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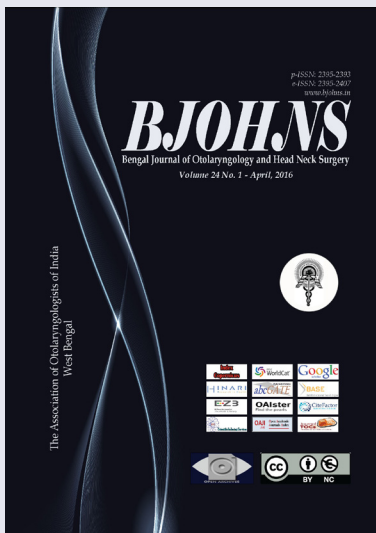
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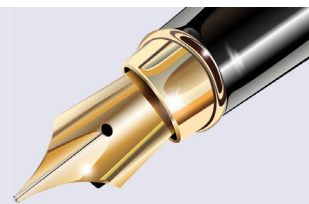
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From the Desk of the Editor



Medical science is soaring to new heights in its pursuit of excellence. However, it must be acknowledged that the gulf of mistrust and ill-feeling between the patient and the doctor is also widening. It is time we should introspect and try to bridge the gap with faith and trust.

Increased deployment of technology, while improving the cure rate, has added to the burden of expenditure of the Governments on healthcare globally. The National Health Policy (NHP), 2002 of India, for example, changed dramatically from the NHP, 1982 to encourage the private sector to step in to regulate the burgeoning healthcare costs. The global healthcare industry has grown phenomenally and in the USA, the medical industrial complex has grown even larger than the military. The Indian health care sector is growing at a 15% CAGR to reach US\$ 158.2 billion in 2017 and is expected to grow to US\$ 280 billion by 2020. Per capita health expenditure in India was US\$ 68.6 in 2015. The hospital and diagnostic centres attracted FDI to the tune of US\$ 3.41 billion between April, 2000 and December, 2015, according to data released by Dept. of Industrial Policy and Promotion (DIPP). The growth of the Health Industry has essentially transformed a 'public service' into a 'for-profit enterprise'. India accounts for 21% of world's burden of disease but with a meagre expenditure on healthcare to the tune of 6% of GDP, it is one of the countries with the lowest public health spending. The crumbling government health infrastructure has attracted people towards the private sector. The industry is advertising directly to people about the newer technologies it has acquired to build the notion that scientific medicine has a potential cure for all ailments with the Governments doing little to expose the myth or improve their own infrastructure.

Over-dependence on science has metamorphosed the physicians into super-specialised technologists working on the bio-medical models, the erstwhile 'patients'. The uniqueness of each suffering man is ignored. "Each patient now is a statistic and similar to any other patient with the same illness."

As the patient loses his identity, the sacred bond of trust with his doctor fades. Doctors are now 'healthcare providers' and the patients are 'consumers'. Medical ethics becomes a hostage to business ethics. Widespread social indifference to gradual corporate takeover of the healthcare services has overlooked the physician losing his autonomy on clinical decision-making. The doctor happens to be the interface between the industry and the patient. He has to bear the brunt of the disillusionment and anger of the clientele for the mismatch between the promise and the performance. The doctors are scared and open the flood-gates of a multitude of investigations and procedures which add to the patients' expenditure and the consequent profit of the industry.

I would suggest two readings: one is a book, 'Dissenting Diagnosis' by Drs Arun Gadre and Abhay Shukla, and another is an article titled 'Market Health Care: The Commodification of Health Care' by Bernard Lown, Professor Emeritus, Harvard School of Public Health (Philosophy and Social Action 2000; 26:57-71), which may make you feel uncomfortable.

It is a difficult time and we should reiterate our faith in medical ethics and try to strengthen the bond of trust between the doctor and the patient to withstand the onslaught of the economic forces to marketise all human transactions. We cannot afford to allow technology and economics to dominate us to such extremes so as to render us philosophically bankrupt.

Dr Saumendra Nath Bandyopadhyay
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A Clinical Study on the Influence of Sinusitis in Chronic Suppurative Otitis Media

Sellappampatty Veerappapillai Dhanasekaran,¹ Jiji Sanjeevan Nair,¹ Komathi Raja,¹ Govind Krishnan Gopalakrishnapillai,¹ Abhilash Kuniyath Chandran,¹ Shankar Radhakrishnan²

ABSTRACT

Introduction

Diseases of the nose and paranasal sinuses are known to influence the middle ear conditions. In the evaluation of the patients with chronic otitis media, radiological, endoscopic, and other auxiliary diagnostic tools may have their roles in the objective assessment of the patients, and to rule out lesions of the nasal cavity and the nasopharynx as potential aetiological factors.

Materials and Methods

This cross sectional observational study was conducted for a period of two years to establish the role of sinusitis as focus of sepsis in patients with tubotympanic type of CSOM. All patients in the age group of 20-40 years with more than 2 months of ear discharge and with a hearing loss of 25- 40 db and diagnosed as tubotympanic type of CSOM were included in our study. Patients who had features of mastoiditis on X-ray and also with persistent ear discharge even after treatment with oral and topical antibiotics were subjected (n=70) to diagnostic nasal endoscopy and computed tomography of paranasal sinuses.

Result

Among the 100 patients of CSOM, 70% had features suggestive of sinusitis. Deviated nasal septum (40%) was the most common pathology among the study population. Majority (54%) of them had mucopurulent type of ear discharge. The CT findings of the paranasal sinuses revealed that 48.5% of the study population had grade I type of involvement of the PNS. 54.2% of the patients had a large central perforation and the middle ear mucosa was found to be edematous for 65.7% of the patients.

Discussion

Coexistence of deviated nasal septum and chronic rhinosinusitis with discharging CSOM is at par with several other studies conducted in other parts of the world.

Conclusion

Deviated nasal septum, enlarged middle turbinate, medialised uncinate associated with sinusitis are the predisposing factors in the development of CSOM. So assessment for sinusitis in the treatment of CSOM should become a routine practice.

Keywords

Otitis Media, Suppurative; Otitis Media with Effusion; Paranasal Sinuses; Maxillary Sinusitis

Chronic Suppurative Otitis Media (CSOM) of tubotympanic type is a persistent inflammation that causes irreversible changes of the mucosa in the middle ear and mastoid cavity. It is characterized by a persistent discharge from the middle ear through a tympanic membrane perforation. It is an important cause of preventable hearing loss, particularly in the developing world (WHO, 2004).¹ Its pathophysiology begins with irritation and subsequent inflammation of the middle ear mucosa. The most important pathological factors in CSOM are dysfunction of the Eustachian tube and bacterial infection.² Obstruction of ET in turn leads to Otitis media (OM). Diseases of the nose and Paranasal

sinuses (PNS) thus influence the middle ear condition.

Although most of the literature refers to sinusitis and upper respiratory tract as causative factor of otitis media, only few articles refer to actual nasal pathologies

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involving anatomical factors that can lead to it. Those patients who have otitis media secondary to nasal and /or PNS pathology need to have both problems addressed.³

Sinonasal pathology frequently leads to ear disease. Improvement of otitis media pathology following septoplasty was noted by Grady (1983).⁴ Von Cauwenberge and Derycke (1983)⁵ and Kim et al. (1993)⁶ also showed evidence of association of sinonasal pathologies in cases of otitis media. Bozkuset et al (2013)⁷ demonstrated that the role of sinonasal abnormalities and allergic rhinitis in the pathogenesis of chronic otitis media is prevalent. They concluded that although medical history and physical examination are considered mandatory procedures during the initial evaluation of the patients with chronic otitis media, radiological, endoscopic, and other auxiliary diagnostic tools should be used in the objective assessment of the patients, and lesions of the nasal cavity and the nasopharynx must always be taken into consideration in the differential diagnosis. Without correcting the sinusitis, the management of ear including surgery has frequently led to failures and poor prognosis.⁸ Therefore it is essential to establish the role of sinusitis as focal sepsis in chronic otitis media active mucosal disease.

Materials and Methods

A cross sectional observational study was undertaken in the ENT OPD for a period of two years from January 2013 to December 2014 to establish the role of sinusitis as focus of sepsis in patients with tubotympanic type of CSOM. All patients, in the age group of 20-40 years with more than 2 months of ear discharge and with a hearing loss of 25-40 dB and were diagnosed as tubotympanic type of CSOM, were included in our study. One hundred patients who met the above criteria were included in the study. X-ray of the mastoids was taken for all the patients. Patients with evidence of chronic sinusitis were treated with antibiotics and antihistamines and decongestants were given on and off for a period of 6 weeks.

Patients who had evidence of mastoiditis on X-ray and also with persistent ear discharge even after treatment

with oral and topical antibiotics were subjected (n=70) to diagnostic nasal endoscopy and computed tomography of paranasal sinuses.

Results

Table I shows the age and sex wise distribution of the study population. The majority of the study population were males and they were in the age group between 20-30 years. Almost 90% of the study populations were from rural areas belonging to lower socio-economic status.

The findings of the nasal endoscopy were shown in

Table I : Distribution of Study Population as per Age and Sex

AGE GROUP (YRS)	MALE	FEMALE	TOTAL
20-25	12	12	24
26-30	18	10	28
31-35	8	4	12
36-40	4	2	6
TOTAL	42	28	70

Table II. Deviated nasal septum (DNS) was the most common pathology (40%) among the study population followed by enlarged bulla. Medialised uncinata was seen in 17.1% of the study population and 10% of them had enlarged bulla with prominent agger.

The type of discharge in the middle meatus viewed through nasal endoscopy had shown that almost 54.2% of the discharge was mucopurulent type and the remaining was either purulent or mucoid in nature (Table III).

The grading of paranasal sinuses based on CT findings had shown that almost 48.5% of them had grade I, where the disease is limited to OMC (ostio-meatal complex), 22.8% had grade II (incomplete opacification of one/more sinuses) 14.2% had grade III (complete opacification of one or more major sinuses) and 7.1%

had grade IV findings i.e., total opacification of all sinuses (Table IV).

Table II : Nasal endoscopy findings among study population

NASAL ENDOSCOPY FINDINGS	FREQUENCY	PERCENTAGE
Deviated nasal septum / turbino septal deformity	28	40%
Medialised uncinata	12	17.1%
Enlarged middle turbinate	10	14.2%
Enlarged bulla with prominent agger	7	10%
TOTAL	70	100%

Table III : Type of discharge seen in middle meatus during nasal endoscopy

NATURE OF DISCHARGE	FREQUENCY	PERCENTAGE
Mucopurulent	38	54.2%
Purulent	18	25.7%
Mucoid	14	20%
TOTAL	70	100%

The anatomical variations of paranasal sinuses based on CT findings had shown that 40% of them had deviated nasal septum, 20% of them had medialised uncinata with maxillary mucosal thickening and 11.4% of them had prominent agger (Table V).

The otoendoscopy findings among the study population had shown that 54.2% of them had a large

Table IV : Grading according to findings of CT Scan of PNS

CT SCAN PNS FINDING	FREQUENCY	PERCENTAGE
Grade 0	5	7.1%
Grade I	34	48.5%
Grade II	16	22.8%
Grade III	10	14.2%
Grade IV	5	7.1%
TOTAL	70	100%

Table V : Anatomical variations as per CT Scan of PNS

ANATOMIC VARIANTS	FREQUENCY	PERCENTAGE
Deviated Nasal septum	28	40%
Medialised uncinata with maxillary mucosal thickening	14	20%
Enlarged bulla narrowing OMC	7	10%
Concha bullosa	13	18.5%
Prominent agger / frontal cell obstructing frontal recess	8	11.4%
TOTAL	70	100%

central perforation of the tympanic membrane, 31.4% had a subtotal central perforation and the remaining 14.2% had only a small central perforation. The middle ear mucosa were edematous for 65.7% of the population

and 34.2% of them had a polypoidal mucosa (Table VI).

Table VI : Otoendoscopy findings in study population

TYPE OF PERFORATION	FREQUENCY	PERCENTAGE
Large CP	38	54.2%
Subtotal CP	22	31.4%
Small CP	10	14.2%
TOTAL	70	100%

Discussion

The most important step in the diagnosis of chronic suppurative otitis media (CSOM) is to identify the underlying pathology, once it is identified, the treatment would be much simpler.

Keeping in view the importance of nasopharyngeal and sinonasal pathology of CSOM, the present study was carried out on 70 patients of CSOM presenting to our Outpatient Department of Otolaryngology. Age of patients ranged from 20 to 40 years with a mean age of 28.7 ± 6.4 years. Maximum number of patients (74.2%) was aged between 21-30 years. CSOM is defined primarily as a disease of pediatric age group (Nelson, 1988).⁹ Other workers like Shrestha et al (2010),¹⁰ Karkiet al (2011),¹¹ Poorey and Iyer (2002)¹² had found maximum prevalence of CSOM in the younger age group, which was almost at par with our study.

Several studies have proposed nasal septum deviation as a predisposing factor in patients with CSOM. Van Cauwenberge et al demonstrated that increase in nasal resistance leads to higher static middle ear, and closing pressures of the Eustachian tube pressure with resultant formation of mucosal edema and finally Eustachian tube dysfunction.¹³ Gutierrez-Marcos showed that obstructive septal deviation induces Eustachian tube dysfunction.¹⁴ Deron et al detected that opening pressure of the Eustachian tube recovers in the early,

and late postoperative period surgical repair of the septal deviation.¹⁵ Using paranasal CT procedures, Gocmen et al reported septal deviations in 52% patients with CSOM.¹⁶ It is almost at par with our study where we found 40% of patients with CSOM had deviated nasal septum.

Diagnostic nasal endoscopy findings of our study revealed DNS alone or in combination with other pathologies to be the most common findings. Similar observations were made by Yeolekar et al (2011)¹⁷ in their study, sinonasal pathology was seen in 90% of the patients with CSOM.. Poorey and Iyer (2002)¹² reported presence of pharyngeal and sinonasal pathology in 93% patients with CSOM.

In the literature, detection of sinusitis ranges between 43 and 78% in the patients with OME, supports the prevalent finding of inflammation in the upper respiratory tract as a culprit of OME.¹⁸ Fireman et al. emphasized that otitis media is a multifactorial disease which was effected by many etiologies including nasal, and paranasal sinus abnormalities.¹⁹ Eryilmaz et al reported the presence of chronic rhinosinusitis in patients with (57.7%) and without (25%) chronic otitis media with effusion (COME) with a significant difference between groups.²⁰ Grote and Kuijpers detected maxillary sinusitis in 47% of 1252 pediatric cases with COME.²¹ In the present study, maxillary sinusitis was present in 48.5% of cases.

Majority of investigators have revealed the important role of upper respiratory tract abnormalities as causative factors for Eustachian tube obstruction in the aetiopathogenesis of CSOM.¹¹ Stammberger et al reported serious loss in Eustachian tube functions as a consequence of impaired function of nasal, and paranasal sinuses.²² Gocmen et al. detected chronic inflammation of the osteomeatal unit in 27% of 52 patients with adhesive otitis, and revealed that nasal, and paranasal sinus abnormalities were significantly different relative to the control group.¹⁶

Takashi et al demonstrated that inflammatory processes of nasal, and paranasal sinuses ensued in obstruction, inflammation, and resultant dysfunction of Eustachian tube.²³ In our study maxillary sinusitis was found to be the most common type of sinusitis among

the patients with CSOM. The same study showed that among the patients with CSOM, 62% of them had mucopurulent type of ear discharge and 60% had a large central perforation of the tympanic membrane and the results were almost similar to our study where 54% of them had central large perforation with mucopurulent discharge. Grote and Kuijpers²¹ in their study on the middle ear mucosa using otoendoscopy among the patients with CSOM revealed that 71% of them had edematous middle ear mucosa and 29% had polypoidal mucosa which was almost in par with our study.

Conclusion

This study had demonstrated that sinusitis is one of the most important predisposing factor in the development of CSOM. Deviated nasal septum, enlarged middle turbinate, medialised uncinata are the most common anatomical variants of nose and paranasal sinuses predisposing to sinusitis. So sinusitis should be considered as one of the most important risk factor in the development of CSOM and it has to be identified and treated promptly.

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Correlation of Fine Needle Aspiration Cytology with Histopathology in the Diagnosis of Thyroid Swellings

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ABSTRACT

Introduction

Fine needle aspiration cytology (FNAC) is now being accepted as the most cost-effective, minimally invasive technique with very low incidence of complications in the diagnosis of most of the thyroid lesions with an added advantage of segregating the patients of solitary thyroid nodule (STN) into operative and non-operative groups.

Materials and Methods

A prospective longitudinal study was undertaken over a period of one year (2015) at the out-patient department of a medical college hospital in Tamil Nadu to determine the accuracy of FNAC in terms of sensitivity, specificity, positive predictive value and negative predictive value in comparison with histopathology in the diagnosis of a thyroid swelling. Patients with solitary thyroid nodule, in euthyroid state without serious medical disorders were included in our study. FNAC was performed with 23G needle, smears were fixed with ether-95% alcohol solution, and staining was performed using Papanicolaou's stain. The thyroid specimen which was excised during the thyroidectomy procedure was processed in automated tissue processing units and sent for histopathological examination.

Results

The validity of FNAC in terms of sensitivity and specificity was assessed by comparing it with the histopathological examination. The sensitivity of FNAC in detecting all the benign and malignant type of thyroid lesions was found to be in the range of 80-100%, whereas the specificity and the positive predictive value was almost 100% and the negative predictive value was between 98-100%, for all the lesions detected by FNAC. The accuracy of detection of lesions through FNAC is almost 94%.

Conclusion

The use of FNAC has reduced the number of patients with solitary thyroid nodules undergoing unnecessary surgery and has led to proper planning of surgery in malignant cases.

Keywords:

Thyroid Nodule; Biopsy, Fine-Needle; Sensitivity and Specificity.

Thyroid gland swelling is a common manifestation in most parts of the world, particularly countries like India which is endemic for iodine deficiency disorders. Studies had shown that the prevalence of goitre in India is as high as 40%.¹ The development of goitre is a concern for both the patient and the clinician,

as many of the thyroid swelling may turn to malignant. Though many of the goitre swellings are benign but still the reports had shown that the prevalence of malignancy among the solitary nodule goitre was about 10%.²

As such thyroid cancer is relatively a rare malignancy but it is the commonest endocrine cancer accounting for more than 90% of all the endocrine cancers. Among the various types of cancers in thyroid gland, papillary carcinoma is the most common which is followed by follicular carcinoma, medullary carcinoma, anaplastic carcinoma and lymphoma.

Fine needle aspiration cytology (FNAC) is now being accepted as the most cost-effective, minimal invasive technique with very low incidence of complications in

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the diagnosis of most of the thyroid lesions with an added advantage of segregating the patients of solitary thyroid nodule (STN) into operative and non-operative groups.³⁻⁵

A thyroid nodule which is usually considered for FNAC should be of firm, palpable and solitary. FNAC can also be performed on nodules with suspicious ultrasonographic features; dominant or atypical nodules in multinodular goitre; complex or recurrent cystic nodules; or any nodule associated with palpable or ultrasonographically abnormal cervical lymph nodes.⁶

FNAC is considered to be the “gold standard” in the selection of patients for surgery.⁷ It is usually performed without local anaesthesia and any previous preparations on the patients. Studies have quoted that medical professionals with longstanding experience, the diagnostic (adequate) biopsies obtained from solid nodules had ranged between 90–97%.^{8,9} During the procedure, ultrasound guidance instead of palpation had enhanced the value of the FNAC diagnostic accuracy.^{10,11}

However, the success of FNAC depends on several factors such as aspirator experience, skilful cytological interpretation and a rational analysis based upon a synthesis of cytological and clinical information in the context of an individual patient. Still the histopathological examination of the thyroid gland was considered superior to FNAC in diagnosing the thyroid pathologies due to certain pitfalls in FNAC such as scanty sample, vascularity of thyroid swelling, variation in sampling technique and skill of the performing expert and as well as the experience of pathologist interpreting the aspirate.¹²

However studies had been done in comparison of the diagnostic efficacy between FNAC and histopathology in western countries, in India as such very few studies had been done in this aspect and so the current study was undertaken in view of comparing and correlating the FNAC findings with that of histopathology readings among the patients with palpable thyroid swelling.

Materials and Methods

A prospective longitudinal study was undertaken over

a period of 1 year from Jan 2015 to Dec 2015 at the out-patient department of a medical college hospital in Tamil Nadu to determine the accuracy of FNAC in terms of sensitivity, specificity, positive predictive value and negative predictive value in comparison with histopathology in diagnosing a thyroid swelling. Patients with visible thyroid swelling with a solitary nodule, in euthyroid state and with no other serious medical disorders were included in our study. With those meeting the above criteria totally 200 patients were our study subjects. The study was carried out after getting the clearance from our institutional ethical committee and the informed consent was obtained from all the patients who were included in our study.

All the patients were evaluated by thorough clinical examination including the status of the vocal cords followed by routine serological investigations like haemogram, renal function tests, liver function tests and thyroid function test. The imaging test like chest X-ray, X-ray of soft tissue of neck lateral view and USG of neck were also carried out. FNAC was performed with 23G needle, smears were fixed with ether-95% alcohol solution, and staining was performed using Papanicolaou's stain.

Following the FNAC all the patients were subjected to surgery after getting the fitness from anaesthetist. The thyroid specimen which was excised during the thyroidectomy procedure was processed in automated tissue processing units and sent for histopathological examination. The report of FNAC was then compared with HPE and the validity of FNAC was assessed in terms of sensitivity, specificity and the predictive values.

Results

The age and sex wise distribution was shown in Table I. The majority of the study subjects were females and the male: female ratio is 1:9. Most of the female patients were aged between 30 and 45 years. Out of the 200 patients in our study population, only 20 were males.

The diagnosis of the various thyroid gland swelling made on the basis of the FNAC report had shown that among 200 patients, 146 of them had benign lesions and 42 of them had malignant lesions. Among the benign

diseases colloid solitary goitre was the most common followed by thyroiditis whereas among the malignant lesions it was the papillary carcinoma which was more common followed by follicular carcinoma. 12 of the FNAC report showed that the sample is inadequate (Table II).

Table I : Distribution of Study Population as per Age and Sex

AGE GROUP	MALE	FEMALE	TOTAL
25 – 30	0	3 (1.6%)	3 (1.5%)
31 – 35	3 (15%)	58 (32.2%)	61 (30.5%)
36 – 40	6 (30%)	32 (17.7%)	38 (19%)
41 – 45	8 (40%)	46 (25.5%)	54 (27%)
46 – 50	2 (10%)	36 (20%)	38 (19%)
>50	1 (5%)	5 (2.7%)	6 (3%)
TOTAL	20 (100%)	180 (100%)	200 (100%)
MEAN (SD)	38.6 (4.23)	40.5 (5.42)	

The post surgical sample of the thyroid gland which was sent for histopathological examination had revealed the report which was almost similar to that of FNAC. The only difference was the 12 samples which were not diagnosed by FNAC due to the inadequacy of the sample were reported by HPE. In the 12 samples 8 was found to be of benign lesions and the remaining 4 was found to be of malignant lesion (Table III).

The validity of FNAC in terms of sensitivity and specificity was assessed by comparing it with the histopathological examination. The sensitivity of FNAC in detecting all the benign and malignant type of thyroid

lesions was found to be in the range of 80 - 100%, whereas the specificity and the positive predictive value was almost 100% and the negative predictive value was between 98-100%, for all the lesions detected by FNAC. So this shows the accuracy of detection of lesions through FNAC is almost 94% (Table IV).

Table II : FNAC diagnosis of thyroid swelling among the study subjects

FNAC DIAGNOSIS		FREQUENCY	PERCENTAGE
Benign (n=146)	Solitary/ colloid goitre	109	74.6%
	Thyroiditis	23	15.7%
	Adenomatous goitre	8	5.4%
	Follicular adenoma	6	4.1%
Malignant (n=42)	Papillary carcinoma	19	44.6%
	Follicular carcinoma	13	29.7%
	Anaplastic carcinoma	6	14.8%
	Medullary carcinoma	4	10.6%
INADEQUATE CYTOLOGY (N=200)		12	6%

Discussion

Any form of thyroid enlargement usually leads to a battery of investigations, mainly to rule out the possibility of a neoplasm. The routinely done investigations for

an enlarged thyroid are ultrasound (US) examination, thyroid function tests, thyroid scan, and antibody levels and subsequently FNAC was done to segregate the patients requiring surgery and those who can be managed conservatively.¹³⁻¹⁵

Table III : HPE diagnosis of thyroid swelling among the study subjects

HPE DIAGNOSIS		FREQUENCY	PERCENTAGE
Benign (n=154)	Solitary/ colloid goitre	111	72%
	Thyroiditis	25	16.2%
	Adenomatous goitre	10	6.4%
	Follicular adenoma	8	5.1%
Malignant (n=46)	Papillary carcinoma	21	45.6%
	Follicular carcinoma	13	28.2%
	Anaplastic carcinoma	7	15.2%
	Medullary carcinoma	5	10.8%

The mean of the study population in the present study was 38 years among the males and 40 among the females. The similar type of results was also observed by the study done by Gardner et. al¹⁶ and Miller et. al.¹⁷ In our study, female population were almost 9 times than that of the males. Thyroid swelling is more prevalent among the females and many of the studies had proven it and our study was also in par with it and

majority of the females were in the age group between 30 – 45 years.

The solitary colloid goitre is the most common benign condition and the papillary carcinoma was the most common malignant lesion identified by FNAC

Table IV : Validity of FNAC in comparison with HPE

DIAGNOSIS	SENSITIVITY	SPECIFICITY	POSITIVE PREDICTIVE VALUE	NEGATIVE PREDICTIVE VALUE
Solitary/ colloid goitre	98%	100%	100%	97.8%
Thyroiditis	92%	100%	100%	98.8%
Adenomatous goitre	80%	100%	100%	98.9%
Follicular adenoma	75%	100%	100%	98.9%
Papillary carcinoma	90.4%	100%	100%	98.8%
Follicular carcinoma	100%	100%	100%	100%
Anaplastic carcinoma	85.7%	100%	100%	99.4%
Medullary carcinoma	80%	100%	100%	99.4%

in our study and the results was almost similar to the study done by Handa et. al.¹⁸ In our study the FNAC showing inadequacy in getting the sample was only 6% and a similar type of study done by Mahar et. al¹⁹ had shown that 9% of the FNAC sample was found to be inadequate and so our study was almost in par with it.

In the present study the HPE report, which was considered to be the gold standard had identified all the

12 samples which were reported as insufficient sample by FNAC. Among the 12 samples 8 were found to be benign and 4 were malignant, the remaining 188 samples which were reported by HPE were almost similar to that of FNAC. Similar to our results the studies done by Gupta et. al,²⁰ Mundasad et. al²¹ had shown the samples which were reported as insufficient in FNAC had been diagnosed in HPE. This had proven HPE to be considered as the gold standard test.

In our study the accuracy of FNAC in detection of the thyroid swelling was found to be 94%. It is well compared with the study done by Safirullah et. al,²² in which the accuracy was reported as 94.2%, and another study done by Mundasad et. al²¹ and Gupta et. al²² the accuracy was 80% and 85% respectively.

Several international studies have documented the sensitivity of FNAC in thyroid nodules to range from 52-98%.^{5,23} Similarly, the international normal range is for specificity is 72 to 100% and for PPV is 50 to 90%.^{24,25} whereas in our study the sensitivity of FNAC in detecting all the benign and malignant type of thyroid lesions was found to be in the range of 80 - 100%, whereas the specificity and the positive predictive value was almost 100% for all the lesions detected by FNAC. There was not even a single false positive case reported in our study.

Conclusion

Fine needle aspiration cytology is highly sensitive and specific in the detection of thyroid lesions. Fine needle aspiration cytology is highly accurate in the evaluation of solitary thyroid nodule. Therefore, FNAC should be adapted as an initial investigation of thyroid diseases in all tertiary care hospitals.

FNAC provides much more useful information and can readily be used along with other clinical information to decide on the best form of treatment in patients with solitary thyroid nodule. So the use of FNAC has reduced the number of patients with solitary thyroid nodules undergoing unnecessary surgery and has led to proper planning of surgery in malignant cases.

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Endoscopic Solution to Rhinogenic Contact Headaches

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ABSTRACT

Introduction

Headache is a common complaint that brings patients to multidisciplinary clinics. It is utmost important to have meticulous clinical diagnosis of patients with rhinogenic and non sinusogenic headaches. The diagnosis has become easier with the advent of modern endoscopy and endoscopic sinus surgical techniques. This study aims to investigate the role of some anatomical nasal abnormalities in rhinogenic contact headache and to evaluate response to endoscopic surgery.

Materials and Methods

A prospective study was conducted at a secondary level regional referral Hospital in the Sultanate of Oman. Patients with long-lasting, frequent, severe headaches not amenable to medical treatment, above 20 years of age were taken into consideration. Routine nasal endoscopy, Computerized tomography scan of the paranasal sinuses, Nasal decongestion and various surgical techniques to correct the anatomical abnormalities were included in our study and results were correlated statistically.

Result

There was a male predominance in our study with duration of headache ranging from 2 weeks to 5 years. There was a preponderance of headache in frontal region in our study group. Diagnostic nasal endoscopy and CT scan of PNS revealed Deviated nasal septum / septal spur, concha bullosa, Haller cell, pneumatized uncinate process and agar nasi cells. The overall success rate of the surgery in relieving headaches, measured by the MIDAS- VAS score, was approximately 75 %. The non-parametric Wilcoxon signed rank test, Chi square and paired T tests shows that the following study has rejected the null hypothesis as statistically significant where the P value <0.05.

Discussion

Researchers have examined the contact points as a source of rhinogenic / contact headache. Intranasal mucosal contact released substance P, causing pain and headache, Substance P has a potent vasodilator effect. Vasodilatation and perivascular inflammation are the final common pathways in pain. Surgical treatment for contact point-induced headaches has had good success.

Conclusion

The etiology of rhinogenic headache is multifactorial. Complete history taking, scrupulous preoperative evaluations, multidisciplinary consultations, Initial medical controls, long observation, and diligent postoperative follow-ups are mandatory for not only accurate diagnosis but also for promising surgical outcomes of non-sinusitis related rhinogenic headache. Our experience reveals that patients with rhinogenic contact headaches can benefit significantly from meticulous endoscopic decompression

Keywords:

Headache; Facial Pain; Forehead; Endoscopy; Nasal Mucosa; Contact Points; Surgical Procedures, Operative

Headache is a common complaint flocking patients to General Physicians, Neurologists, Ophthalmologists and otolaryngologists in date to day clinical practice. It's therefore mandatory to have high proficiency and meticulous care in evaluating

headaches of both rhinogenic and non sinusogenic origin. Rhinogenic or sinusogenic headache is a controversial topic to be discussed, but this is gaining increasing attention following advent of endoscopic solution during last two decades. This study aimed to investigate the role of some anatomical nasal abnormalities in rhinogenic contact headache and to evaluate response to endoscopic surgery. It also defines rhinogenic headache, and reviews the literature supporting and opposing the existence of rhinogenic headaches.

The concept of rhinogenic headache secondary to

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mucosal contact points was first described by J.O. Roe in 1888.¹ In the 1920's, Sluder theorized that headaches could occur from the sinuses in the absence of inflammation or infection by the creation of a vacuum in a sinus cavity. McAuliffe et. al. performed a frequently-sited study in 1943 regarding the origin of headache and facial pain. Both the International Headache Society (IHS) and the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) have described conditions that can cause headaches of rhinogenic origin.²

Rhinogenic headache is secondary to mucosal contact points in the nasal/sinus cavities in the absence of inflammatory sino-nasal, purulent discharge, sino-nasal polyps, sino-nasal masses or hyperplastic mucosa. It has multiple synonyms used frequently in the literature which include rhinopathic headache, sinogenic headache, middle turbinate headache, nasal spur headache, four finger headache, sinus headache, contact point headache, and Sluder headache.

Stamberger and Wolfe described a potential mechanism for nasal mucosal contact point headaches in 1988. According to their theory mechanical contact between two mucosal surfaces in the nose or sinuses creates a sensory stimulus which is known as axonal reflex. Sensory nerve endings primarily from V1 and V2 extend into the nasal mucosa and nearly to the cell surface. The axonal reflex results in the release of substance P, a vasoactive neuropeptide found in unmyelinated C fibers.³ Substance P causes vasodilation, plasma extravasation, histamine release, and other inflammatory events. These vascular phenomenon may be responsible for migraine-like headache symptoms. Since V1 innervates the dura, this mechanism may also involve the above discussed referred pain from V2/V3 as well.

Materials and Methods

This was a prospective study which was conducted at ENT department in Secondary level regional referral Ministry Hospital in Sultanate of Oman between January 2014 and January 2015. We reviewed those who were

accessible for 6 months to 1 year follow up in treatment. 20 such patients were enrolled in our prospective study.

Inclusion criteria

Patients who were above 20 years of age and had long-lasting, frequent, severe headaches without other identifiable sino-nasal disease or other known obvious cause and not relieved by any analgesic treatment.

Exclusion criteria

Any patient with sinonasal tumour, patients with other obvious causes of headache like migraine, cluster headache, headache caused by ophthalmological causes, patients who refused surgery or follow up care, pregnant ladies and patients with history of previous sinonasal surgeries were excluded from this study.

Preoperatively, all patients were assessed by a questionnaire on the detailed history of their headache including onset, time of day, duration, frequency, nature, side of the head and location, existence of an aura, aggravating and relieving factors, and accompanying nasal symptoms, they were evaluated using a MIDAS [Migraine Disability Assessment Questionnaire Score] Headache score questionnaire based on the activities of daily life (Fig. 1).

All the patients under this study underwent a preliminary diagnostic nasal endoscopy and a CT PNS evaluation to identify nasal mucosal contact points and to rule out other nasal pathologies (Table I). Most of them underwent a nasal decongestion test. Using this test, topical anaesthetic was applied to a mucosal contact point while a patient was actively experiencing headache. A positive test occurred when application of the anaesthetic relieved the headache. Each patient was also evaluated by a multi-disciplinary team consisting of a neurologist, ophthalmologist, orthopaedic specialist, and internist to rule out other possible causes of headaches. The patients were managed initially by medical therapy without success.

Surgically corrected contact points in these case series included deviated nasal septum in contact with

lateral nasal wall, deviated nasal septum in contact with middle turbinate, deviated septum in contact with inferior turbinate, Pneumatized Middle turbinate or concha bullosa, pneumatized Haller cells, Onodi cells, pneumatized uncinate process and any other visualized mucosal contact point.

Surgical Technique

After obtaining written informed consent, surgery was performed under general anaesthesia. At the end of the surgical procedure, the nasal cavity was packed with (polyvinyl alcohol formaldehyde foam) Merocel® and gauze which were removed on first postoperative day. Antibiotics and analgesics were administered for 7 days following surgery.

The surgery was done meticulously preserving most of the functional mucosa and it was a limited endoscopic sinus surgery based on location of the anatomical variation, contact points, as identified by nasal endoscope and CT PNS. In patients with nasal septum deviation or septal spur, a septoplasty or spurrectomy was performed initially. The concha bullosa in the diseased side was approached by way of lateral lamellectomy. For Haller cell, the inferior, medial, and lateral walls were carefully removed to fully open the cavity of the cell, with preservation of the superior wall to prevent injury to the orbital cavity. For turbinate hypertrophy turbinoplasty or conservative partial turbinectomy was done on patients with severe hypertrophy of the inferior turbinate.

Postoperative follow-up evaluations were scheduled at 2 weeks, 1, 2, 3, and 6 months. Postsurgical wound care included regular debridement- extirpation of any granulation tissue, post synechiae release and medical therapy. The evaluations included an endoscopic examination of the nasal cavity and VAS-MIDAS score grading of headache intensity (Fig. 1). For further analysis patients were asked to grade the pain intensity on visual analog scales, with 0 indicating no pain at all and 10 indicating worst possible pain. The VAS scores of the four groups based on the MIDAS score severity of headache (Table II) were compared using a non-parametric Wilcoxon signed rank test (Table III). The SPSS 16.0 software (SPSS Inc., Chicago, IL) was used to conduct the statistical tests. p values < 0.05 (2-sided)

were deemed to indicate statistical significance. The Ethical research committee of the hospital approved this study protocol.

Results

Out of the 20 patients accepted for study 12 [60%] were Female and 8 [40%] were Male patients. The duration of headache was ranging from 2 weeks to 5 years. The mean headache duration was 6.20 hour per headache, ranging from 60 seconds to 24 hour, and the frequency of headaches ranged from one episode per month to every day. The headache occurred in the frontal area in 8 patients, in glabellar region in 5 patients, periorbital in 2 cases, one each in vertex, parietal, temporal, forehead and malar regions. (Table I)

Diagnostic nasal endoscopy and CT scan of PNS revealed deviated nasal septum / septal spur in 8 patients, concha bullosa in 5 cases, Haller cell in 2 patients, pneumatized uncinate process and agar nasi cells in 2 cases and Onodi cell in a patient. Some patients had combination of the above. Timing of headache was another factor – 11 patients had an early morning headache and 9 of them had an evening bout of headache. 10 patients had stabbing quality and 4 patients attributed as squeezing and rest 6 patients had a dull vague nature of ache.

The overall success rate of the surgery in relieving headaches, measured by the MIDAS-VAS score, was approximately 75%. Almost complete relief from headaches was achieved in 15 of 20 patients (75%), and 3 patients (15%) reported a decrease in headache intensity after surgery. In contrast, 2 patients reported that headache intensity was unchanged after surgery (5%), or either worsened or remained the same (5%). (Table II) The non-parametric Wilcoxon signed rank test, Chi square and paired T tests shows that the following study has rejected the null hypothesis as statistically significant where the P value < 0.05. (Table III)

Discussion

Many researchers and studies have examined the contact

MIDAS QUESTIONNAIRE

INSTRUCTIONS: Please answer the following questions about ALL your headaches you have had over the last 3 months. Write your answer in the box next to each question. Write zero if you did not do the activity in the last 3 months.

1	On how many days in the last 3 months did you miss work or school because of your headaches?	<input type="text"/> <input type="text"/> days
2	How many days in the last 3 months was your productivity at work or school reduced by half or more because of your headaches? (<i>Do not include days you counted in question 1 where you missed work or school</i>)	<input type="text"/> <input type="text"/> days
3	On how many days in the last 3 months did you not do household work because of your headaches?	<input type="text"/> <input type="text"/> days
4	How many days in the last 3 months was your productivity in household work reduced by half or more because of your headaches? (<i>Do not include days you counted in question 3 where you did not do household work</i>)	<input type="text"/> <input type="text"/> days
5	On how many days in the last 3 months did you miss family, social or leisure activities because of your headaches?	<input type="text"/> <input type="text"/> days
TOTAL		<input type="text"/> <input type="text"/> days
A	On how many days in the last 3 months did you have a headache? (<i>If a headache lasted more than 1 day, count each day</i>)	<input type="text"/> <input type="text"/> days
B	On a scale of 0–10, on average how painful were these headaches? (<i>Where 0 = no pain at all, and 10 = pain as bad as it can be</i>)	<input type="text"/>

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Once you have filled in the questionnaire, add up the total number of days from questions 1–5 (ignore A and B).

<i>Grading system for the MIDAS Questionnaire:</i>		
Grade	Definition	Score
I	<i>Minimal or infrequent disability</i>	0–5
II	<i>Mild or infrequent disability</i>	6–10
III	<i>Moderate disability</i>	11–20
IV	<i>Severe disability</i>	21+

Fig.1. Migraine Disability Assessment Questionnaire

points as a source of rhinogenic / contact headache. Stammberger and Wolff suggested that intranasal mucosal contact released substance P, causing pain and headache. Substance P, which is associated with the inflammatory process, has a potent vasodilator effect.

Vasodilatation and perivascular inflammation are the final common pathways in pain. Surgical treatment for contact point-induced headaches has had good success. Clerico et al and Tosun et al has reported an 79 % and 90 % success rate respectively following surgery to

Table I : Contact areas within nasal cavity that is responsible for headache as confirmed during diagnostic nasal endoscopy by the patch and probe test and CT Scan PNS findings

S.NO	AGE	SEX	SITE OF HEADACHE	DNS/ SEPTAL SPUR	CONCHA BULLOSA	HALLER CELLS	PNEUMATIZED UNCINATE PROCESS	PNEUMATIZED AGGAR NASI CELLS	ONODI CELLS
1	23	F	FRONTAL	1					
2	35	F	FRONTAL	1					
3	40	F	FRONTAL				1		
4	32	M	GLABELLAR					1	
5	26	F	FOREHEAD	1					
6	22	M	TEMPORAL	1					
7	36	M	MALAR		1				
8	32	M	FRONTAL					1	
9	30	F	FRONTAL				1		
10	27	M	PERIORBITAL		1				
11	22	F	GLABELLAR	1					
12	24	F	GLABELLAR	1					
13	27	M	FRONTAL		1				
14	31	M	PERIORBITAL			1			
15	38	M	GLABELLAR		1				
16	36	M	FRONTAL	1					
17	27	F	FRONTAL		1				
18	21	M	VERTEX						1
19	29	M	PARIETAL	1					
20	34	M	GLABELLAR			1			

correct contact point induced headaches. The following table represents an overview of different authors in successfully relieving the contact headaches including one of our own study as well. Table IV depicts an overview of different authors in successfully relieving

the contact headache with different surgical techniques they used.

Mohebbi et al reported 83% success rate following surgery to correct contact point-induced headaches.⁸ Stammberger and Wolf suggested that hypoxia

Table II : Preoperative and Postoperative VAS-MIDAS Questionnaire

MIDAS SCORE SEVERITY OF HEADACHE	PREOPERATIVE PAIN SCORE	POSTOPERATIVE PAIN SCORE
0-5(Minimal or infrequent disability- Grade I)	2	15
6-10(Mild or infrequent disability- Grade II)	4	3
11-20(Moderate disability- Grade III)	12	1
>21(Severe Disability- Grade IV)	2	1

Table III : Statistical Analyses

PAIRED SAMPLES TEST									
		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MIDAS PREOP PAIN SCORE - MIDAS POSTOP PAIN SCORE	1.300	.979	.219	.842	1.758	5.940	19	.000
CHI SQUARE TESTS									
				Value	df	P value			
McNemar-Bowker Test				17.000	6	.009			
N of Valid Cases				20					
WILCOXON SIGNED RANK TEST									
				N	Mean Rank				
MIDAS POSTOP PAIN SCORE - MIDAS PREOP PAIN SCORE a. postop score < preop score b. postop score > preop score c. postop score = preop score				Negative	16 ^a	9.31			
				Positive	1 ^b	4.00			
				Ties	3 ^c				
				Total	20				

Table IV : An overview of different studies reporting successful treatment of contact headache

STUDY / AUTHOR	PATIENTS	SYMPTOMS	SURGICAL MANAGEMENT	PERCENTAGE RELIEVED OF HEADACHE
Schonsted-Madsen et al ⁴	157	Headache	septoplastic surgery, reconstruction of the nasal pyramids, or submucosal conchotomy	60%
Low and Willatt et al ⁵	116	Headache	submucous resection for a deviated nasal septum	63%
Parsons and Batra et al ⁶	34	Headache	FESS	91%
Ramadan et al ⁷	23	Headache	FESS	60%
Our study	20	Headache	ESS- Septoplasty/spurrectomy, lateral lamellectomy	75%

secondary to pressure differentials within the sinuses was a possible mechanism for the release of substance P.

Conclusion

The etiology of rhinogenic headache is multifactorial.⁹ In addition to the often-seen anatomical abnormalities, other variations have also been identified as sources of referred pain, for example, paradoxical middle turbinates or overexpanded agger nasi cells. Complete history taking, scrupulous preoperative evaluations, multidisciplinary consultations, initial medical controls, long observation, and diligent postoperative follow-ups are mandatory for not only accurate diagnosis but also

for promising surgical outcomes of non sinusitis related rhinogenous headache.

Few prospective studies have investigated the improvement of headaches after nasal or sinus surgery. Mariotti and Setliff evaluated patient history and computed tomography (CT) scans in a prospective study designed to predict the outcome of headaches after surgery.¹⁰ Our experience reveals that patients with rhinogenic contact headaches can benefit significantly from meticulous endoscopic decompression.

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A Comparative Study on Laryngeal Aerodynamics in Dysarthrophic versus Normophonic Male Subjects

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ABSTRACT

Introduction

Dysarthria is a motor speech disorder. It occurs due to paralysis, weakness, or incoordination of the speech musculature. The authors with this study want to enrich clinical understanding of the difference of the aerodynamic characteristics in normophonic and dysarthric population.

Materials and methods

The aerodynamic characteristics in normophonics and in dysarthric population were compared and documented using Voice Function Analyzer (Aerophone II®). Forty male individuals within the age range of thirty five to fifty five years participated in this study. The control group had twenty normophonic cases with no history of neurological disorder. The second group had twenty cases with dysarthria.

Results

Significant difference was found between the two groups in peak flow, forced volume and duration, vital capacity and fast adduction-abduction measurements.

Discussion

The difference in results from both the groups and their implications are discussed based on these findings.

Conclusion

The present study has assessed the parameters of speech and voice disorder in male dysarthric individuals. It suggests inclusion of aerodynamic measurement in test protocol and for evidence based research and prognosis documentation. Measurement of laryngeal or vocal tract resistance may be useful in documenting a variety of the perceptual voice characteristics.

Keywords

Speech Disorders; Dysarthria; Dysphonia; Documentation.

Dysarthria is a collective name for a group of speech disorders resulting from disturbances in muscular control over the speech mechanism due to damage of the central or peripheral nervous system.¹ Dysarthrophonia, denotes “neurological dysphonia that presents one aspect of dysarthria.”^{2,3} In dysarthria one or all speech sub - system may be affected. The power generator of speech is the respiratory system, which

plays an important system of speech mechanism. One of the assessment parameter of respiratory system is the assessment of subglottal air pressure. This can be measured by Voice Function Analyzer (Aerophone II®). The analyzer analyses different parameters of voice as mentioned in Table I and Fig. 1.

Voice Function Analyzer, Aerophone II® was used in this study to measure the aerodynamics characteristics in normophonics and in dysarthric population

In aerodynamic measurement of vocal function, the presence of laryngeal hyperfunction would be expected to manifest as increased resistance, increased pressure, decreased laryngeal airflow during phonation and a decrease in the adduction/ abduction rate (Ad/Abd) of the vocal folds.^{4,5} The authors undertook the study to find there is difference of the aerodynamic characteristics

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Table I : Parameters of voice measured by Voice Function Analyzer

PARAMETERS	RATINGS
Airflow	Peak airflow. Forced 1 second expiration. Vital capacity. Volume of any air flow. Duration of air flow. Mean Airflow rate. Phonation quotient.
Air pressure	Oral air pressure. Pharyngeal air pressure. Subglottal air pressure.
Sound parameters	Maximum sound pressure level. Minimum sound pressure level. Average sound pressure level. Phonation time (used for mean flow rate calculation).
Glottal parameters	Aerodynamic input power. Aerodynamic output power. Glottal resistance. Glottal efficiency.
Pitch calculations	Average Pitch Sigma Pitch
Rate of movement	Ab-/adduction rate of glottis. Ab-/adduction rate of velum. Rate of lip closures.

between normophonic and dysarthrophonic population.

The aim of the present study was to compare the aerodynamic measurement of males with dysarthria with their age matched normophonic peers. The study may help to reflect the varying physiological symptoms associated with dysarthria. The study further highlights the importance of aerodynamic measurement of dysarthric speech.

Materials and Methods

Subjects

Forty male cases within the age range of thirty five to fifty five years (Mean age- 42.8 years, SD- 4.1; Mean height-5'4", SD-2.7") were included in this study. They were divided into two groups. The control group constituted of twenty normophonic cases (Mean age-

39.6years, SD-2.9; Mean height-5'35", SD-3.2") with no history of neurological disorder. The second group (experimental group) had twenty cases (Mean age-44.6year, SD-2.9; Mean height-5'3", SD-3.8") with dysarthria. The neurological assessment was done by neurologists through imaging tests, electrophysiological evaluation and serological tests. Dysarthria was diagnosed by Speech Language Pathologist by using Frenchay Dyarthria Assessment (FDA),⁶ cranial nerve evaluation. Western Aphasia Battery (WAB)⁷ was used to evaluate associated language deficits. Mayo Clinic Protocol was used to assess the dysarthria.

phonation, vital capacity and fast AD/ ABD. For the measurement of vital capacity, the subjects were instructed to take a deep breath and blow slowly as long as possible into the mouth piece connected to the Aerophone II[®], as shown in Fig.2.

For the measurement of mean airflow rate, the subjects were instructed to take a deep breath and phonate /ae/ as long as possible in the mouth piece connected to the Aerophone. The data was collected while placing a circumferentially placed mask. Three trials were done for each case for the above mentioned parameters to attain test retest reliability and an average was obtained of all the values. Statistical analysis was done to find the

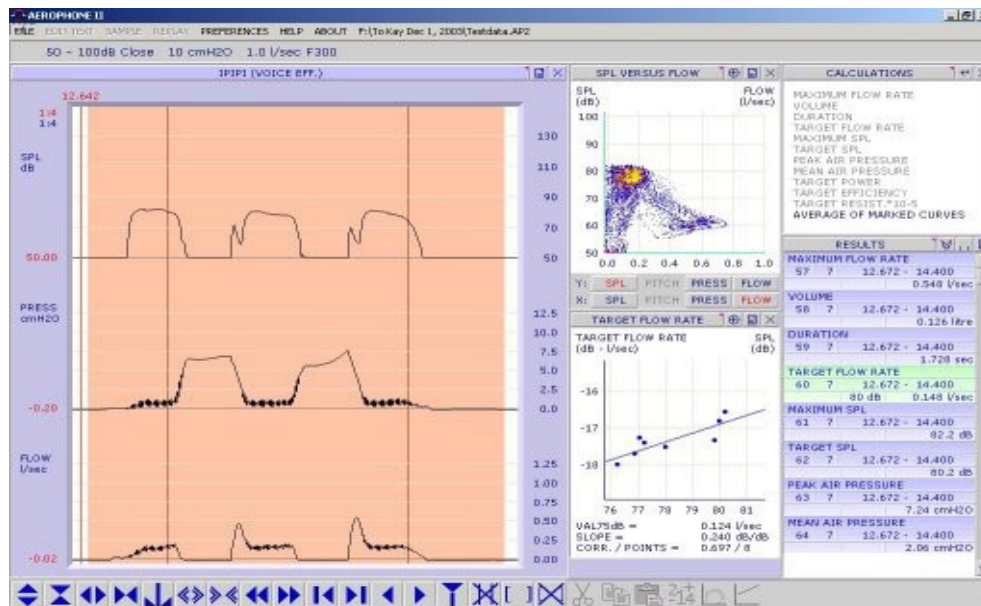


Fig.1. Illustration showing an output of aerodynamic measurement

Tools

Aerophone II[®], by F.J. Electronics, Ellebuen 21, DK-2950 Vedbaek, Denmark a voice function analyzer was used in this study. It has a circumferentially vented mask to identify and record the inspiratory and expiratory air flow direction.

Procedure

The cases were asked to do tasks on peak flow, sustained

difference of the aerodynamic measurements between these two groups. Then the statistical analysis was done to find the mean value for each of the difference between the normophonic and dysarthric population. One sided t-test was measured to identify the significant difference between the two groups.

Results

Significant difference was found between the two groups in aerodynamic measurement (Table II). There



Fig.2. Recording of sample using Aerophone II®

was a significant difference at the level of 95% CI in the result of one sided t-test. In peak flow measurement there was significant difference in mean values of peak flow (control group mean- 6.37, SD- 2.50 , experimental group - 2.50, SD- 2.64), forced volume (control group mean- 1.21,SD-0.83 , experimental group-6.62, SD- 7.46) and duration(control group mean- 3.43, SD- 1.28 , experimental group – 5.00, SD- 2.94). In vital capacity, significant difference was found in mean values of maximum flow rate (control group mean-2.33, SD- 1.48, experimental group – 2.78, SD- 1.72), vital capacity (control group mean- 5.49, SD- 2.66, experimental group – 4.13, SD- 2.93) and duration (control group mean- 8.82, SD-3.74, experimental group –9.19, SD- 3.76). In sustained phonation, a significant difference was also found in all the parameters. Fast adduction (AD)/ abduction (ABD) measurements also show a significant difference in all the mean values between the two groups.

Discussion

The present study aimed to document the dysarthrophonic characteristics of individuals with dysarthria. A variety of laryngeal impairments were noted in the study. Low peak flow and reduced duration in airflow measurement may be because of the reduced pliability in laryngeal

muscle kinematics. The laryngeal resistance was found to be more which may emphasize on excessive muscle tension either at the level of the glottis or supraglottis.

The study documented reduced vital capacity which is manifested as short utterances and reduced loudness in dysarthric speakers. Dysarthric patients show weak respiratory support, low volume, incoordination of the respiratory stream. The change of aerodynamic characteristics can be due to the neurological impairments, which is common in dysarthric population. Since the vital capacity (VC) reflects mainly lung function, it was expected that there will be statistical difference between the two groups. The most frequent speech deviations observed were impaired loudness control and harshness; less frequently occurring deviations were defective articulation, restricted use of vocal variations for emphasis, poor pitch control, hypernasality, inappropriate pitch level, and breathiness. The pathological explanation lies with the fact that the Dopamine deficiency induces a dysfunction of the respiratory muscles that is partly responsible for dysarthria.⁸

The overall poor control of expiratory airflow, an alteration of the air quantity needed for the vibration of vocal cords.^{9,10} The fast abduction and adduction rate might be due to inadequate closure of the vocal cords. Pressure and flow information can aid in identifying

Table II : Statistical analysis of laryngeal aerodynamics between normal and dysarthrophic subjects

		NORMAL			DYSARTHROPHONIC			RESULT 95% CI
		MEAN	SD	DF	MEAN	SD	DF	
PEAKFLOW	Peak flow	6.37	2.50	29	2.50	2.64	9	t= 4.1827; p=0.0002
	Forced vol.	1.21	0.83	29	6.62	7.46	9	t= -3.9905; p=0.0003
	Duration	3.43	1.28	29	5.00	2.94	9	t= -2.3678; p=0.0231
VITAL CAPACITY	Max. flow rate	2.33	1.48	29	2.78	1.72	9	t= -0.8001; p=0.0286
	Vital capacity	5.49	2.66	29	4.13	2.93	9	t= 1.3661; p=0.00799
	Duration	8.82	3.74	29	9.19	3.76	9	t= -0.2706; p=0.003882
FAST AD/ABD	Max. flow rate	0.9	0.31	29	0.67	0.15	9	t= 0.2457; p=0.0306
	Volume	1.4	1.05	28	0.69	0.57	9	t= 2.029; p=0.0495
	Duration	13.0	7.33	29	6.94	4.04	9	t= 2.4776; p=0.0178
	Mean airflow	0.4	0.23	28	0.13	0.12	9	t= 3.5339; p=0.0011
	Ad/Abd rate	6.8	2.72	29	11.74	2.53	9	t= -5.0552; p=<0.0001

laryngeal manifestations of pathophysiology affecting phonatory characteristics and glottal efficiency¹¹

Conclusion

The present study may help to document the parameters

of speech and voice disorder in male dysarthric individuals. The study may be helpful to include aerodynamic measurement in test protocol and for evidence based research and prognosis documentation. Further elaborated study is needed with more number of subjects and inclusion of females with dysarthria

to study the commotion of quality of life in these individuals. This will aid in further enrichment of clinical understanding and formulate appropriate intervention plan. From this limited sample it is possible to suggest but not to confirm that laryngeal or vocal tract resistance measures may be useful in documenting a variety of the perceptual voice characteristics

Conflict of Interest

The authors declare no conflict of interest and certify that the project was not funded by outside agency or company.

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Clinicopathological Study of Thyroid Swellings with Some Emphasis on Geographical and Community Distribution: A Hospital Based Analysis

Kusum Borsaikia,¹ Mukul Patar²

ABSTRACT

Introduction

Thyroid swellings/goiter are still prevalent in north east part of India. Apart from its sub-Himalayan location the areas along the river Brahmaputra suffer from flooding every year and there is also frequent changing of river course, thought to be another reason for iodine depletion in soil of this region(3).

Aim

To determine the incidence of thyroid swellings and distribution among different sections of society and geographical areas, and to evaluate the role of FNAC in the diagnosis and management and find out its accuracy by comparing with histopathology.

Materials and methods

In the present study, total 212 patients with thyroid swellings attending department of ENT of a state medical college during the period from January 2013 to December 2015 and undergone FNAC at department of Pathology were taken into consideration.

Results

Out of 212 cases major fraction (52.83%) were hailed from areas along the Brahmaputra river followed by patients (33.96%) from tea gardens and adjacent areas. Patients belonging to tribal communities constituted 45.28%, whereas patients from tea workers section of society formed the second majority (34.9%). Female male ratio of cases was 5:1. Majority of patients were from 21-40 years age group with mean age of 37.2 years. Cytology results of 212 cases showed colloid goiter 73.58%, adenomatous goiter 8.49%, thyroiditis 9.9%, hurthle cell neoplasm 1.41%, follicular neoplasm 4.24%, papillary carcinoma 1.41%, papillary carcinoma of follicular variant 0.47% and medullary carcinoma in 0.47% cases. Histopathology was possible in 65 cases and compared with FNAC results with accuracy rate of 89.23%.

Conclusion

Frequent flooding and changes of river course may be one of the reasons for high prevalence of thyroid swellings and goiter along the Brahmaputra valley apart from its sub-Himalayan location. Consumption polluted drinking water and goiterogenous food stuffs may be another reason of high incidence. FNAC is an easy, rapid, reliable, less invasive, low cost technique for diagnosis of thyroid swellings.

Keywords

Goiter; Thyroid Neoplasms; Incidence; Aspiration Biopsy, Fine-Needle; Drinking Water; Iodine

Enlargement of thyroid gland or goitre is a common manifestation of iodine deficiency and its incidence is high in iodine deficient areas. Despite

the salt iodization programme by Govt of India goitre is still widely prevalent in some areas of northeastern India. According to ICMR Bulletin (Vol. 26, June 1996) no state in the country was believed to be free from Iodine Deficiency Disorders.

Patients with thyroid swelling or goitre gave history of taking iodized salt for years. Pollution and bacteriological impurity of drinking water act as goitrogenic agents by raising the bodily demand of iodine.¹ Surveys conducted by National Goitre Survey Team of the Director General

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of Health Services during the past three decades have detected a high prevalence of endemic goitre in different states.² Iodine content of staple food (rice) and drinking water was found to be poor in sub Himalayan zone of India.²

In the north eastern part of India environmental iodine deficiency is one of the principal reasons for high prevalence of goitre and thyroid swelling. Frequent flooding and changes of river course are the major causes of iodine depletion in the soil of this region.³ We have also come across significant number of patients coming with thyroid swelling to our institution for diagnosis and treatment. As a tertiary referral centre major bulk of patients to our Institute are from Jorhat and Golaghat districts and few of them from adjacent Sibsagar, Nagaon and Lakhimpur districts of Assam.

Thyroid swellings are very superficial, easily visible and display an intriguing range of lesions widely differing in biological behaviour and are source of concern for the patient and a diagnostic dilemma for physicians.⁴ FNAC is a well-accepted and established OPD procedure used in the primary diagnosis of palpable thyroid swelling with high sensitivity and specificity.

Aims and Objectives

1. The objective of this study is to determine the overall incidence and clinical analysis of thyroid swellings with some emphasis on geographical and community distribution of cases.
2. The frequency of occurrence of different variants of thyroid swellings and their age and sex distribution.
3. To evaluate the results of thyroid FNAC and correlate with histopathological results, wherever available.

Materials and Methods

In this retrospective study patients with clinically diagnosed thyroid swellings attending the OPD of department of ENT who had undergone FNAC at department of Pathology, State Medical College and Hospital from January 2013 to December 2015 were taken into consideration. The detailed information each

patient including name, age, sex, address, category, community, religion, presenting complaints, duration of thyroid swelling, general examination, local examination stating site, size and other characteristics of thyroid swellings were retrieved from records and noted in a prescribed proforma.

Patients were subjected to clinical palpation, mobility during swallowing was assessed, lymph node examination, thyroid profile and FNAC were done. Patients were then treated surgically or medically. Prior to FNA, thyroid glands were palpated carefully and details of the procedure were explained to the patients. The patients were made to lie supine with the neck extended and after taking all aseptic precautions aspiration was done by a 23 G needle attached to a 20 ml disposable syringe. Two to three passes were made in each case.

For cystic swellings, cyst contents were aspirated and centrifuged and sediments stained for cytological examination. The slides were stained by May-Grunwald-Giemsa (MGG), hematoxylin and eosin (H and E) and Papanicolaou (pap) stains, wherever necessary. Results of cytopathological slides examination were correlated with clinical diagnosis of all cases and histopathological results of operated patients. Out of total 212 cases 65(30.66%) cases underwent either hemithyroidectomy, subtotal thyroidectomy or total thyroidectomy in our hospital and histopathological examination was done in department of Pathology.

Results

A total of 212 cases with palpable thyroid swelling were examined at Department of ENT, State Medical College and Hospital during the period from January 2013 to December 2015 and after thorough clinical examination the patients were subjected to FNAC at Department of Pathology. From the medical records and history, it was observed that majority of patients were from areas along the Brahmaputra river (112 cases, 52.83%) and patients living in and around tea gardens formed the second major group (72 cases, 33.96%). On the other hand, majority of patients belonged to tribal (mongoloid origin) communities (96 cases, 45.28%), mostly living

Table I : Geographical and Community distribution of cases (n=212)

GEOGRAPHICAL DISTRIBUTION OF CASES					
No. of patients hailing from areas along the river Brahmaputra	Percentage	No. of patients from tea gardens and adjacent places	Percentage	No. of patients from other places	Percentage
112	52.83%	72	33.96%	28	13.20%
COMMUNITY DISTRIBUTION OF CASES					
No. of patients belonging to tribal (mongoloid origin)	Percentage	No. of patients belonging to tea tribes (Adivasi)	Percentage	No. of patients from other section of society	Percentage
96	45.28%	74	34.9%	42	19.8%

in villages along the Brahmaputra river and tea tribe section (Adivasi community) of society formed the second major group (74 cases, 34.9%) (Table I).

Out of total 212 patients 35 cases (16.5%) were male and 177 cases (83.49%) were female with a female male ratio 5:1 (Table II). The age of patients ranged from 11 to 78 years with a mean age of 37.2 years. It was observed that majority of patients with thyroid swellings were in the 21 to 40 years age group (Table II).

The major presenting symptom in all the patients was diffuse and/or nodular swelling of thyroid (100%) and other less common symptoms were pain in thyroid region in 21 (9.9%) patients, hoarseness or change of voice in 3 cases (1.4%) and difficulty in swallowing in 7 (3.3%) patients. Respiratory difficulty was observed in one (0.47%) patient only. Duration of swelling for less than 3 months was observed in 33 (15.56%) patients and thyroid swellings between 3 months to one year duration was noted in 141 (66.5%) patients and more than one year in 38 (17.92%) cases.

FNAC results of the study group are shown in

Table III. In 9 cases FNAC specimens were hemorrhagic and/or inadequate but diagnosis was done only after repeat FNAC. In our study, FNAC results of 195 (91.98%) patients showed non-neoplastic lesions and 17 cases (8.01%) showed neoplastic lesions (Table III). Based on cytological study of 212 cases, it was observed that non-neoplastic lesions were more common (91.98%) than the neoplastic lesions (8.01%). The most common non-neoplastic lesion was colloid goitre with 156 cases (73.58%) followed by thyroiditis in 21 cases (9.9%) and adenomatous goiter in 18 cases (8.49%). Among the neoplastic lesions follicular neoplasm was more common (9 cases, 4.24%) and 5 cases showed malignancy (2.36%).

Out of total 212 cases, 65 cases were operated and their histopathological diagnosis correlated with FNAC diagnosis with accuracy rate of 89.23%. Out of 5 cytologically diagnosed malignant thyroid swellings, correlation with histopathological findings were done in 4 cases and found 100% accuracy (Table-IV).

Table II : Distribution of Study Population as per Age and Sex

AGE (YEARS)	MALES	FEMALES	TOTAL	PERCENTAGE
0 – 20	1	18	19	8.96%
21 – 40	13	83	96	45.28%
41 – 60	10	43	53	25.00%
> 61	11	33	44	20.75%
TOTAL	35	177	212	100 %

Discussion

In the present study, majority of patients with thyroid swelling/goitre were from villages/areas along the Brahmaputra river and most of them belonged to tribal communities of mongoloid origin, followed by tea tribes (Adivasi) hailing mostly from Jorhat and Golaghat districts and few of them from Sibsagar and Lakhimpur districts of Assam. This high incidence of goitre can be explained by possibility of iodine depletion in the soil along the river Brahmaputra due to frequent flooding and change of river course.³

Studies also observed low iodine level in the soil along the river Brahmaputra³ and in drinking water of sub-Himalayan region.⁵ Secondly high incidence of thyroid swelling among tea tribes can be explained by pollution and bacteriological impurity of drinking water acting as goitrogenic agent, raising bodily demand of iodine¹ and consumption of goitrogenous foodstuff.³

Age of the patients ranged from 11 to 78 years with a mean age of 37.2 years, which correlated with studies conducted by Handa et al⁶ (37.69 +14.93), Gupta et al⁷ (38.9) and Sathiyamurthy et al⁸ with (36.5). But not correlating with studies conducted by Silverman et al⁹ and Arvintham et al¹⁰ with mean ages of 44.8 and 46 years respectively. In this study out of total 212 cases, 35 cases (16.5%) were male and 177 cases (83.49%)

Table III : FNAC results of 212 patients

FNAC DIAGNOSIS	NUMBER OF PATIENTS	PERCENTAGE
NON-NEOPLASTIC	195	91.98%
Colloid goiter	156	73.58%
Adenomatous Goiter	18	8.49%
Thyroiditis	21	9.9%
NEOPLASTIC	17	8.01%
<i>Benign</i>	12	5.65%
Hurthle cell neoplasm	3	1.41%
Follicular neoplasm	9	4.24%
<i>Malignant</i>	5	2.35%
Papillary carcinoma	3	1.41%
Papillary ca follicular variant	1	0.47%
Medullary carcinoma	1	0.47%

were female with male female ratio 1:5, which correlated with the studies conducted by Ghazaleh et al¹¹ (16% male and 84% female), Alam et al¹² (13% male and 87% female) and Sathiyamurthy et al⁸ (20% male and 80% female) and Parikh et al¹³ where male female ratio was 1:5.1. Regarding distribution of cases, cytological study of 212 cases showed nodular/colloid goitre in 156 cases (73.58%), which was correlated with study conducted by Sathiyamurthy et al⁸ (69.09%) but the incidence was higher when compared to study conducted by Gupta et al⁷ (52%), Silverman et al⁹ (50.4%) and Nggada et al¹⁴ (57.97%). Adenomatous goitre was diagnosed in 18 cases (8.49%), the number of which was higher when compared with study conducted by Handa et al⁶ (2.53%). Thyroiditis was diagnosed in 21 cases (9.9%), which was lower than when compared to study conducted by Handa et al⁶ (27.41%). Hurthle cell neoplasm accounted for 3 cases (1.41%), similar to study conducted by Handa et al⁶ (1.38%), but lower

Table IV : Correlation between FNAC and histopathological findings (n= 65 patients)

FNAC DIAGNOSIS	HISTOPATHOLOGICAL DIAGNOSIS						
	COLLOID GOITER	THYROIDITIS	ADENOMATOUS GOITER	FOLLICULAR ADENOMA	HURTHLE CELL ADENOMA	PAPILLARY CARCINOMA	MEDULLARY CARCINOMA
Colloid goiter	40	-	1	2	-	-	-
Thyroiditis	-	-	-	-	-	-	-
Adenomatous goiter	3	-	7	-	1	-	-
Follicular neoplasm	-	-	-	5	-	-	-
Hurthle cell neoplasm	-	-	-	-	2	-	-
Papillary carcinoma	-	-	-	-	-	3	-
Medullary carcinoma	-	-	-	-	-	-	1
TOTAL	43	0	8	7	3	3	1

then Gupta et al⁸ (8%). The number of cases detected as follicular neoplasm was 9 (4.24%), which correlated with studies conducted by Silverman et al⁹ (5.2%) and Sathiyamurthy et al⁸ (5.45%), but higher than Handa et al⁶ (1.84%) and lower than Gupta et al⁷ (16%). In the present study 5 cases were cytologically diagnosed as malignant and among this papillary carcinoma was diagnosed in 3 cases (1.41%), which was lower than Sathiyamurthy et al⁸ (2.72%), Nggada et al¹⁴ (4.3%), Handa et al⁶ (2.30%) but much lower when compared to study by Nart et al¹⁵ (42.34%). Papillary carcinoma of follicular variant was diagnosed in 1 case (0.47%), which was also much lower when compared to study conducted by Nart et al¹⁵ (15.3%). Medullary carcinoma was also diagnosed in 1 case (0.47%), and almost correlated with studies conducted by Silverman et al⁹ (0.6%), Handa et al⁶ (0.69%), Sathiyamurthy et al⁸ (0.90%), but the incidence was much lower than Nggada et al¹² (4.3%) and Nart et al¹⁵ (5.4%).

In our study histopathological studies were

conducted in 65 cases and correlated with their cytological diagnosis. Total 43 cases of cytologically diagnosed nodular and colloid goitre were operated and subjected to histopathological studies; 40 cases matched the cytological diagnosis. But in one case histopathology diagnosis came out as adenomatous goitre and 2 cases as follicular adenoma. In the present study 18 cases were diagnosed as adenomatous goitre and histopathological examinations were possible in 11 cases, which showed adenomatous goitre in 7 cases, colloid goitre in 3 cases and hurthle cell adenoma in 1 case. Out of 9 cases diagnosed as follicular neoplasm on cytology, histopathological studies were possible in 5 cases and all of them showed follicular adenoma with addition of another 2 cases which were initially diagnosed as colloid goitre by cytology. Cytological diagnosis of Hurthle cell neoplasm was done in 3 cases and histopathological study was possible in 2 cases and found 100% diagnostic accuracy by FNAC, with addition of one case where initial cytological diagnosis

was adenomatous goiter. Papillary and medullary carcinoma were detected in 3 and 1 cases respectively by cytology and subsequent histopathological examination of all these cases were found to be similar with 100% accuracy. Statistical analysis of results of our study shows the overall diagnostic accuracy of FNAC to be 89.23%, almost similar to study conducted by Parikh et al¹⁴ (90.24%).

Conclusion

In conclusion, frequent flooding of Brahmaputra valley and changes of river course, attributed to be one of the reasons for high prevalence of thyroid swelling and goitre in Jorhat and Golaghat districts of Assam, apart from its sub-Himalayan location. As pollution of drinking water is related to intensity of goitre, taking of contaminated water and goitrogenous foodstuff may be one reason of high incidence of goitre or thyroid swelling among the tea tribes, probably due to lack of proper health education.

At the same time, FNAC is an easy, rapid, reliable, less invasive, low cost technique for diagnosis of thyroid swellings. It can be performed as an OPD procedure with high diagnostic accuracy, for palpable thyroid swellings, thus avoiding unwanted surgery and decreasing morbidity.

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Role of Ultrasonography in Otolaryngology

Rezaul Karim¹

ABSTRACT

Ultrasonography (US) is frequently requested by the otolaryngologists in their day to day practice. Though US assessment is sensitive and in many situations, specific investigation for prognosis and management of patients, FNAC and Ultrasonography carries more predictive value. Ultrasonography is very useful for assessment of neck nodes and in combination with CT scan is an excellent imaging tool for follow up of head and neck cancers. Inflammatory neck nodes vary in characteristics from neoplastic nodes and US can classify them with fair degree of predictability. Thyroid nodules should strictly follow standard protocol of management, as most of the masses are benign and unnecessary diagnostic or therapeutic interventions are not required. Kim's criteria and American Association for Clinical Endocrinology recommendations are sensitive and specific for offering systematic guidance for management of thyroid nodules. US have limited roles in the assessments of sialadenitis, Sialolithiasis and salivary tumors. US is an effective tool in guiding biopsies and aspirations for diagnostic and therapeutic purposes.

Keywords

Ultrasonography; Diagnosis; Lymph Nodes; Thyroid Nodule; Salivary Glands

Ultrasonography is a low cost, easily available tool. While Conventional Radiography, MDCT and MRI are the preferred diagnostic armamentarium for the otolaryngologist, role of Ultrasonography in the assessment of neck cannot be overemphasized. Ultrasonography has the traditional role in distinguishing solid and cystic masses but with the advent of more and more sophisticated ultrasound machines, the sensitivity, specificity and predictive values of detected lesions have substantially improved. I present here a brief review of the usefulness of Ultrasonography as a diagnostic tool useful for the otolaryngologist.

Assessment of Neck Nodes

Cervical lymphadenopathy is a common problem affecting all age groups. The sonographic appearance of normal nodes is different from abnormal nodes. Gray

scale ultrasound assessment is used for evaluation of the number, size, shape, margin, hilum, matting and perilymph-node fluid collection, oedema, caseous necrosis and abscess formation while colour and power Doppler are utilised for evaluation of the intranodal vascularity.¹

In sonography neck nodes are classified into eight zones- submental, submandibular, parotid, upper cervical, middle cervical, lower cervical, supraclavicular and posterior triangle (Fig.1).¹ Routine sonographic assessment shows small normal lymph nodes in the cervical region. These nodes are oval in shape (i.e., wider than their length) having echogenic hilum. The cortex and medulla of lymph nodes are easily identified. When the nodes are larger (>9mm), round, hypoechoic and vascular, these are more likely to be pathological. Reactive and cancerous lymph nodes can be differentiated by an experienced sonographer. The reactive nodes (Fig.2) are usually oval (the long axis short axis ratio is around 0.5) matted or non-matted have cortico-medullary differentiation and shows ample vascularity with low pulsatility and resistance whereas the malignant nodes are round, hypoechoic, show no cortico-medullary differentiation and have multiple

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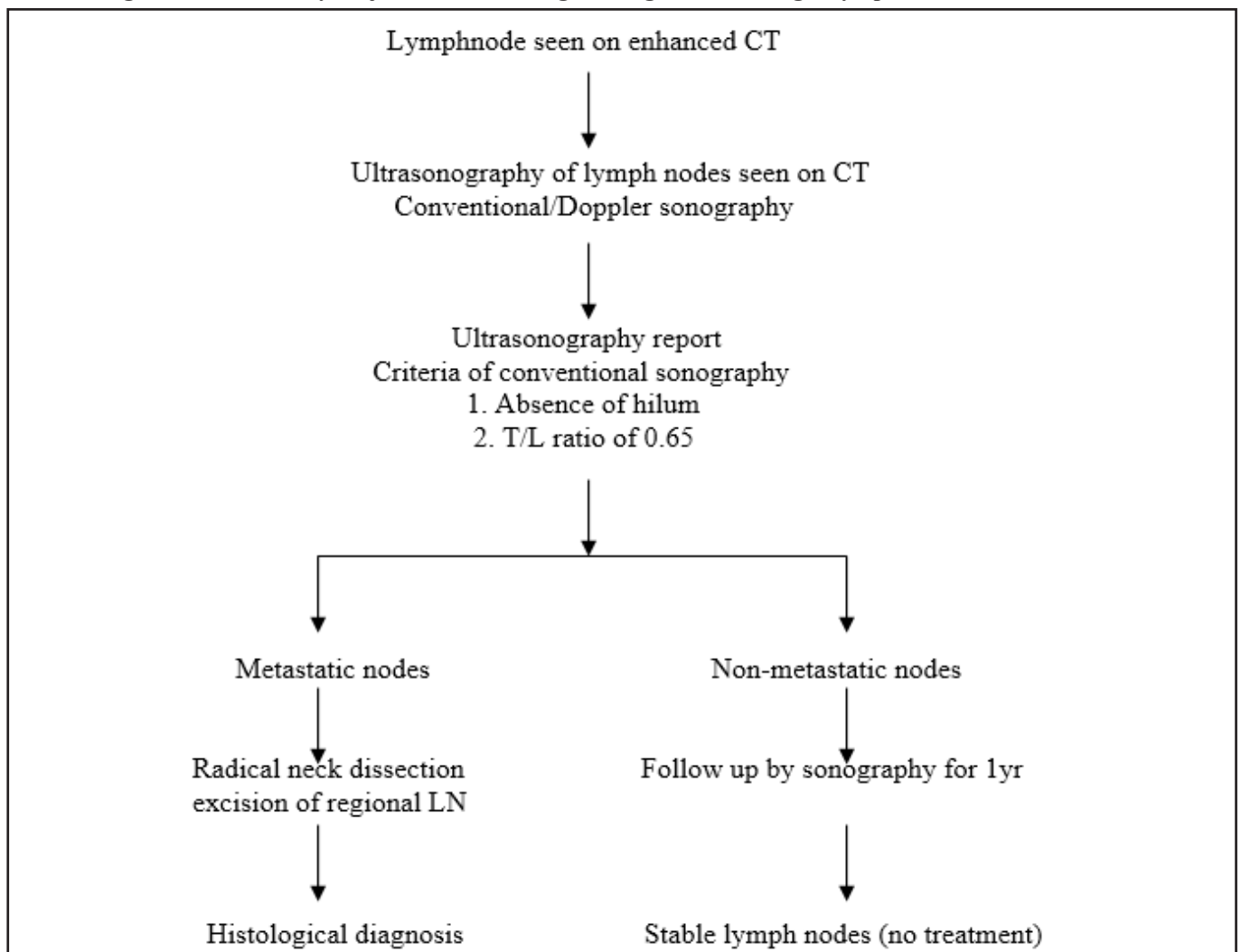
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vessels in the parenchyma. Lymph nodes loaded with malignant cells are hypoechoic in US and the echogenic hilum is not seen. Solbaiti² showed that only 4% of malignant nodes show echogenic hilum. Most agree that benign nodes show hilar echogenicity though a few investigators (Vassalo et al³) published just the contrary findings. However, no single criterion is foolproof and with experience, investigators learn to distinguish different categories of lymph nodes fairly accurately.

Colour and power Doppler sonography predict the vascularity of the node fairly accurately. Power Doppler is more sensitive in detection of flow in low-flow in small vessels. For effective power Doppler assessment

standardized setting must be used to detect low-velocity flow.⁴ Ariji et al⁵ described a unique technique of power Doppler assessment of metastatic lymph node in head and neck cancer. First, CT scan of neck is performed to detect the lymph nodes, followed by assessment by power Doppler sonography. The nodes with transverse length/longitudinal length of 0.65 which have no detectable hilum fulfilling power Doppler characteristics are considered metastatic. The colour Doppler signals from lymph nodes are of three types: hilar, parenchymal (Fig. 3) and no signal. Metastatic lymph nodes are more likely to show parenchymal signal whereas reactive nodes show hilar signal. By this technique, the

Table I : Algorithm followed by Ariji et al⁵ for radiological diagnosis of enlarged lymph nodes



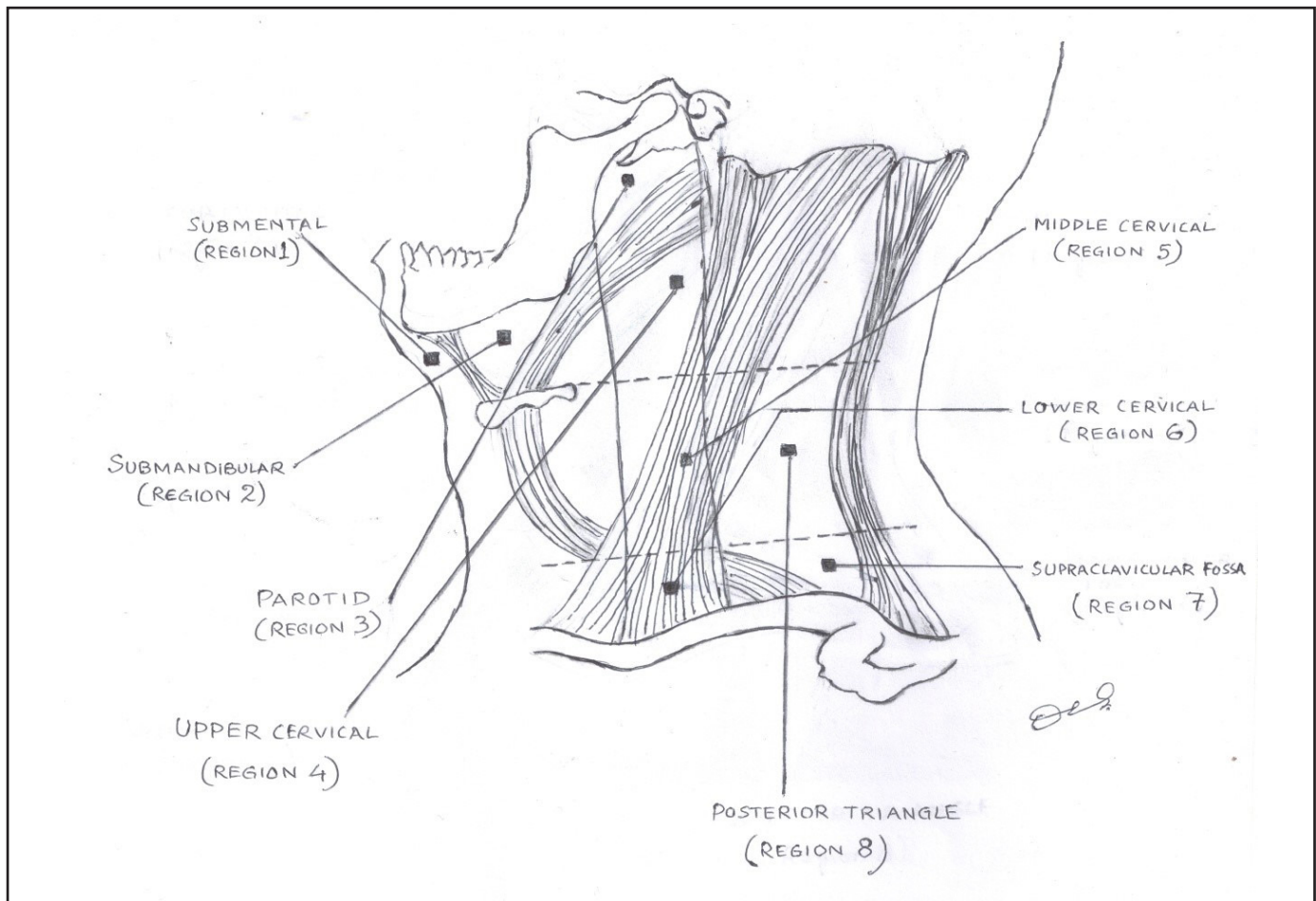


Fig.1. The sonographic zones of cervical lymph nodes (Image courtesy – Dr Debasish Guha)

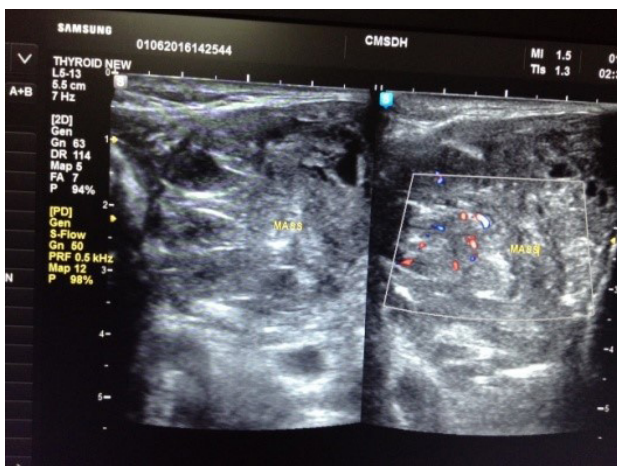


Fig.2. Grayscale and colour Doppler assessment of neck masses

sensitivity and specificity of detecting neoplastic nodes are 83% and 98% respectively. Arijji et al⁵ advocated the following algorithm for classification of suspicious neck nodes for proper management. [Table I]

Since head and neck cancers and many non-neck cancers (such as stomach) metastasise to the cervical region metastasis and lymphoma are common differential diagnoses in patients presenting with neck nodes. Calcification in metastatic lymph node is not common, exception being thyroid malignancies. The papillary thyroid cancers show peripherally located fine punctate calcification which is sometimes accompanied with acoustic shadowing. Gooding⁶ noted that previously resected medullary carcinoma may present with recurrent lymph nodes showing intranodal calcification. Post radiotherapy or chemotherapy nodes

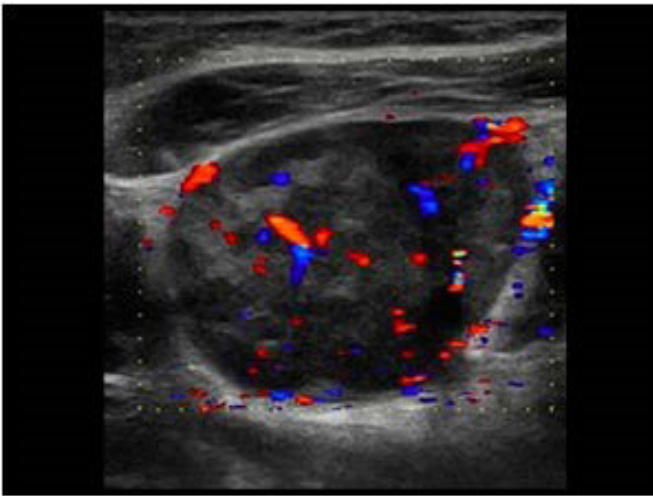


Fig.3. Colour doppler parenchymal pattern of flow

may show intranodal calcification.

Sometimes the malignant lymph nodes may show focal cortical hypertrophy or central necrosis. The lymph nodes are vascular but they show high pulsatility and resistive indices. Though malignant lymph nodes are hypoechoic metastasis from thyroid shows some variations. Metastasis from papillary carcinoma is usually hyperechoic and most commonly associated with microcalcification. The metastasis from solid papillary carcinoma may be cystic. Nodes show fine crystalline calcification in contrast to medullary where the calcification is coarse, which gives acoustic shadows. The malignant or metastatic lymph nodes are usually discrete but extra nodal spread may turn the margin fuzzy and there might be oedema surrounding the affected nodes. Metastatic lymph nodes are site specific and uncommon sites usually involves worse prognosis. Regardless of the primary presence of one lymph node metastasis in neck reduces the survival by 50% and another contralateral node by further 25%.

Uncommon diseases Kikuchi, Kimurai and Rosai Dorfman disease may present with inflammatory lymphadenopathy. The key to diagnosis lies in a properly done FNAC, or needle biopsy.

Some centres may prefer ultrasound-guided FNAC for cytological diagnosis. Ultrasound-guided FNAC⁷ has been shown to be an accurate method in evaluation

of cervical lymphadenopathy with a high sensitivity (89–98%), specificity (95–98%) and accuracy (95–97%). This technique provides more accurate information than direct FNAC, and influences the therapeutic options. It has been reported that ultrasound-guided FNAC can correctly stage the cervical lymph nodes in 93% of the patients with head and neck carcinoma. In non-head and neck cancer, it has been found that ultrasound-guided FNAC has the risk of missing occult metastases in about 18% cases. Therefore, ultrasound-guided FNAC is useful in the follow-up examination of the neck after tumour excision, and serial examinations should be performed if no elective treatment of neck is undertaken.

Assessment of the Thyroid Gland

Thyroid nodules (Fig. 4) are very common. These are found in 4% – 8% of adults by means of palpation, in 10%– 41% by means of US,⁸ and in 50% by means of pathologic examination at autopsy.⁹ Most of these nodules are benign. USG of thyroid has fascinated the radiologist and surgeons for its popularity, usefulness and sensitivity (83%). In spite of its high sensitivity US should not be utilised as a routine screening but palpable nodule may be recommended for US investigation, as US thyroid does not decrease the likelihood of cancer detection. The Society of Radiologists in Ultrasound consensus joint statement concluded that any lesion which is distinguishable from the surrounding is a nodule.¹⁰ They did not take into account the modalities for dealing with nodules less than 1 cm because of its slow growing nature and excellent prognosis.

The American Association of Clinical Endocrinologists (AACE) and Associazione Medici Endocrinologi (AME) recommendations of ultrasound of thyroid are as follows:¹¹

1. To confirm presence of a thyroid nodule when physical examination is equivocal.
2. To characterize a thyroid nodule(s), i.e. to measure the dimensions accurately and to identify internal structure and vascularisation.
3. To differentiate between benign and malignant thyroid masses, based on their sonographic

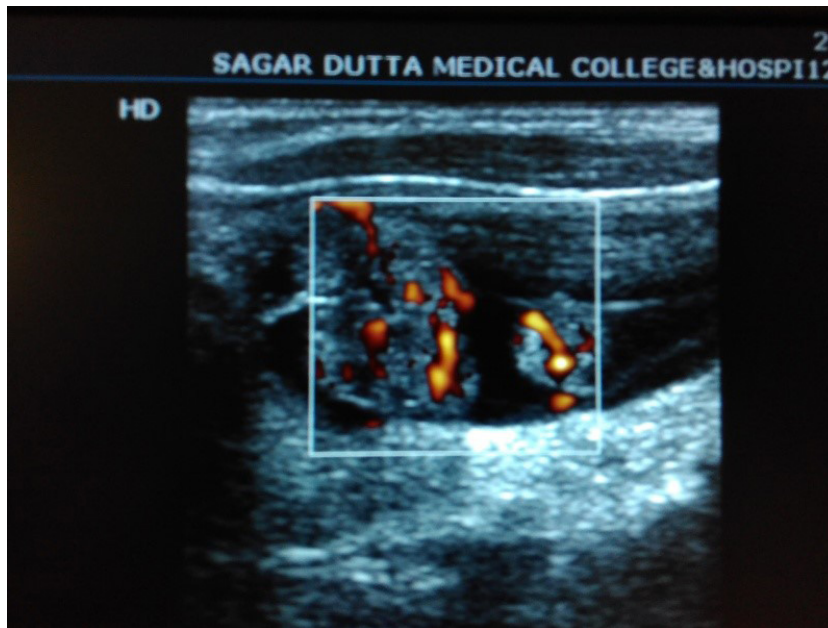


Fig.4. Thyroid nodules with intranodal vascularity

- appearance.
4. To differentiate between thyroid nodules and other cervical masses like lymphadenopathy, thyroglossal cyst and cystic hygroma.
 5. To evaluate diffuse changes in thyroid parenchyma.
 6. To detect post-operative residual or recurrent tumor in thyroid bed or metastases to neck lymph nodes.
 7. To screen high risk patients for thyroid malignancy like patients with history of familial thyroid cancer, multiple endocrine neoplasia (MEN) type II and irradiated
 8. To guide FNABC or for therapeutic intervention.

Thyroid ultrasound cannot distinguish a hot or a cold nodule but it is a sensitive device for detection and determines benignity of thyroid masses. The benign nodule is usually either hypoechoic or echogenic, has a hypoechoic halo round it, shows curvilinear calcification and spoke of wheel vascularity. They are wider than longer and sometimes show comet tail artefacts. Malignant nodules lack the hypoechoic halo, are very hypoechoic with an irregular outline and show intrinsic vascularity. An avascular nodule is unlikely to be malignant. The nodules are longer than wider and show microcalcification. The other features suggestive

of malignancy are their size ($>1\text{cm}$) and local or lymph node invasion and flow in the central part of the tumour. Nodal metastasis is common in thyroid malignancy, usually the metastatic lymph nodes due to Ca thyroid involve levels II, III or IV (anterolateral groups). Microcalcification is highly predictive of malignancy and in USG they are seen as punctate hyperechogenicities and common in medullary or papillary carcinoma. Thyroid micro calcifications are psammoma bodies, which are $10\text{--}100\ \mu\text{m}$ round laminar crystalline calcific deposits. The calcification in the medullary carcinoma thyroid is usually coarse. Rarely follicular carcinoma may present with jugular vein thrombosis (Fig. 5). Multiplicity of nodules is not a boon and there is no guarantee that they are nonmalignant.¹² Anaplastic thyroid carcinoma and lymphoma are highly aggressive. Thyroid lymphoma is usually paucivascular. Metastasis to thyroid is very uncommon. Independent predictors of the presence of malignancy in thyroid nodules in the Ultrasonography is done by studying 7 features- 1) irregular or microlobulated margin 2) microcalcification 3) hypoechogenicity 4) markedly low echogenicity 5) Larger than wider size 6) solidity 7) calcification.

Multinodular and diffuse goiters are common among

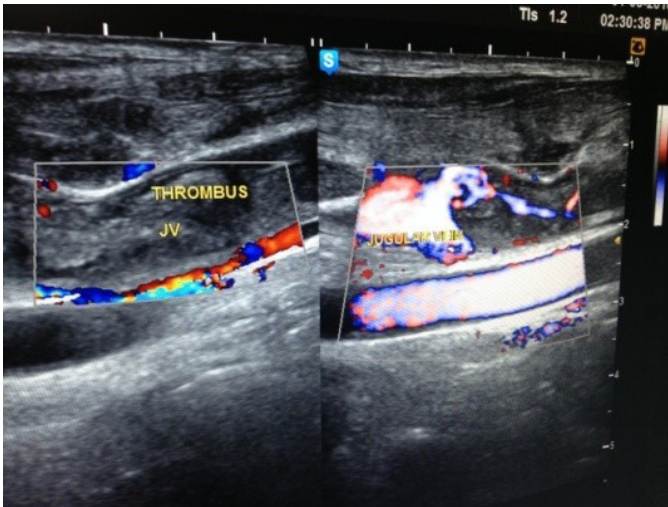


Fig.5. Thrombus in jugular vein in a patient with recurrent neck cancer

women of 35-50 years. USG predictability is high and sometimes no other invasive study is required for confirmation of their benignity. The thyroid gland is asymmetrically enlarged, with or without nodules. There are usually many nodules with barely any normal thyroid tissues. The nodules are prone to degeneration showing clear fluid inside; sometimes they accompany curvilinear calcification or comet tail artifact.

Graves' disease, chronic lymphocytic thyroiditis and de Quervain's thyroiditis present with goiter but their ultrasound features are not distinctive. In Graves' disease thyroid enlargement is massive, usually twice or thrice the normal size, and are highly vascular (thyroid inferno). The Hashimoto's disease presents with painless enlargement- they are vascular and may have numerous micronodules. The de Quervain's thyroiditis presents with a painful swelling and USG shows focal hypoechoic nodules, which are usually avascular. Thyroiditis is usually accompanied by perithyroidal lymph node enlargement- most commonly level VI nodes. Hashimoto's disease may turn into malignant thyroid nodule and concomitant hypoechoic nodules should be dealt with caution. FNAC plays an important role for suspicious lesions of thyroid.

Thyroid swelling or presence of thyroid nodules is so ubiquitous that many workers have tried to find uniform guidelines for management. The fate of

thyroid nodules are traditionally decided on the basis of three internationally accepted recommendations- the Kim criteria, American Association of Clinical Endocrinologists criteria and the Society of Radiologists in Ultrasound recommendations. According to Kim criteria, FNAC should be considered in a nodule if any one of the 7 suspicious criteria is present.¹³ This is independent of the nodule size.

According to the Society of Radiologists in Ultrasound FNAC should be considered in the following conditions:

1. If nodule size $\geq 1\text{cm}$ + microcalcification
2. If nodule size if nodule size is 1.5 cm or above plus completely or almost entirely solid or presence of coarse calcification
3. If size is 2 cm or more and if mixed solid-cystic components are present or entirely cystic with mural nodule and has grown substantially (usually taken to be $>3\text{ mm}$ or more increase in diameter) in the last 6 months
4. If nodules of any size has concomitant abnormal lymph nodes (of any sizes).

The American Association of Endocrinologists guidelines show that FNAB should be performed on hypoechoic nodules with at least any one of the following additional US features - irregular margins, intranodal vascular spots, longer than wider shape or microcalcification.

Ahn et al has compared the three sets of guidelines and concluded that Kim and American Association of Clinical Endocrinologists criteria to be superior to the SRIU criteria.¹⁴ The Kim criteria are more sensitive and the American Association in Clinical Endocrinologists criteria more specific.¹⁴

Presence of cysts in thyroid should be evaluated cautiously and wherever required should accompany needle biopsy or FNABC. Indeterminate thyroid nodules can be evaluated by elastography. This technique utilises the intrinsic hardness of the nodule. Hard nodules are predictive of malignancy whereas a soft nodule is less likely to be malignant. In combination with colour Doppler and grey scale imaging, elastography can increase the sensitivity, specificity and positive predictive value, obviating the need for unnecessary FNABC. USG has some roles in guided treatment

procedures, such as alcohol ablation of cystic nodules. High intensity focused ultrasound (HIFU) is a technique of targeted thermal ablation of nodules. US-guided HIFU ablation is an effective and safe noninvasive treatment method for benign solid thyroid nodules.

Assessment of Salivary Glands¹⁵

The major salivary glands are easily accessible by US probes and can help in narrowing down the differential diagnoses. Though CT is the ideal investigation for salivary inflammation and MR for tumours, US can sometimes give final diagnosis. The examiner must, however, be conversant with the complex anatomy of the region. The parotid gland has a deep lobe which remains hidden from the scanning probe but superficial gland can be easily diagnosed by identifying the retromandibular veins and external carotid artery. Further the facial artery and veins pass through the glands. The submandibular gland lies in the SM triangle bounded by the digastric muscles. The facial artery and vein passes through it. The glands show no distinctive echo pattern but are diffusely echogenic. The ducts of both the parotid or submandibular glands normally remain collapsed and difficult to identify. In calculus disease the ducts are dilated and the calculus itself gives strong acoustic shadows.

In most inflammatory lesions of acute onset the glands are enlarged, inhomogeneous and studded with numerous small hypoechoic areas and the vascularity is generally increased. In chronic inflammation the gland size may be reduced. When the inflammation is localised and there is gland necrosis, abscess might develop. Abscess is relatively easy to diagnose as the necrotic lesion is hypoechoic, may have an echogenic halo and shows posterior acoustic enhancement. The fluctuant mass sometimes show microbubbles within. Abscess can be easily drained by guided aspiration.

Chronic sialadenitis patients frequently present with recurrent pain and swelling. On US the gland is relatively smaller and shows in homogenous appearance consisting of hypoechoic lesions and increased blood flow. The differential diagnoses are Sjogren syndrome, disseminated lymphoma, metastasis and HIV associated

infections. Tuberculous sialadenitis presents with a nonhomogeneous mass and necrotic caseous lesions will not show any color signal on Doppler US. Sialolithiasis is relatively easy to diagnose as the calculus in dilated duct can be identified readily by US. The sonography must clarify whether the calculus is in the parenchyma or duct to properly guide the treatment.

In all cases of Sialolithiasis there might be concomitant inflammation giving distinctive sonographic appearance. Other differential diagnoses are chronic sclerosing sialadenitis and actinomycosis. Intraparotid lymph nodes commonly pose diagnostic dilemma and unnecessary investigations follow, if careful examination is not done. In all doubtful cases, guided FNABC should be done.

The salivary gland tumours give nonspecific ultrasound appearance. Cysts are easily identified by its classic well defined hypoechoic clear appearance with posterior acoustic enhancement. Solid benign tumours show well defined heterogeneous mass. The most common benign salivary tumours occur in parotid and about 3/4th are pleomorphic adenoma. The tumours show a lobulated appearance and usually show no colour signal on Doppler study. There might be focal calcification within the mass. The other common tumours include Warthin tumour which show hypoechoic areas which are abundantly vascular. Pleomorphic tumours are usually lobulated, while Warthin tumours show anechoic areas. They present pictures which are distinctive but not pathognomonic.

Warthin tumours which appear as anechoic areas at US may occur in other benign tumors (pleomorphic adenoma), in malignant tumors (mucoepidermoid carcinoma), in an abscess or necrotic metastatic nodes. Warthin tumor may also appear in the form of a simple cyst at US and thus require differentiation from cystic carcinomas (mucoepidermoid carcinoma, acinic cell carcinoma) and benign cysts (lymphoepithelial cysts). The other differential diagnoses are lymphoma and metastasis which when present show nonspecific appearance and must be evaluated by guided FNAC. The common primaries metastasising in the salivary glands are head and neck cancers, breast, melanoma and rarely renal cell carcinoma. Salivary tumours are uncommon in submandibular gland but when present, most are

malignant. Another problem frequently encountered in the US clinic is a recurrent painful parotid in chronic alcoholic, cirrhosis, endocrine disease or malnutrition. The condition, sialosis, presents as enlarged hyperechoic gland without colour Doppler abnormality where the deeper portion of the gland is poorly visualised.

There are many other benign neoplasms of the salivary glands which offer no specific US pattern. However, haemangioma demands special mention as it is sometimes in infants. The tumour is echogenic and extremely vascular. Phleboliths and tortuous blood vessels may be found in the tumour.

Assessment of Larynx and Pharynx

US examination has very limited role in the assessment of laryngeal and pharyngeal pathology. However, laryngeal masses, vocal cord thickening and paralysis can be assessed by US. Thyroid cartilage invasion and extra-nodal spread can be assessed by US.¹⁶ US has been successfully used for assessment nasopharyngeal carcinoma.¹⁷ It is seen to be highly sensitive but less specific and MRI is much better than US.

Conclusion

US is an important, sensitive and specific diagnostic aid for assessment of the neck masses. In experienced hand it is a very potent instrument providing diagnostic and prognostic leads for proper management of the patients. US can be successfully used for guiding FNABC and biopsies in suspected cases of neck masses.

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Long Term Success of Endo-DCR with Silicone Tube Catheter (STC) versus Endo-DCR without STC: A Comparative Study

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ABSTRACT

Introduction

Epiphora caused by mechanical block at puncta, canaliculi, lacrimal sac and nasolacrimal duct need surgical correction. EndoDCR is gaining popularity over conventional surgery. This study aims at evaluating the role of Silicone Tube Catheter (STC) to improve the long term outcome of endoDCR.

Materials and Methods

This retrospective study was conducted on 58 consecutive endoDCR surgeries between 2012 and 2014. 22 subjects had endoDCR without STC, 36 subjects had endoDCR with STC, of whom in 20 cases STC was removed in 3 weeks and in 16 cases in 12 weeks. Clinical and endoscopic data collected post-operatively after 3 weeks, 12 weeks and at 1 year. Analysis was done on intention to get suggestion for better result from endoDCR operations.

Results

Complications were identified as early and late. Complications like granulations, synechia, echymosis, eyelid haematoma and surgical emphysema were searched for in every follow up. Development of obliterating scar was the main cause of failure. Epistaxis was negligible. No retrobulbar haematoma or rectus injury was noted. Minor synechia between middle turbinate and nasal wall noted in 13.6 to 20% of cases in all groups. Granulations were more in cases had STC for 12 weeks but managed with conservative measures. Obliterating scar was slightly less in this group in comparison to other groups.

Discussion

The present study emphasises the use of indwelling STC in endoDCR for a longer period.

Keywords:

Epiphora; Dacryocystorhinostomy; Endoscopes; Silicones; Catheters; Outcome Assessment

Nasolacrimal duct (NLD) obstruction can result in a watery eye due to obstruction of the out flow of tears and presents to the disciplines, Ophthalmology and Otolaryngology. Diagnosis of epiphora is usually made by ophthalmologists, and otolaryngologists perform the nasal examination and

subsequent surgery. Dacryocystorhinostomy (DCR) is the surgical procedure that aims to eliminate epiphora caused by nasolacrimal duct obstruction. A DCR procedure involves removal of bone adjacent to the nasolacrimal sac and connecting lacrimal sac wall with the lateral nasal wall mucosa, thereby directly draining tears into the nasal cavity, bypassing the nasolacrimal duct (NLD) obstruction.

NLD obstruction occurs either congenitally or from various acquired causes like facial trauma, chronic environmental allergies, toxicity from chemotherapeutic drugs or topical medications, neoplasms, long standing sinus disease or following sinonasal surgery. Dacryocystitis mostly results from descending inflammation from the eye or ascending inflammation

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from the nose. Repeated occurrence of inflammatory reactions ends up with structural, epithelial and sub-epithelial changes leading to total fibrous closure of lumen.

A detailed history is crucial to distinguishing NLD obstruction as the cause of tearing, as opposed to reflex tearing from other causes. Evaluation for epiphora also includes –

1. Visual acuity, best corrected
2. Assessment of pupillary function and ocular motility.
3. Slit lamp Biomicroscopy of the anterior segment to exclude ocular surface disease and inflammatory causes of epiphora.
4. Assessment of tear meniscus height and quality.
5. Lower eyelid tone ;
6. Eyelid position ;
7. Punctal patency and position ;
8. Dye disappearance test to demonstrate delayed clearance of fluorescein.
9. Probing and irrigation of NLD system.
10. Nasal evaluation (examination, radiology and endoscopy).

Primary external DCR surgery (success rate 90-95%) has long been the treatment of choice where a large osteotomy is created under direct visualization and direct suturing of lacrimal sac wall with lateral nasal wall mucosal flap allowing for optimal apposition and primary intention healing of sutured flaps to create a bypass system. But a visible scar (often with keloid formation) and weakening of orbicularis oculi muscle pump function sometimes pose a great disadvantage. Search for an alternative surgical procedure gave rise to primary endonasal endoscopic DCR Surgery (with almost similar success rate). Its popularity increased due to absence of visible skin scar, less invasive nature, shorter operative time and preservation of orbicularis oculi muscle pump function. Endonasal DCR also enables correction of associated pathology like deviated nasal septum and chronic rhinosinusitis at the same sitting. Pyoceles and acute infection of NLD with or without skin involvement can be drained safely as part of endonasal DCR thereby reducing risk of intracranial

extension. The disadvantages include relatively smaller opening between lacrimal sac and nasal cavity, high equipment cost and steep learning curve. The endonasal DCR is contraindicated for patients with a suspected lacrimal system neoplasm, lacrimal sac diverticulae, lacrimal system stones, common canalicular stenosis and severe mid-facial trauma.

Efforts are on to reduce the failure rates of endonasal DCR. Balloon Dacryocystoplasty, laser-assisted dacryocystorhinostomy, Dacryoendoscopy, Microsurgery of the Lacrimal System and different stenting procedures are in this run. This study explored the role of indwelling silicone tube catheter (STC) to improve the success rate in endonasal DCR.

In this study we analyzed and compared the long term outcome of endonasal DCR without indwelling silicone tube catheter versus endo-DCR with indwelling silicone tube catheter. All cases had primary acquired NLD obstruction at saccal or subsaccal level. Mean age and sex were not significantly different between the groups. End point of the study was at the end of 1 year post operatively.

Materials and Methods

To design a study we matched all patients, who underwent endonasal DCR without any indwelling STC (Group-I) during the year 2012 to 2014 with another group who had indwelling STC during endonasal DCR during the same period (Group-II). All patients were operated on by same team of surgeons. Twenty two patients were followed up in Group-I and Thirty-six patients were followed up in Group-II. Group II was again divided into two groups, IIa and IIb, where the STC were retained for three weeks and three months respectively. (Table I)

Endonasal DCR operation followed standard technique in all cases. Under either general or local anaesthesia, routine local decongestion of nasal mucosa and middle turbinate were achieved.

Using nasal endoscope identification of maxillary line made on lateral nasal wall in front of uncinat process. A vertical incision made on crista maxillaris (Maxillary

Line) of about 1.5 cm length. Another vertical incision of same length made 1cm in front of first incision. Upper ends of two incision joined making a interiorly based muco-periosteal flap of about 1.5 X 1cm in size.

Table I : Distribution of patients

SEX	GROUP I		GROUP IIA		GROUP IIB	
	NO. (N)	%	NO. (N)	%	NO. (N)	%
Male (M)	9	41	8	40	7	44
Female (F)	13	59	12	60	9	56

Dissection was don at subperiosteal plane. Adequate bone removal (using Kerrison rongeur and drill burr) done to open entire medial wall and most of anterior wall of the NLD. A vertical incision made on the anterior wall of the sac with No.11 blade. (Fig.1) Removal of entire medial wall of sac and a part of anterior wall done to create an ostium of approximately 8 mm in height. Syringing and flushing were followed by insertion of STC through both puncta. Both ends pulled into nasal cavity (Fig.2), multiple reef knots placed and fixed with silk stitches. High up large ostium at the level of common canaliculus and not to leave any bare bone was the basic accepted protocol. The inferiorly based muco-periosteal flap was repositioned up to cover raw areas below the neo-ostium.

Syringing on 3rd, 7th and 14th day and then at monthly interval for 3 months were done in Group-I. Endoscopic clearance of crusts was done at 7th day and then weekly for 3 weeks in Group-II. Post-operative medications consisted of oral antibiotics, antibiotic-steroid eye drops, analgesics, oral antihistamines for first 10 days. Saline nasal wash and gentle massage at inner angle of eye for next 2 weeks was advised in all the cases. STC were removed at the end of 3rd week in 20 cases (Group-IIa). STC of remaining 16 cases (Group-IIb) were removed at the end of 3rd month (12weeks).

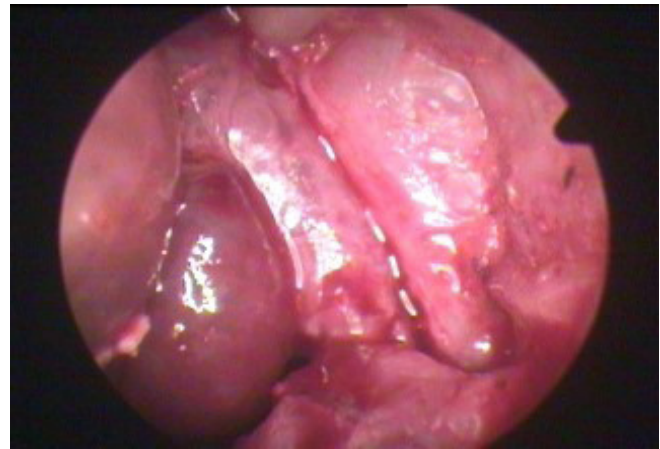


Fig.1. Medial & anterior wall of NLD

Clinical and endoscopic data were collected at different post-operative visits. Analysis of data was done in quest of better outcome from endonasal DCR procedures. In addition, information regarding operative time, post-operative morbidity for each surgical procedure was collected. Mean operative time was slightly higher in group-II.

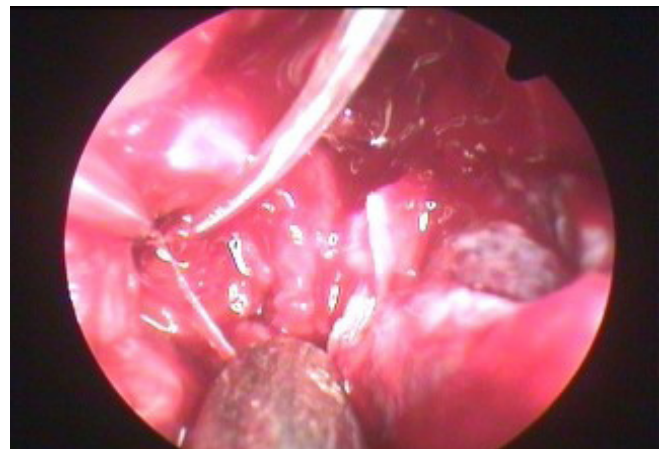


Fig.2. Neo-ostium with STC

Results

As the surgical work is under direct endoscopic vision almost all the endonasal DCRs were without any major complications. Minor complications like ecchymosis were noted in 9% of cases in group-I, 15% in Group-IIa and 12.5% in Group-IIb. Most common complication was minor degree of eyelid hematoma in immediate

post-operative period. 13.6% of subjects in Gr-I, 20% in Gr-IIa and 12.5% in Gr-IIb developed minor eyelid hematoma. Surgical emphysema was noted in one case only. None of the cases had complications like canalicular injury or ecchymosis of the cheek. Exposure

Table II : Post-Op Complications: Early

COMPLICATIONS	GROUP I	GROUP IIA	GROUP IIB
	N (%)	N (%)	N (%)
Ecchymosis	2 (9%)	3 (15%)	2 (12.5%)
Eyelid Hematoma	3 (13.6%)	4 (20%)	2 (12.5%)
Surgical Emphysema	-	-	1 (6.25%)

of orbital fat happened in two cases without any serious consequences. (Table II) No medial rectus muscle injury or retro-bulbar hemorrhage was noted. Very little amount of oozing of blood was noted in majority of cases which we considered as negligible and settled in few hours.

Delayed complications like synechiae between anterior end of middle turbinate and lateral nasal wall, between middle turbinate and septum were noted in 13.6% of cases in Gr-I, 20% cases Gr-IIa and 18.75% cases in Gr-IIb at the end of 3-4 weeks. The adhesions were mostly asymptomatic.

At the end of 3rd week granulations developed in one case in Gr-I (4.5%), 2 (10%) cases in Gr-IIa; which were excised under endoscopic guidance and STC removed. (Fig.3) In Gr-IIb 2(12.5%) cases had granulations in the inner ostium, for which endoscopic removal of granulations and steroid-antibiotic eye drops plus intranasal corticosteroids added at a low dose for two months in both the sub-groups of Group-II. No displacement of STC was noted. (Table III)

All the cases underwent endoscopic examination at the end of 3 months. 2 new subjects developed granulations in Gr-IIb, i.e., a total of four cases developed granulations in this group. STC was removed in all Gr-IIb subjects. Granulations were excised, local steroid antibiotic eye

Table III : Late complications: At 3 – 4 weeks

COMPLICATIONS	GROUP I	GROUP IIA	GROUP IIB
	N (%)	N (%)	N (%)
Minor Synechiae	3 (13.6%)	4 (20%)	3 (18.75%)
Granulations	1 (4.5%)	2 (10%)	2 (12.5%)
Displacement of tube	-	-	-

drop and intra-nasal corticosteroids were added for one month more for cases with granulations. Subjects of Gr-I and Gr-IIa were free from any further development of granulation tissue. Incidence of developing synechiae was same as before. Obliterating scar were noted in



Fig.3. STC with granulation tissues

Table IV: Late Complications: At 3 months

COMPLICATIONS	GROUP I	GROUP IIA	GROUP IIB
	N (%)	N (%)	N (%)
Synechiae	3 (13.6%)	4 (20%)	3 (18.75%)
Granulations	-	-	2+2 (25%)
Obliterative scarring	1 (4.5%)	2 (10%)	-

4.5% cases in Gr-I and in 10% cases in Gr-IIa. (Table IV)

At the end of 1 year no granulations were noted. However obliterating scar was noted in 9% of cases in Gr- I, 10% in Gr-IIa and 4.5% in Gr-IIb. None of the cases had displacement of STC. (Table V) 7 cases had associated nasal pathology which were corrected in the same sittings.

Discussion

The primary advantages of endo-nasal DCR were improved success rate, correction of coexistent nasal pathology at the same sitting, better aesthetic result and patient compliance. Our study reiterated these views. The best way to improve success and prevent obliteration is to create a large ostium at the level of common canaliculus and to leave no bone uncovered surrounding it .

The first description of feasibility of endo-nasal DCR was presented through cadaver study by Rice¹ and published in the year 1988. And in the next year McDonough and Meiring² published their experience of endo-DCR on four subjects. The rationale for endo-nasal approach arises out of its anatomy; 80% of NLD

Table V: Late Complications: At 12 months

COMPLICATIONS	GROUP I	GROUP IIA	GROUP IIB
	N (%)	N (%)	N (%)
Synechiae	3 (13.6%)	4 (20%)	2 (12.5%)
Granulations	-	-	-
Obliteration/ scarring	2 (9%)	2 (10%)	1 (4.25%)

pathway is in the nose. Use of silicon tube catheter (STC) in endo-DCR started with a view that it is helpful in keeping the neo-ostium patent in the initial stage thus decreasing the chances of failure. Different opinions built up regarding the duration of stay of STC.

In a prospective randomized study Al-Qathani³ analysed the success of use of STC in endo-DCR, with STC the success rate was 90% and without STC the rate was 91%. He removed STC at the end of 8th week. The differences in success rates between the groups were not statistically significant. Nistha Saini⁴ found significant difference in endo-DCR success rates with the use of Mitomycin C along with stents.

Higher success rates were noted in cases where STC was used by Shah⁵ and Smirnov.⁶ They kept STC for longer duration of time in two separate studies. Shah removed stents at 21 weeks and found 93.3% success rate versus 92.3% in cases without STC.⁵ Smirnov documented 89% success in cases with STC and 75% success rate in cases without STC.⁶ Sahida found the overall success rate of endo-DCR to be 90.3%.⁷ It was 93.7% in cases with use of STC and 86.7% in cases without use of STC. There was no significant statistical difference (P value 0.4180) in the outcome of two groups. Complications were also not significantly different in frequency and intensity between the groups.

He advised a selective stenting for specific indications and to remove stent after 6 weeks. As described by Ambani, external DCR with STC had good results in terms of success rate. They removed the stent at the end of 4 to 8 weeks.⁸

Disadvantage of putting indwelling STC are foreign body sensation in nose/eyes in some cases, formation of granulation tissue, as seen by us and also by Bernal-Sprekelsen and Toma's.⁹ They recommended maximum stay of STC to be not more than 3 weeks and said that indwelling STC more than 3 weeks of time were complicated with increased formation of granulation tissue. Similar was the experience of Kakker, who found 85% success with indwelling STC and 91% in cases without it.¹⁰ He also found stents to be associated with increased incidence of granulation tissue formation. Many authors described no significant statistical difference between the two groups. Unlu noted similar surgical success rates and recommended endo-DCR without stenting.¹¹ Naik found that STC did not increase the success rate of endo-DCR.¹² He opined that a wide neo-ostium with mucosal flaps and primary healing is the secret to success.

Also, in our study, no significant difference among the three groups (endo-DCR without STC, with STC for 3 weeks and with STC for 12 weeks) were noted. Our intention was to find out the role of STC in improving success of endo-DCR, especially when it is kept for longer period. Nuhoğlu remarked that use of stents in complicated cases increases the success of endo-DCR significantly.¹³ Shah et al⁵ left stents for 21 weeks and Samirnov et al⁶ removed after 8 weeks. Both of them reported better results, though statistically not significant. In our study stents were removed after 3 weeks and after 12 weeks in two subgroups of subjects of Group-II with statistically insignificant difference in success rate. Incidence of granulation tissue formation was also higher in the group where stent was removed after 12 weeks, but managed effectively with local excision of granulation tissue and conservative measures. Though in our case series the subjects were primary cases, it appears that STC staying over a longer period of time yielded comparative results and may be useful in revision surgeries and in some selective cases like traumatic/iatrogenic injury or obstruction of NLD

system. Even if STC does not alter the final functional result, it may help in post-operative clearance of crusts, clots and identification of the inner ostium during endoscopic examination in post-operative follow up and during other endonasal maneuvers if warranted, during that period. STC can also have some role in prevention of development of circular stenosis around the neo-ostium.

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Intratemporal Facial Nerve Paralysis- A Three Year Study

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ABSTRACT

Introduction

This study on intratemporal facial paralysis is an attempt to understand the aetiology of facial nerve paralysis, effect of different management protocols and the outcome after long-term follow-up.

Materials and Methods

A prospective longitudinal study was conducted from September 2005 to August 2008 at the Department of Otorhinolaryngology of a medical college in Kolkata comprising 50 patients of intratemporal facial palsy. All cases were periodically followed up for at least 6 months and their prognostic outcome along with different treatment options were analyzed.

Result

Among different causes of facial palsy, Bell's palsy is the commonest cause; whereas cholesteatoma and granulation were common findings in otogenic facial palsy. Traumatic facial palsies were exclusively due to longitudinal fracture of temporal bone running through geniculate ganglion. Herpes zoster oticus and neoplasia related facial palsies had significantly poorer outcome.

Discussion

Otogenic facial palsy showed excellent outcome after mastoid exploration and facial decompression. Transcanal decompression was performed in traumatic facial palsies showing inadequate recovery. Complete removal of cholesteatoma over dehiscent facial nerve gave better postoperative recovery.

Conclusion

The stapedial reflex test is the most objective and reproducible of all topodiagnostic tests. Return of the stapedial reflex within 3 weeks of injury indicates good prognosis. Bell's palsy responded well to conservative measures. All traumatic facial palsies were due to longitudinal fracture and 2/3rd of these patients showed favourable outcome with medical therapy.

Keywords:

Facial Paralysis; Bell Palsy; Herpes Zoster Oticus; Facial Nerve Injuries; Cholesteatoma; Decompression, Surgical; Treatment Outcome

Facial nerve, more than any other cranial nerves, affects non-verbal humanistic expression, which is a significant component of communication. Facial nerve, originates from the pons, emerges through cerebello-pontine angle, and runs a long intratemporal course and exits through stylomastoid foramen to supply different muscles of facial expression. This long intra-osseous part of the nerve makes it vulnerable to different types of injuries ranging from local oedema

to entrapment of the nerve in the bony canal or even impingement of the nerve by bony spicule after fracture of temporal bone.

Treatment of facial palsy is individualized depending on cause, duration, degree of facial palsy.

Intratemporal facial paralysis and its treatment outcome have been studied in other parts of the world, but a proper study in eastern India is lacking. This study is an attempt to understand the aetiology of facial nerve paralysis, effect of different management protocols and the outcome after long-term follow-up.

Materials and Methods

This prospective longitudinal study was conducted at a

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medical college in Kolkata on fifty consecutive patients of intratemporal facial palsy, who presented to the Department of Otorhinolaryngology during a three year period from September 2005 to August 2008.

Facial palsy due to parotid surgery and upper motor type facial palsy were excluded.

After detailed history taking all patients underwent thorough general and routine otorhinolaryngological examination. Facial nerve palsy was graded according to House-Brackman grading system. Topodiagnostic tests and Electro-Myography, Pure Tone Audiometry and tympanometry were performed in all patients. Topodiagnostic tests included Schirmer's test for lacrimation, Stapedial reflex, Taste sensation from anterior two-third of tongue.

HRCT scanning of temporal bone was the radiological investigation of choice in this study. Treatment of all patients presented with facial nerve palsy was individualized depending on the aetiology, duration and degree of facial palsy.

Results

Age and sex distribution of the study group shows most of the patient belongs to the 10-20 year age group (30%) with a male: female ratio of 2.75:1.

Most common cause of facial nerve paralysis in our study was found to be Bell's palsy (50%). Among different types of otitis media that causes facial nerve paralysis, squamousal disease was found in 75% (3/4 patients). Traumatic facial palsy including iatrogenic palsy, herpes infection and neoplasm are other important causes of facial palsy. (Table I)

Pre-operative audiological profile of these patients showed 2 patients had mixed hearing loss; rest of the patients had conductive type of hearing loss with most of them showed mild conductive loss.

Topodiagnostic tests are done to locate the site of injury of the facial nerve before any intervention. 10 patients showed bizarre results of topodiagnostic tests.

In electromyography, patients with grade VI or grade V facial weakness showed acute denervation pattern whereas grade IV and grade III facial palsy patients had

Table I : Comparison of different aetiologies of facial palsy between present study and another study

AETIOLOGY	MARK MAY'S STUDY ¹	PRESENT STUDY
Bell's palsy	51%	50%
Otitis media	4%	8%
Traumatic	22%	24%
Herpes zoster oticus	7%	6%
Neoplasms	7.5%	4%
Others(Melkerson- Rosenthal syndrome, Necrotising otitis externa, TB, HIV)	8.5%	8%

partial denervation pattern.

Bells's palsy was treated with short course high dose corticosteroid (1mg/kg/day), antiviral, facial exercise in 20/25 patients. The rest 5 patients of Bell's palsy were observed without any medication. Facial palsy due to squamosal disease was essentially treated with inside-out mastoidectomy. It was observed that, cholesteatoma mostly compressed the dehiscence facial nerve and granulation tissue intermingled with facial nerve. The single case of facial palsy due to acute otitis media was treated with myringotomy and intravenous antibiotic therapy with steroids. Traumatic facial palsy was noticed in longitudinal fracture. Transcanal decompression was performed in those cases showing inadequate recovery (patients with more than Grade III facial palsy after 3 months of optimal medical treatment). In transcanal facial decompression, first canalplasty was performed, then atticotomy, incus and head of malleus were removed to gain access to horizontal part of facial nerve. Drilling out of processus cochleariformis is essential to decompress inferior part of geniculate ganglion. After decompression malleostapedopexy was done by rotating the malleus laterally (by cutting the tensor tympani tendon).

All patients of Bell's palsy who were treated showed

favourable outcome (grade I/II), whereas 75% cases of observation group showed good outcome. Two cases of Bell's palsy had multiple (>1) episodes of facial palsy but showed favourable results. Otogenic facial palsy showed excellent outcome after mastoid exploration and facial decompression. But cases with long duration (>1 year), complete transection with loss of significant amount of nerve tissue showed poorer outcome even after nerve grafting. Complete removal of cholesteatoma over dehiscence facial nerve was usually enough to give better outcome. Transcanal decompression of traumatic facial palsy showed good results after long term follow-up (3-6 months after surgery).

Discussion

Facial nerve is more prone to injury than any other cranial nerve due to its long intratemporal course. A review of medical literature from 1900 to 1990 has revealed a host of conditions that can cause facial nerve paralysis. Most of these conditions also were represented among the presenting diagnoses for 2856 patients who had facial paralysis seen by Mark May¹ between 1963 and June 1990.

Among otologic facial palsy, cholesteatoma was found in 50% (2/4 patients) cases, whereas granulation tissue was the offending factor in 25% (1/4 patients).

Table II : Comparison of otogenic facial palsy between present study and other studies

STUDY	CHOLESTEATOMA	GRANULATION TISSUE
Yetiser S et al ²	70.8%	-
Baliosevic et al ³	37%	42%
Present study	50%	25%

Table III : Comparison of traumatic facial palsy and their site of injury between present study and other studies

STUDY	LONGITUDINAL FRACTURE	TRANSVERSE FRACTURE	MIXED FRACTURE	SITE OF LESION GENICULATE GANGLION
UlugT ⁴	+	-	+	100%
Yanagihara N ⁵	+	-	+	55%
Lambert ⁶	+	-	+	100%
Present study	+	-	-	100%

Yetiser S et al² found 70.8% of patients with facial palsy caused by chronic otitis media had cholesteatoma, whereas Baliosevic et al³ found it in only 37% of cases. (Table II)

Comparison of literature regarding traumatic facial palsy has been noted in Table III.

Mark May¹ found Herpes zoster oticus in 7% of cases, whereas it was 6% in the present study. All had vesicles in the pinna and external auditory canal and face. Mark May¹ stated that eruptions may be delayed up to ten days after facial palsy.

In this study, we grade facial nerve status by using House-Brackmann grading system. At the University of Iowa, Gidley and colleagues⁷ use 'Repaired Facial Nerve Recovery Scale' (RFNRS), for nerve resections repaired by neurotaphy or grafting. Like the HB scale, the RFNRS has six grades but uses letters instead of numbers (Grade A to F). Topodiagnostic tests have been done in the present series to locate the exact site of lesion. But it was found to produce bizarre results in 40% of cases. Currently, these tests are used infrequently because of the unreliable information provided. Adour⁸ observed great discrepancy in the results of these tests: marked decrease in lacrimation with normal stapedial reflex and normal taste; or absent lacrimation, absent stapedial reflex with normal taste sensation. Similar findings are also observed in the present series.

Table IV : Comparison of treatment protocol of Bell's palsy and its outcome between present study and other studies

STUDY	MANAGEMENT PROTOCOL IN BELL'S PALSY	SATISFACTORY	UNSATISFACTORY
Mark May ⁹	Observation	84%	16%
Present study	Observation	75%	25%
	Steroid + Facial exercises	100%	Nil

Of all topodiagnostic tests, the stapedial reflex test is the most objective and reproducible. An absent stapedial reflex that returns to normal within 3 weeks of injury indicates returning of facial function, thus this test has been termed as "otolaryngologist's electromyography" by Adour.⁸

Mark May⁹ found that outcome in patients treated surgically was no better than can be expected to occur without treatment in Bell's palsy. Gantz et al¹⁰ recommended surgical decompression of the nerve from meatal foramen up to tympanic part through middle cranial fossa approach in patients showing more than 90% denervation in Electroneuronography (ENoG) and absent motor unit potential within 14 days of onset of Bell's palsy. In this study, we treated patients with serial follow-up and exercises in 5 cases, 20 patients were managed with oral corticosteroids in a dose of 1mg/Kg/day Prednisolone and facial exercises. (Table IV)

Patients with <90% of degeneration in ENoG and voluntary action potential can be treated with oral steroids and facial exercises, whereas patients with poor prognostic variables are better managed with facial nerve decompression through middle cranial fossa route.

Patients with facial nerve palsy due to chronic otitis media were treated mostly with mastoid exploration and

Table V : Comparison of treatment options of otogenic facial palsy between present study and other studies

STUDY	TREATMENT OPTION IN CHRONIC OTITIS MEDIA	SATISFACTORY OUTCOME (GRADE I/II)	UNSATISFACTORY OUTCOME (GRADE III/IV)
Zhang & Song ¹¹	Open technique	75%	25%
	Close technique	66.67%	33.33%
Yetiser et al ²	CWU & CWD mastoidectomy	53.8%	46.2%
Present study	Combined approach	Nil	100%
	Modified radical mastoidectomy + FND	80%	20%
	Modified radical mastoidectomy + FN grafting	Nil	100%

facial nerve decompression. (Table V)

All patients with traumatic facial nerve palsy had longitudinal fracture in the temporal bone. Patients with traumatic facial palsy were initially treated with steroids, physiotherapy etc. Patients who showed poorer outcome (Grade III or more) after three months of optimal medical therapy were subjected to transcanal decompression of facial nerve. 4 out of 12 patients had grade V/VI palsy after medical therapy and subjected to transcanal decompression of facial nerve. (Table VI)

Lambert and Brackmann⁶ suggested early exploration of traumatic facial nerve palsies by a combined approach, consisting of both middle cranial fossa and transmastoid approaches. Yanagihara⁵ approached by transmastoid

supralabyrinthine route. He also proposed this route avoids hazards of craniotomy. In this study, we found that decompression of the nerve in traumatic facial nerve paralysis gives satisfactory results through transcanal route. The single case of iatrogenic facial nerve palsy

Table VI : Comparison of treatment options of traumatic facial palsy between present study and another study

STUDY	APPROACH	SATISFACTORY OUTCOME	UNSATISFACTORY OUTCOME
Ulug & Arif ⁴	Middle cranial fossa	82%	18%
	Combined approach (MCF+ transmastoid)		
Present study	Medical therapy	75%	25%
	Transcanal Facial nerve decompression (those failed medical therapy)	100%	Nil

was due to mastoid exploration done outside. The lesion was found to be in the vertical segment of the nerve.

All patients of Ramsay-Hunt syndrome were treated with oral Acyclovir, steroids and facial exercises. One out of 3 patients showed satisfactory outcome, Mark May⁹ postulated 60% of these patients recover satisfactorily while Fardin¹² showed 73% of patients would have poor prognosis with residual paralysis. Dickins¹³ proposed the use of intravenous Acyclovir as the main treatment

option for this syndrome.

Among 2 cases (4%) of neoplasms that caused facial nerve palsy, 1 had squamous cell carcinoma of the tympanomastoid region and 1 had multiple myeloma affecting the intrameatal part of facial nerve along with multiple cranial nerve paralysis.

This study has shown that treatment of facial nerve palsy should be individualized depending on the aetiology, duration, site of lesion etc. Though surgical treatment had shown good outcome, statistical significance could not be calculated due to small number of study population. This study is being carried forward to include large number of patients of facial palsy due to different causes to get a statistical significant outcome.

Conclusion

Bell's palsy was the most common cause of facial palsy in this study and it was mostly treated with medical therapy with favourable outcome. Otogenic facial palsy was commonly due to cholesteatoma and granulation (Squamous type of COM). These patients were treated with modified radical mastoidectomy with facial nerve decompression with good outcome. However facial nerve palsy for long duration, complete neuronal discontinuity requiring nerve grafting usually produce unfavourable outcome. All traumatic facial palsies were due to longitudinal fracture and 2/3rd of these patients showed favourable outcome with medical therapy. Transcanal approach is a tailor-made approach for traumatic facial palsy with good outcome with disadvantage of poor postoperative hearing. Herpes zoster oticus and neoplasms had shown uniformly poor prognosis.

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An Asymptomatic Pointed Foreign Body in the Hypopharynx - A Rare Case Report

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ABSTRACT

Introduction

Foreign body ingestion is an ENT emergency frequently encountered in both children and adults.

Case Report

A case of an open safety pin in the hypopharynx in a fifteen year old boy is reported, which remained impacted there for the past 15 days without any significant symptom or complication. CT scan, performed before surgical intervention, did not show any migration of this foreign body from its intraluminal site. This was removed by 'Magill forceps technique'. Postoperative period was uneventful.

Conclusion

Pointed foreign body may present with negligible symptoms and that too may stay in the cricopharynx for long without migration. Magill forceps technique can be a good surgical option in such cases.

Keywords:

Foreign Bodies/surgery; Hypopharynx; Pyriform Sinus; Magill Forceps Technique

Foreign bodies in hypopharynx and oesophagus are more common in children compared to adults. Generally foreign bodies are ingested accidentally. Most common foreign bodies in children are coins, but marbles, buttons, batteries, safety pins and bottle tops are also reported.¹⁻³ Regional and cultural factors also take part to dictate the frequency with which different objects are ingested. Radiological localization is mandatory for decision making regarding removal. Smooth foreign bodies do not pose much threat but sharp or pointed foreign bodies if not retrieved at the earliest may penetrate oesophageal wall and cause complications. Foreign bodies, which have gone beyond the oesophagus, usually pass uneventfully through gastrointestinal tract in 70-80% cases. But if a foreign body is lodged in the esophagus it can give rise to many problems of which drooling and dysphagia are the two most common features. Complications including respiratory obstruction may occur with large foreign body. Retropharyngeal

abscess formation may occur as late presentation especially in sharp objects like safety pin, bone piece, fish bone leading to severe throat pain, fever, drooling of saliva or dysphagia and odynophagia. We present a case of open safety pin lodged in the hypopharynx with open end facing downward and presented after fifteen days of accidental ingestion. The only complaint was of mild pain during swallowing. There was no feature suggestive of acute retropharyngeal abscess. This type of case with almost asymptomatic presentation has rarely been reported in literature.

Case Report

A fifteen year boy attended ENT OPD of a tertiary medical college hospital in Kolkata with complaints of throat pain for preceding ten days. Patient gave a vague history that a safety pin may have been eaten accidentally with rice and one soft tissue X-ray neck done from outside before reaching this hospital showing shadow of a safety-pin further raised his anxiety and prompted the patient to attend our institution for removal of the same. Pain was absent at rest but during swallowing there was mild throat pain, but despite that, he was eating and

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drinking normally. There was no fever or vomiting, dysphagia, odynophagia or regurgitation after intake of food. Patient had no previous history of ingestion of corrosive, radiation exposure, tuberculosis, any psychiatric illness or any head and neck surgery. Patient could drink water normally in front of the examiner. There was no earlier attempt of removal of the foreign body by anyone before reaching this institution.

On neck examination, there was no swelling with normal surface temperature. On left side of lower neck there was mild tenderness. When he was asked to drink water there was no pain. No cervical lymph node was enlarged. Oral cavity and posterior pharyngeal wall on examination were normal. Indirect laryngoscopy examination was within normal limits. Detailed ear and nose examination were found to be normal. Other systemic examinations were within normal limits. The patient was immediately admitted as the case was an ENT emergency and all routine investigations were done. Complete haemogram, serum urea and creatinine, fasting and postprandial plasma glucose level, chest X-ray and resting electrocardiogram were all within normal limits. He was kept nil per mouth since admission. Intravenous fluid in the form of Ringer's lactate solution, broad spectrum antibiotic in the form of injection co-amoxiclav 1.2 gm. intravenously twice a day, analgesics as and when necessary and long acting systemic steroid in the form of injection dexamethasone was started thrice a day.

X-ray soft tissue neck on anteroposterior and lateral views revealed a safety pin at the level of C6-C7 with open end pointed below.(Fig.1)

But there was no widening of the prevertebral soft tissue shadow. Contrast enhanced computed tomography (CT) scan of neck was done on the next day also showed the same findings and there was no migration of this sharp foreign body till then. (Fig.2A) Operative intervention had to be planned subsequently. 3D reconstructed CT images exactly pinpointed the size, shape and location of the safety pin. (Fig.2B)

After obtaining anaesthetic fitness, patient was put under inhalation anaesthesia and laryngoscopy performed with the help of anaesthetic Macintosh laryngoscope and posterior end of the safety pin was

located in the left pyriform sinus in inverted manner. The proximal end of the safety pin was grabbed with Magill forceps and safely extracted. The safety pin was 3.5 cm in length with its pointed end open below. (Fig.3)

The patient did not complain of pain in the neck, shoulder or chest in the post-operative period. Check X-ray of neck was performed on the very next morning and was found to be normal. The patient was discharged after 24 hours. On postoperative visit after 7 days he was doing well and without any complaint.

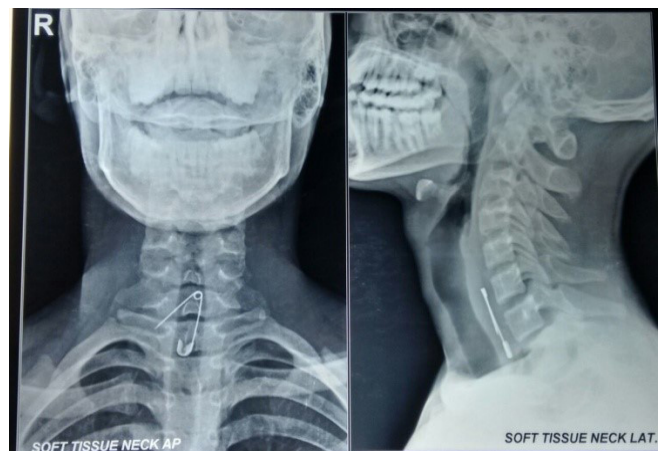


Fig.1. Soft tissue X-ray neck (AP and lateral views) showing open safety pin at the level of C6-C7

Discussion

Ingested foreign bodies in children represent a major global health problem.⁴ Coins, toys and food particles are the principal dangerous things commonly ingested. Coin shaped foreign bodies like watch batteries, when impacted, can cause caustic alkaline injury with possible perforation.⁵ The main risks are to children under 3 years of age. As in this age group 2nd molars are not yet developed and their grinding and swallowing mechanisms are poor with immature glottic closure.⁶ Adults have a wider variety of foreign bodies with food bolus being the most common. Artificial dentures of more than 1.75 inches (4.4cm) long are especially dangerous.⁷ Rarely foreign bodies, which are not large enough, may get impacted in oesophagus in cases of strictures and due to smooth muscle spasm.⁸ In our case, the safety pin was stuck in the cricopharynx, more so as

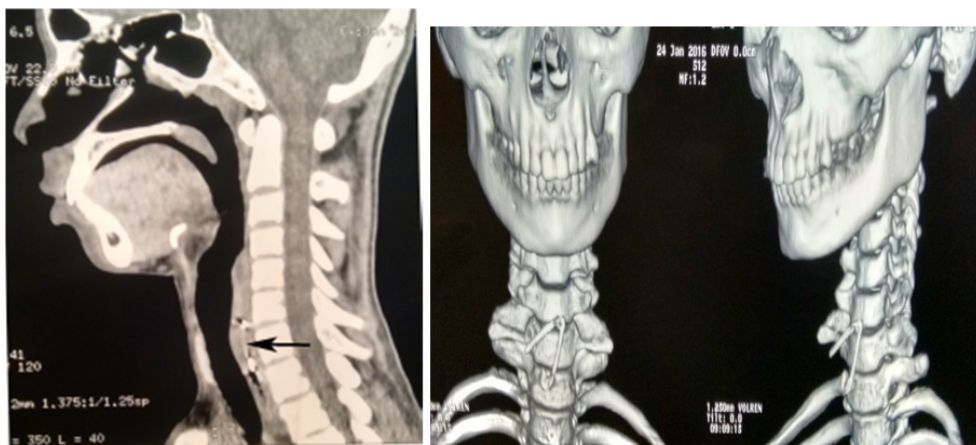


Fig.2. (A) CT scan on sagittal plane showing the safety pin (black arrow) on left hand side. (B) Reconstructed 3D images from CT scans on right hand side showing exact position and orientation of the safety pin.

it was open, and surprisingly never migrated probably due to same reason.

Dysphagia and tenderness are the most common clinical features.⁹ Majority (89%) of patients attend hospital within 24 hours of ingestion. X-ray of the neck (lateral view) is the most useful investigation with presence of air in the oesophagus being a significant finding.¹⁰ Foreign bodies in hypopharynx and cervical oesophagus such as chicken and fish bones usually need radiological workup. However some foreign bodies such as pieces of plastic and wood are only faintly radiopaque and their detection may require a CT scan. Indirect signs visible on plain radiographs are soft tissue swelling and/or air due to edema or haematoma.

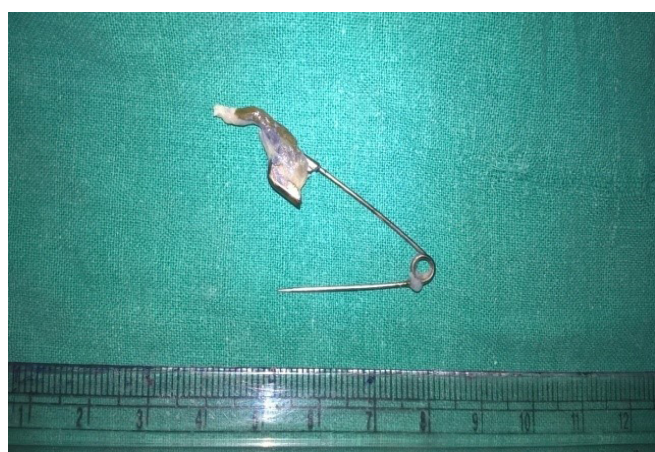


Fig.3. Safety pin after removal (3.5 cm.long).

A vast majority of the swallowed objects pass through digestive tract and pass out with stool, frequently undetected.¹¹ A small proportion may impact in pharynx and oesophagus. Complications like dysphagia, vomiting, and respiratory distress due to tracheal compression may occur. The patient may develop retropharyngeal abscess presenting with drooling of saliva, severe throat pain, dysphagia, tenderness over the neck. Sharp objects like fish bone, safety pin, and chicken bone may cause perforation manifesting as pneumomediastinum. In our case interestingly there was neither abscess nor perforation of oesophagus as evident from scans though pointed nature of open safety pin and it was seated there for long. Although rare, perforating objects are potentially life threatening because they may provoke formation of a fistula between the oesophagus and the innominate artery thus ensuing catastrophic bleeding.¹²

We listed cases of different sharp oesophageal foreign bodies in literature with various presentations. Sharma et al in their study showed two cases of sharp foreign bodies, one was a sharp metallic folded tin cover and another was a sharp metallic bottle cap both presented with pain and dysphagia.¹³ Wadhwa et al, in their study, presented a case of accidental ingestion of razor blade in a 6 year old child who came to emergency after 5-6 hours with complaint of throat pain.¹⁴ Shivkumar et al presented a case of safety pin in oesophagus with complication of retropharyngeal abscess.¹⁵ Singhal et

al in their case study showed a Neem stick (Datun) in a 56 year old man with complaints of difficulty and pain during swallowing, drooling of saliva and pain in the chest.¹⁶ Rohila et al in their presentation described a case of an eight month old child presented to their department with history of ingestion of sharp foreign body. Patient was restless and unable to eat and drink after ingestion of the foreign body. Soft tissue neck (Antero posterior and lateral views) and chest radiograph revealed an angulated radiopaque foreign body in front of the prevertebral space at level of C4-T1.¹⁷ Presentation of our case was neither acute (and the incident of ingestion of the foreign body was almost forgotten) nor the patient had any problem with drinking and eating.

Pelluchi et al reported a case of a 40 year old female who had been referred to the emergency department complaining of dysphagia and odynophagia, which had begun several hours earlier after a fish meal. Anteroposterior and lateral chest X-rays revealed the presence of a radiopaque ingested foreign body (4.5 x 1.5 cm) located in the upper cervical oesophagus. An immediate gastroenterological evaluation performed with flexible endoscopy under sedation confirmed a bone-like FB just below the superior oesophageal sphincter.¹⁸

Shinde et al reported a case of an unusual foreign body i.e. thorn of babul tree in oesophagus presented with perioesophagitis with dysphagia.¹⁹ Agbomhekkel et al in their publication described a case of 28 year old male who presented in the accident and emergency department of a hospital with a five hour history of ingestion of fish hook and line impaction in the esophagus. There was an associated history of dysphagia, odynophagia and drooling of saliva. X-ray soft tissue neck done showed a radiopaque foreign body in the oesophagus at the level of the 6th cervical vertebra.²⁰ Unlike our case neither of these two cases of pointed foreign body mentioned above, presented after so many days and also without any apparent symptom or retropharyngeal abscess formation. There was no complaint of dysphagia, vomiting, respiratory distress or fever in our patient. Both X-ray soft tissue neck (lateral view) and CT scan neck did not reveal enlarged prevertebral shadow.

In long standing radiopaque foreign bodies in aerodigestive tract, especially for the sharper ones, CT

scan is the best imaging modality before any surgical intervention can be planned to know its migration. Chang et al in their study reported two cases of oesophageal foreign bodies and in both the cases, 3D reconstructed images were compared with the FB that were removed according to the object shape, size, location, and orientation in the esophagus. Their results not only indicate the usefulness of conversion of CT data to 3D images to help in diagnosis and treatment, but also use of 3D images prior to treatment allows for rapid prototyping and surgery simulation.²¹ In our case we could also exactly match size and location, as these were on 3D images with real safety pin.

Several articles in literature point out the use of Magill forceps to retrieve foreign bodies like coins, marbles, rings and safety pins from hypopharynx. This is known as 'Magill forceps technique' (MFT) and noted as one of the extra-anaesthesia uses of Magill forceps.²² Singh et al studied 100 consecutive paediatric patients of impacted coin at upper end of the oesophagus where they used MFT under inhalational anaesthesia using Macintosh laryngoscope and concluded that this technique was at par with rigid endoscopy in terms of efficacy, safety and complication rate with reduced hospital stay and cost of treatment. Statistically they showed it to be more applicable in younger age group (0-6 years).²²

In our case we found no difficulty in using it in an adult patient. Takrouri et al reported an interesting case of a pin-ended earring got stuck in the hypopharynx of a child where they used MFT to remove it under general anaesthesia uneventfully but a small mucosal tear occurred at the pin entry site and chest complications subsequently.²³ We did not face any such complication postoperatively using MFT in our case. Ramadass et al described a case of intraluminal migrating foreign body (open safety pin) in the oesophagus and concluded that pointed ends of a foreign body are likely to get impacted submucosally or intramurally due to inadvertent attempts at removal by the patient or inexperienced surgeon and this foreign bodies can be removed without any difficulty by the ingenuity of the attending surgeon.²⁴ In our case, no earlier attempt was made to remove it before the patient reached us nor the safety pin migrated from the lumen of the pharynx even after fifteen days of ingestion as was evident on the scans. It came out easily

with the help of Magill forceps as it did not penetrate the wall of the pyriform sinus.

Conclusion

Foreign bodies, more so pointed and sharp ones, lodged in aerodigestive tract are always considered to be treacherous things. A pointed foreign body may even present with minimum or negligible symptoms. It may get impacted in the cricopharyngeal sphincter and may stay there for long without migration. A strong sense of suspicion and timely investigations including a CT scan is essential before surgical intervention in case of a long standing foreign body to pinpoint its exact size, shape and location. 3D reconstructed CT images often help in these cases. Magill forceps technique is useful in cases where foreign body is seen to be lodged in the pyriform sinus. The role of tone and tightness of the sphincter to hold a pointed foreign body for long in the upper oesophagus needs to be evaluated further in future research.

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Double Nail in Hypopharynx- A Rare Presentation

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ABSTRACT

Introduction

An extremely rare case of a pair of nails impacted in the right pyriform sinus, presenting 72 hours after the incident, is reported.

Case Report

X-ray soft tissue neck revealed the presence of a pair of nails in the neck at C4-C5 vertebral level. The foreign bodies could not be seen on hypopharyngoscopy due to severe mucosal oedema. Lateral pharyngotomy was done to remove the nails with C-arm guidance.

Discussion

Retained foreign bodies in the aerodigestive tract are known to produce complications. Delayed presentation makes the management difficult. C-arm guidance during surgical exploration is helpful to locate a radiopaque foreign body in difficult situations.

Keywords

Foreign Bodies/surgery; Nails; Hypopharynx; Pyriform Sinus

Foreign body in throat is common emergency encountered in routine otorhinolaryngology practice. Foreign body which we commonly encounter in the upper aerodigestive tract include metallic i.e. coin, pin, needles, safety pin, battery and non-metallic i.e. fish bone, meat bone, chicken bone, artificial dentures, plastic toys etc. There are very few reported cases of foreign body in the hypopharynx. Pharyngeal foreign bodies get lodged in the mucosa and may not be visible on routine clinical examination.¹

We present here an extremely rare case of a pair of nails impacted in the right pyriform sinus presenting 72 hours after the incident at the emergency department. The absence of ENT facility at the remote residential location in Nepal and absence of acute symptoms were responsible for the delayed presentation.

Case Report

A 25 years old male patient presented at otorhinolaryngology emergency with history of accidental ingestion of nails while doing decorative work. Patient had chief complaint of foreign body sensation in throat along with pain during swallowing. There was no history of fever or vomiting. Local regional examination by indirect laryngoscopy was suggestive of edematous right pyriform sinus with significant pooling of saliva. Laryngeal crepitus was impaired. Laryngeal framework was tender on palpation.

X ray soft tissue of neck – anteroposterior and lateral view was suggestive of a pair of nails impacted in the right pyriform sinus with the sharp end of the nails projecting towards the vertebrae at the level of C4–C5. (Fig.1) We planned to remove the foreign body by hypopharyngoscopy or esophagoscopy under General Anaesthesia .

After proper consent, antiseptic dressing and draping with proper patient positioning, the hypopharyngoscope was introduced. However, due to extremely edematous hypopharyngeal mucosa, foreign body could not be visualised. Per-operative C arm was used to see the

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exact topographical location of the foreign body and found to be situated at the level of thyroid cartilage. (Fig. 2) However, the foreign body could not be grasped by alligator forceps due to edematous mucosa. Hence, we decided to explore the neck by lateral pharyngotomy approach.



Fig.1. X ray soft tissue of neck - antero posterior and lateral views

Transverse incision was made at the level of upper border of thyroid cartilage. Subcutaneous tissues and platysma were incised along the line of incision. Strap muscles were retracted and the right lateral border

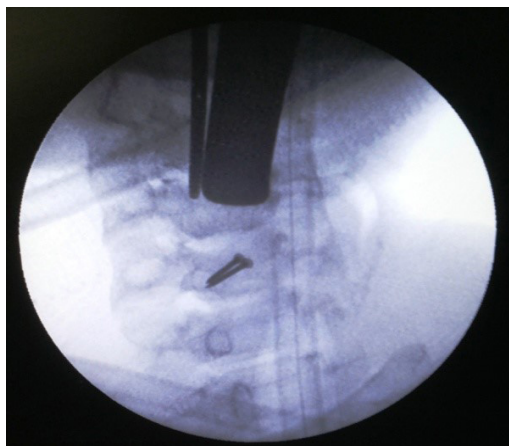


Fig.2. Per operative localisation using C arm

of thyroid cartilage was delineated. C arm was used to precisely identify the location of foreign body. Pyriform sinus mucosa was incised just behind the

right lateral border of thyroid cartilage close to the superior cornu. Foreign body was identified and gently removed without any inadvertent injury to the adjacent mucosa.(Fig. 3) Nasogastric tube (16 FG) was introduced before pharyngeal mucosal repair. Mucosa was repaired using 3-0 monofilament suture. Corrugated



Fig.3. Foreign bodies after removal

rubber drain was placed and the wound was repaired in two layers. The patient had subsequent uneventful recovery. (Fig. 4)



Fig.4. Patient in the post-operative period

Discussion

Accidental ingestion of foreign body is a common

emergency in ENT practice. Swallowing of foreign bodies occurs more commonly in children, especially between the age of 6 months and 3 years, and in specific adult risk groups, such as prisoners, alcoholics, edentulous adults and psychiatric patients.²⁻⁴ Our patient did not belong to any of these risk categories.

History of ingestion of foreign body, inability to swallow saliva and dysphagia are most important symptoms with which a patient usually presents to the Out Patient Department.⁵ In children however, many are asymptomatic. Our patient presented with history of definite ingestion of foreign body along with foreign body sensation in the throat. Usually ingested foreign bodies pass harmlessly through the gastrointestinal tract but a few become impacted at various levels of pharyngeal soft tissue⁶ or oesophagus depending upon the nature of foreign body and obstruction in the oesophagus which may be physiological or pathological like pre existing stenosis or any undiagnosed growth.

X ray soft tissue neck-lateral and Anteroposterior views are the preliminary radiological investigations which are mandatory even with the slightest suspicion of a foreign body. If the impacted foreign body is radiolucent, in the presence of positive history, symptoms or clinical suspicion, Computed Tomographic scan of neck and thorax and endoscopic examination may sometimes be essential. In most of the cases no medical or surgical intervention is needed. Endoscopic treatment and surgical intervention are necessary in 20% and 1% of cases, respectively.⁷⁻⁹

In our case, X-ray soft tissue neck- anteroposterior and lateral views revealed two radiopaque sharp tipped linear parallel shadows, each approximately 1.5 cm in length at the level of C4 –C5 vertebrae. There was no coexisting retropharyngeal collection.

Hypopharyngoscopy or oesophagoscopy is usually done for removal of foreign body under general anaesthesia. Rarely, it is extremely difficult to retrieve the foreign body by endoscopic approach as in our case. Excessive mucosal oedema and congestion causing poor localization of the foreign body by endoscopy may be due to prolong stay of foreign body due to delay in presentation of the case. Sharp impact foreign bodies are extremely notorious in this account due to their

potential capacity for migration. External approach by lateral pharyngotomy is well established in the literature in such cases. Since the foreign body was very close to the vertebra, we hence decided to remove it by lateral pharyngotomy. C-arm was used to locate the foreign bodies precisely and hence minimizing the chances of injury during their removal.

Some important complications due to neglected foreign bodies of upper aero-digestive tract include scratches and lacerations of oropharyngeal mucosa, perforation, retropharyngeal abscess, soft-tissue infection or abscess, oesophageal perforation and subsequent para-oesophageal abscess, oesophageal necrosis, oesophageal stricture, migration of foreign body, mediastinitis, pneumothorax and/or pneumomediastinum, pericarditis/cardiac tamponade, tracheo-oesophageal fistula, aorto-oesophageal fistulae or other mediastinal vascular injury etc. Considering these myriad and dangerous complications, urgent removal of foreign body is absolutely mandatory.

It is thus always mandatory to give due respect and care to the complaints of the patient and do a proper ear, nose and throat examination, get the investigations done as needed so as not to under diagnose the case or leave a foreign body and give constant irritation and misery to the patient.¹⁰ Under-diagnosis and delay in presentation may increase the complications and fatality of the cases.

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