyroid disorders, multiple sclerosis and other autoimmune disorders.[9]

The clinical features of acute Epstein-Barr virus infection overlap those of a variety of other infectious and non-infectious diseases, and reliable laboratory tests are important to not only confirm but aid in the differential diagnosis.[10] Primary EBV infection can be diagnosed by viral DNA in cell-free serum or plasma of patient or by an assay for heterophile antibodies. For indirect evidence serological studies can demonstrates the presence of IgM antibodies in acute infection and IgG antibodies for chronic infection against different EBV antigens. During early primary infection, IgM class of antibody to Epstein Barr viral capsid antigen is detected; whereas detection of IgG to viral capsid antigen is seen in past infections. Both IgM and IgG antibodies are detected during recent infection or reactivation.[5] EBV infection usually confirmed by clinical manifestation and EBV serology. Furthermore, serological studies are often done but they are relatively unreliable and insensitive for diagnosis. Heterophile antibodies assay's sensitivity is low for children. In primary infection of children, the appearance of EBNA antibodies may be unusually delayed, resulting in a false diagnosis of recent EBV infection. Therefore, Viral DNA in cell-free serum or plasma of patients is most useful direct evidence for diagnosing primary EBV infection.[11]

American scientist Kary Mullis devised PCR in 1983. Qualitative PCR is used to determine the presence and absence of specific DNA product. It is used for cloning or pathogen identification. Quantitative real time PCR allows real time measurement and provides information far beyond the DNA detection. It shows how much of specific DNA is present in the sample. Real-time PCR is a more rapid, sensitive, specific and reproducible method for detecting and monitoring the levels of EBV in comparison to conventional PCR.

The lack of knowledge about immune system response to EBV has impaired our ability to develop an effective prophylactic vaccine against EBV. Greatest challenge in recent time is to develop a prophylactic vaccine and devise treatment strategies for EBV infected patient.[12] The Timely diagnosis will definitely help clinicians to avoid a

battery of investigations and misuse of antibiotics. In India there are very limited studies available that have employed qualitative RT-PCR for laboratory evidence of Epstein Barr virus associated acute cervical lymphadenitis in paediatric patients.

Materials and Methods

This hospital based cross sectional study was conducted in the Department of ENT& Microbiology during the period from September 2018 to April 2020. All patients in the age below 18 years from ENT OPD were enrolled for the study. Exclusion criteria include neck swelling other than lymph node origin. Known case of lymphadenopathy due to tuberculosis and malignancy, which were on treatment, were excluded from the study. Parents of children were informed about the study. Written and informed consent was given by the parents. The study protocol was approved by the institutional ethics committee. A detailed and relevant history was taken followed by a thorough general physical, ENT and Head & neck examination. Necks of patients were thoroughly examined for any palpable lymph nodes. Patient's blood sample was taken in plain vials and serum was separated by centrifugation at room temperature. Serum samples were stored on ice during transportation and serum samples were stored in deep freeze. Multiple thawing and freezing was avoided before isolating the viral DNA. All 30 serum sample were subjected to RT-PCR for detection of Epstein-Barr virus as per the RTP® Pathogen Kit manufacturer guidelines. Isolation of DNA of EBV was done by Sample lysis, binding of the DNA, first washing of the RTA Spin Filter, second washing of the RTA Spin Filter and elution of the DNA. The eluted DNA was used in different subsequent applications. Samples of heparinised patients were not used as heparin is a PCR interfering substance. The viral DNA was amplified by polymerase chain reaction. The presence of specific pathogen sequences in the reaction was detected by an increase in fluorescence observed from the relevant dual-labelled probes, and was reported as a cycle threshold value (Ct) by the Real-time thermo cycler. Results were analyzed according to Real-time PCR kit manufacturer guidelines.

Epstein - Barr virus IgM and IgG-ELISA was intended for the qualitative determination of IgM and IgG class antibodies against Epstein-Barr virus viral capsid antigen in human serum. Before assaying, all samples were diluted 1 in 100 with IgM and IgG sample diluent.10ul sample dispensed with 1ml IgM sample diluents into the tubes to obtain a 1 in 100 dilution. ELISA microwell plate reader was adjusted to zero using the substrate blank absorbance of the wells measured at 450nm and the absorbance values recorded for each standard and sample in the plate layout. Results were analyzed according to ELISA kit manufacturer guidelines and statistical analysis was done.

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Qualitative variables were compared using Chi square test/Fisher's exact test. A p value <.05 was considered as statistically significant. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0.

Results

Our study was conducted in the Department of Otorhinolaryngology & Microbiology department of Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi during the period of September 2018 to April 2020.Thirty(30) children below 18 years of age with acute cervical lymphadenitis were included in the study and results are as follows.

Table I : Age Distribution

AGE (YEARS)	FREQUENCY	PERCENTAGE
1-5 years	12	40.00%
6-10 years	11	36.67%
>10 years	7	23.33%
Mean ± SD	6.97 ± 3.1	
Median (IQR)	6 (5-8.75)	
Range	2-13	

In present study, 40% of patients belonged to age group 1-5 years followed by 6-10 years (36.67%). Age was >10 years in only 7 out of 30 patients. Mean value of age (years) of study subjects was 6.97 ± 3.1 with median (IQR) of 6 (5-8.75). (Table I)

Sixty three percent (approx.) (63.33%) of patients were males and 11 out of 30 patients were females.

26 (86.67%) patients had bilateral lymph nodes. Only 4 out of 30 patients had unilateral lymph nodes. In majority (90%) of patients, tenderness was present. Tenderness was absent in only 3 out of 30 patients. In all thirty 30(100%) patients, level of lymph node was II followed by level I (83.33%), level III (16.67%) and level V (10.00%). Level of lymph node was IV in none of the patient.

Sixty three percent (63.33%) of patients, haemoglobin was 11.1-13 gm/dl followed by >13 gm/dl (16.67%) and <9 gm/dl (13.33%). Haemoglobin was 9-11 gm/dl in only 2 out of 30 patients.

Fifty six percent (56.67%) of patients, total leucocyte count was 12100/mm^3-14000/mm^3 followed by 10000/mm3-12000/mm^3 (16.67%). Total leucocyte count was <10000/mm^3 and >14000/mm^3 in only 4 out of 30 patients each. (Table II)

In majority (96.67%) of patients, EBV IgM was negative. EBV IgM was positive in only 1 out of 30 patients. (Table III)

Table II : Distribution of total leucocyte count of study subjects

TOTAL LEUCOCYTE COUNT	FREQUENCY	PERCENTAGE
<10000/mm^3	4	13.33%
10000-12000/mm^3	5	16.67%
12100-14000/mm^3	17	56.67%
>14000/mm^3	4	13.33%
Total	30	100.00%

Table III : Distribution of EBV IgM of study subjects.

EBV IgM	FREQUENCY	PERCENTAGE
Negative	29	96.67%
Positive	1	3.33%
Total	30	100.00%

Table IV: Comparison of EBV IgM between genders

EBV IgM	FEMALE (N=11)	MALE (N=19)	TOTAL	P VALUE	TEST PERFORMED
Negative	11 (100%)	18 (94.74%)	29 (96.67%)	1	Fisher Exact test
Positive	0 (0%)	1 (5.26%)	1 (3.33%)		
Total	11 (100%)	19 (100%)	30 (100%)		

No significant gender difference was seen in the distribution of EBV IgM. (P value>.05) EBV IgM was negative in 100% in female and 94.74% in male and positive in 0% of patients in female and 5.26% of patients in male with no significant difference between them. (Table IV).

In present study, in majority (90.00%) of patients, EBV IgG was positive. EBV IgG was negative in only 3 out of 30 patients. (Table V)

No significant gender difference was seen in the distribution of EBV IgG.

Table V : Distribution of EBV IgG of study subjects

EBV IgG	FREQUENCY	PERCENTAGE
Negative	3	10.00%
Positive	27	90.00%
Total	30	100.00%

(p value>.05) EBV IgG was positive in 100% in female and 84.21% in male and negative in 0% of patients in female and 15.79% of patients in male with no significant difference between them. (Table VI)

Table VI: Comparison of EBV IgG between genders

EBV IgG	FEMALE (N=11)	MALE (N=19)	TOTAL	P VALUE	TEST PERFORMED
Negative	0 (0%)	3 (15.79%)	3 (10%)	0.279	Fisher Exact test
Positive	11 (100%)	16 (84.21%)	27 (90%)		
Total	11 (100%)	19 (100%)	30 (100%)		

Table VII : Distribution of EBV RT PCR of study subjects

EBV RT PCR	FREQUENCY	PERCENTAGE
Negative	30	100.00%
Total	30	100.00%

In present study, in all the patients, EBV RT PCR was negative. (Table VII)

In present study all patients were EBV RT PCR negative. (Table VIII)

Table VIII: Comparison of EBV RT PCR between genders

EBV IgG	FEMALE (N=11)	MALE (N=19)	TOTAL	P VALUE	TEST PERFORMED
Negative	11 (100%)	19 (100%)	30 (100%)	No p value	-
Total	11 (100%)	19 (100%)	30 (100%)		

Discussion

Our study, a hospital based cross sectional study was conducted in the Department of Otorhinolaryngology & Microbiology of a Medical College & Hospital, New Delhi during the period of September 2018 to April 2020. Thirty children below 18 years of age with acute cervical lymphadenitis were included in the study. All patients were analysed with respect to age, sex, laterality, level of lymph node, tenderness, consistency, haemoglobin, total leukocyte count, Epstein Barr virus IgM and IgG and RT PCR for EBV.

A cross-sectional study by Jalal et al[6] conducted among eighty two children presented with cervical lymphadenopathy out of which Epstein-Barr virus infection was diagnosed in 13 (15.9%) children (n=82). The average age of these cases was 7.5 (SD±3.3) years with 1.6 male to female ratio. The anterior group cervical lymph nodes were commonly affected. On examination lymph nodes was mobile and firm in majority, 12 (92.3%) of patient. The lymph node number ranged from 2-6 nodes; with a mean of 3.5 nodes. Increase in total leukocyte count was seen in 3 patients.

Our study was a hospital based cross sectional study, conducted among 30 children presented with cervical lymphadenopathy out of which EBV infection was diagnosed in 27 (90%) children (n=30). A cross-sectional study by Jalal et al[6] conducted among eighty two children presented with cervical lymphadenopathy out of which Epstein-Barr virus infection was diagnosed in 13 (15.9%) children (n=82).

In our study, the average age of children was 6.97 ± 3.1 with median (IQR) of 6(5-8.75). The male to female ratio was 1.7. These observations are in accordance with that of Jalal et al. where the average age of these cases was 7.5 (SD±3.3) years with 1.6 male to female ratio.

Cervical group of lymph nodes was seen in majority (90%) of patient. On examination, majority of patient had mobile and firm lymph node. These results in this study are similar to other studies. Increase in total leukocyte

was found in 21(70%) of the patient. In an Indian Retrospective observational study, Nandi et al[10] studied clinical and laboratory features of fifty-three (53) serologically EBV positive infectious mononucleosis children aged between 1 month to 12 years. The majorities (89.5%) cases aged between 5 and 8 years were found to have cervical lymphadenopathy. Similarly, Balfour et al[13] observed in 95%, Grotto et al[14] observed in 88.0%, and Gao et al[15] observed in 89.5% of the cases.

Sarsu et al[16] studied population consisted of 1003 (59%) boys and 697 (41%) girls aged less than 18 years. Forty-three patients with unilateral and 452 patients with bilateral lymphadenopathies were studied. On conclusion, most widely encountered cause of lymphadenopathy was cytomegalovirus (CMV) and Epstein-Barr virus (EBV) infections. Similarly in present study, we observed twenty-seven (27) (90%) patients with cervical lymphadenopathy who were positive for Anti VCA- IgG antibody. That means cases included in study acquired this infection in their lifetime. EBV IgG was positive in 100% in female and 84.21% in male, no significant difference was seen in the distribution of EBV IgG between genders (p value>.05).

Figueira et al[17] studied the prevalence of EBV antibodies in a sample of 283 children and adolescents between 1 and 21 years old. Anti-VCA (Virus Capsid Antigen) IgG antibodies were detected in 71% of patients by ELISA kits. These results demonstrate that there is a high prevalence of EBV antibodies occurs more frequently at a younger age in children from families with low socioeconomic status. Similarly in present study, Anti-VCA (Virus Capsid Antigen) IgG antibodies against EBV were detected in 90% of patients.

In a study done for serological diagnosis of primary EBV infection and EBV reactivation with real-time EBV PCR by Luderer et al[18] the diagnosis of primary EBV infection was established for 24 of the 45 IgM VCA-positive patients. Out of 24 IgM positive case of primary infection, no EBV DNA was detected in five cases by PCR. EBV DNA was detected only in two of the 62 serum sample of reactivation profile cases.

In a study Paschale et al[19] found that, EBV DNA could be determined in serum or plasma. In patients with primary infection, it is frequently detected in whole blood (plasma/serum) within 14 days of symptoms onset. After the initiation of an immune response, viral load decreases slowly in peripheral blood mononuclear cells, but rapidly in plasma/serum, and it becomes undetectable after 3-4 weeks. Viral load may increase after an initial decline, and in some cases, it may take as long as a year or more before it reaches stably low levels. Finally, even when this level is reached, the blood of a healthy carrier contains 1-50 copies of EBV DNA per million white blood cells, whereas EBV-DNA is almost always undetectable in plasma or serum.

In a study Gartzonika et al[20] collected serum sample from 118 patients of suspected primary EBV infection. After serological testing, a quantitative real time EBV PCR assay was performed. Samples which were drawn 20 days after onset of symptoms were negative and younger patients were found to have higher viral load. In a study Elansary et al[21] found 38 patients reactive for anti-VCA antibody against EBV and PCR was negative for all of the reactive cases. In present study, EBV RT PCR was negative in all twenty-seven (27) seropositive cases.

Conclusion

RT-PCR for EBV was negative in serum samples of all thirty (30) patients. EB virus could not be detected by RT-PCR in all seropositive cases. However, a firm diagnosis cannot be made with serological studies. Majority (90.00%) of cases, who were positive for Epstein Barr virus anti-IgG antibody, belonged to the younger age group. Firm diagnosis cannot be made on the basis of serology. This study proves that RT-PCR for EBV has to be interpreted along with serological antibody results. The qualitative RT-PCR for EBV needs not to come positive even with presence of EBV as a cause of cervical lymphadenopathy in paediatric patients, if the viral load is less. It also proves that serological antibody could be positive for EBV in many patients either because of cross reactivity with adenovirus or because of past infection with EBV.

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A Descriptive Study on the Common Causes of Neck Injuries, their Treatment and Outcome at a Tertiary Hospital in India

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ABSTRACT

Introduction

ENT experts manage neck traumas, particularly penetration neck injuries or cut throat injuries, which violate the platysma muscle layer. The aim of this study was to assess further in detail about the sociodemographic status, etiology, presentation of patients, treatment provided and its outcome.

Materials and Methods

This study was carried out in the Department of ENT at a tertiary care hospital from January 2020 to January 2023. The study is retrospective. Total 17 cases of cut throat injuries, irrespective of age and sex, were included in the study. Patients with insignificant injuries to neck and those with multiple traumas to other body parts were excluded from this study.

Results

Among the 17 patients included in the study, most of them were males and belonged to upper lower socioeconomic class according to modified Kuppuswamy scale. The most common mode of neck injury was by suicide and four of them were suffering from depression. The most common site involved was the zone II.

Conclusions

Poor socioeconomic status and unemployment negatively impact mental health, leading to homicidal injuries. Resolving societal issues like poverty and drug addiction, implementing government enforcement measures, and improving communication systems can reduce complications and death rates.

Keywords

Neck injury; Suicidal; Tracheostomy; Zone II; Asphyxia

Traumas to neck are one of the most critical conditions managed by ENT experts.[1] Penetrating neck injury (PNI) or cut throat injuries is defined as any trauma to the neck that violates the platysma muscle layer. As per the data by world Health Organization (WHO), more than 5 million people all over the world have lost their lives due to neck injuries.[2]

The common causes of neck injuries in this part of the world are suicide attempts. The provoking factors in suicide attempts can be issues in family, psychological disorders, joblessness and privation. The motives for homicide may include land-related disputes, sex related crimes and familial disharmony.[3,4] Falling from a height and road traffic incidents are the main causes for accidental neck injuries.[5]

Urgent and optimal management is paramount to good clinical outcomes. Management of neck injuries is an arduous job. The vital organs like larynx, trachea, pharynx, carotids and nerves are situated in this vulnerable compact zone. Prompt establishment of airway by tracheostomy/ intubation, immediate control of bleeding, blood transfusion and apt surgical repair must be done.[3] In case of delay in treatment, patient can lose his life from asphyxia and hemorrhage.[6] The anesthetist helps in establishing the airway; the ENT expert does the repair

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of the distorted anatomy. Later the psychiatrist takes care of the mental health of the patient during and after surgical treatment.[3,4,7,8]

The treatment approach to neck injuries has changed with the help of current advancements in radiology techniques. In these days, neck injuries are managed more conservatively.[9]

This study was conducted in our setup to study further in detail about the sociodemographic status, etiology, clinical presentation of patients, treatment provided and its outcome.

Materials and Methods

This study was carried out in the Department of ENT at a tertiary care hospital from January 2020 to January 2023. The study type was retrospective and Institutional Ethical Committee approval was taken for this study. Total 17 cases of cut throat injuries, irrespective of age and sex, who were admitted in the ward, were included in the study. Patients with insignificant injuries such as minor contusions and abrasions on neck and those with multiple traumas to other body parts were excluded from this study. Patients and their relatives were approached and an informed written consent was obtained from them to participate in this study. In case of loss to follow up the necessary data needed for the study was collected from the record section of the hospital with permission from Medical Superintendent. The details of the patients including age, gender, socioeconomic status, cause behind the injury, injury inflicted by, anatomical zone involved, condition of patient at the time of admission, structures damaged, treatment given, complications and outcome were documented. The Socio-economic classification was done using modified Kuppuswamy scale.[10] Findings of clinical examination, blood investigations, x rays and CT scans were also noted.

All the data regarding study population were collected and compiled in a predesigned case record form. All the data pertinent to the patients were kept confidential. After doing the necessary investigations, all patients were immediately shifted to operation theatre and managed as per the ATLS (Advanced Trauma Life Support) guidelines. All patients received psychiatric counselling.

The data was collected and analyzed by descriptive statistical methods. The data was analysed statistically using the Microsoft Excel software. Descriptive statistics like mean and percentage were used to interpret data. All the data was depicted as the figures and tables that follows.

Results

Present study includes total 17 patients of neck injury. Out of which, 14 of the patients were males (82.3%) and three were (17.6%) females (Fig. 1). The majority of patients (41%) were between 31- 40 years and most of them belonged to upper lower socioeconomic class (Fig. 1 & 2).

Regarding the causes and motives behind the neck injury, majority of patients attempted suicide (52.9%) and four of them were suffering from depression (Table I). Many patients were under influence of alcohol and were not aware of their actions. Five patients (29.4%) were victims of homicidal attack (Fig. 3). Associated medical co-morbidities were reported in 7(41.1%) patients, these included; psychiatric illness in 4 patients and diabetes mellitus, hypertension and chronic chest infection in one patient each respectively. Zone II was the most commonly injured zone (64.7%). Four patients (23.52%) were injured in the zone 1 and the remaining two patients (11.7%) in zone III. Nine out of 14 patients of suicidal/ homicidal modes were injured by using agricultural tools (Table II). Injuries with sickle caused more damage to anatomy and vessels because of its curvature. Though injuries with kitchen knife and scissors had a small point of entry, but it caused airway puncture and surgical emphysema. 52.9 % of patients were presented with laryngeal injury as shown in table III. Distribution of patients according to the structures injured is depicted in table III.

At the time of presentation to the hospital, all had open wounds. In case of an open wound to trachea we found it better to intubate the patient immediately to give support to the structural framework. This acted like an intra-

tracheal stent and we repaired the injury over that. Twelve patients came with respiratory distress. 16 patients presented with active hemorrhage and one had gone to hemorrhagic shock. Most of the patients (58.8%) reported to the hospital within 12 hours after injury (Table IV). None of the patients received any pre-hospital care and majority of them (76.4%) were brought in by relatives, friends or Good Samaritans, 17.6% by police and only one patient (5%) was brought in by a ambulance.

All patients in this study underwent surgical procedures as depicted in Table V. Surgical site infection was the most common complication and it was seen in 70.5 % of patients. Permanent voice change, respiratory distress, hemorrhagic shock and laryngeal stenosis were seen in one patient each and 4 patients had ugly scar. One patient had to keep a permanent tracheostomy (Table VI). The majority of patients stayed in the hospital for less than 2 weeks. In this study, two patients died, 13 patients (76.4%) had full recovery without any permanent defects and others had recovery with permanent defects like voice change, upper airway stenosis, ugly scar and tracheostomy.

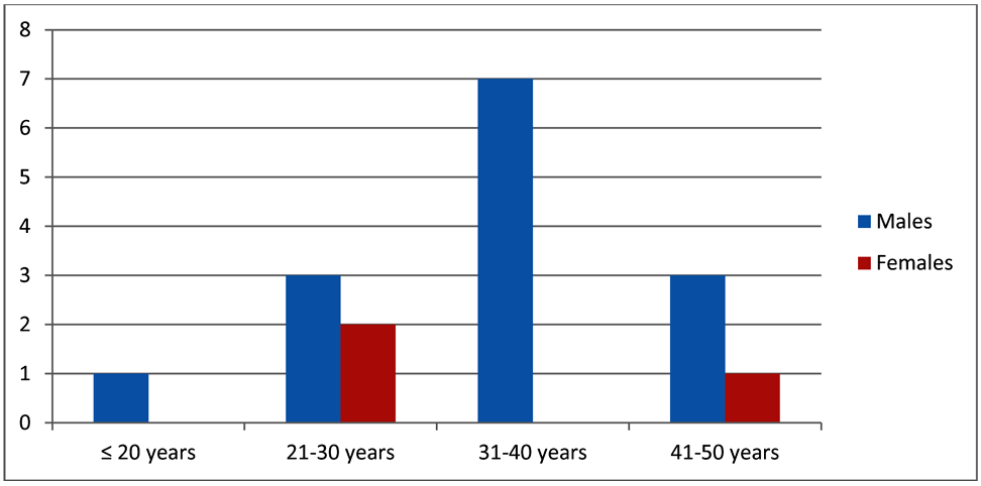

Fig. 1. Distribution of patients on age and gender.

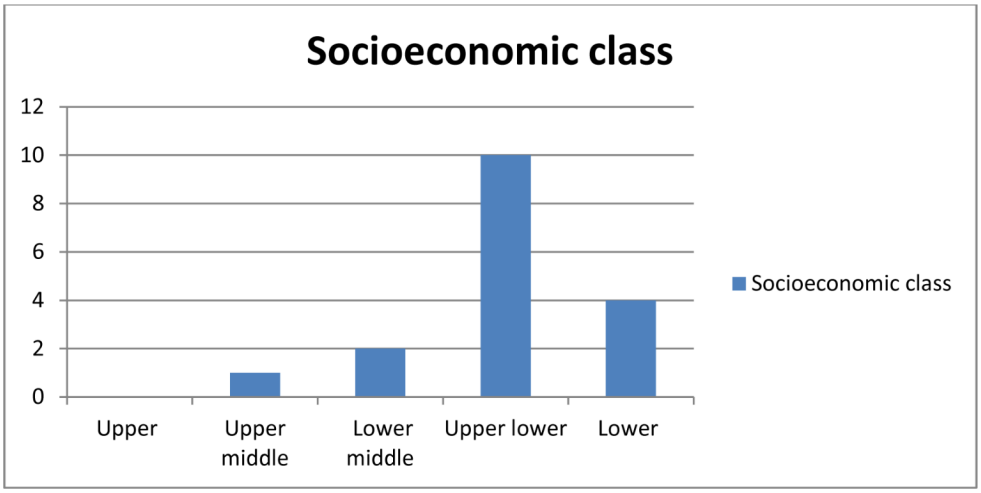

Fig. 2. Distribution of patients based on socioeconomic class

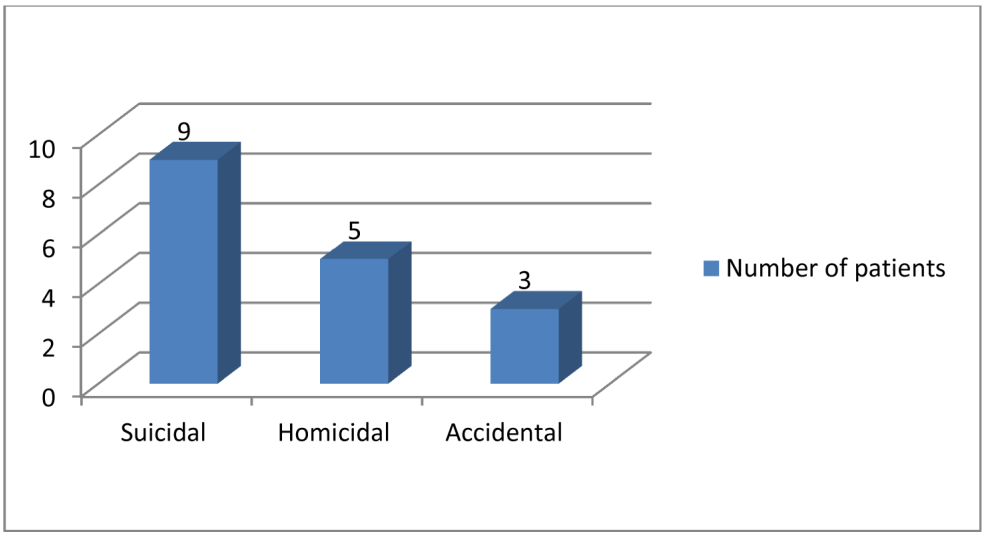

Fig 3. Distribution of patients according to the cause of the cut throat injury

Table I: Distribution of patients on the basis of mode of injury

MODE OF INJURY	MOTIVATING FACTOR	NUMBER OF PATIENTS	PERCENTAGE (%)
Suicidal	Depression	4	23.53
	Low socio-economic status	1	5.88
	Substance abuse	3	17.64
	Family abuse	1	5.88
	Total	9	53
Homicidal	Robbery	1	5.88
	Land dispute		5.88
	Interpersonal conflict	3	17.64
	Total	5	29.4
Accidental	Road traffic accident	2	11.76
	Fall from height	1	5.88
	Total	3	17.6

Table II : Type of weapons used for inflicting injury (suicidal/ homicidal)

WEAPONS	NO. OF PATIENTS	PERCENTAGE (%)
Agriculture tools	9	64.3
Kitchen knives/ butcher knives	3	21.4
Scissors	1	7.1
Axe	1	7.1

Table III: Distribution of patients according to structures injured

STRUCTURES INJURED	NUMBER OF PATIENTS	PERCENTAGE (%)
Skin, soft tissue, small vessels	17	100
Hypopharynx	10	58.8
Larynx	9	52.9
Thyroid gland	3	17.6
Trachea	2	11.7
Great vessels	1	5.8
Recurrent laryngeal nerve	2	11.7

Table IV: Distribution of patients according to delay in hospital arrival

TIME OF DELAY IN HOSPITAL ARRIVAL	NUMBER OF PATIENTS	PERCENTAGE (%)
< 6 hours	3	17.6
6 – 12 hours	10	58.8
13 – 24 hours	3	17.6
>24 hours	1	5.8

Table V: Distribution of patients according to treatment provided

TREATMENT PROVIDED	NUMBER OF PATIENTS	PERCENTAGE (%)
Simple wound closure	8	47
Repair of larynx and hypopharynx	1	5.8
Tracheostomy	9	52.9
Blood transfusion	15	88.2
Ligation of great vessels	1	5.8
Psychiatric consultation	17	100

Table VI: Distribution of patients based on the complications

COMPLICATIONS	NUMBER OF PATIENTS	PERCENTAGE (%)
Surgical site infection	12	70.5
Permanent voice change	1	5.8
Respiratory distress	1	5.8
Hemorrhagic shock	1	5.8
Ugly scar	4	23.5
Laryngeal stenosis	1	5.8
Permanent tracheostomy	1	5.8

Discussion

The neck accommodates vital vascular, aerodigestive and neurological structures. Hence, the surgical repair of neck injuries is a demanding task.[9] Thrombosis is the most common complication of blood vessel injury, and the most common sites are the internal jugular vein and carotid artery. Blood extravasation, pseudo aneurysm and AV

(arteriovenous) fistula are the other vascular problems.[11] Around thirty percentage of patients with neck injuries present with aerodigestive injury. The death rate of patients with pharyngo-oesophageal injuries and tracheal injuries are around twenty percentage. Spinal cord, cranial nerves VII–XII, the sympathetic chain, peripheral nerve roots and brachial plexus are the neurological structures that are prone to get injured from neck trauma.[9]

Neck injuries are usually seen in males more than females. In this study, most of the victims were males and were in their third decade of life. This is in accordance with the studies by Onotai LO et al and Manilal A et al.[12,3] Male preponderance in this age group is attributed to their active participation in risk taking behaviors and their frequent involvement in interpersonal violence. This has great economic impact as they are the valuable members of the society and in m ost cases the sole bread winners for their family. These are people in their most productive years and the injuries impose a considerable burden on their families and the society as a whole.[13]

Most of the patients in this study belonged to lower socioeconomic status. In this study, the most common weapon used was agricultural implements and in majority of cases the motivating factor behind the neck injuries was suicidal. Similar findings were reported in Western studies by Simpson et al and Gordon O et al.[14, 15] On the contrary, in a study by Japhet M Gilyoma et al, the most common cause of neck injury was homicidal attacks.[13] Psychiatric disorders were the most frequent cause for suicidal attempts. Similar finding was also reported in Bangladesh by Manilal et al.[3]

In the present study, associated medical comorbidities were reported in 41.1% of patients. Of these, psychiatric illnesses accounted for more than 50% of cases. As found in our study, psychiatric conditions has been reported to be associated with suicidal attempt in studies done by Mohanty S and Terra JL et al also.[16, 17] Psychiatric ailments are the strongest predictors of.[13] Suicide occurs 20.4 times more frequently in individuals with psychiatric illness than the general population.[16-18] In this study, psychiatric evaluation was sought to all patients to help them cope up with their symptoms and to lead a normal life.

The final result of the condition of the patient is significantly decided by the care they receive before reaching the hospital or on the way to the hospital.[19] 76.4% of the patients in this study were brought to hospital by relatives, friends or good citizens. Only 1 patient was brought in an ambulance. This is a very usual scenario in many other developing countries as well.[19,20] The insufficiency of paramedic services on transportation to these patients can lead to further deterioration of their condition and negative impact on the outcome of their treatment.[13]

The assessment and management of neck injuries is decided on the anatomical zone-based classification.[21] Roon and Christiansen classification is most frequently used:[12]

- Zone 1: Area from the clavicles to the cricoid cartilage.
- Zone 2: Area from the inferior margin of the cricoid cartilage to the mandibular angle.
- Zone 3: Area from the mandibular angle to the skull base.

Though it provides a useful guideline, it has certain disadvantages, such as making it difficult to determine zones in multiple injuries, and offering poor correlation between surface location and internal organ involvement.[22]

In the present study, site of injury of most of the patients was the zone II. In contrast to other zones, zone II is more susceptible to injuries as it is not secured by bony covering.[2]

The most common presentation of patients in this study was with open lacerated wounds and hemorrhage. Studies by Onotai LO and Manilal et al had similar findings.[12, 3] The main reasons for death in our patients of neck injuries were due to damaged hypopharynx and/or larynx and active bleeding which can lead to shock and asphyxia. The study done by Iseh et al recommended that the surgical management of the exposed hypopharynx, larynx and any other vital structures in neck should be carried out within 24 hours to save the life of the patient.[23] Likewise in our study also, the patients who were

managed within the first 24 hours had better chances at survival. With time the probability of the injury getting infected increases.

In this study, simple wound closure and tracheostomy were the most common treatment provided. The researches by Ezeanolue BC et al and Akpan E et al also displayed the importance of tracheostomy in the treatment of patients with neck injuries.[24,25]

After the treatment few patients had permanent disabilities like hoarse voice, stenosis and a tracheostomy but some could return back to living their normal life. These permanent complications can affect the quality of one's life. The most common complication in this study was infection of the sutured site. This result was also in accordance with the study by Gilyoma JM et al.[13]

The chances of patients ending up with complications were notably related to the late presentation and also the zone involved. This can be prevented by quickly securing the airway either by intubation or tracheostomy and control of active bleeding site and blood transfusion. Promptly diagnosing the condition and apt surgical management are of prime importance in order to decrease the morbidity and death of such patients.[13]

Neck injuries demand a combined approach treatment from the anesthetist, psychiatrist and otolaryngologist. With early presentation and immediate care, the prognosis of the patients can be improved.[2] In the present study, a psychiatric counselling was given to all patients who were treated for self-inflicted neck injury. As the act of intentionally hurting one's own body indicates an unstable mental health condition and there are high chances of repeating the incident.[3] Similarly the patients who were assaulted also received psychiatric assistance to overcome the trauma of the disturbing experience they had to face.[3,16]

Conclusion

Cut throat injuries are usually rare but very challenging cases. It has high patient mortality and morbidity. In this study we analyzed the demographic pattern, cause of the injury, structures injured, treatment given, complications and outcome of the injury. As per the findings of this study, incidences of self-induced neck injuries were seen to be more frequent in young males. This is mainly due to psychiatric illnesses. Unemployment and poor socioeconomic status also affects the mental health of an individual. Homicidal injuries are mainly due to low socioeconomic status. The number of such cases can be reduced by resolving the underlying problems of society like poverty, unemployment and drug addictions. Appropriate measures should be taken by the government agencies for enforcement of law and order. Proper communication system, adequate knowledge about first aid and prompt ambulance services can reduce the complications and reduce the death rate of patients with neck injuries.

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Persistence of Olfactory Dysfunction in Post CoVid-19 Patients Using Sniffin Sticks - A Prospective Study

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ABSTRACT

Introduction

This study is conducted to assess the Olfactory dysfunction (OD) of CoVid-19 recovered patients using ODOFIN Sniffin' Sticks and to analyze the demographic features, duration of recovery, co-morbidities/metabolic disorders associated with persistence of OD in Post CoVid-19 patients.

Materials and Methods

This prospective observational study was conducted at our tertiary care hospital on 40 CoVid-19 recovered patients with persistent OD. The olfaction was assessed qualitatively using ODOFIN Sniffin' sticks at 6th, 10th, 12th weeks Post CoVid and the results documented and analysed.

Results

Total 40 eligible patients were selected. 50% of study participants were males and 60% aged 18-38 years. 3 patients were diabetic and 3 were hypertensive. 37 had OD of which 26 had hyposmia and 11 had anosmia 6 weeks Post CoVid. 22 had OD of which 14 had hyposmia and 8 had anosmia 10 weeks Post CoVid. 10 had persistent OD 12 weeks Post CoVid. There was no association found between age, co-morbidities and OD at 6, 10 and 12 weeks Post CoVid ($p>0.05$). Hyposmia was common among females at 10 weeks Post CoVid which was found to be statistically significant ($p<0.05$).

Conclusions

Knowledge about time pattern on the recovery of OD in Post CoVid patients will be essential in counselling and treating them.

Keywords

Olfactory dysfunction; Post CoVid; Odofin Sniffin' Sticks

Altered taste and smell sensations were common symptoms of the CoVid-19 disease, Olfactory Dysfunction (OD) in CoVid-19 patients was found to be 47.85%.[1] Post CoVid OD lasting for a prolonged period of time might impact quality of life (QOL) and can result in psychological illnesses such as depression, anxiety, anorexia and its nutritional effects, social interaction issues, and cognitive impairment.[2] OD following a respiratory infection is not unique to CoVid-19, viruses such as adenovirus, rhinovirus, corona virus and influenza are already known etiological factors for Post Viral Olfactory Dysfunction (PVOD).[3] However, prevalence of post CoVid OD varies between studies, and several factors have been reported to be associated with the prognosis of smell loss in CoVid-19 cases.[4] Studies on duration of post CoVid OD is still unclear as most of the data's were based on questionnaires or telephone interviews. Olfaction being an important sense in human life, knowing the recovery rate and factors associated with persistence of OD in post CoVid patients is crucial. In India mostly a subjective evaluation of CoVid-19 induced OD is carried out and limited studies are available on objective assessment of OD in post CoVid patients. Using established olfactory tests will help to characterize OD in more detail.[5]

The Sniffin Sticks Test (SST) is a semi-objective and

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validated olfactory test used for objective assessment of OD.[6] The objective of the study is to assess the OD of CoVid-19 recovered patients using SST and to observe the duration of recovery and to analyze the demographic features, co-morbidities/metabolic disorders associated with persistence of OD in post CoVid-19 patients.

Materials and Methods

This is a prospective observational study conducted at our tertiary care hospital from July 2021 to December 2021. After getting Institutional Ethical Clearance, reverse transcriptase polymerase chain reaction/ rapid antigen test (RT-PCR/RAT) positive CoVid patients with OD were identified through inpatient medical records/OPD basis. This study included 40 CoVid-19 recovered patients (RT-PCR/RAT negative) with persistent OD (more than 6 weeks from the time of onset of smell loss). Participants under 18 years of age, with known olfactory disorder before the CoVid-19 disease, previous histories of nasal disorders and nasal/sinus surgeries, history of nasal tobacco (snuff) abuse, with psychological / psychiatric disorders, neurological disease known to be associated with OD were excluded from the study. Sample size was calculated using cochran's formula taking a prevalence of 14.8%,[7] and precision of 10%, the sample size was calculated to be 40. Informed written consent from the patients meeting the inclusion and exclusion criteria was obtained. At 6th week post CoVid, after complete ENT examination and investigations, olfactory dysfunction was assessed with Questionnaire for Olfactory Dysfunction (QOD)[8] and SST and results documented. All the patients were reviewed at 10th and 12th week post CoVid and olfactory assessment was repeated with SST and results were documented. Olfactory training was encouraged in all the study participants. At the end of 12th week post CoVid, in patients with persistent OD, demographic features and associated co-morbidities and recovery rate of OD were assessed. The results were statistically analysed and presented. The study methodology is shown in (Fig. 1).

The ODOFIN (BURGHART) Sniffin' Sticks Test kit (Burghart Messtechnik Denmark) consists of 16 test pens loaded with odours such as peppermint, orange, fish, leather, rose, cloves, coffee, pineapple, liquorice, anise, lemon, banana, cinnamon, apple, turpentine, garlic. A choice card with 4 odour choices is provided for each odour pen. (Fig. 2a)

After explaining the procedure to the patient, each patient is instructed to smell each pen separately. The tip of the pen is held approximately 2 cm below one nostril, with other nostril closed with their thumb and instructed to inhale the odour for 3-4 seconds (Fig. 2 b).The procedure is repeated on the opposite side and then once again with both nostrils open and holding the test pen in the centre of the nostrils. All 16 odour pens are presented one after another, at an interval of 30 seconds. For each odour pen, a choice card with 4 odour choices is provided and the patient is asked to choose the item that best matches their olfactory perception. A correct identification is given one point. The score is a sum of all correct answers. A score less than 8 were graded as anosmia, 8-11 as hyposmia, more than 11 as normosmia and the results documented.

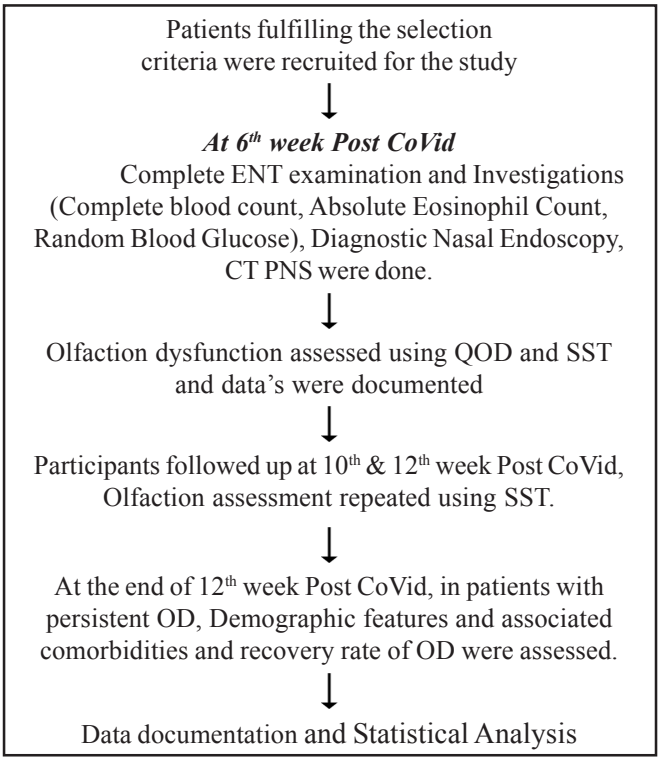

Fig. 1. Study methodology

Fig. 2a. Showing the ODOFIN Sniffin' stick test kit with 16 odour pens, choice cards and answer keys [black colour]

Fig. 2b. Showing Olfactory function being assessed using ODOFIN Sniffin' sticks

Results

In present study, total of 40 patients fulfilling inclusion criteria were included. The mean age of participants was 36.8±14.6 years, about 60% aged 18-38 years and 50% were males. 3 patients were diabetic and 3 were hypertensive. The most frequent symptoms reported by patients associated with SARS-CoV-2 infection were fatigue (95%), muscle pain (87.5%), fever (65%), headache (62.5%), nasal obstruction (47.5%), diarrhea (35%), cough (30%), rhinorrhea (27.5%), dyspnoea (7.50%) (Table I). None of the study participants reported hospitalization or intensive care unit stay during the period of CoVid infection. None of the patients had undergone therapy for post CoVid OD. In this study, at 6 weeks post CoVid none of the patients had nasal complaints. The objective assessment of olfaction using the SST revealed OD in 37 (92.5%) of which 26 (65%) had hyposmia and 11 (27.5%) had anosmia 6 weeks post CoVid infection. At 10 weeks Post CoVid, 22 (55%) had OD of which 14 (35%) had hyposmia and 8 (20%) had anosmia. 10 (25%) had persistent OD 12 weeks Post CoVid (Fig. 3). None of the patients had other olfactory distortions like parosmia, cacosmia. There was no association found between age, co-morbidities and OD at 6,10 and 12 weeks Post CoVid ($p>0.05$). Hyposmia was common among females at 10 weeks post CoVid which was found to be statistically significant ($p<0.05$). There was improvement in SST scores at the end of 12th week post CoVid which is shown in (Table II). Majority of people with hyposmia recovered early compared to anosmics, who had longer recovery time. In this study, out of 40 patients 3 had persistent anosmia even after 6 months post CoVid infection , MRI of brain and paranasal sinus of them showed normal study and they were treated with short course of intranasal steroid therapy and found to have no improvement in olfaction.

All the patients data were collected in predesigned proforma and entered in excel sheet. All the collected data were summarized as frequency, percentage, mean and standard deviation. The summarised data were represented with the help of tables and figures. The categorical data was analysed using chi-square test, a p-value of < 0.05 was considered statistically significant and all the statistical analysis was performed using SPSSv21 operating on windows 10.

Table I : Clinical-demographic characteristics

CHARACTERISTICS	PATIENTS
Sample size	40
Age (mean ± SD)	36.8 ± 14.6
Gender	Males Females
	20 (50%) 20 (50%)
Comorbidities	Diabetes Mellitus - 3 Hypertensives - 3
Hospitalization	0
PRESENTING SYMPTOMS DURING COVID INFECTION	N (%)
Fever	26 (65%)
Headache	25 (62.5%)
Muscle pains	35 (87.5%)
Rhinorrhoea	11 (27.5%)
Nasal obstruction	19 (47.5%)
Diarrhoea	14 (35%)
Fatigue	38 (95%)
Dyspnoea	3 (7.5%)
Cough	12 (30%)

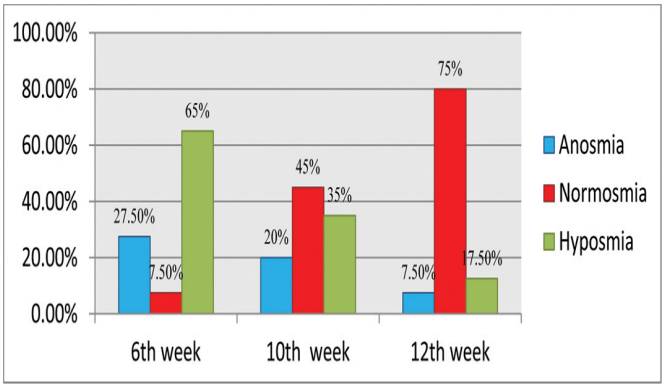

Fig. 3. Olfactory scores at 6th, 10th, 12th week Post CoVid infection assessed using SST

Table II : Sniffin stick scores

SST SCORES	(mean +SD)
At 6 weeks	8.6 + 2.7
At 10 weeks	11.3 + 2.9
At 12 weeks	12.5 + 2.986

Discussion

Loss of smell is a key symptom of the corona virus disease 2019, which may be an isolated symptom or associated with other general and otolaryngological symptoms. Postviral Olfactory Loss (PVOL) is not a uncommon phenomenon. Numerous virus has been advocated to enable OD, but some studies found that rhinovirus and parainfluenza-2 to be the predominant cause of PVOL. Previous studies have shown olfactory loss following viral infection among female patients.[9] In our study, hyposmia was common among females at 10 weeks post CoVid. Several studies suggest that a significant number of patients may have persistence of symptoms for several weeks to months after resolution of acute CoVid illness which is known as syndrome of Post-Acute Sequelae of CoVid (PASC) or long CoVid or chronic CoVid.[10] Symptoms of PASC include persistent fatigue, dyspnea, anosmia, cognitive dysfunction ('brain fog'), anxiety, depression and insomnia. Several mechanisms have been proposed to explain persistence of symptoms in PASC including viral reservoirs, continued inflammation, development of autoantibodies, and/or sequelae of organ damage during acute infection.[11,12] Exact pathophysiology behind CoVid-19 induced OD remains unclear. OD in CoVid-19 infection could be related to the involvement of the olfactory bulb or damage to the peripheral olfactory receptor cells in the nasal neuroepithelium as SARSCOV-2 is neurotrophic in nature. An emerging consensus favors a crucial role of the sustentacular cells in the olfactory epithelium as the primary mechanism of CoVid-induced anosmia.[13] CoVid-19-related smell impairment usually does not affect patients with significant nasal symptoms, a small percentage of patients might have a component of nasal

inflammatory changes contributing to the hyposmia.[14] In our study none of the patients had nasal complaints at the time of olfactory assessment and majority of the patients with hypsomia at 6 weeks from onset of smell loss recovered early compared to patients with anosmia,who had longer recovery time. In a study done by Tsivgoulis G et al showed hypothyroidism was independently (p=0.021) associated with higher likelihood of persistent OD among patients with CoVid-19.[15] In our study none of the patient had hypothyroidism or any other metabolic disorders.

In a study done by Tsivgoulis G et al showed that CoVid-19-induced persistent (>40days) OD was associated with olfactory bulb atrophy on high-resolution brain MRI.[16] A study done by Yildiz E et al[17], to assess the effect of steroid nasal spray in patients with CoVid 19 related OD showed topical corticosteroids was found to be successful in the treatment of OD due to CoVid-19. In this study, out of 40 patients 3 had persistent anosmia even after 6 months post CoVid infection, MRI scan of these patients showed no such significant findings and they were treated with steroid nasal spray and found to have no improvement in olfaction.

The duration of OD in CoVid-19 disease is still unclear. Most of the studies show that anosmia in CoVid recovers within a period of 4-6 weeks, but cases of persistent anosmia lasting more than 3 months are also being reported.[18] Using established smell tests will help to characterize post CoVid OD in more detail. In India mostly subjective evaluation of CoVid-19 induced OD results is carried out. Objective assessment of olfaction will be effective in identifying patients with true Post CoVid OD. The Sniffin 'Sticks Test - (SST) is a semi-objective and validated olfactory test used for assessment of OD.[19] A study by Vaira et al, reported that 10.3% of patients who were found to have a disorder on objective testing had self-reported normal function.[20]

A study by Amer et al[21], reported an association of comorbidities with a worse olfactory recovery in patients with allergic rhinitis, smoking, and hypertension. In our study, there was no association of comorbidities with the recovery of OD following the CoVid infection.

The limitations of our study is the smaller sample size. A study with a larger patient numbers with all levels of disease severity will be needed to determine whether there are predisposing factors for developing long term post CoVid OD.

Conclusion

Eventhough we have overcome the worst part of the initial outbreak of CoVid-19 infection, post CoVid OD has a huge negative impact on the QOL. Knowledge about time pattern on the recovery of Post CoVid OD will be essential and by objectively evaluating these patients using SST will help us to identify people with true OD and treating them. In our study most of patients with post CoVid OD recovered their olfaction at the end of 12 th week post CoVid, so proper counselling and olfactory training will be essential before initiation of any treatment for post CoVid OD.

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Case Series

Aetiologies and Management of Retropharyngeal Abscess in Paediatric Age group

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ABSTRACT

Introduction

Retropharyngeal abscess (RPA) is deep neck space infection which requires prompt diagnosis and management due to its potential life-threatening nature. In paediatric group it is most common between 3-5 years of age with infants presenting it very rarely. We are reporting a case series of all the children who were diagnosed of RPA and managed successfully.

Materials and Methods

This is a single-center, retrospective study conducted at the tertiary care hospital. Detailed data from the case files of patients who were diagnosed and managed for RPA from 2012 to 2022 were included. The demographic details, presenting complaints, site of involvement, CT findings, intra-operative findings, pus culture report and course of child during hospitalization was meticulously documented along with their follow up findings and analysed.

Results

Total number of children who underwent treatment for RPA during the study period is 17. Maximum number of cases were below 4 years of age accounting for 65%. 58.8 % had an episode of upper respiratory tract infection before developing the RPA. 2 patients were diagnosed to have tuberculosis and had started on anti tubercular treatment. One child had sustained injury to neck, and one had history of chicken bone ingestion. Five children showed the complications of which 60% of them were infant.

Conclusion

The crucial step in infants with RPA is prompt diagnosis and aggressive management. Initial antibiotics should be a broad spectrum until the pus culture sensitivity reports are available. There is a recent trend is Methicillin resistant staphylococcus aureus especially in younger children. Paradoxical reaction of tubercular treatment is rare and should be borne in mind of its possibilities while treating.

Keywords

Retropharyngeal Abscess; Paediatric Neck Abscess; Methicilin Resistant; Staphylococcus Aureus; Paradoxical Tuberculosis

Retropharyngeal abscess (RPA) is a deep neck space infection which requires prompt diagnosis and management due to its potential life-threatening nature.[1] This is due to its anatomical location which when progressed leads to upper airway obstruction. It has various clinical presentations ranging from nonspecific symptoms like fever, irritability, poor appetite, sore throat to more severe presentations like drooling of saliva, difficulty swallowing, neck swelling and respiratory distress.[1-3] It usually follows upper respiratory tract infection (URTI) in children who are more prone for adenotonsillitis and middle ear infections. In adults it usually follows trauma, foreign body ingestion, history of instrumentation like endoscopy or immune compromised status and tubercular in older children.[1,2,4] In pediatric group it's most common between 3-5 yrs of age with infants presenting it very rarely.[2-5] This paper is aimed to determine the aetiology and outcomes of the children

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diagnosed and managed with retropharyngeal abscess (RPA) at a tertiary care centre.

Materials and Methods

This is a single center, retrospective study conducted at the tertiary care pediatric hospital. Detailed data from the case files of patients who were diagnosed and managed for RPA from 2012 to 2022 were included. Exclusion criteria was the case files with inadequate data.

The demographic details, presenting complaints, site of involvement, CT findings, intra-operative findings, pus culture report and course of child during hospitalization was meticulously documented along with their follow up findings. This was entered into an excel sheet and analyzed.

Results

Total number of children who underwent treatment for RPA during the study period is 17. When analysed for age distribution we found, maximum number of cases were below 4 years of age accounting for 65% . Female outnumbered the male with (F:M-10:7) [Fig 1].

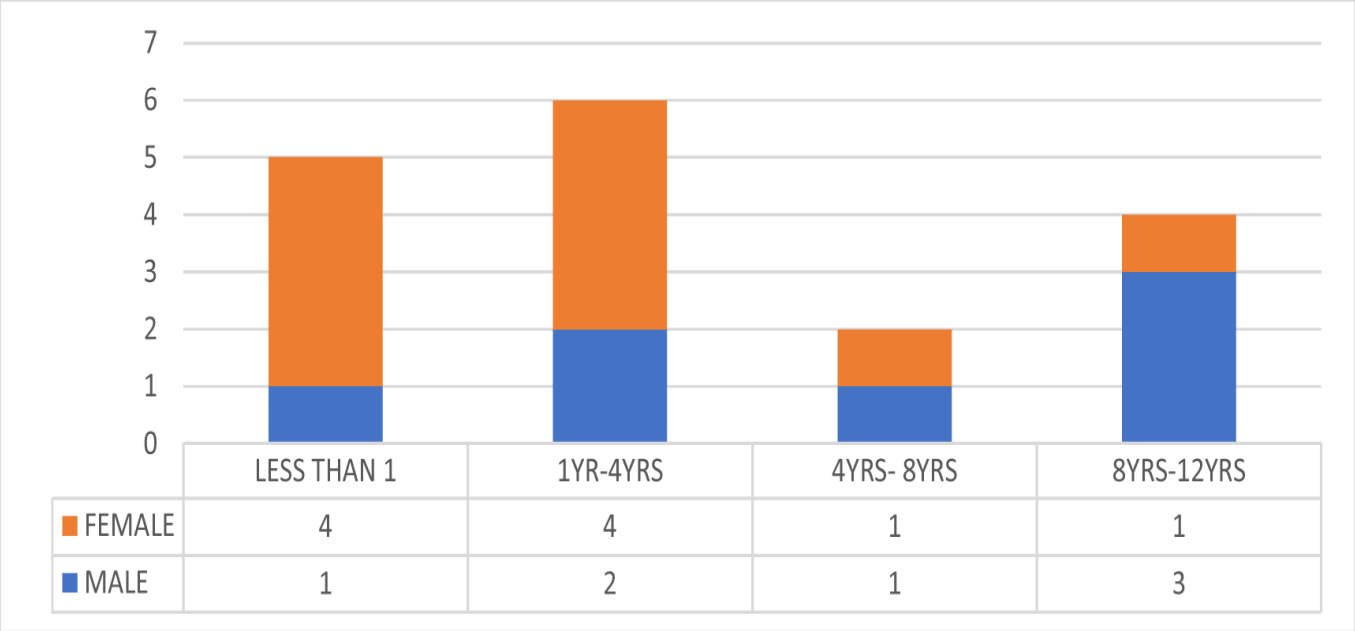

Fig. 1. Distribution according to age and gender

Various presenting complaints were observed (Table I). All 17 children had history of fever and difficulty swallowing. Next common symptom was swelling of neck (70%). Throat pain was seen in 64.7%. Stridor was seen in 8 children accounting for 47% among which 7 were below 2 years. Inconsolable cry was seen in 5 children who all were below 1 year of age. Irritability was seen in 2 neonates and 3 children showed torticollis (Fig. 2).

Duration of presenting symptom ranged from 2days-2months. Most of them were within 5-10days (64.7%). When the aetiology was analysed, 58.8 % had an episode of URTI before developing the RPA. 2 patients were diagnosed to have tuberculosis and had started on anti tubercular treatment. One child had sustained injury to neck, and one had history of chicken bone ingestion.

TABLE I: Clinical features and aetiology of all the children included in this case series

CASE NUMBER	AGE AND GENDER	DURATION	NECK SWELLING	THROAT PAIN	STRIDOR	INCONSOLABLE CRY	IRRITABILITY	TORTOCOLLIS	AETIOLOGY
1	12y/M	2	NO	YES	NO	NO	NO	NO	Developed symptoms spontaneous
2	10m/F	10	YES	NO	NO	NO	NO	NO	Following URTI
3	3m/F	10	NO	YES	YES	YES	NO	NO	Following URTI
4	1y/M	7	YES	NO	YES	YES	YES	NO	Following URTI
5	10m/M	10	YES	NO	YES	YES	NO	NO	Following URTI
6	1m 20d/F	5	YES	NO	YES	YES	YES	NO	Following URTI
7	1m 8 D/F	8	YES	YES	YES	YES	NO	NO	Following URTI
8	8y/M	7	YES	YES	No	NO	NO	NO	Suspected for Diphtheria → swab was negative → CT was advised
9	2.6y/F	10	YES	NO	NO	NO	NO	NO	Following URTI
10	2y/M	35	YES	YES	NO	NO	NO	NO	Following URTI
11	2y/F	20	YES	YES	YES	NO	NO	NO	Following URTI
12	2.3y/F	4	NO	YES	NO	NO	NO	YES	Following URTI
13	7y/M	5	YES	YES	NO	NO	NO	NO	Developed symptoms spontaneous
14	1.6y/F	45	YES	YES	YES	NO	NO	NO	Multiple neck swelling with discharging sinuses and was diagnosed as TB by biopsy. Child was started on ATT and she developed distress within a week
15	11y	60	YES	YES	YES	NO	NO	YES	Recently diagnosed with TB and was started on ATT 20days back following which he developed the symptoms
16	9y	3	NO	NO	NO	NO	NO	YES	FOREIGN BODY INGESTION
17	7Y 11M	7	NO	YES	NO	NO	NO	NO	INJURY TO NECK

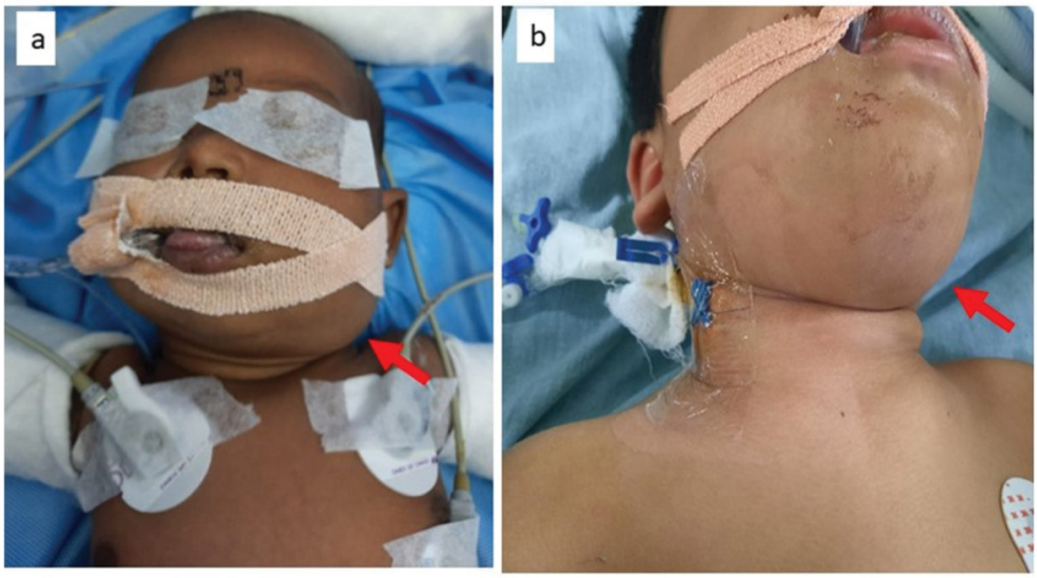

Fig. 2. Clinical picture showing: (a) a 1 Month 20days old female child with swelling on left side of the neck with torticollis; (b) 8 years old boy with neck swelling who were diagnosed as RPA

Fig. 3. (a) Coronal section. (b) Sagittal section of contrast enhanced computerized tomography (CECT) of neck and thorax showing RPA predominantly seen on left paramedian region extending from base of skull to C7 level with symmetrical narrowing of nasopharynx and oropharyngeal airway. Cervical spinal vertebrae appears normal without any erosions.

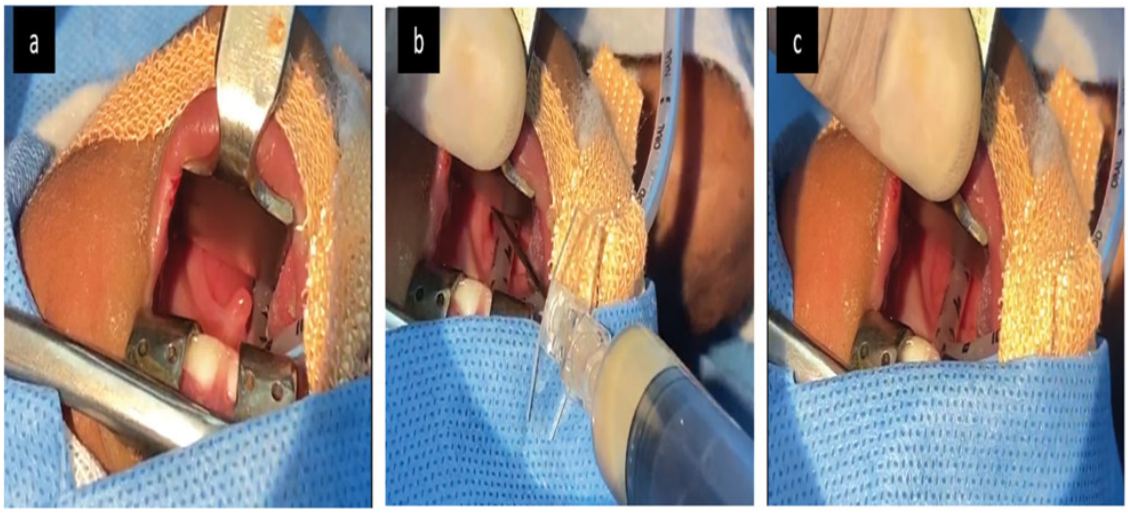

Fig. 4. Intra operative pictures of a 2 and half month-old infant undergoing incision and drainage via oropharyngeal route. a) Examination of oropharynx under GA. Note the asymmetric bulge over posterior pharyngeal wall predominantly on left side. (b) Intra operative picture of aspiration using an 18-gauge spinal needle. Note the pus collected in the syringe. (c) Post-operative picture showing reduction of bulge over posterior pharyngeal wall.

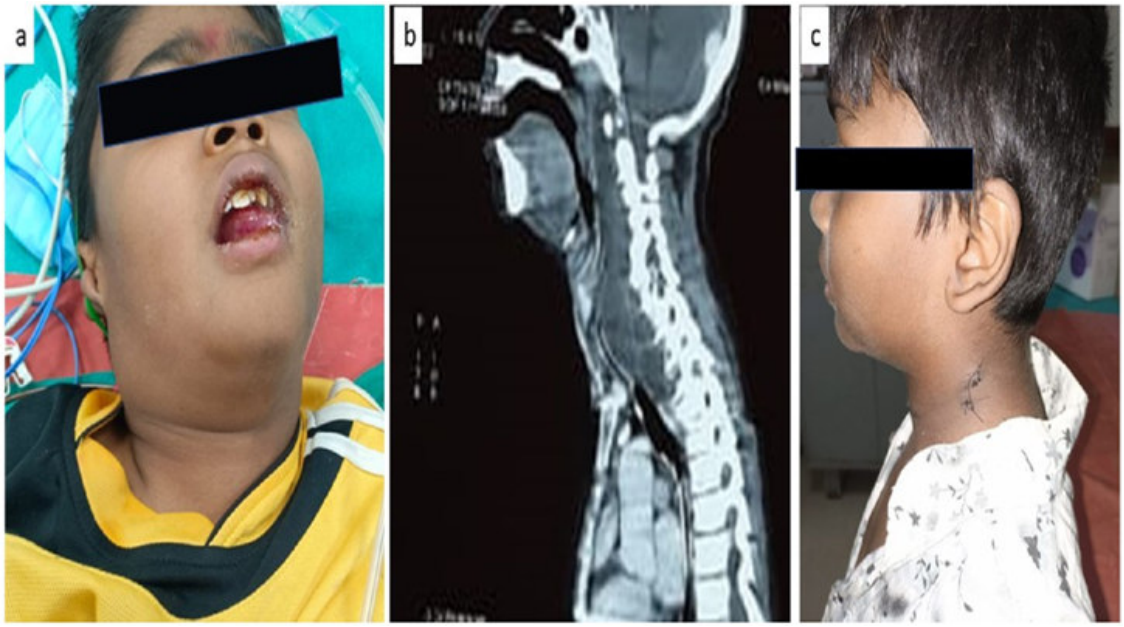

Fig. 5. 11 years old male child previously diagnosed with tuberculosis who was on anti tubercular treatment presented with neck swelling, stridor and new onset of fever. (a) Note the neck swelling; (b) CT scan showing large multi loculated cystic density of 12*1.67.2cm vol 71cc seen involving midline prevertebral, retropharyngeal region of neck from C2 to D4 causing compression of anterior structures ; (c) Post operative scar picture of external cervical approach to drain the pus.

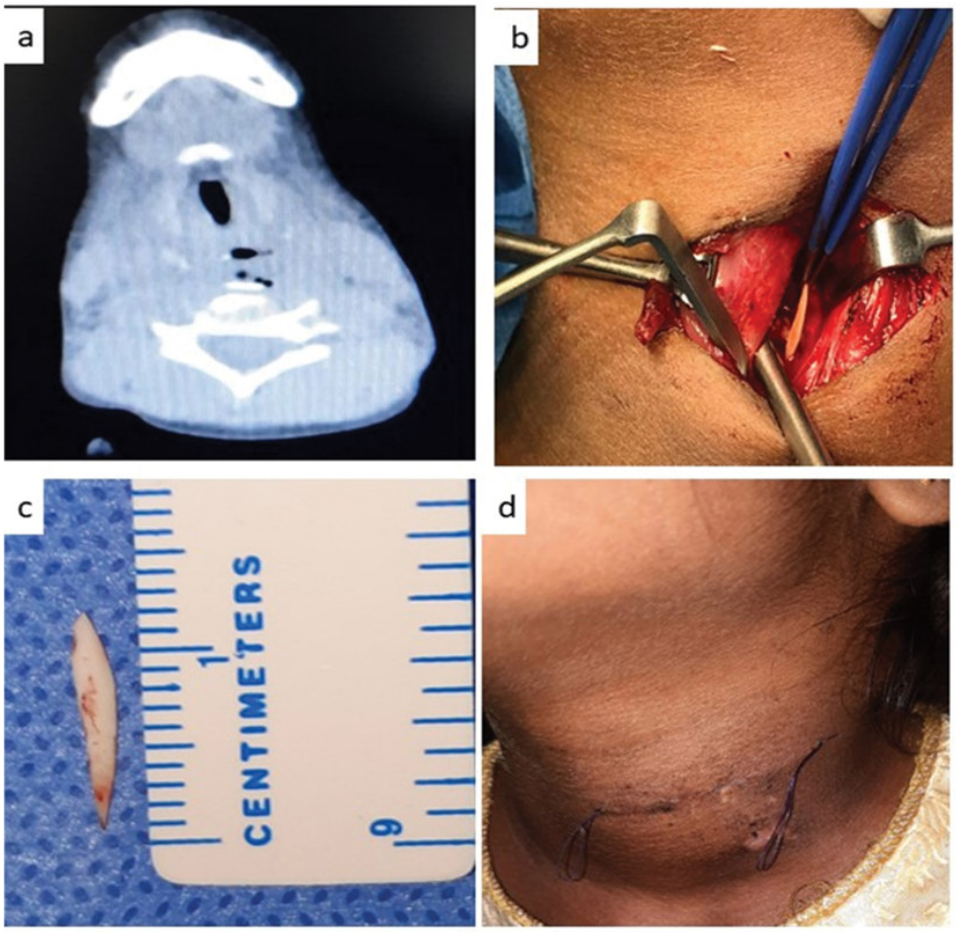

Fig. 6. Nine years old female child with history of chicken bone ingestion who presented with dysphagia and odynophagia. (a) Coronal section of CT of neck showing well defined RPA with air foci within and hyperdense foci measuring 1* 0.4 cm with 2.5mm thickness is noted within the collection at C5 vertebra; (b) Intra operative picture showing lateral neck approach retrieving the foreign body; (c) foreign body removed; (d) Post operative scar picture.

All children had undergone CT scan for diagnostic purposes and showed definitive evidence of RPA (Fig. 3).

For removal of the collected abscess surgical management was planned. 16 children underwent incision and drainage via oropharyngeal route and had complete removal of pus (Fig. 4). Under general anaesthesia, Boyle Davis mouth Gag with blade was introduced cautiously and the oropharynx was visualized. Bulge over posterior pharyngeal was examined and using an 18-gauge spinal needle the abscess was aspirated. Followed by introduction of negus right angled tonsillar artery forceps into the opening and breaking of all the locules around the abscess was done. Betadine-soaked ribbon gauze was kept into the cavity for 5minutes and removed. The aspirated pus was sent for culture sensitivity.

Two children required lateral neck exploration in which one was to retrieve the foreign body and one child for clearance of pus due to inaccessibility to the area via oropharyngeal route. (Figure 5 & 6).

When the pus c/s report was analysed, 29.4% of them showed Methicillin resistant staphylococcus aureus (MRSA). It is interesting note that all these 5 children were under 1 year. Other organisms grown were Klebsiella, Staphylococcus Aureus, Streptococcus species. 4 children showed no growth (Table II).

Table II: Culture sensitivity report and the complication observed

CASE NUMBER	AGE AND GENDER	AETIOLOGY	PUS CULTURE GROWTH	COMPLICATIONS
1	12y / M	Developed symptoms	Strept. pyogenes	NIL spontaneous
2	10m / F	Following URTI	MRSA	Pleural effusion with lung consolidation
3	3m / F	Following URTI	MRSA	Recurrent collection
4	1y / M	Following URTI	MRSA	NIL
5	10m / M	Following URTI	MRSA	IJV thrombosis+ Pleural effusion+ lung consolidation
6	1m 20d / F	Following URTI	MRSA	NIL
7	1m 8 D / F	Following URTI	MSSA	NIL
8	8y / M	Suspected for Diphtheria → swab was negative → CT was advised	Strept. pyogenes	NIL
9	2.6y / F	Following URTI	Klebsiella	NIL
10	2y / M	Following URTI	NO GROWTH	NIL
11	2y / F	Following URTI	NO GROWTH	Recurrent collection
12	2.3y / F	Following URTI	Staph. Aureus	NIL
13	7y / M	Developed symptoms	Klebsiella	NIL spontaneous
14	1.6y / F	Multiple neck swelling with discharging sinuses and was diagnosed as TB by biopsy. Child was started on ATT and she developed distress within a week	NO GROWTH	NIL
15	11y	Recently diagnosed with TB and was started on ATT 20 days back following which he developed the symptoms	NO GROWTH	Erosion of C2 – D4 vertebral bodies + Pleural effusion with lung consolidation
16	9y	FOREIGN BODY INGESTION	α haemolytic strept.	NIL
17	7Y 11M	INJURY TO NECK	Staph. Aureus	NIL

Case 3 developed spikes of fever after the procedure and hence repeat CT was done which again showed collection which was drained under general anesthesia. Case 11 had an initial I and D done outside and was referred to us as the symptoms did not improve. Repeat CT showed recollection and the procedure was repeated. Post the 2nd drain, child recovered well.

Duration of treatment was less than a week in 35.2% of them. All the MRSA positive children were treated with antibiotics for 3 weeks. 2 children took more than 3 weeks as they had to complete their anti-tubercular treatment.

Five children showed the complications of which 60% of them were infant:

- Two children had lung abscess.
- Two had recurrent collection of RPA
- One had IJV thrombosis with lung consolidation and
- One had subluxation of vertebral body.

Discussion

Retropharyngeal space extends from base of skull upto mediastinum which is bounded laterally by carotid sheaths lying behind buccopharyngeal membrane and anterior to alar fascia ie; deep cervical fascia. This space beholds lymph nodes which drain from nasopharynx, nose and paranasal sinuses.[4] Hence the infection can spread secondary to adenotonsillitis, pharyngitis and rhinosinusitis. The suppuration of lymphnode is thought to cause retropharyngeal abscess. The infectivity in adults is more due to trauma, foreign body ingestion and history of instrumentation like endoscopy or compromised immune status.[1,2,4] In pediatric group retropharyngeal abscess is most seen between 3-5 yrs of age.[2-5] Following which the incidence reduces because retropharyngeal lymph nodes atrophies.[3] In our study we have 65% of them within 4 years of age. Among them, maximum number of cases were within 1 to 4 years of age 6 (35.2%) and 5 (29.4%) cases were infants. Presentation in this age group is life threatening due to their immature immune system.

There are various clinical presentations depending on the extension of space involved. The children usually present with fever, sore throat, drooling of saliva, refusal to feed, neck swelling, respiratory distress, or stridor.[1-3] All our children presented with fever and dysphagia. Many studies have shown fever to be the most common symptom accounting for 70-90% of.[2,4,5] Next common symptom seen was neck swelling (12). In study by Huang MC et al on deep neck space infection in children found neck swelling (82.7%) as the most common symptom and suggested to rule out DNI whenever a child presents with neck swelling.[6]

Current study showed stridor in 8 children (47%) and 7 of them were 0-2 years old. In couple of studies, it is shown that airway symptoms are more pronounced in infants when compared to older children. It has been quoted to be around 71% of infants and approximately 43% in older children.[5] Atypical symptoms like inconsolable cry, irritability, should be paid attention especially in an infant and prompt diagnosis to be done at the earliest. Since it's not possible to have clear physical examination findings it is best to get the imaging studies to rule out the infection. Various differential diagnoses to be considered with these signs and symptoms are epiglottitis, foreign body aspiration, meningitis, and cervical lymphadenitis.[2, 7]

The most common aetiology to cause RPA is considered to upper respiratory tract infection. In our study 58.8 % children had an episode of URTI before developing the RPA. One child had trauma to neck and one child had foreign body ingestion. 2 children were diagnosed as tuberculosis and had started on anti-tubercular treatment.

Imaging has to be done to confirm the diagnosis and know the extent of the disease. Though many modalities are available like lateral neck radiograph, CT and MRI. Correct extension of neck on full inspiration with adequate lateral orientation were must to detect any alterations in para or reteopharyngeal spcaes according to Haugh et al.[8] Since this is difficult to achieve in children, Nagy and Backstrom advise against using lateral neck x ray to diagnose the RPA.[9]

Though MRI is a noninvasive and safer option, it is not practical as it requires longer time to complete a study which requires sedation of the child and added higher

cost makes it less popular. CT has been considered as preferred diagnostic method in RPA after a survey conducted by the American society of pediatric otolaryngologists.[10,11] It has shorter scanning period, consistently better quality, lower cost and it is helpful in confirmation of the abscess, its extent and detects other possible complications. The sensitivity of CT for diagnosing RPA has been reported to be 88–91% [12]. All the children were subjected to CT neck and thorax at our institute.

When it comes to management of RPA both medical and surgical interventions are advocated. Few reserves surgical line to those who fail to resolve with former intervention. However, this amounts to a very small percentage of 20-25% cure.[4] Initial Antibiotics should be a broad spectrum until the pus culture sensitivity reports are available. Dawes L C et al recommend a combination of third generation cephalosporin, cloxacillin and metronidazole as initial antibiotic therapy.[12] We used 3rd generation cephalosporin and metronidazole for all the children initially and later changed.

Intra oral drainage and incision is the preferred route and external cervical approaches are reserved for very rare cases. We could drain the abscess in 16 of them via intra oral method. Using a long wide gauge spinal needle, it was easier to reach the abscess area.

Two children required external cervical approach. One to remove the foreign body which was embedded deep and another to drain the abscess which was at the level of T2 to T3 level. The pus which was drained was sent for culture sensitivity.

The most common pathogens isolated from deep neck spaces used to be Staphylococcus aureus, streptococcus viridians, Klebsiella-pneumoniae, Escherichia coli, beta-haemolytic Streptococcus Group A, and Haemophilus species.[4] Recently, MRSA has predominated as shown by one of the cohort studies conducted on 228 pateints by Inman et al; between 1999 to 2007.[13] A case report by Pascu has also demonstrated the same in a 3-month-old infant.[14]

Poonith et al recommend that MRSA should be suspected etiology in newborns, infant and young children.[1] Our study showed maximum number of staphylococcus (8) in which 5 were MRSA. It is interesting note that all these 5 children were under 1 year. In a study by Abdel-Haq N et al showed MRSA as a major pathogen of RPA. They suggested this change in trend to general increase of CA-MRSA infections in their pediatric popula-tion. Several virulence factors have been attributed to the invasiveness of CA-MRSA. The main factor appears to be the Panton-Valentine leukocidin, a pore-forming exotoxin.[15]

Four children showed no growth. This included 2 patients who had started on anti-tubercular treatment in last one month. Both the children presented with multiple neck lymphadenopathy which was diagnosed as Tuberculosis and initiated on the ATT. After initial brief asymptomatic period, they presented with new onset of fever, dysphagia, and stridor.

A paradoxical reaction in tuberculosis (TB) is defined as the clinical or radiological worsening of the pre-existing tuberculous lesion or the development of a new lesion in a patient who initially improves with anti-tuberculosis therapy (ATT), in the absence of disease relapse. It can occur any time after 2 weeks of initiation of the treatment. Its incidence is said to be 11-15% of patients with TB. The culture yields no growth but responds well on continuation of the ATT and the temporary management of the presented symptoms.[16-17]

Retropharyngeal abscess can progress to cause complications like mediastinitis, aspiration, jugular vein thrombosis, carotid artery aneurysm, necrotizing fasciitis and vertebral body subluxation.[2,4] Five children showed complications in which one child had lung abscess, 2 had recurrent collection of RPA, one had IJV thrombosis with lung consolidation and one had subluxation of vertebral body. 60% of them were infants. This highlights the early surgical intervention for successful outcome as the crucial step in infants with RPA.

Poonith at al mentioned in case the child does not improve after initial incision and drainage, repeat CT to be considered to rule out any additional loculations which needs to be drained.[1] Which was found to be useful in two of our cases. Along with surgical treatment, the administration of prolonged antibiotics and airway

maintenance will avert the possible life-threatening complications.

Conclusion

The crucial step in infants with RPA is prompt diagnosis and early surgical intervention for successful outcome. Along with surgical treatment administration of prolonged antibiotics and airway maintenance will avert the possible life-threatening complications.Emphasis has to be given to the recent trend is MRSA especially in younger children in oorder to start the IV antibiotics which covers all common pathogens. We need to make ourselves with the concept of paradoxical reaction of TB and treat accordingly.

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Evaluting Functional Outcome of Oblique cut across Mentum in Advanced Oral Squamous Cell Carcinoma

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ABSTRACT

Introduction

Segmental / hemi mandibulectomy is standard for advanced oral squamous cell carcinoma (SCC). Sometimes the mentum needed to include to achieve an adequate resection. Loss of which often leads to a variety of complications. Evaluation of the functional outcome has been done in those cases which were unsuitable for free flap reconstruction, so an oblique cut was placed across mentum & pedicle flap was done instead.

Materials and Methods

In this study from 26 December 2022 to 25 March 2023, the effect of oblique cut across mentum in 10 patients of oral SCC were analysed for functional outcome over next 3 months.

Results

Successful decanulation from tracheostomy tube were achieved in all patients by 6weeks. By 12 weeks nasogastric tube removal and commencement of oral feeding were achieved in all. Complete oral competency were achieved in all by 12 weeks.

Conclusion

Mandibular reconstruction is necessary to restore postoperative function. Free flaps remain the first choice. But sometimes the patients' age, overall health & co- morbidities are not in favour; hence pedicle flaps are needed. Preserving the mentum with clear margin then requires very stringent case selection. This novel approach, in selected cases may solve a lot of functional issues.

Keywords

Oral squamous carcinoma; Hemi- mandibulectomy; Segmental- mandibulectomy; Mentum; Pedicle Flap; Free Flap

Segmental / hemimandibulectomy is a standard procedure for locally advanced Squamous cell cancer [SCC] of oral cavity. Sometimes the mentum has to be included in specimen to achieve an oncological R0 resection margin. Loss of mentum often leads to a variety of complications i.e oral incompetency, fall back of tongue, difficulty in swallowing, risk of aspiration and dysarthria. Removing mentum often requires Fibular free flap reconstruction to maintain functional outcome. Cases which are not suitable for free flap, keeping a part of mentum often is a tricky issue as one has to achieve an R0 margin and also at the same time to maintain the functional outcome in terms of quality of life.

Materials and Methods

In this study from 26 December 2022 to 25 March 2023 done in a tertiary Cancer Hospital of eastern India, the effect of oblique cut across mentum in 10 patients of SCC of oral cavity (T3, T4a) touching /close to mentum (up to ipsilateral canine) were analysed. All are above 60 years (including both male and female). 6 of them had significant medical comorbidities (3 had Coronary artery disease, 2 had chronic kidney disease, 1 had a history of CVA with diabetes & hypertension) making them not very suitable for long hours of surgery needed for free flap and / re-exploration if required. 4 patients had severe post adjuvant radiotherapy changes with local recurrence making them un-suitable for free fibular flap. They all underwent segmental / hemi mandibullectomy with

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oblique cut placed across mentum preserving lower border of mandible and reconstruction done with Pectoralis major myocutaneous flap. In all cases a clear (> 5mm) tumour free margin (R0) was found in final HPE. All were subjected to speech and swallowing rehabilitation training after 3 weeks of surgery. Functional outcome in terms of swallowing, decanulation of tracheostomy tube, oral competency were evaluated over next 3 months.

Results

Table I: Patients and comorbidities

COMORBIDITIES	NO. OF PATIENTS
Coronary artery disease	3
Chronic kidney disease	2
D.M+ HTN+CVA	1
Post radiation changes with local recurrence	4

Successful decanulation from tracheostomy tube was achieved in all 3 patients with Coronary artery disease & 2 patients with chronic kidney disease by 1week after surgery, by 3 weeks in 4 patients with post radiation changes with local recurrence & by 6 weeks in the one with history of CVA with diabetes & hypertension.

Table II: Successful decanulation from tracheostomy tube

	NO. OF PATIENTS WITH COMORBIDITIES			
Duration	Coronary artery disease (3)	Chronic kidney disease (2)	D.M+HTN+ CVA(1)	Post Radiation with local recurrence (4)
At 1week	3	2	Not possible	Not possible
At 3 weeks or before	Already done	Already done	Not possible	4
At 6 weeks or before	Already done	Already done	1	Already done
At 12 weeks or before	Already done	Already done	Already done	Already done

Nasogastric tube removal and commencement of oral feeding was achieved in all 3 patients with Coronary artery disease & 2 patients with chronic kidney disease by 3 weeks after surgery, by 6 weeks in 4 patients with post radiation changes with local recurrence & by 12 weeks in the one with history of CVA with diabetes & hypertension.

Table III: Nasogastric tube removal and commencement of oral feeding

	NO. OF PATIENTS WITH COMORBIDITIES			
Duration	Coronary artery disease (3)	Chronic kidney disease (2)	D.M+HTN+ CVA(1)	Post Radiation with local recurrence (4)
At 1week	Not possible	Not possible	Not possible	Not possible
At 3 weeks or before	3	2	Not possible	Not possible
At 6 weeks or before	Already done	Already done	Not possible	4
At 12 weeks or before	Already done	Already done	1	Already done

Patients with coronary artery disease (3) & chronic kidney disease (2) achieved oral competency partially by 1 week & completely by 3 weeks. The one with history of CVA with diabetes & hypertension and those with post radiation recurrence (4) achieved oral competency partially by 3 weeks. Patients with post radiation recurrence (4) achieved complete competency by 6 weeks and The one with history of CVA with diabetes & hypertension achieved complete competency by 12 weeks.

Table IV: Oral Competency

DURATION	ORAL COMPETENCY			
At 1 week	No. of Patients with comorbidities	Poor competency	Partially competent	Adequate competency
	Coronary artery disease (3)	None	3	None
	Chronic kidney disease (2)	None	2	None
	D.M + HTN + CVA (1)	1	None	None
	Post radiation with recurrence (4)	4	None	None
At 3 weeks or before	Coronary artery disease (3)	None	None	3
	Chronic kidney disease (2)	None	None	2
	D.M + HTN + CVA (1)	None	1	None
	Post radiation with recurrence (4)	None	4	None
At 6 weeks or before	Coronary artery disease (3)	None	None	3
	Chronic kidney disease (2)	None	None	2
	D.M + HTN + CVA (1)	None	1	None
	Post radiation with recurrence (4)	None	None	4
At 12 weeks or before	Coronary artery disease (3)	None	None	3
	Chronic kidney disease (2)	None	None	2
	D.M + HTN + CVA (1)	None	None	1
	Post radiation with recurrence (4)	None	None	4

Discussion

Successful mandibular reconstruction is necessary to ensure satisfactory postoperative cosmetic outcome and to restore optimal function, including speech and mastication; therefore, this surgery is a complicated and challenging procedure [1,2]. Reconstruction using a fibula free flap can be considered to restore the continuity of the mandible following segmental mandibulectomy.[3] Reconstruction using a fibula free flap and a reconstruction plate is associated with stability & aesthetic satisfaction. However, occasional flap failure, non-union, instability, and infection are known complications in such cases[4] that reflect the complexity of the procedures and appear strongly related to the underlying disease and predisposing medical risk factors hence may not be suitable for elderly patients with atherosclerotic vascular changes, patients with comorbidities / recurrence with post radiation changes. Though free flaps remain the first choice for reconstruction of any type of defects following oral cancer resections having the advantage of multiple donor site availability and reliability but the procedures being intricate and time-consuming, requiring advanced training and resources; hence, it cannot be considered in all settings. Alternate reconstructive techniques with local and pedicled flaps have been adopted to reach the ultimate goal in most high volume cancer centers.[5]

Therefore in carefully selected cases our approach of preserving part of lower portion of mentum, without jeopardizing the tumour free resection with adequate margin (R0) may solve a lot of functional issues in immediate and long term future.

Conclusion

Preserving the mentum in locally advanced SCC of oral cavity without jeopardizing the tumour free resection with clear margin (R0), requires very stringent case selection. Therefore wherever, though only in a few cases, where it is required, particularly where free flap is not possible, our novel approach of preserving part of lower portion of mentum, may solve a lot of functional issues in immediate and long term post-operative period. So we advocate this approach for larger scale studies involving multiple institutions in carefully selected cases for further evaluation, particularly where free flap might not be an option.

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Case Report

Rare Encounter Behind the Ear: Unveiling Kimura Disease in the Postaural Region

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ABSTRACT

Introduction

Kimura disease, a rare chronic inflammatory disorder primarily impacting subcutaneous tissue, particularly affects young Asian males, with around 200 reported cases in India. Its etiology, linked to an abnormal allergic reaction, remains uncertain, featuring a characteristic indolent growth pattern. The condition manifests as swelling and lesions in the head and neck region, involving subcutaneous soft tissue, major salivary glands, and lymph nodes. Eosinophilia and elevated serum immunoglobulin E levels are common, and diagnosis relies on biopsy. Given its benign nature, optimal management lacks consensus.

Case Report

Presented is a case of Kimura disease in the postauricular region, treated with surgical excision under local anesthesia. Post-operative steroid therapy resulted in an absence of recurrence and reduced eosinophilia during follow-up.

Discussion

Managing Kimura disease is challenging due to its rarity and diverse clinical presentations. Treatment options encompass systemic steroids, antihistamines, immunosuppressants, chemotherapy, radiotherapy, and surgical excision. Despite interventions, the disease often locally recurs. Our case highlights the efficacy of surgical excision under local anesthesia, coupled with post-operative steroids, in preventing recurrence and reducing eosinophilia. Ongoing research and case reports are crucial for establishing standardized protocols in Kimura disease management.

Keywords

Kimura disease; Postauricular Region; Eosinophilia; Surgical Excision

Kimura disease is an uncommon benign disorder associated with chronic inflammation of unknown etiology.[1]

In 1937, ST Kimm and C Szeto documented Kimura disease in Chinese literature, referring to it as eosinophilic hyperplastic lymphogranuloma.[2] This disease got its name as Kimura disease after the histological description of "unusual granulation combined with hyperplastic changes of lymphatic tissue" by Kimura et al. in the year 1948.

It is generally seen in young adults, in the age range of 20 to 40 years. The condition predominantly affects men, with a ratio of 3:1 compared to women.[3] Kimura disease presents as a painless swelling of subcutaneous tissue in the head and neck region and may be associated with regional lymphadenopathy or salivary gland involvement. There are few cases reported with systemic manifestations like nephrotic syndrome in Kimura disease, within the range of 10% to 60%.[2] It has a good prognosis without the risk of malignant transformation. Due to its rarity, it is usually not included in differential diagnoses of head and neck pathologies.

A confirmatory histopathological result is essential, as the findings are pathognomonic and consistent with various literature reviews.[4] It is benign, and recurrence is most commonly seen; hence, regular monitoring of the case is very much needed in this disease. Here, we report a rare case of a 40-year-old male with swelling in the left ear.

Case report

A 40-year-old male patient came to our hospital with a 4-year history of swelling in the left ear that is insidious

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in onset, originally peanut in size and gradually progressed to present size, painless, and not associated with itching or any discharge from the swelling. No history of similar swellings in other parts of the body. Clinical examination revealed, on inspection, a 6 x 8 cm single, ovoid swelling seen in the left postauricular region, from the level of the superior part of the helix to the level of the ear lobule, with a smooth surface and no visible pulsations (Fig.1). The skin covering the swelling appears normal, without any visible scars or sinuses. On palpation, all inspection findings were confirmed, revealing a firm consistency, and non-tender swelling with no localized increase in temperature. The swelling is mobile both horizontally and vertically, non-reducible, and does not display any fluctuation. Additionally, the skin over the swelling appears normal characteristics. On examination, no bruit was heard. In both ears, the external auditory canal and tympanic membrane were normal. The remainder of the ear examination was normal. No other swellings or palpable lymph nodes were found in the body. Both side's facial nerves were intact. The general and neurological examinations were normal.

The audiological examination of both ears was within normal limits. Blood investigations showed mild eosinophilia (Absolute Eosinophil count of 1100/ microliter) with normal renal function and elevated serum immunoglobulin E levels. An ultrasound examination revealed no evidence of fluid in the swelling. Computed tomography shows no involvement of underlying structures or bones. Fine-needle aspiration cytology of the swelling showed numerous mature lymphocytes, scattered histiocytes and interdigitating cells with folded nuclei along with scattered eosinophils, suggestive of reactive lymphadenitis (Fig. 2).

Surgical Procedure - The patient underwent excision of the swelling through a post aural approach under local anaesthesia**,** with a corrugated drain kept for 48 hours. Excess skin tissue was surgically excised, and the resulting wound underwent primary closure using silk sutures and a pressure bandage dressing was applied.

Histopathological examination of the swelling - The specimen was submitted for histopathological analysis, revealing a stratified squamous epithelium accompanied by extensive regions of fibrocartilaginous connective tissue. Prominent collections of mature lymphocytes, forming lymphoid follicles, were observed (Fig.3). These lymphoid cells were intermingled with eosinophils, forming focal aggregates. Additionally, mild capillary proliferation was noted. The histopathological finding of infiltration of lymphoid follicles into the subcutaneous tissue supports the diagnosis of Kimura disease.

Postoperatively, the patient was on 60mg of methylprednisolone (1mg/kg/day) in three divided doses for the first 5 days, 40mg in two divided doses for the next 5 days and 20mg once daily for the last 5 days and showed decreased peripheral eosinophilia (Absolute eosinophil count of 450/microliter) in the follow-up.

Post-operative Challenges-The postoperative pictures of the surgical site of the patient are shown in (Fig.4a and Fig.4b). As can be seen in the postoperative pictures (Fig.4a and Fig.4b), there seemed to be an initial challenge in wound healing. Following the surgery, meticulous post-operative care was administered with antibiotics, including regular wound dressing on the third day to ensure cleanliness and reduce the risk of infection. Initially on day 7, interrupted sutures were removed later remaining sutures were removed on the next week. This comprehensive approach to wound management aims to promote optimal recovery and minimize complications by using steroids postoperatively. The patient was followed up for about a year, and no recurrence of the swelling was noted.

Fig. 1. Postaural swelling in the left ear

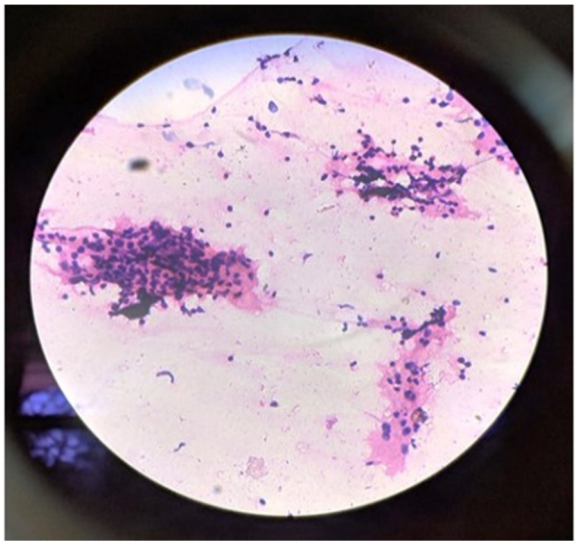

Fig. 2. Fine Needle Aspiration Cytology Examination of the swelling using eosin and hematoxylin stain at 10x magnification showed numerous mature lymphocytes, scattered histiocytes and interdigitating cells with folded nuclei along with scattered eosinophils.

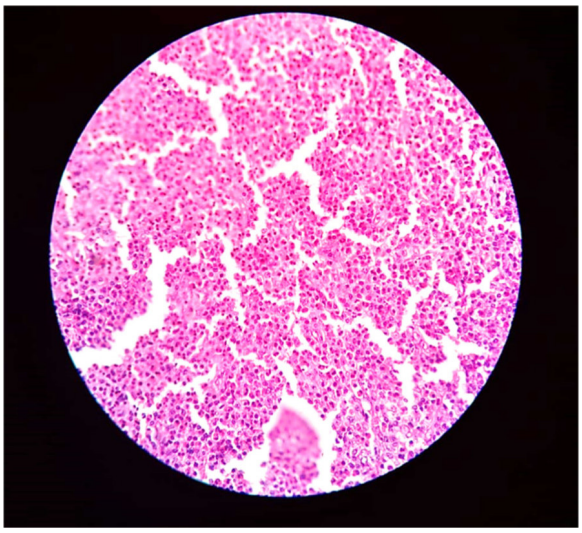

Fig. 3. Histopathological examination of the specimen using eosin and hematoxylin stain at 10x magnification showed prominent collections of mature lymphocytes, forming lymphoid follicles. Lymphoid cells were intermingled with eosinophils, forming focal aggregates.

Fig. 4a. Shows the surgical site on the postoperative day 7 and

Fig. 4b. Shows the surgical site on the postoperative day 14

Discussion

Kimura disease is a rare, idiopathic, chronic inflammation of subcutaneous tissue with or without regional involvement. The classical sign of Kimura disease is peripheral blood eosinophilia, an increase in serum immunoglobulin E levels,[5] swelling in the subcutaneous tissue, involving most commonly the head and neck region, or it can be associated with regional lymphadenopathy and occasional involvement of salivary glands. Although eosinophilia and increased immunoglobulin E levels are seen, interleukin 4,5,13, mast cells, and tumour necrosis factor-alpha without specific antigens have been

identified.[6] Autoimmunity, allergies, neoplasms, and parasite infestation are possible risk factors for Kimura disease.

Fine needle aspiration cytology is the initial investigation of Kimura disease, showing eosinophils with a background of lymphoid cells. Histopathological examination is the definitive diagnosis of the disease, showing lymphoid follicles with eosinophil aggregates, vascular proliferation, and fibrosis.[7] Ultrasound and Computed tomography scans help to determine the extent of the disease. Computed tomography scans may be non-specific for Kimura disease.[8]

Surgical excision, radiotherapy, steroids, anti-allergic drugs, and cytotoxic drugs like cyclosporine, oral pentoxifylline, and all-trans retinoic acid in combination with oral steroids[9] are the treatment options available. Surgical excision is a widely used therapy, but relapses are frequent. Steroids and cytotoxic drugs for long-term usage have side effects, especially in young patients. Few reports show leflunomide's effectiveness in Kimura disease patients with renal involvement.[10] Tomizuka et al. highlighted the relationship between juvenile temporal arteritis and Kimura's disease.[11]

Differential diagnoses include angiolymphoid hyperplasia with eosinophilia, Kikuchi disease, Mikulicz's disease, and Hodgkin's and non-Hodgkin's lymphomas. The prognosis of Kimura disease is good, with no potential for malignant transformation. It is chronic and may persist or recur despite treatment. Failing to identify and treat the disease may result in the formation of significant and disfiguring lesions. The recurrence rate is high, about 40%, despite early treatment. Treatment of recurrence and overall outcome is good, as there is no association with malignancy. In our case, the timely detection, surgical removal, and post-operative follow-up with steroid therapy contributed to the absence of recurrence and a reduction in eosinophilia.

Conclusion

Kimura disease is an uncommon, chronic inflammatory condition of the subcutaneous tissue, characterized by unknown causes. Accurate clinical diagnosis, coupled with histopathological assessment, plays a crucial role in effectively managing this condition. Timely identification and treatment are essential in addressing the extensive and aesthetically challenging lesions associated with Kimura disease. Although recurrence rates are notable, the prognosis is generally favourable, as there is no established link between the disease and malignancy. In our case, the timely detection, surgical removal, and post-operative follow-up with steroid therapy contributed to the absence of recurrence and a reduction in eosinophilia.

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Case Report

Adenoid-Cystic Carcinoma of Nasal Septum and Pterygo-Palatine Fossa

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ABSTRACT

Introduction

Adenoid cystic carcinoma (ACC) is an uncommon malignant tumour arising from salivary glands. It is more common in minor salivary glands, palate being the commonest site. Local recurrence, distant metastasis and perineural invasion are the common clinico-pathological features of this tumour. ACC of nasal septum and pterygo-palatine fossa is extremely rare entity with a very few reported cases in the available literature.

Case Report

We report a case of ACC of nasal septum and pterygo-palatine fossa with its surgical management through endoscopic approach and follow up in the background of available literature. The article is aimed to highlight the clinical features, diagnosis, endoscopic approach for surgical management and long term post operative follow up of this rare entity.

Discussion

Adenoid cystic carcinoma (ACC) itself is rare in nasal cavity; where lateral nasal wall is the commonest site of occurrence. ACC arising in the pterygo-palatine fossa is further rare entity; only 3 or 4 cases have been reported till date. ACC arising in these two sites simultaneously is a unique occurrence.

Keywords

Adenoid Cystic Carcinoma; Nasal Septum; Pterygo-palatine Fossa; Endoscopic Resection

Adenoid cystic carcinoma (ACC) is a malignant neoplasm of major and minor salivary glands. ACC corresponds to 1% of the Head and Neck region malignant tumors and contributes 4-10% of all salivary tumours.[1] ACC of nasal septum is exceedingly rare and ACC arising in the pterygo-palatine fossa (PPF) is also very rare; only 4 cases have been reported till date.[2] ACC arising in the septum as well as pterygo-palatine fossa is a unique clinical presentation. Tumour location and perineural spread pattern should be considered in the planning of surgical resection and further treatment. Post operative radiation is now generally recommended and long term follow up is usually necessary keeping in mind that incidence of local recurrence and distant metastasis rate are high.[3]

Case Report

A 63 years old male patient, presented to ENT OPD of a tertiary care hospital with complaints of nasal blockage, more towards left side, for last 1 year along with recurrent epistaxis, mostly from left nostril, for the same duration. He suffered at least two episodes of moderate to severe bouts of spontaneous bleeding per nose, for that, he had to seek medical advice. He consulted many local doctors and took medicines to stop bleeding, nose drops, anti-allergic medications; but his nasal blockage gradually progressed and nose bleeding did not stop. On anterior rhinoscopy, there was mild deviation of nasal septum towards right with thickened, pale mucosa on the right side. On the left side, a swelling or tumour like mass seen arising from the nasal septum and occupying the

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valve area of the left side of nose. The mucosa overlying the mass appeared pale, thickened and there was mild bleeding on touch. The mass was sessile, non-mobile, attached to the septum and free from other sites. No evidence of active bleeding per nose or muco-pus in the nostrils was noticed at the time of examination except while touched. Posterior rhinoscopy examination was unremarkable. Patient had a dimness of vision on left eye for last 5 to 6 years, which according to the ophthalmologist, was due to presbyopia. There was no proptosis and eye-ball movement was not restricted on either side. Other cranial nerve examination was within normal limits and clinically no neck nodes were palpable. A plain and contrast-enhanced C.T. scan of para nasal sinuses was done, which showed an irregular enhancing soft tissue mass measuring 12x11 mm at left pterygo-palatine fossa with erosion of left pterygoid plates, left sphenoid wing, floor of sphenoid sinus with extension to left parasellar region. The mass was protruding into left sphenoid sinus, middle meatus and left orbital apex. (Figure 1)

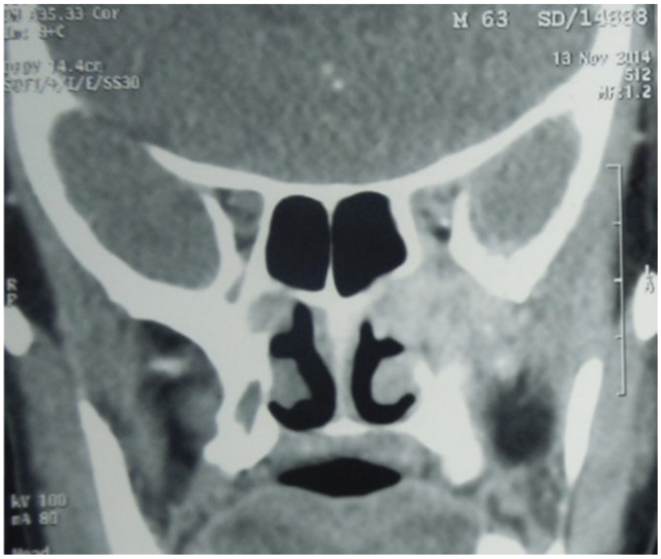

Fig. 1. Enhancing soft tissue mass in left pterygo-palatine fossa

There was deviated nasal septum to right side with septal mucosal thickening and a soft tissue mass arising from the septal mucosa seen on the left side. (Figure 2)

Fig. 2. Enhancing soft tissue mass in left side of nasal septum

Diagnostic nasal endoscopy corroborated the radiological findings. An excision biopsy of the both the masses at left pterygo-palatine fossa and septum were planned after proper anaesthetic check up and making the patient fit for general anesthesia. Patient was admitted and operated under general anesthesia. Diagnostic nasal endoscopy was done to plan the operative procedure. First, the tumour arising from the nasal septum excised with wide local margin dissecting sub muco-perichondrially. Bleeding was controlled with bipolar diathermy. Then, the medial wall of the left maxillary sinus and the middle turbinate were removed to gain access to the posterior wall of the sinus. The orbital process of the palatine bone was removed and the sphenopalatine foramen was enlarged. The posterior wall of the maxillary sinus was then removed up to the vertical process of the palatine bone medially and up to the angle between the lateral and posterior wall of the sinus laterally to expose the pterygo-palatine fossa. The tumor was then scooped out from the fossa and the bleeding was controlled with endoscopic bipolar cautery. The nasal cavity was packed with roller gauge pack which was removed after 48 hours. Patient was discharged from the hospital with a course of oral antibiotics, anti-histaminics, local decongestant drops, and analgesics. A post-operative nasal endoscopy was performed after a fortnight to check mucosal healing and to clear crust and debris. No bleeding points or left out tumor were found.

Histopathological examination (HPE) report came as ACC of nasal septum and pterygo-palatine fossa (Figures 3 & 4) and the resected margins of the septal tumor was free of malignancy three dimensionally, but comment on margin for other tumor was not available as it was scooped out.

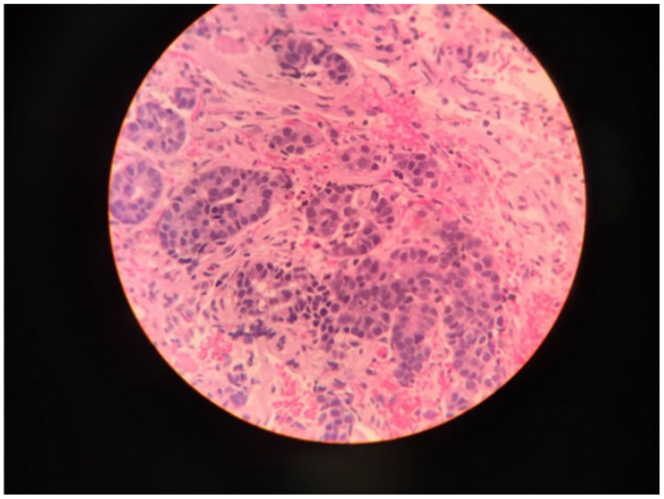

Fig. 3. HPE picture of mass in left Pterygopalatine fossa (H-E stain wit 10 X magnification)

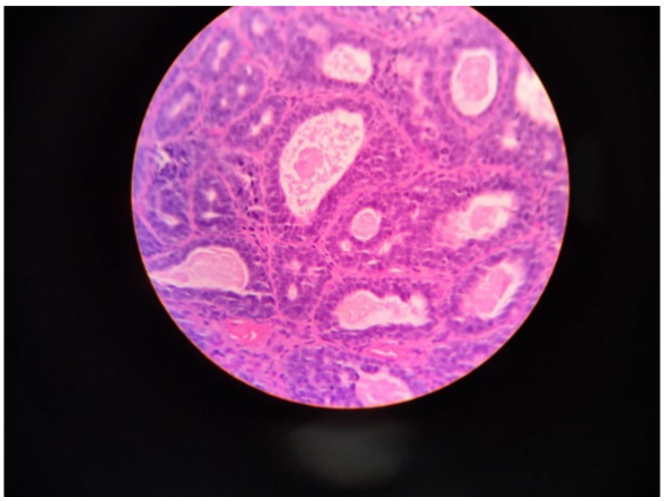

Fig. 4. HPE picture of mass in Nasal Septum (H-E stain wit 40 X magnification)

With this HPE report patient was referred to medical oncologists for opinion regarding further management and they advised for a course of adjuvant radiotherapy for this patient. Accordingly the patient underwent a 28 days external beam radiation therapy which he managed to complete over a time span of 6 weeks (5 days a week).

Thereafter patient was followed up for a period of one year, at the three months interval. Diagnostic nasal endoscopy was done at each visit to check local recurrence and complication, if any. No evidence of any recurrence of tumour was found till the end of one year follow up. Patient suffered some radiation related complications like dry mouth, otitis media with effusion, mucositis and dermatitis; which were managed accordingly.

Discussion

Incidence of malignant tumours from the nasal septum is quite rare ranging from 2.7% to 8.4% of nasal and paranasal malignant tumours.[1] Adenoid cystic carcinoma (ACC) is rare in nasal cavity; where lateral nasal wall is the commonest site of occurrence.[1,4] ACC arising in the pterygo-palatine fossa is also a rare entity; only 3 or 4 cases have been reported till date.[2] ACC arising in these two sites (Double Primary Cancer) at the same time is a unique case. ACC of nasal cavity or septum most commonly presents with mass or epistaxis and that of pterygo-palatine fossa (PPF) usually presents with epistaxis, facial pain and the symptoms attributed to the spread of tumour from PPF; visual disorders being the commonest.[2,5,6] Biological behavior of ACC includes slow growth rate, perineural spread and high tendency of local recurrence.[1] Three architectural growth patterns have been described, namely: cribriform, tubular and solid (anaplastic). Cribriform pattern is also called cylindroma; presents with typical "Honeycomb" or "Swiss-cheese" pattern. Tubular pattern has a very aggressive course while the solid variety has the worst prognosis.[7] Though a slow growing tumour (peak incidence in 4^{th}-6^{th} decades), it has a high incidence of metastasis; early perineural and late hematogenous spread. Most common site of distant metastasis is lung, usually multiple and being associated with tumours with a solid growth pattern.[1,5]

Combined wide local excision with post-operative radiotherapy is the treatment of choice; which gives more satisfactory local control when compared to either surgery

or radiotherapy alone.[1,3] Endoscopic trans-nasal excision of tumors of septum, nasal cavity and PPF is now widely practiced[8,9] which may be combined with navigation, where facilities available. The medial wall of the maxillary sinus and the middle turbinate are removed to gain access to the posterior wall of the maxillary sinus. The orbital process of the palatine bone is removed and the sphenopalatine foramen is enlarged. The posterior wall of the maxillary sinus is then removed up to the vertical process of the palatine bone medially and up to the angle between the lateral and posterior wall of the maxillary sinus laterally to expose the PPF. Following resection of the tumour, all the symptoms attributed to the tumour in PPF and extension wherefrom; can be resolved including visual deficit, if any. Post-surgical radiotherapy amounts not less than 60 Gy (200 cGy/ fraction – 30 fractions in 6 weeks)[7] which enhances the local and regional control of the tumour. The role of chemotherapy in the management of ACC is still controversial.[7] But as the ACC in sinunasal compartments are often not completely resectable, adjuvant therapy with neutron irradiation, chemotherapy with taxols and carboplatins and targeted therapy are suggested by some authors.[10] Long term follow up is needed in these cases owe to increased chances of local recurrence and distant metastasis. Early detection of the tumour and treatment guides prognosis due to less likely to have chances of advanced neural involvement and metastasis to regional or distant sites.

Conclusion

Adenoid cystic carcinoma may be considered in the differential diagnosis of tumours of nasal septum and pterygo-palatine fossa; common presenting symptom being the epistaxis. Diagnostic nasal endoscopy and C.T.scan of paranasal sinuses guides the definitive treatment. Endoscopy guided excision and post-operative radiotherapy is the treatment of choice. Long term follow up is necessary, keeping in mind its perineural invasion, local recurrence and distant metastasis.

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