# Bengal Journal of Otolaryngology and Head Neck Surgery

Official Publication of The Association of Otolaryngologists of India, West Bengal

**Volume 24 No. 3 - December, 2016**





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***p-ISSN: 2395-2393***
***e-ISSN: 2395-2407***
***RNI No.: 62551/95***


## CONTENTS

**Bengal Journal of Otolaryngology and Head Neck Surgery**
(Incorporating and directly descended from State Journal of Otolaryngology and Otolaryngology, Calcutta)

*Published by*
The Association of Otolaryngologists of India, West Bengal
CMC House, 91B Chittaranjan Avenue,
Kolkata - 700073,
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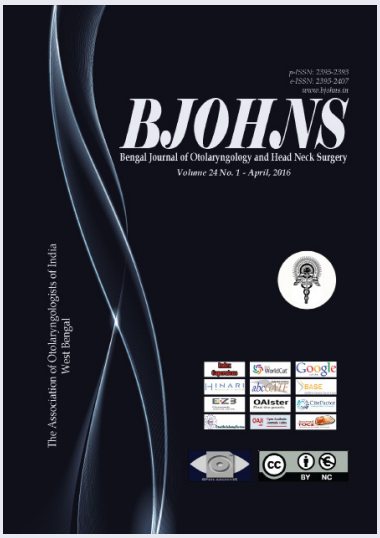


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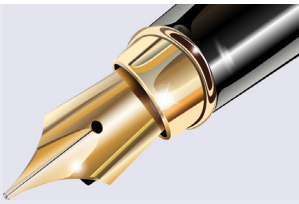
# From the Desk of the Editor



The United Nations is aiming at a better future for the world and is working on 'Transforming our World: The 2030 Agenda for Sustainable Development.' The September 2015 United Nations General Assembly resolution urges the member nations to work comprehensively for the next fifteen years to achieve the specified 17 universal goals and 169 targets, collectively termed as Sustainable Development Goals (SDGs). Achieving such difficult targets need determined and concerted efforts from all the agencies.

The past performance of the countries and their present status may be indicative of their potential trajectories for the next 15 years. Health forms the core of any effort towards sustainable development. The Institute for Health Metrics and Evaluation, University of Washington has come out with its report (Lancet 2016; 388: 1813–50.Published Online September 21, 2016. http://dx.doi.org/10.1016/S0140-6736(16)31467-2) on the performance of 188 countries related to their health-related SDG indicators during the last 25 years (1990-2015).

This report, unfortunately, has some bad news for India. While Iceland, Singapore and Sweden topped the list of performers, "India, despite its rapid economic growth, is ranked 143rd, just below Comoros and Ghana" among the 188 countries. The study highlighted the importance of income, education and fertility as drivers of health improvement, that need to be strengthened by policy reforms and financing in the healthcare sector and political resolve. Timor-Leste and Tajikistan, despite civil unrest and severely disrupted health services in late 1990s, could reorganize them and progress even faster than the USA (which has a much higher Socio-demographic Index – SDI) in their pursuit for universal health care. India, on the other hand, performed even worse than its South East Asian neighbours like Maldives, Sri Lanka, Bhutan and Myanmar.

Though India has improved its health considerably by the adolescent birth rate, skilled birth attendance, sanitation, neglected tropical diseases, consumption of alcohol and smoking etc., it needs to tighten its belt in its fight against maternal mortality, neonatal mortality, tuberculosis, malaria, HIV, air pollution and diseases that can be controlled by better wash, sanitation and hygiene (WaSH) as well as access to improved drinking water.

The Government, while strengthening its health sector, should also address the full range of economic, environmental and social factors to ensure healthy lives for its citizens. Improvement in income/wealth distribution, education, gender equality, peace and security is of paramount importance for a healthier India to emerge during the next fourteen years.

Dr Saumendra Nath Bandyopadhyay
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# Study of Asssociation of Concha Bullosa with Rhinosinusitis

*Shrikrishna B H,[1] Jyothi A C[1]*

**ABSTRACT**

***Introduction***

*There are several studies with contradictory findings about the role of concha bullosa with predisposition to rhinosinusitis. This study was conducted to assess the relationship of osteomeatal unit blockage with concha bullosa.*

***Materials and methods***

*A cross-sectional observational study by radiological assessment of prevalence of chronic rhinosinusitis and blockage of ipsilateral osteomeatal unit was done on 100 cases of concha bullosa detected on computed tomography to determine the prevalence of chronic rhinosinusitis in subjects with concha bullosa and to examine the latter's relationship to osteomeatal unit blockage, which is a precursor for rhinosinusitis.*

***Results***

*One hundred cases of concha bullosa were studied in a total of 87 CT scan films depicting concha bullosa. Some CT scans showed unilateral concha bullosa while few scans showed bilateral concha bullosa. Ipsilateral rhinosinusitis was found in only 31% of the sides in scans of subjects with concha bullosa. Of the total 100 concha bullosae studied, extensive type was the commonest followed by bulbous and lamellar variety.*

***Discussion***

*Although rhinosinusitis was more predominant in the extensive type of concha bullosa compared to other types, it was statistically not significant and there was no statistically significant association between any type of concha bullosa with ipsilateral rhinosinusitis either in right side or left side.*

***Conclusion***

*This study has found no statistically significant association between any type of concha bullosa with rhinosinusitis. A bigger study with larger sample size is required to better assess the strength of association between concha bullosa and rhinosinusitis.*

***Keywords***

*Sinusitis; Turbinates; Tomography, X-Ray Computed Turbinates; Concha Bullosa; Osteomeatal Unit*

Concha bullosa is the presence of pneumatisation in the middle turbinate of the nose.[1] According to Bolger et al., the pneumatisation of the middle concha is of three types: lamellar type is the pneumatisation of the vertical lamella of the concha; bulbous type is the pneumatisation of the bulbous segment; pneumatisation of both the lamellar and bulbous parts is called extensive concha bullosa.[2] The middle turbinate pneumatisation is a part of the normal pneumatisation of the ethmoid air cells.[1-3] Stammberger and Kennedy have defined osteomeatal unit as a functional unit of the anterior ethmoid complex representing the final common pathway for drainage and ventilation of the frontal, maxillary and anterior ethmoid cells.[4] There are several studies with contradictory findings about the role of concha bullosa with predisposition to rhinosinusitis.[2,5,6] The purpose of our study was to determine the possible relationship of concha bullosa to osteomeatal unit blockage, which is a precursor for rhinosinusitis by doing a radiological assessment.

## Materials and methods

This cross-sectional observational study was carried out at the Department of ENT and Head Neck Surgery over a period of one year from 1st January 2015 to 31st December 2015 to determine the prevalence of

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chronic rhinosinusitis in subjects with CT scan showing presence of concha bullosa and to examine the possible relationship of concha bullosa with osteomeatal unit blockage, a precursor for rhinosinusitis. Our only inclusion criterion was presence of pneumatisation of middle turbinate, irrespective of the type and grade of pneumatisation. Since, our study aims at finding association between concha bullosa and rhinosinusitis, no other radiological parameters in the nose and paranasal sinus region was taken into consideration. This is an observational study and not an interventional study. This radiological assessment study included the scans which had been taken for evaluation of various features like headache or allergy. CT scans of patients with history of previous sinus surgery and facial trauma were excluded from our study. The CT machine used in our study was Pro-Speed Plus 4 Slice Multidetector CT machine. The sections were taken with slice thickness of 5 mm.

One hundred cases of concha bullosa were selected in a total of 87 CT scan films. Some CT scans showed unilateral concha bullosa while few scans showed bilateral concha bullosa. In all the 100 cases of concha bullosa, a search was done for presence of chronic rhinosinusitis on the side of concha bullosa. It has been shown that mucosal thickening less than 4 mm in chronic rhinosinusitis is not normally of clinical importance, even though these patients may still have symptoms.[7] Hence, in our study, we have taken CT scan with 4 mm or more mucosal thickening in the sinus cavity as positive for chronic rhinosinusitis. Ipsilateral osteomeatal block is taken positive in case grayish opacity is noted in the osteomeatal unit area. The collected data was subjected to statistical analysis. Software used for analysis is Epi info version 6 and the test applied is Chi-Square test. Where ever the sample size was less for Chi-Square test, Fischer exact test was utilised.

Ethical considerations: The study got clearance by the Institutional Ethical Committee before its commencement. Also, a written informed consent was taken from all the patients whose CT scan films were included in the study.

**Results**

The age group of the subjects ranged between 21 to 48 years (average age was 28.4 years). There were 49 males (56.3%) and 38 females (43.7%). One hundred cases of concha bullosa were selected in a total of 87 CT scan films. 46 scans showed unilateral concha bullosa on right side, 28 scans showed unilateral concha bullosa on left side and 13 scans showed bilateral concha bullosa. Of the total 100 concha bullosae studied, 46 (46%) were of extensive type, 31 (31%) were of bulbous type and 23 (23%) were of lamellar type. Of the extensive type, 29 cases (63%) were present on right side and 17 cases (37%) were present on the left side. Of the bulbous type, 23 cases (74.2%) were on right side and 8 cases (25.8%) were on left side. Of the lamellar type, 14 cases (60.9%) were on right side and 9 cases (39.1%) were on left side.

In a total 100 cases of concha bullosa, ipsilateral rhinosinusitis was present in 31 (31%) cases of concha bullosa (Figures 1 to 5). Of the 29 cases of extensive concha bullosa on the right side, 10 cases (34.5%) had associated ipsilateral osteomeatal unit blockage and 19 cases (65.5%) were free of ipsilateral osteomeatal unit blockage. Of the 17 cases of extensive concha bullosa on the left side, 7 cases (41.2%) had associated ipsilateral osteomeatal unit blockage and 10 cases (58.8%) were

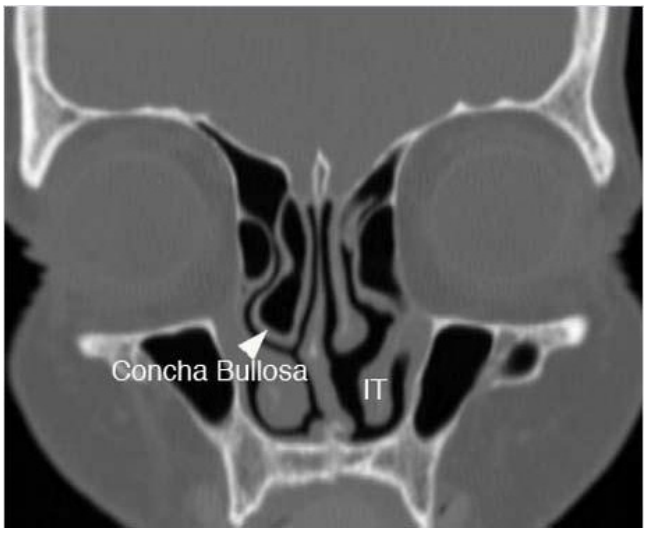


**Fig.1. Right sided extensive concha bullosa with normal sinuses on ipsilateral side (IT- inferior turbinate)**

**Table I : Association of rhinosinusitis with different types of concha bullosa**

| SL. NO | CONCHA BULLOSA TYPE AND SIDE | ASSOCIATED WITH RHINOSINUSITIS | NOT ASSOCIATED WITH RHINOSINUSITIS | TOTAL | CHI-SQUARE VALUE | P VALUE |
|---|---|---|---|---|---|---|
| 1 | Right extensive | 10 | 19 | 29 | 0.23 | 0.63 |
| 2 | Left extensive | 7 | 10 | 17 | 0.99 | 0.31 |
| 3 | Right bulbous | 5 | 18 | 23 | 1.19 | 0.27 |
| 4 | Left bulbous | 4 | 4 | 8 | Fischers Exact | 0.4 |
| 5 | Right lamellar | 3 | 11 | 14 | Fischers Exact | 0.61 |
| 6 | Left lamellar | 2 | 7 | 9 | Fischers Exact | 0.85 |
| | **TOTAL** | **31** | **69** | **100** | | |

free of ipsilateral osteomeatal unit blockage. Of the 23 cases of bulbous concha bullosa on the right side, 5 cases (21.7%) had associated ipsilateral osteomeatal unit blockage and 18 cases (78.3%) were free of ipsilateral osteomeatal unit blockage. Of the 8 cases of bulbous concha bullosa on the left side, 4 cases (50%) had associated ipsilateral osteomeatal unit blockage and 4 cases (50%) were free of ipsilateral osteomeatal unit blockage. Of the 14 cases of lamellar concha bullosa on the right side, 3 cases (21.4%) had associated ipsilateral osteomeatal unit blockage and 11 cases (78.6%) were free of ipsilateral osteomeatal unit blockage. Of the 9 cases of lamellar concha bullosa on the left side, 2 cases (22%) had associated ipsilateral osteomeatal unit blockage and 7 cases (78%) were free of ipsilateral osteomeatal unit blockage. (Table I)

On statistical analysis, we found no statistically significant association between any type of concha bullosa with osteomeatal unit block either in right side or left side. Even though the rhinosinusitis was more predominant in the extensive type of concha bullosa compared to other types, it was statistically not significant.

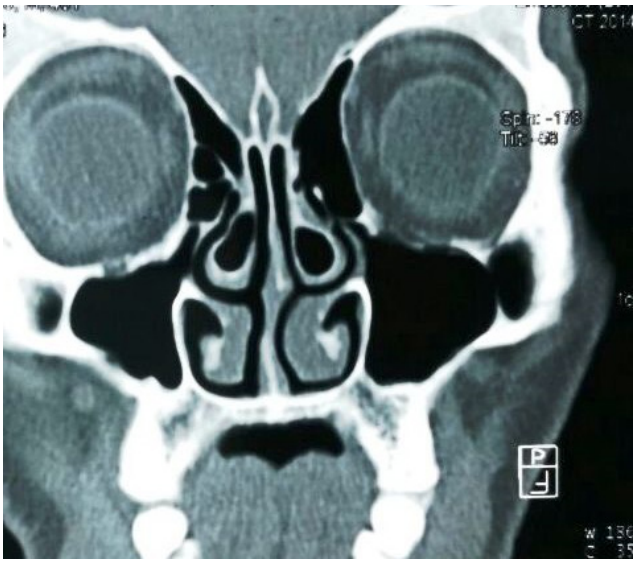

**Fig.2. Bilateral bulbous type concha bullosa with bilateral normal osteomeatal units**

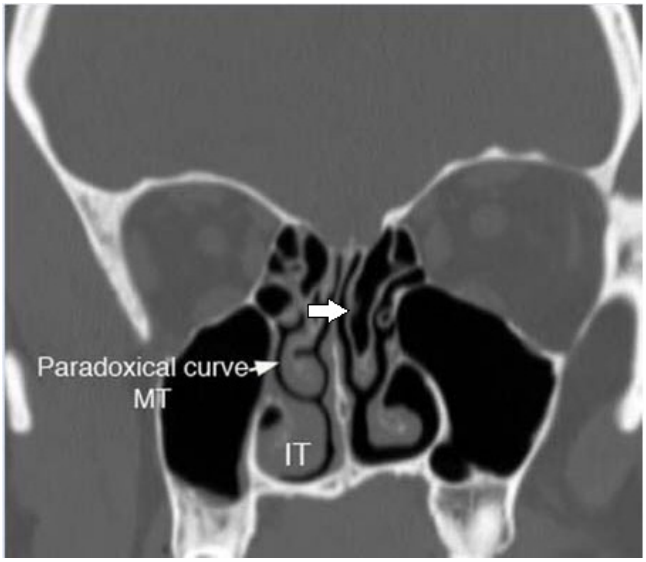


**Fig.3. Left sided lamellar concha bullosa (bold arrow) with no osteomeatal unit blockage**

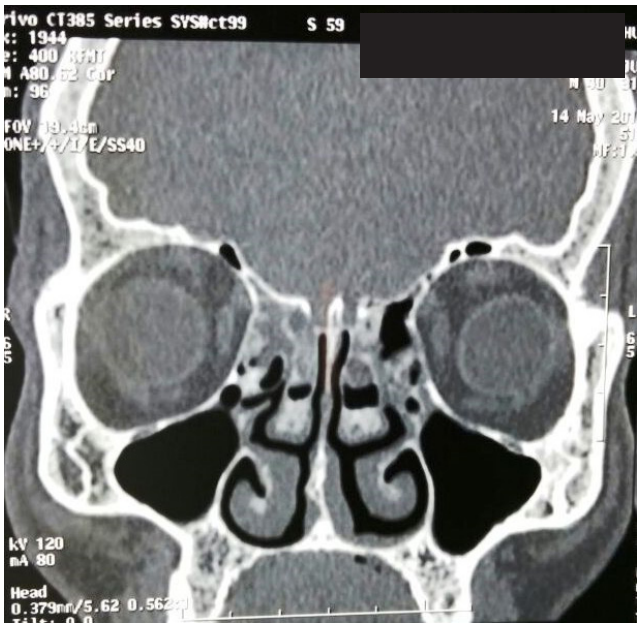


**Fig.5. Bilateral lamellar type concha bullosae with bilateral osteomeatal block**

## Discussion

The exact mechanism of concha bullosa formation has been unclear. However, it is considered that the airflow pattern of the nasal cavity plays an important role. This theory is named as "e vacue". As the airflow is markedly reduced in the nasal cavity with convexity of the deviation, pneumatisation of the middle turbinate is augmented in the contralateral site.[8] This theory can explain the association between contralateral concha bullosa and nasal septal deviation. A study by Stalman at al. shows presence of contralateral nasal septal deviation in 69.5% of patients with unilateral concha bullosa or dominant concha bullosa.[5]

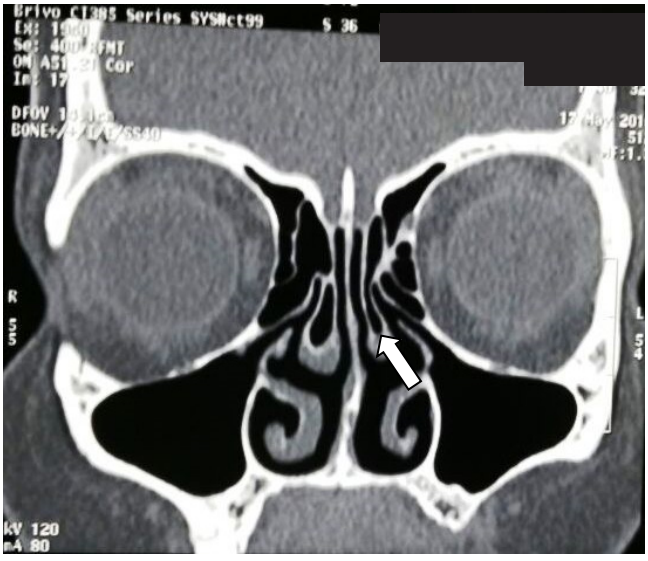


**Fig.4. Right bulbous concha bullosa and left lamellar concha bullosa (arrow) with no osteomeatal block on both sides**

The frequency of concha bullosa in the literature ranges from 14-53%.[1] Stallman defined concha bullosa as being present when more than 50% of the vertical height (measured from superior to inferior in the coronal plane) of the middle turbinate is pneumatised while Smith et al defined concha bullosa as the presence of pneumatisation of any size within the superior, middle or inferior conchae.[5,9] However, Hatipoğlu et al classified concha bullosa depending on the location of the pneumatisation as lamellar, bulbous and extensive.[10] In his study, the incidence of concha bullosa was extensive type (46.95%), bulbous type (32.17%) and lamellar type (20.86%). In the study by Unlu et.al, the incidence of concha bullosa was extensive type (34.2%), bulbous

type (20.63%) and lamellar type (45.23%).[11] Tonai and Baba reported the incidence of concha bullosa as extensive type (52%), bulbous type (19%) and lamellar type (2%).[12] Bolger et al. reported the incidence of concha bullosa as extensive type (15.7%), bulbous type (46.2%) and lamellar type (31.2%).[2] Uygur et al reported the incidence of concha bullosa as extensive type (10.8%), bulbous type (33.9%) and lamellar type (55.3%).[13] In our study, the incidence of different types of concha bullosa was extensive type (46%), bulbous type (31%) and lamellar type (23%). The variations may be due to differences between the study groups, differences in pneumatisation parameters and the analytical methods used.

It is to be noted that this is a cross-sectional observational study and not case control study. Hence, there is no control group in our study. In our study, we found no statistically significant association between any type of concha bullosa with rhinosinusitis either in right side or left side. Even though the rhinosinusitis was more predominant in the extensive type of concha bullosa compared to other types, it was statistically not significant. Some authors have reported that concha bullosa plays a role in recurrent sinusitis by compressing the uncinate process and obstructing or narrowing the infundibulum and the middle meatus.[1,2,14,15,16] According to Lloyd et al, when concha bullosa fills the space between the septum and the lateral nasal wall, there may be total obstruction of the middle meatus orifice.[15, 16] Comparative studies involving asymptomatic patients and sinusitis patients have reported that concha bullosa is more frequently encountered in patients with sinusitis.[15-17] It is significant to note that the comparative studies which failed to show a significant association between the sinus disease and concha bullosa were performed only on the symptomatic groups.[11,18] There are studies pointing out that the size of concha bullosa is important for the presence of symptoms.[13,14] Yousem et al. have advocated that concha bullosa is not one of the causes of sinusitis yet the size has implications.[18] Stallman et al have demonstrated no significant association between the concha bullosa size and sinusitis.[5] No consensus was achieved regarding this matter. We did not classify conchae bullosa by their sizes. ENT specialists believe that especially bulbous type concha bullosa with large dimensions may have a role in sinus disease.[3] We studied the importance of concha bullosa location (lamellar, bulbous and extensive) in relation osteomeatal block, which predisposes to rhinosinusitis. In the most extensive study on this topic by Ünlü et al, no significant relation was demonstrated between concha bullosa and osteomeatal unit blockage; however, when the bulbous-extensive type was compared with the lamellar type, a significant correlation was found regarding osteomeatal unit blockage.[11] They thus concluded that pneumatisation of the inferior portion of the middle concha has a role in osteomeatal unit blockage. No significant difference was found between the bulbous and extensive types in their study.[11] This study is based on purely radiological assessment and clinical features were not included in the assessment. Future studies including clinical signs and symptoms along with the radiological parameter would through more light on the association between concha bullosa and rhinosinusitis.

## Conclusion

There is no statistically significant association between any type of concha bullosa with rhinosinusitis. In our study, even though the rhinosinusitis was more predominant in the extensive type of concha bullosa compared to other types, it was statistically not significant. The limitation of our study was that our study group included only hospital visiting subjects and did not include any normal population. It is to be noted that this is a prospective cross-sectional observational study and not case control or cohort study. A bigger study with larger sample size will throw more light on the presence and strength of association between concha bullosa and rhinosinusitis.

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# The Efficacy of Local Application of Mitomycin C in Reducing Recurrence Rate of Keloid after Surgery

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**ABSTRACT**

***Introduction***

*Keloid is a hyperproliferative response of the fibroelastic connective tissue to dermal trauma, appearing predominantly in areas of high skin tension. Surgical excision produces immediate cosmetic correction, but recurrence rates after surgical treatment alone are high and post excision adjunct therapies should be considered. Topical application of Mitomycin C has shown to suppress cell division, fibroblast proliferation, protein and collagen synthesis and angiogenesis. In our study we applied it locally after surgical excision of keloid of auricle and compared the outcome with post-surgical perilesional Triamcinolone acetonide injection to reduce recurrence.*

***Materials and Methods***

*Fifty cases with primary or recurrent keloid over auricle were studied from February 2015 to January 2016. They are divided into two groups; Group 1 received local Mitomycin C application after keloid excision while Group 2 had perilesional injection of Triamcinolone acetonide after surgical excision of keloid. The results were compared 6 months after the initial treatment.*

***Results***

*There was no statistical difference in the baseline characteristics like age, sex, type of symptoms and previous history of recurrence between the two groups. Most of the patients in both the groups were aged between 14 and 30 years. The study population constituted predominantly of females. At the end of 6 months follow up, the recurrences noted were 5 and 6 respectively in Group 1 and 2 out of 25 patients in each group.*

***Conclusion***

*After surgical excision of keloid, topical application of Mitomycin C is as effective as intralesional Triamcinolone acetonide injection in terms of recurrence of the keloids affecting the auricle.*

***Keywords***

*Keloid; Ear Auricle; Mitomycin; Triamcinolone Acetonide; Recurrence*

Keloid is a hyperproliferative response of the fibroelastic connective tissue to dermal trauma, appearing predominantly in areas of high skin tension. Keloids are the result of an abnormal wound healing process that lacks control over tissue repair and regeneration. They are cosmetically unpleasant and discomforting due to associated itching, tightness and tenderness and can cause significant morbidity. Keloids in the head, neck and face are highly conspicuous. Moreover, owing to their location, they cannot be easily covered. However, the most challenging aspect of management of keloids is dealing with their recurrence.

Surgical excision produces immediate cosmetic correction, but recurrence rates of surgical treatment alone are high and post-excision adjunct therapies should be considered. This includes post-operative topical application of 5-FU, Bleomycin, Mitomycin C. Post-operative treatment with immunomodulators like Imiquimod and interferon alpha-2b are also being studied. Preliminary reports of some of these adjunct therapies

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suggest potential benefit in preventing recurrence after surgery.

Mitomycin C has been isolated from Streptomyces caespitosus.[1] It is an alkylating agent which inhibits DNA synthesis in rapidly dividing neoplastic cells. It is used as an antineoplastic chemotherapeutic agent in treatment of upper gastrointestinal, breast and urinary bladder malignancies. Topical application of Mitomycin C has been reported in ophthalmic and endoscopic sinus surgeries to reduce scar formation.

In our study, we compared the effectiveness of immediate post-excision topical application of Mitomycin C with immediate post-excision Triamcinolone acetonide local injection therapy, and analyzed its potential in management of keloid of pinna.

## Materials and Methods

Patients with primary or recurrent keloid over auricle, registered at the Department of Otorhinolaryngology and Head and Neck Surgery were studied from February 2015 to January 2016. A total 50 lesions in 40 patients, of which 10 have bilateral keloids, were included in the study. The patients were randomly divided into two groups and the treatment procedure and study protocol was explained to them. Twenty five cases were included in Group 1 and 25 in Group 2. Patients with primary or recurrent keloid over the auricular region, who consented to their inclusion, were included in this study irrespective of their age. Patients with known/ developed hypersensitivity to Mitomycin C or Triamcinolone acetonide were not included in the study. Patients with extensive keloids that cannot be excised by surgical excision under local anaesthesia and needed surgical intervention under general anaesthesia were also excluded from this study.

Group 1:

After proper positioning and local infiltration of the surgical site with 2% lignocaine with adrenaline (1:100000). After elevation of the skin flap, a part of it was left behind, and the core of the keloid was removed by sharp dissection. Cotton pledgets soaked in Mitomycin C in dilution of 1mg/ml were applied to the surgical wound for 5 minutes. Wound was then irrigated with normal saline. Tensionless wound closure was done using 5-0 monofilament polypropylene suture.

Group 2:

In group 2 patients, after surgical excision by similar method Triamcinolone acetonide (1 ml of 40mg/ml) was injected at the site of excision and surrounding area and post-operative dressing done.

Evaluation:

All the patients of both the groups were evaluated after 6 months and documented with photograph of the site (Fig. 1). A blinded surgeon not related to the study evaluated the result.

## Results

The results obtained 6 months after the treatment were then compared between the two groups and chi square test applied where appropriate. P value smaller than 0.05 was considered significant.

The mean age of the sample was 28.5 years ranging from 14 to 52 years. The mean age of Group 1 was 27.2 years while that of group 2 was 29.8 years. Both the groups were statistically age matched by paired t test. Majority of the patients were female with only 2 male patients. All the patients had history of dermal trauma at the keloid site.

Majority of them had cosmetic complaints; others had itching, burning and pain at the site. Ten out of the 25 patients in Group 1 and 12 out of 25 in Group 2 had previous history of treatment and recurrence.

No significant association was found between history of recurrence on presentation and recurrence after the current treatment in either group.

Recurrence rates after treatment at the end of 6 months follow up were not significantly different in patients of postoperative Triamcinolone therapy compared to patients of post-operative Mitomycin C application by chi square test (Table I).

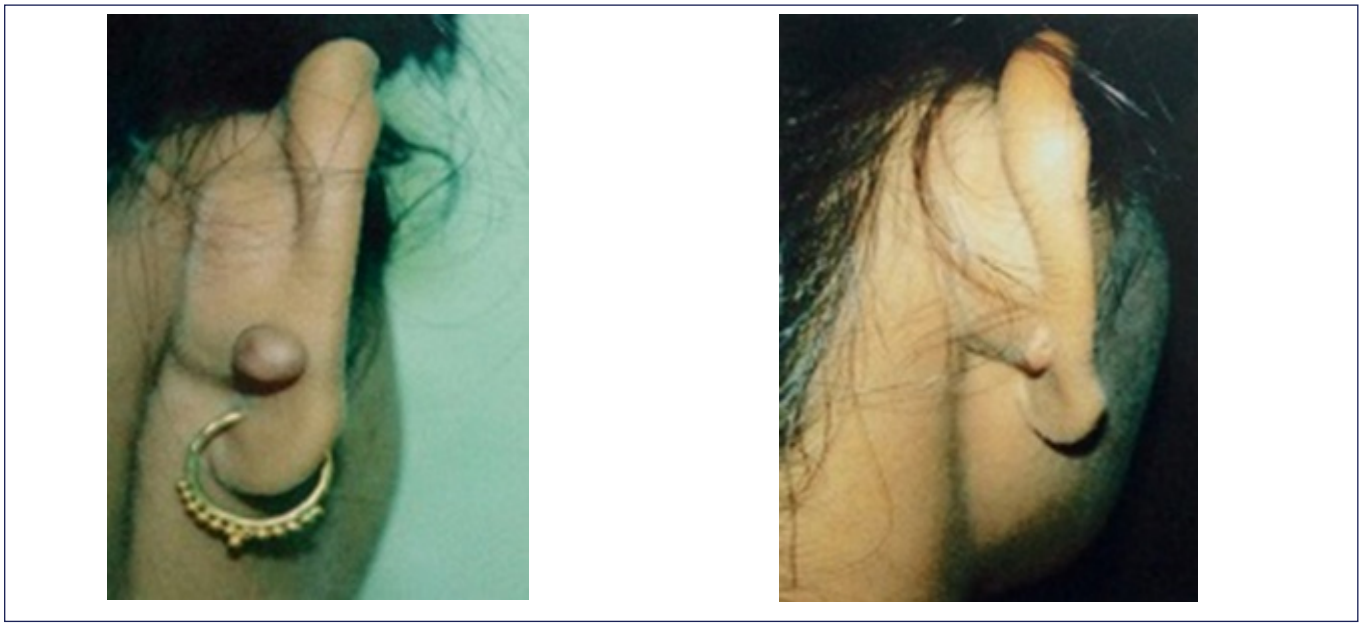

**Fig.1. Preoperative and postoperative photographs (taken after 6 months follow-up) in a 25 year old female with right auricular keloid**

## Discussion

Keloid is a cosmetic blemish. A significant number of treatment modalities have been tried for successful cure of Keloids over the years. Therapeutic treatment of keloids includes occlusive dressings, compression therapy, intralesional corticosteroid injections, cryosurgery, Mitomycin C, excision, radiation therapy, laser therapy, interferon (IFN) therapy, 5-fluorouracil (5-FU), doxorubicin, bleomycin, verapamil, retinoic acid, imiquimod 5% cream, tamoxifen, tacrolimus, botulinum toxin, and over-the-counter treatments.[2] Surgical treatment gives immediate improvement in appearance and aesthetically pleasing results, but recurrence rate of surgery alone is relatively high, in the range of 45 to 100%.

Mitomycin C imparts antiproliferative effect on wound fibroblast through DNA synthesis inhibition. It can cause fibroblast arrest without sacrificing re-epithelialization. Mitomycin C when applied onto the mucosa immediately following dilatation of oesophageal and tracheal stenosis, would decrease re-stenosis by decreasing the production of fibroblast tissue and scar tissue.[3,4,5]

Egyptian surgeons around 1700 BC first described keloid.[6] Baron Jean-Louis Alibert (1768-1837) first reported it as an entity in 1806. He called them cancroïde, later changing the name to chéloïde to avoid confusion with cancer.[2] Incidence of keloids is more in the dark skinned people; the incidence being reported to be between 4% and 16% in the black population.[7] The ratio of type I collagen to type III collagen is elevated.[8] Keloids are fibrotic tumours containing relatively acellular centres and thick, abundant collagen bundles that form nodules in the deep dermal portion of the lesion.[9,10,11,12] Keloids are associated with significant pain, pruritus (itching), and physical disfigurement.[13] Recurrence after surgery poses a therapeutic challenge.

In concert with most other studies maximum number of patients with keloid in our study fall under the age group of 10 to 30 years.[14] Sex distribution in our study was in agreement with three other studies by Gupta et al[6] Chi et al[9] and Fruth et al[15] done on head neck keloid where majority of patients were female.

Finally, when the recurrence rates in the two groups were considered, we found that the recurrence rates in the Mitomycin C group were not significantly different as compared to the Triamcinolone group. Five

cases of recurrence were observed after post-surgical application of Mitomycin C, whereas 6 cases recurred after Triamcinolone injection. In one study Mitomycin C (0.4mg/ml) was topically applied after surgery for 4 minutes. 9 out of 10 patients had no recurrence after 8 months follow up.[16] Other study in which 20 patients were treated with surgical excision followed by

**Table I : Comparison of the recurrence rates of keloid between the two groups**

| GROUP | RECURRENCE | NO RECURRENCE | TOTAL |
|---|---|---|---|
| Group 1 | 5 | 20 | 25 |
| Group 2 | 6 | 19 | 25 |
| **TOTAL** | **11** | **39** | **50** |
| **p value = 0.7328 (Pearson's Chi square Test)** | | | |

Mitomycin C application for 5 minutes all 20 patients were satisfied after 14 months follow up and 2 showed complete disappearance of keloid. Contrary to this, in a study using patients as their own controls, Sanders et al reported that topical Mitomycin C application on excised keloid made no difference in recurrence.[1]

The mixed results of these trials may be related to small study sample size, different doses of Mitomycin C, different durations of follow up and lack of randomization. Sanders et al used Mitomycin C at a concentration of 0.4 to 0.5 mg/ml which made no difference in recurrence of keloid.[1] We used Mitomycin C in doses of 1mg/ml like many other studies and showed better results in terms of keloid recurrence. In concordance with many other studies no complications were observed with local application of Mitomycin C.[1,6,9,16]

## Conclusion

Minimizing recurrence of keloids after surgery is of paramount importance. Combination of surgical excision with topical application of Mitomycin C is as effective as intralesional Triamcinolone acetonide injection in treating auricular keloids. Both of these two treatment modalities give far less recurrence rates compared with surgical treatment alone. So, these combination therapies are feasible options for management of keloid as they have very low recurrence rate and no significant adverse reaction.

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# Vitamin D Deficiency in South Sharqiya in Oman and its Impact on ENT Patients - A Retrospective Study

*Hasan Abdul Cader Segana,[1] Reghunandanan Nair,[1] Fahim Ahmed Shah[1]*

**ABSTRACT**

***Introduction***

*Vitamin D deficiency has multitude of causes and can present with varying clinical manifestations. Studies show that it can lead on to recurrent respiratory infections, ear infections and deafness. Vitamin D also has immunomodulant action. Here we discuss the varying features concerning an Otolaryngologist in general as far as Vitamin D metabolism is concerned.*

***Materials and Methods***

*This retrospective study was performed on 800 patients 152 males and 648 females of different socioeconomic background at secondary level regional referral hospital under Ministry of Health in Sultanate of Oman. The patients attending the outpatient clinic with various complaints and not responding to conventional treatment were advised for assessment of vitamin D [25 (OH) D] level in blood. The patients were evaluated with general history, blood samples of serum calcium, phosphate, alkaline phosphatase and serum vitamin D level were measured by the most standardized laboratory of the country.*

***Results***

*Out of 800 patients, 275 cases had Vitamin D levels below 20 ng/ml and 167 patients had values greater than 30 ng/ml in serum.81% patients with vitamin D deficiency were females.56.25% patients were between third and sixth decade. Otolaryngologic manifestations were acute and recurrent URTI (n=352) 44%. 7% of the patients presented with recurrent ear infection (otitis externa). The rest of them presented to a lesser extent with deafness, otosclerosis.*

***Discussion***

*Vitamin D deficiency has been reported worldwide as one of the commonest deficiency diseases. It can lead to autoimmune dysfunctions, Beta cell dysfunction in pancreas, Multiple sclerosis, recurrent chest infections and congestive cardiac failure. Studies have shown the involvement of cochlea with sensorineural hearing loss and otosclerosis.*

***Conclusion***

*Vitamin D deficiency has multi system implications as patients presenting with different signs and symptoms. Mass level screening and vitamin D supplementation should be planned to decrease its varied and multidimensional ill effects on health. Adequate vitamin D supplementation and sensible sunlight exposure to reach optimal vitamin D status are among the front line factors of prophylaxis for spectrum of disorders.*

***Keywords***

*Vitamin D Deficiency; Prevalence; Oman; Diagnosis; Deafness*

Vitamin D is considered an essential micronutrient. It is well known for its important role, together with calcium, in bone mineralization. Vitamin D in human body is present in several forms: the most important are 1,25-hydroxyvitamin D, the circulating form, and 1,25- dihydroxyvitamin D, the active form. Vitamin D is produced in the skin through exposure to UV light[1] (through the transformation of 7-dehydrocholesterol in vitamin D3 or cholecalciferol) or absorbed from few foods. Vitamin D can be ingested in the form of vitamin D3 or vitamin D2 (ergocalciferol).

Vitamin D is important for good health, growth and strong bones. A lack of vitamin D is very common. Vitamin D is mostly made in the skin by exposure to sunlight. Most foods contain very little vitamin D naturally. Some people are more at risk of vitamin D deficiency, and so are recommended to take vitamin D

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supplements routinely. These include all pregnant and breastfeeding women, all infants and young children aged 6 months to 5 years, people aged 65 and over, and people who are not exposed much to sun.

Vitamin D deficiency can also occur in people taking certain medicines, Examples include: Carbamazepine, Phenytoin, Primidone, Barbiturates and some anti-HIV medicines. Most affected people either don't have any symptoms, or have tiredness or vague aches and pains, or are unaware of the problem. Many studies suggest that vitamin D deficiency can lead on to recurrent respiratory and ear infections.[2] A simple blood test for vitamin D level can make the diagnosis.

Vitamin D, in its active form 1,25-hydroxyvitamin D, has a complex action on the immune system, by modulating and inhibiting its activity in different ways. Pathogenic microorganism sensing by the Toll-like receptor 2/1 (TLR2/1) complex increases expression of vitamin D receptors (VDR) and CYP27B1 in monocytes.[3] The synthesis of 1,25-dihydroxyvitamin D promotes VDR-mediated transactivation of the antimicrobial peptide cathelicidin and killing of intracellular microbes.

Cathelicidins have a direct antimicrobial function. In addition to anti-bacterial effects including membrane disruption, they have antiviral effect in the inhibition of herpes simplex viruses, adenovirus and retrovirus.[4] A study showed that transcriptional regulation of cathelicidin can be mediated by activation of 1,25-dihydroxivitamin D. Stimulation of TLR receptors in macrophages by microbial products results in increased conversion from the inactive 25-hydroxyvitamin D to the active 1,25-hydroxyvitamin D. According to Adams and colleagues, a consequence of TLR activation is the production of defensin-2 and of cathelicidin: these two antimicrobical peptides are strongly up-regulated by 1,25-hydroxyvitamin D.[5] A research has documented that 1,25-dihydroxyvitamin D promotes autophagy in monocytes.[6]

In the Middle East and other Arab countries, the hypovitaminosis D is very frequent in children and adults. A cross-sectional study observed high prevalence of vitamin D deficiency (VDD) in apparently healthy children living in Jeddah.[7] For cultural and religious reasons, the dress style of women outdoors prevents exposure of skin to sunlight. A cross-sectional randomized study conducted in Saudi Arabia indicated that VDD among healthy Saudi women of 25-35 years was 30% and 55% in women of ≥ 50 years.[8] In Iran high percentage of VDD was defined in a population study: in Teheran prevalence of severe, moderate and mild VDD was 9.5%, 57.6% and 14.2% respectively.[9] New lifestyles, with an increase in time spent in artificial environment (offices, houses, commercial centres), mainly in the hottest season, limit the physiological ability of human body to synthesize from precursor "active" form of vitamin D.

Much debate has taken place over the definition of vitamin D deficiency. Most agree that a 25(OH) D concentration ≤ 50 nmol/L, or 20 ng/mL, is an indication of vitamin D deficiency, whereas a 25(OH) D concentration of 51-74 nmol/L, or 21-29 ng/mL, is considered to indicate insufficiency; concentrations > 30 ng/mL are considered to be sufficient.[10]

Vitamin D deficiency increases patients' vulnerability to viral respiratory infections and it is also involved in the pathophysiology of chronic rhinitis and rhinosinusitis.[11]

Researches have shown that VDD is associated with development of vertigo. In fact, scientists have confirmed that Vitamin D receptors are located on calcium channel transport systems in the inner ear and help regulate proper calcium balance. This mechanism helps explain the role of vitamin D in maintaining proper ear function. The role of vitamin D deficiency has been attributed to cochlear deafness, Meniere's disease and otosclerosis including cochlear otosclerosis representing with trough shaped pure tone audiogram with a dip during 1 and 2 kHz frequencies.[12] The calcium and phosphorus content of the woven bone of the otic capsule are much higher than other bones hence may be more affected by deficient vitamin D levels.[13]

## Materials and Methods

The study was performed on 800 patients 152 males and 648 females of different socioeconomic background. This was a retrospective study performed over a ten

year period from 2005 to 2015 at Sur Hospital in South Sharqiyah region of Oman. The patients were attending the general medical outpatient department, and were referred from other hospitals and clinics attached to Sur Hospital. The patients attending outpatient of medical clinic with various complaints and not responding to conventional treatment were advised for assessment of vitamin D [25 (OH)D] level in blood. Those presenting with ENT symptoms were referred to Outpatient ENT clinic. A quick general history and examination was also undertaken for presence of other medical conditions. The age groups ranged from 20 to 80 years, mean age being 50 years. Subjects were predominantly married and majority living in their houses or offices and when outdoor most of them only exposed face and hands. Blood samples were collected in the morning. Overnight fasting sample was collected by venepuncture by disposable syringes and 5 ml blood sample was taken and samples were stored at -20°C till they were analyzed in the laboratory. Their serum calcium, phosphate, alkaline phosphatase and serum vitamin D level were measured by the most standardized laboratory of the country. The study was analyzed on SPSS-Version-16 for windows. P<0.05 was considered statistically significant. In our study the various determinants and variables of interest were: age, gender, serum calcium, phosphate, alkaline phosphatase, serum vitamin D levels and history of bone or body aches.

## Results

Vitamin D deficiency is defined as serum 25(OH)D level below 20 ng/mL and out of 800 patients, Vitamin D deficiency was found in 34.3% (n=275) of patients. Comparing this to serum 25(OH)D level that was sufficient at greater than 30 ng/mL, we found among our 800 patients that this was evident among 21 % (n=167). (Fig. 1) Overall 79.0% (n=733) of the study population had sub-optimal levels of Vitamin D (<30 ng/mL). 800 patients were reviewed for this retrospective chart analysis. Males comprised 19% (n=152) and 81% (n=648) were females.

The number of patients below the age of 30 years was 181(22.62%) and 158 of them (87.2%) had sub-optimal levels of vitamin D. Four hundred and fifty (450) patients (56.25%) were of the age between 30-60 years and 373 (82.8 % ) of them had sub-optimal vitamin D whereas 169 patients (21.12%) were above 60 years and 102 of them (60.3 %) had sub-optimal levels of vitamin D. (Fig. 2, Table I) Analysis on the basis of gender concluded that 61% (n=93) of total males and 83.3%(n=540 ) of total females had a deficient serum Vit.D. We also found that 119 patients were obese and 99 patients (92%) had sub-optimal level of vitamin D. Only 185 patients (30.83%) were having bone or body aches as a presenting feature while remaining 415 individuals (69.16%) were having no pains. In our sample, all had normal values for serum Calcium and Phosphates. However, only 20 patients had modestly elevated levels of serum alkaline phosphatase.

Most of the patient who attended the ENT clinic, presented with acute and recurrent URTI (n=352; 44%). Seven per cent of the patients presented with recurrent ear infection (otitis externa). The rest of them presented to a lesser extent with deafness, otosclerosis.(Table II) Out of the 800 patients, 633 patients (79.1%) required Vit. D supplementation.(Table III)

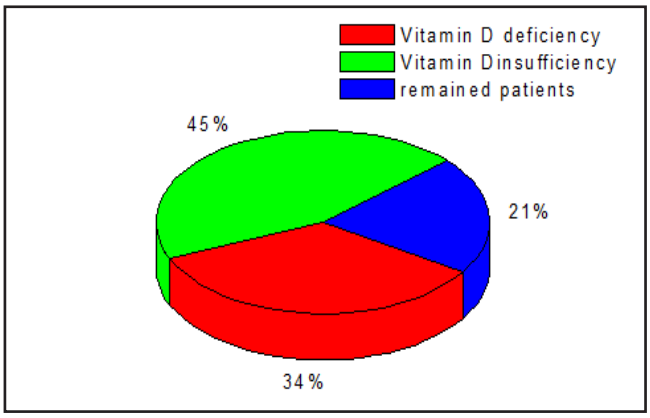


**Fig.1. Total No. of Vit. D insufficiency and deficiency in 800 medical patients**

## Discussion

Vitamin D deficiency is common disease in the world. It has been widely reported in all age groups in recent years. Rickets has never been eradicated in developed countries as well.[14] Hypo-vitaminosis and Vitamin D

**Table I : The incidence of Vitamin D deficiency and insufficiency in different age groups**

| AGE (YRS) | TOTAL | VIT. D DEFICIENCY | PERCENTAGE | VIT. D INSUFFICIENCY | PERCENTAGE |
|---|---|---|---|---|---|
| <30 | 181 | 100 | 55% | 58 | 32% |
| 30-60 | 450 | 151 | 33% | 222 | 49% |
| >60 | 169 | 24 | 14% | 78 | 36% |

deficiency have been in developed and developing countries including several in the Middle East.15 Vitamin D is important for calcium absorption and bone growth.[15] Vitamin D inadequacy is a causative factor in development of certain autoimmune diseases[14,16,17] like

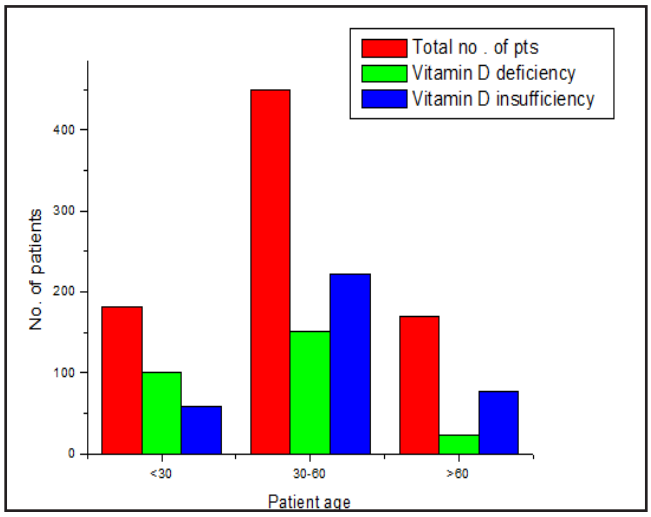


**Fig.2. The incidence of Vit. D deficiency and insufficiency in different age groups**

type 1 diabetes,[16,17] rheumatoid arthritis and certain cancers later in life.[14]

Vitamin D deficiency exists in patients with tuberculosis and it is possibly a cause rather than effect of the disease.[18] It is part of the pathology of Alzheimer's, Parkinson's and some peripheral neuropathies including Restless legs syndrome.[19] Vitamin D deficiency may also

**Table II: Presenting clinical features of patient with Vit. D deficiency**

| SL. NO | ENT PROBLEMS | NO. OF CASES | PERCENTAGE |
|---|---|---|---|
| 1 | Recurrent URTI | 352 | 44% |
| 2 | Sinusitis | 92 | 11.5% |
| 3 | Pharyngitis + Tonsillitis | 90 | 11.25% |
| 4 | Chronic headache and fatigue | 24 | 3% |
| 5 | Simple Vertigo(unsteadiness) | 34 | 4.25% |
| 6 | Recurrent ear infection | 56 | 7% |
| 7 | CSOM Tubotympanic type | 12 | 1.5% |
| 8 | CSOM Atticoantral type | 10 | 1.25% |
| 9 | Otosclerosis | 6 | 0.75% |
| 10 | Sensorineural deafness | 15 | 1.87% |
| 11 | Conductive hearing loss | 18 | 2.25% |
| 12 | BPPV | 14 | 1.75% |
| 13 | Airway Hyperreactivity | 19 | 2.37% |
| 14 | Oral ulcers | 24 | 3% |
| 15 | Retracted Ear drums + OME | 34 | 4.25% |

be linked to an increased susceptibility to several chronic diseases such as high blood pressure,[20] periodontal disease, multiple sclerosis,[21] chronic pain, depression,

**Table III : Total number of patients who required Vit. D supplement**

| | | TOTAL NO. OF PATIENTS | TOTAL NO. OF PATIENTS WHO NEED VIT. D SUPPLEMENT | PERCENTAGE |
|---|---|---|---|---|
| AGE GROUP (YRS) | <30 | 181 | 158 | 87.2% |
| | 30-60 | 450 | 373 | 82.8 % |
| | >60 | 169 | 102 | 60.3% |
| GENDER | Male | 152 | 93 | 61% |
| | Female | 648 | 540 | 83.3% |
| TOTAL | | 800 | 633 | 79.1% |

schizophrenia, seasonal affective disorder, peripheral artery disease.[19] Risk of Myocardial Infarction (MI) doubles in patients with 25 OH Vitamin D levels <34ng/ml. Studies have shown that Congestive Heart Failure patients have much lower 25 OH Vitamin D levels than controls.[22,23] Highest Vitamin D levels associated with 60% improvement in insulin sensitivity.[14]

A study showed that 48% of patients with Multiple Sclerosis (MS) were found to be havening vitamin D deficiency.22 Risk of Myocardial Infarction (MI) doubles in patients with 25 OH Vitamin D levels <34ng/ml. Studies have shown that Congestive Heart Failure patients have much lower 25 OH Vitamin D levels than controls.[22,23] Low Vitamin D level has association with insulin resistance and Beta cell dysfunction. Highest Vitamin D levels associated with 60% improvement in insulin sensitivity.[14] A study showed that 48% of patients with Multiple Sclerosis (MS) were found to be havening vitamin D deficiency.[24] This study was conducted to determine the prevalence of vitamin D deficiency in outpatients clinic, its relation to presenting symptom of bones or body aches and to the serum level of calcium, phosphate and alkaline phosphates. The study showed significantly high prevalence (79%) of vitamin D deficiency (34.3% deficient and 44.7% were having insufficient levels).

There is wide variation in the existing international data on Vit. D deficiency, showing 14.5% in U.K reaching to more than 30% in age above 65 years, 24.3% in United States, 12.5% in Italy , 55% in Irish females 20% and 83% in Saudi Arabia.[25] Possible factors may be due to decreased intake or lack of sun exposure due to social, cultural or religious reasons.[26] The results of the present study were different from the mentioned international data. There were only 169 (21.12%) patients above age 60 year. The remaining 631 (78.16%) patients were below 60 year of age and this difference perhaps may be attributed to fact that majority of sample presented in the clinic was from below 60 year age group . Vitamin D deficiency can occur without any symptoms. If symptoms are present, it indicates severe deficiency.[19] Similar observations were made in this study, only 31% patients were having bones or body aches on presentation while remaining 69% were having no complains showing insignificant relation between deficiency and symptoms (P >0.05). Hence, the concept that musculoskeletal pain are directly associated with vitamin D deficiency[26] is not matched to the results of this study. However, young deficient patients were having lesser chance of having bones or body aches as compared to the above 60 year population (P-value <0.05).

In international literature, Vit. D deficiency has no relation to the serum calcium, phosphate and alkaline phosphates levels.[19] In our study all the vitamin D deficient population was having normal serum calcium and alkaline phosphates. All this discussion endorses the fact that vitamin D is much more prevalent in this part of the world. Ear bone remodeling in osteoporosis is similar to the changes in otosclerosis, according to some researchers, osteopenia and osteoporosis may well be associated with idiopathic BPPV.[27] Ikeda et al (1989) investigated the possible role of vitamin D in hearing impairment by the measurement of three metabolites of vitamin D in 28 patients with bilateral sensorineural hearing loss (BSNHL). Twenty-three

of 28 patients showed a significantly decreased level of 1,25-dihydroxyvitamin D3, with a normal value of 25-hydroxyvitamin D3. In addition to experimental and clinical reports regarding vitamin D deficiency, in this study it is suggested that vitamin D deficiency is one of the etiologies of BSNHL, through the calcium metabolism and microcirculation in the cochlea.[28]

## Conclusion

Vitamin D deficiency is much more prevalent in our community as compared to published Western data, particularly young population is more suffering to this new endemic, more ever often it is asymptomatic and also serum calcium, phosphate and alkaline phosphates levels are not predictable indicator of its underlying deficiency. It is suggested that due to its multi system implications patients presenting with different signs and symptoms and where to establish a diagnosis is difficult, serum vitamin D3 levels may be requested. Moreover, to overcome this issue it is recommended that health education be imparted to population and awareness should be created to increase the exposure to sunlight to permissible limits.

Mass level screening and vitamin D supplementation[25] should be planned to decrease its varied and multidimensional ill effects on health. However, it may be taken as an inspiration to conduct health education and to prevent all the ill effects produced by its deficiency. Vitamin D deficiency and insufficiency as a global health problem is likely to be a risk for wide spectrum of acute and chronic illnesses including hearing loss. Adequate vitamin D status seems to be protective against musculoskeletal disorders (muscle weakness, falls, fractures), infectious diseases, autoimmune diseases, cardiovascular disease, type 1 and type 2 diabetes mellitus, several types of cancer, neurocognitive dysfunction and mental illness, and other diseases, as well as infertility and adverse pregnancy and birth outcomes. Vitamin D deficiency/insufficiency is associated with all-cause mortality.[29]

Adequate vitamin D supplementation and sensible sunlight exposure to reach optimal vitamin D status are among the front line factors of prophylaxis for spectrum of disorders. Supplementation guidance and population strategies for eradication of vitamin D deficiency must be included in the priorities of physicians, medical professionals and healthcare policy-makers.

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# Reliable technique of Endoscopic Dacryocystorhinostomy – A Pilot Study

*Sudip Kumar Das,[1] Chiranjib Das,[1] Amit Bikram Maiti,[2] Ruma Guha,[3] Subhendu Chowdhury[1]*

**ABSTRACT**

***Introduction***

*Over last two decades endoscopic dacryocystorhinostomy has gained popularity over external dacryocystorhinostomy for post-canalicular obstruction. But the success rate is not very satisfactory. Our objective is to describe a technique where near 100% success can be achieved.*

*Materials and Methods*

*The study was conducted on 92 patients over 4 years and 6 months. The technique we describe involves creation of a large ostium, creation and apposition of nasal and lacrimal sac mucosal flaps. All the patients were under regular follow-up for12 months after operation. We also compared our result with other techniques.*

*Results*

*The neo-ostium was well healed and free flow of normal saline was seen in 90 cases (97.83%) post-operatively. In one case there was ostium fibrosis and in another case granulations were seen.*

*Conclusion*

*For the past few decades many approaches have been tried for endoscopic dacryocystorhinostomy. But the long term success rates have not been satisfactory. Our technique of creating large stoma and proper mucosal apposition, when done properly gives near 100% success.*

***Keywords***

*Dacryocystorhinostomy; Endoscopy; Nasal Mucosa; Stents; Mitomycin*

Endonasal dacryocystorhinostomy was first described in 1893 by Caldwell, but was not commonly performed because of poor visibility and limited access to the endonasal anatomy.[1] External dacryocystorhinostomy as described in 1904 by Toti, was the procedure of choice for the treatment of post-canalicular stenosis in the 20th century.[2] But with the advent of nasal endoscopes and relevant instruments there was renewed interest in the endonasal approaches in the early 1990s.[3]

McDonogh and Meiring described the first modern endonasal dacryocystorhinostomy in 1989.[4] Over a period of time, success rate varied from 60% to 90 %.[5] The main cause of failure of dacryocystorhinostomy both external and endoscopic was synechia and granulation formation at the stoma.[6] Several methods have been tried to improve the patency using canalicular stents and application of mitomycin C. But both stent and mitomycin C have some disadvantages. Moreover neither of these two techniques gives 100% success.[7] We describe an approach that involves preservation of nasal mucosa and the creation of anterior and posterior flaps of lacrimal sac in order to achieve fusion between nasal mucosa and lacrimal sac thereby bringing the recurrence rate to near zero.

## Materials and Methods

A prospective study comprising of 92 cases was conducted in the Department of Otorhinolaryngology in a district medical college and hospital of West Bengal,

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India, from January 2010 to June 2014.

*Preoperative Assessment*

The preoperative evaluation included an ophthalmologic examination with lacrimal duct probing and syringing to determine the site of obstruction. An otorhinolaryngological examination including nasal endoscopy and digital X-ray nose and paranasal sinuses occipitomental view or CT scan whichever needed in particular case, were done to exclude nasal pathology.

*Inclusion criteria*

Chronic dacryocystitis, Mucocele of lacrimal sac and Acute on chronic dacryocystitis.

*Exclusion criteria*

Epiphora due to entropion or ectropion, Presaccal obstruction, Lacrimal sac tumour, Patients who didn't come for follow-up were excluded from the study.

*Surgical Technique*

Nose was prepared with cottonoids soaked in 4% lidocaine hydrochloride with 1:1000 epinephrine in a ratio of 4:1, 10-15 min prior to surgery. This ensured adequate decongestion, mucosal anaesthesia, easy access and a bloodless field. 2% lidocaine hydrochloride with 1:100,000 adrenaline was injected submucosally into lateral nasal wall, superior and anterior to the attachment of middle turbinate and then along the maxillary line.

The incision for the mucosal flap begins 5 mm above the insertion of the middle turbinate and is brought horizontally forward 5 mm anterior to the middle turbinate. It is taken vertically down to just above the insertion of the inferior turbinate before taking it posteriorly up to the insertion of the uncinate process. (Fig. 1) The mucosal flap is elevated exposing the junction of the hard frontal process of the maxilla and the thin soft lacrimal bone. The lacrimal bone was peeled off the inferior half of the lacrimal sac. Frontal process of the maxilla which overlies the inferior part of the lacrimal sac was removed by straight and upturned Kerrison punch. In the upper part bone becomes too thick to remove by the punch.

As we did not have micro drill, 2 mm curved osteotome was very useful here. The medial wall of the sac is then tented with a Bowman's probe and incised vertically to create a small anterior and larger posterior flap. Lacrimal syringing was done. Small horizontal cuts are made in these flaps superiorly and inferiorly so that they can be reflected onto the lateral nasal wall without any tension. Once the lacrimal sac flaps have been positioned on the lateral nasal wall the nasal mucosal flap is trimmed into a "C" shape. (Fig. 2) It forms a superior and inferior flap extending anteriorly from the posterior hinge. When reflected back onto the lateral nasal wall the "C" shape of the nasal mucosal flaps fits around the opened lacrimal sac so that the mucosal edges are closely approximated. (Fig. 3) Surgical site was covered with small pieces of absorbable gelatin sponge soaked in Feracrylum solution to hold the flaps in position and to ensure hemostasis. (Fig. 4) Usually,

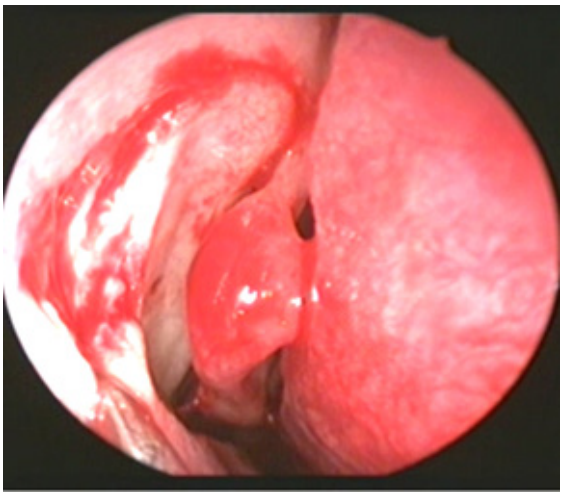

**Fig.1 Incision over lateral nasal wall**

conventional nasal packing was not done except in 5 cases where apprehension of postoperative bleeding was there.

*Postoperative care and follow-up*

Postoperatively, 5 days of oral antibiotics and a topical mixture of antibiotic and steroid eye drops for 1 month were prescribed. Nose drops containing 0.02% hydrocortisone and 0.025% naphazoline nitrate was also advised for 2 weeks. Irrigation of the nasal cavity with saline nasal spray was advised to prevent crust formation. It can be easily made at home by mixing 2 pints of common salt and 2 pints of baking soda in

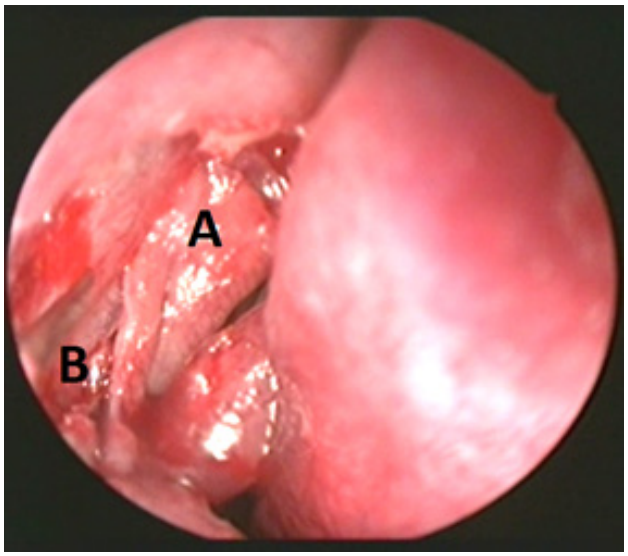


**Fig.2 Assessment of nasal mucosal flap (A) to approximate with opened lacrimal sac (B)**

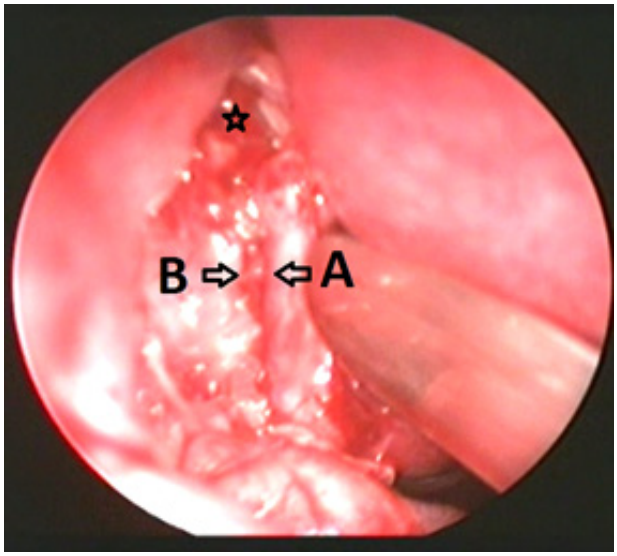


**Fig.3 End to end approximation of nasal mucosal flap (A) and posterior flap of lacrimal sac (B). (* = *stoma)***

180 ml of boiled water. Follow-up reviews were done 1 week, 2 weeks, 1 month, 3, 6, and 12 months after operation. At each follow-up appointment, a nasal endoscopic examination was performed to assess the wound healing and to remove crusts and granulations if any. Lacrimal irrigation was used to confirm the patency of ostium. Surgical success was defined as absence of epiphora and purulent discharge together with a patent lacrimal system, one year postoperatively.

## Results

Over 4 years we operated on 106 patients. But 14 patients were lost to follow-up. So our study includes 92 patients. Among them 40 were male and 52 were female. Their age ranged from 28 to 64 years. There were 3 cases of revision endoscopic dacryocystorhinostomy. One patient presented with nasolacrimal duct obstruction due to gunshot injury. The neo-ostium was well healed and free flow of water was seen in 90 cases postoperatively. (Fig. 5) In one case there was ostium fibrosis and in another case granulation was seen. In 5 cases synechia was seen between middle turbinate and septum which didn't affect the outcome. So the success rate of our series was 97.83%.

## Discussion

Since the early 1990s endoscopic dacryocystorhinostomy has grown in popularity. It has several advantages over external dacryocystorhinostomy like avoiding facial scar, preservation of medial canthal ligament as well as pump action of lacrimal sac. It has minimal morbidity and less risk of intraoperative bleeding. It also enables direct access to the rhinostoma site, reducing tissue injury. Other nasal pathologies like deviated nasal septum or nasal polyp if present can be addressed in the same sitting. It can also be performed during acute dacryocystitis.[8]

The main cause of surgical failure in endoscopic dacryocystorhinostomy is formation of granulation tissues or synechiae at the operative site.[6] It is more pertinent in Asian patients with a low nasal bridge. This is because that the height and length of the nasal bone has a negative correlation with the thickness of the frontal process of the maxilla.[9] Nevertheless, creating a large bony ostium requires extensive removal of the frontal process of the maxilla during endoscopic dacryocystorhinostomy. It is therefore inevitable that a portion of the bone at the frontal process of the maxilla will remain exposed at the completion of the operation. So healing occurs by secondary intention. This leads to formation of granulation tissue and scar tissue

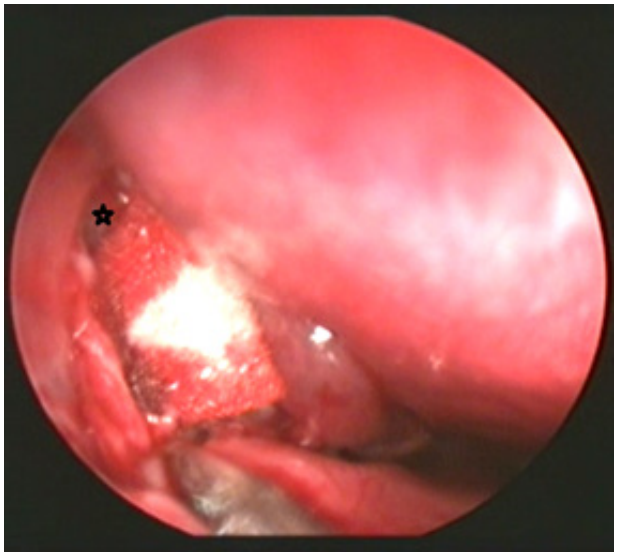

**Fig. 4. Absorbable gelatin sponge soaked in Feracrylum placed at the surgical site. (* = *stoma)***

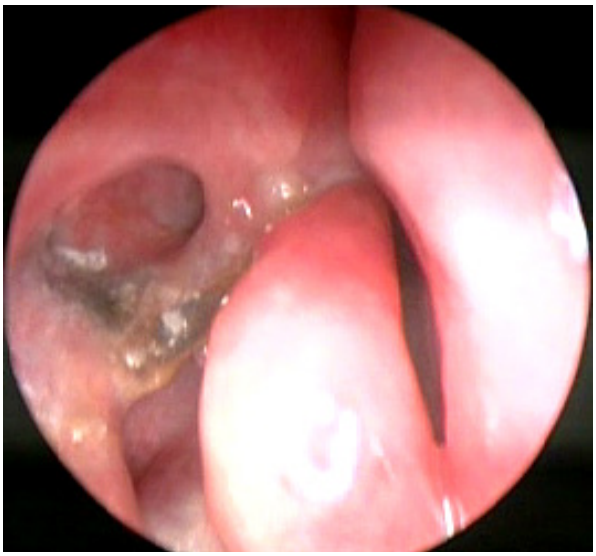

**Fig. 5. Ostium 1 month after operation**

around the ostium, resulting in failure of endoscopic dacryocystorhinostomy. Therefore, it is very important to perform mucosal flap technique to cover bared bone during endoscopic dacryocystorhinostomy for Asian patients. A number of different techniques were used to minimize incidence of granulation tissues or synechiae formation and to improve surgical results. These are use of silicone stents, application of mitomycin C (Table I).

Role of silicone stents in minimizing nasal synechiae is still controversial. Some studies claim good post-operative results by use of stents. Sharma reported a success rate of 88.5% in his 165 patients using silicon stents.[15] Sprekelson reported success with endoscopic DCR with stent in 85% patients.[22] Kakkar reported 85 to 90% success with stent and nearly same success rate without stent.10 Unlu et al reported 85.7% success rate with use of silicone stents and 87.5% in patients without stents.[23] Smirnov et al, in their recent study, have even demonstrated granulation tissue formation due to prolonged use of silicon tubes. So, they recommend to avoid silicon tubes for better post-operative results.[24] Ray et al found no significant difference in the final outcome with or without stent. They suggested that, silicone stents might help in post-operative clearance of crusts, clots and identification of the inner ostium during endoscopic examination or other endonasal maneuvers, if warranted, during post operative follow up.[25]

Jin reported primary success rate of 83% in endoscopic DCR with stent and in 17% cases rhinostomy opening was found to be obstructed by granulations or synechia.[26] Zilelioglu reported lacerations of puncta due to probing and bicanalicular silicon intubation.[27] Kim et al reported decreased long-term patency with stents with success rates dropping from 90 to 77%.[28] Also a major factor negatively affecting patency after stent removal was contraction of lacrimal sac at the time of stent removal.[28]

Mitomycin C, derived from Streptomyces caespitosus, is an alkylating antibiotic. It reduces fibroblast collagen synthesis by inhibiting DNA dependent RNA synthesis and can suppress cellular proliferation in any period of the cell cycle. When used in endoscopic dacryocystorhinostomy, it reduces fibrous adhesion between the osteotomy site and nasal septum and also inhibits scarring around the opening of the common canaliculus. Its effect in glaucoma filtering surgery and pterygium excision has been well established clinically.[17] Controversy exists regarding the efficacy of adjunctive low dose mitomycin C during lacrimal surgery for adults with blocked nasolacrimal ducts.

Muhammad Umar Farooq et al demonstrated a 15% improvement in results using mitomycin C (93.3%).[29] But other studies have shown that use of mitomycin C at the operative site did not improve success rate significantly. Zilelioglu et al found that the success rate

**Table I: Comparison of success rate of different techniques**

| TECHNIQUE | AUTHOR | YEAR | NO. OF PATIENTS | SUCCESS RATE |
|---|---|---|---|---|
| CONVENTIONAL | Kakkar et al[10] | 2008 | 20 | 90% |
| | Mudhol et al[11] | 2012 | 30 | 87% |
| | Naik et al[12] | 2012 | 172 | 89.53% |
| | Jain et al[13] | 2013 | 30 | 83.33% |
| | Shah et al[14] | 2013 | 39 | 92.30% |
| SILICON STENTS | Sharma et al[15] | 2008 | 165 | 88.5% |
| | Kakkar et al[10] | 2008 | 20 | 85% |
| | Zuercher et al[16] | 2011 | 84 | 85.7% |
| | Naik et al[12] | 2012 | 66 | 89.39% |
| | Shah et al[14] | 2013 | 90 | 93.33% |
| MITOMYCIN C | Zilelioglu et al[17] | 1998 | 22 | 77.3% |
| | Ghosh et al[18] | 2006 | 30 | 80% |
| | Mudhol et al[11] | 2012 | 30 | 97% |
| | Jain et al[13] | 2013 | 30 | 90% |
| | Farooq et al[19] | 2013 | 82 | 93.3% |
| MUCOSAL FLAP | Shan et al[20] | 2012 | 120 | 98% |
| | Sonkhya et al[21] | 2008 | 218 | 92% |
| | Present study | 2014 | 92 | 97.83% |

in the mitomycin C treated group was 77.3%, whereas in the untreated group it was 77.8%.[17] Roozitalab et al said that use of intraoperative mitomycin C doesn't change the success rate.[30] Farahani et al showed that patients with nasolacrimal duct obstruction who underwent endoscopic dacryocystorhinostomy didn't benefit from adjunctive topical application of mitomycin C.[31] Mitomycin C induced complications reported in glaucoma filtration or pterygium surgery included dry eye, superficial punctate epitheliopathy, punctal stenosis, corneal and scleral melt, maculopathy, wound infection and leak and endophthalmitis. The optimal dosage and exposure time of mitomycin C is controversial.[31]

On the contrary, mucosal flap technique is easy, safe and doesn't incur additional costs. Here wound edges are brought together so that they are approximated. It allows the edges of wound to heal by primary intention fairly rapidly. It minimizes scarring. When done perfectly it

gives near 100% success. Our study proves it.

## Conclusion

For the past few decades many approaches have been tried for endoscopic dacryocystorhinostomy. But the long term success rates have not been fully satisfactory. The technique we describe involves creation of a large ostium, creation and apposition of nasal and lacrimal sac mucosal flaps. When done properly it gives near 100% success. The procedure is simple and cost-effective because it does not require sophisticated equipment such as silicone stents or mitomycin C.

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# Intralesional Sclerotherapy with Polidocanol in the Management of Head and Neck Vascular Lesions

*Arindam Das,[1] Anindita Sengupta,[2] Debashis Ghosh,[2] Deepjoy Bose,[1] Subhadip Dhara,[2] Arunabha Sengupta[2]*

**ABSTRACT**

***Introduction***

*Vascular lesions (Hemangioma or vascular malformation) in the head and neck region are quite common and need therapeutic intervention if they become symptomatic or cosmetically unacceptable. Different therapeutic modalities including cryotherapy, corticosteroids, laser therapy, sclerotherapy, surgery and/or embolization are available. Advances in laser surgery as well as sclerotherapy techniques have improved our ability to treat extensive lesions. Surgical excision sometimes becomes very difficult due to massive per-operative bleeding and proximity to major neurovascular structures. In this study we have tried to find a simpler, easily available, safe and cost-effective therapy to treat these vascular lesions.*

***Materials and Methods***

*A pilot case study was conducted in a tertiary care hospital in Kolkata for a period of one year. Polidocanol was selected as the sclerosing agent for treatment of head and neck vascular lesions for its safety and its local anesthetic effect. 3% Polidocanol was injected in 20 lesions.*

***Results***

*20 patients with head and neck vascular lesions treated with polidocanol sclerotherapy were followed up for 12 months. The study included 20 patients (12 female and 8 male) with mean age 20.3 years (range 6-62 years). Of these 20 patients 14 had 90% to 100% result and in 6 patients we obtained only mild improvement.*

***Discussion***

*Sclerotherapy is now becoming the first choice of treatment in head and neck vascular lesions. Polidocanol is a mixture of 5% ethyl alcohol and 95% hydroxypolyethoxydodecane, the detergent action of which induces a rapid overhydration of endothelial cells, leading to vascular injury and regression of vascular lesions. As the same time it is a local anesthetic, so treatment is painless.*

***Conclusion***

*It is a less invasive, cost effective, painless OPD based management for head and neck vascular lesions having good functional and aesthetic outcome.*

***Keywords:***

*Vascular Malformations; Hemangioma; Sclerotherapy, Polidocanol*

The field of vascular anomalies has been obscured by its own bewildering, descriptive and histologic nomenclature.[1] Terminological confusion has led to improper diagnosis and illogical treatment. The clinical presentation of vascular lesions can be confusing, because they appear in the same color spectrum of blue, pink and red. Hemangioma has been applied as a generic term to describe various vascular lesions with distinctive natural histories and differing etiologies. The most common localized tumor of the head and neck is the hemangioma. Infantile hemangioma is the most common tumor of infancy occurring in 4% to 10% of children. The incidence is increased (23%) in premature babies weighing less than 1kg. These are more common in girls (F:M=3:1) and in caucasians than dark skinned children.

In 1982, Mulliken and Glowacki presented a biological classification based on the clinical characteristics, natural

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history and cellular features.[2] This initial classification was slightly modified and accepted at the 1996 meeting of the International Society for the study of vascular Anomalies (ISSVA) in Rome. Two major types of superficial vascular lesions are distinguished: vascular tumors (hemangioma being most frequent) and vascular malformations.

Based on individual parameters (such as diameter, location and growth dynamics), different therapeutic modalities,[3] including cryotherapy,[4] corticosteroids, laser therapy, sclerotherapy, surgery and/or embolization can be performed. Advances in laser surgery as well as sclerotherapy techniques have improved our ability to treat extensive lesions and these have also improved patient's quality of life. Complete surgical excision is quite impossible because the facial muscles must be respected to maintain good functional ability and important neurovascular structures must be preserved. Sometimes the procedure can fail because of massive per-operative bleeding. On the contrary, sclerotherapy[5,6] of vascular lesions is a relatively simple, effective and inexpensive method that is valuable as well as promising. Various agents can be used for sclerotherapy, e.g. hypertonic saline, absolute ethanol, sodium tetradecyl sulfate (STDS); ethanolamine oleate and polidocanol.[7,8,9]

## Materials and Methods

Between July 2014 and June 2015 we have performed this pilot case study in the Dept. of Otorhinolaryngology. We have selected 20 patients with various head and neck vascular lesions and they received intralesional sclerotherapy using Polidocanol in this institute. Their age ranged from 6 to 62 years (mean 20.3 years) and male: female ratio was 3:2. In all cases, the written informed consent was obtained from the patients or their parents before the procedure. The diagnosis was made by a combination of clinical presentation and gross anatomical findings. Patients with large lesions underwent CECT and/or ultrasound[10] with color doppler study to assess deep extension and flow dynamics. MRI and angiography was not done.

All the patients received sclerotherapy in the OPD and the sclerosing agent used was 3% polidocanol.[11,12,13] In cases of intraoral vascular lesions 10% lignocaine aerosol spray was used for better patient compliance. With head light illumination, 3% polidocanol was injected into the lesion using 22 gauge needle with the patient in sitting position.

Depending on the size and location of the lesion, 2 to 5 sites were punctured. After confirming by aspiration that the needle was inside the venous lumen, the drug was injected. After the procedure the lesion was compressed with sterile cotton for 10 minutes. After one hour of observation the patient was released with prescription of some analgesics and/or oral rinse. The patient was reviewed after 7 days and next session was scheduled after 2 to 3 weeks depending on clinical improvement. The number of sessions of sclerotherapy depended upon size of the lesion.

## Results

20 patients (12 female and 8 male), aged 6 to 62 years, with an average age 20.3 years were included in our study. Of these 20 vascular lesions, 6 were small (<1cm), 10 were medium (1 to 3cm) and 4 were large (>3cm) in size. (Fig. 1) Intraoral mucosal lesions were more common with the tongue being the most common anatomical site. (Fig. 2)

Scoring system: To evaluate improvement we selected five criteria; Color (Blue to normal), Size, Swelling, Cosmetic result and the patients' opinion. Grading of improvement was: 1 - partial resolution; 2 - complete resolution and 0 - no change. A score of 10 indicated

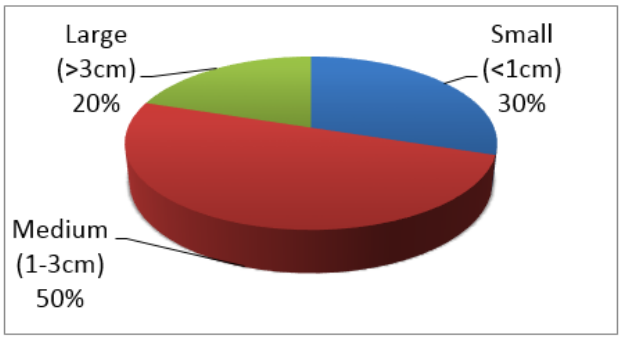


**Fig.1 Size of the vascular lesions in the head and neck**

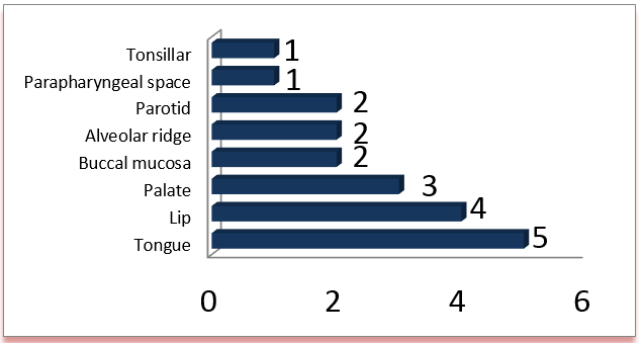


**Fig. 2 Anatomical sites of the vascular lesions**

complete cure (100% result). (Fig. 3)

Of these 20 patients, 14 had a 80% to 100% improvement and in 6 patients we obtained only mild improvement, the mean score being 7.75. (Fig. 4) Except mild swelling for 2-3 days, no complication occurred in these patients. The number of sessions of sclerotherapy varied from 2 to 6 depending upon the size and anatomical site of the lesion. (Fig. 5).

## Discussion

The International Society for Vascular Anomalies (ISSVA) has adopted the classification of vascular anomalies described by Mulliken and Glowacki.[2] They originally proposed the biological classification of vascular anomalies as two major categories: namely, vascular tumor (hemangioma) and vascular malformation. This classification has made the diagnosis and the therapeutic strategy more appropriate. A surgical excision is thought to be best option for the treatment of vascular malformation. However, an extensive and aggressive resection may cause severe complications. Moreover, a complete surgical excision is often not possible because of functional and anatomical limitations. Some recurrent cases after surgical excisions were reported perhaps due to difficulties in achieving a complete resection. Therefore, the indications for surgical treatment should be limited and alternatively sclerotherapy, which can induce a regression of vascular lesions, is now becoming the first choice of treatment.

Polidocanol, ethanolamine oleate, sodium tetradecyl sulfate (STDS) and ethanol[7,8,9] are commonly used as sclerosing agents. Of these ethanol is thought to be the most effective sclerosing agent and it achieves a low recurrence rate. However it may cause wide range of complications like skin necrosis. In addition ethanol has a neurolytic effect and direct toxic effect on myocardium. Ethanolamine oleate[14] can cause hemolytic renal failure. We can avoid these complications using polidocanol as sclerosing agent.

Polidocanol was developed as a local anesthetic[11] in France in 1950s, and during its use an unintended sclerosant effect was noted. Physicians then used polidocanol as a less painful sclerosant and found it effective too. Polidocanol was approved by the USFDA in March 2010 to treat small varicose veins in the legs.

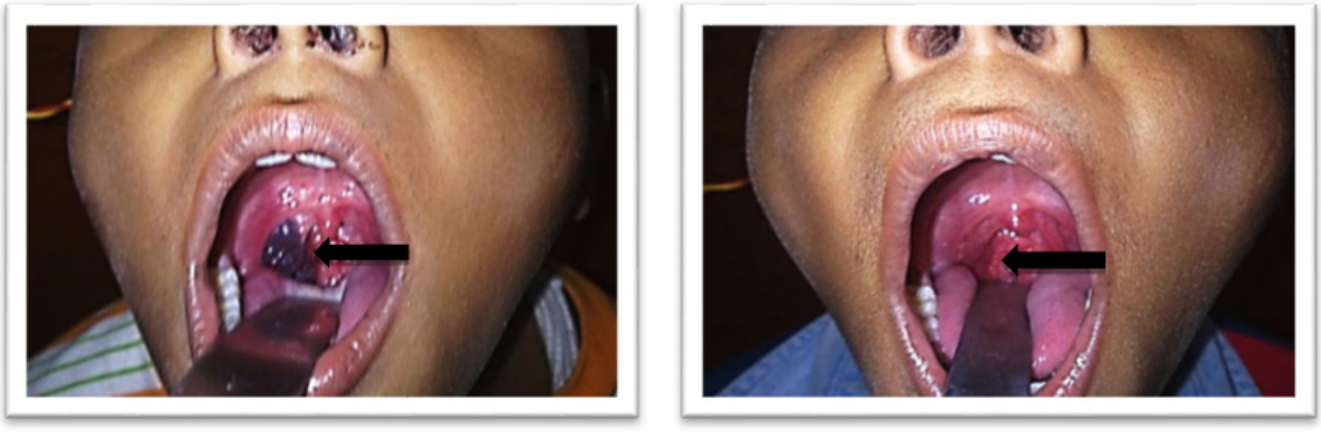

**Fig. 3 Haemangioma of tonsil (before and after sclerotherapy)**

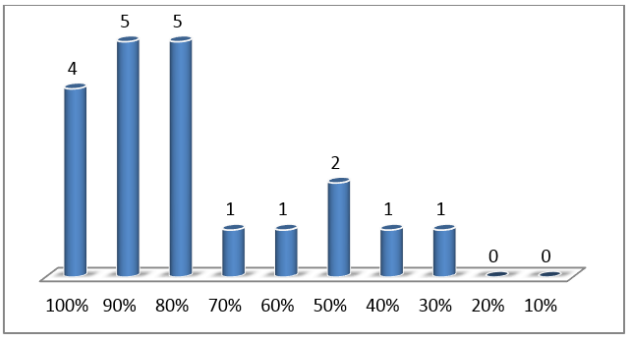


**Fig. 4 Improvement after sclerotherapy**

Polidocanol is a mixture of 5% ethyl alcohol and 95% hydroxypolyethoxydodecane, the detergent action of which induces a rapid overhydration of endothelial cells, leading to vascular injury and regression of vascular lesions.[15]

Regardless of the sclerosing agent that is selected, multiple treatment sessions may be necessary and it is related to the size of the lesion and its anatomical location. Deep seated vascular lesions require image guided technique for better results.

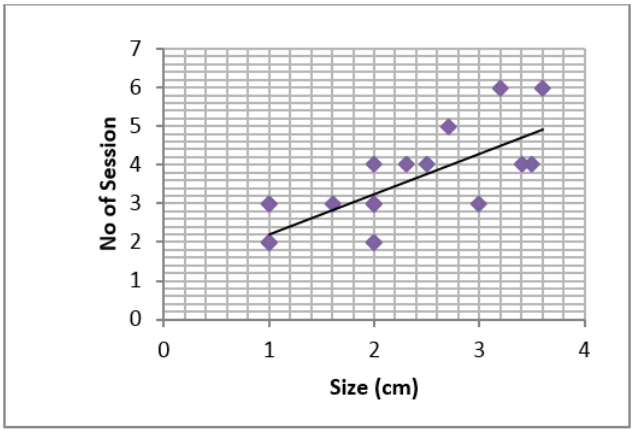


**Fig. 5 Number of sessions**

## Conclusion

In the current study we found that, success depends on proper case selection and correct application technique. It is less invasive, inexpensive, less destructive painless OPD procedure to treat vascular lesions having good functional and aesthetic value.

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# Factors Responsible for the Diagnostic Delay in Oral Cancer Patients: A Hospital Based Sociodemographic Study in Kolkata

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**ABSTRACT**

***Introduction***

*Oral cancer is a challenging health problem globally. Delay in diagnosis is an important factor in determining the outcome of the disease. It is a major determinant of mortality and morbidity of oral cancer patients. Present observational study was conducted with the objective of finding the factors responsible for delay in diagnosis of oral cancer in patients.*

***Materials and Methods***

*Hospital based observational study where patient register was used as data source from 15th Nov, 2013-15th Jan, 2014.*

***Results***

*Among the causes for delay in reporting to hospital, financial constraint (84%) and illiteracy (56.5%) have been found to contribute the most. The risk of primary delay is 3.53 times more among illiterate in comparison with literate. Age, gender, stage of cancer, religion, caste, tobacco use and delayed referral from the first physician were the other factors found to be significant in relation to primary delay.*

***Discussion***

*Early diagnosis is a major factor for favorable outcome of a disease and several factors hinder early diagnosis. Some of these factors can be easily modified through Information, Education and Communication (IEC).*

***Conclusion***

*Some important factors that lead to delay are identified and some of them are preventable. So, IEC regarding cancer among general population will not only provide knowledge to them, but also will break myths regarding cancer and reduce the burden of disease. These identified predictors of delay may be used for designing an educational intervention program for patients with oral cancers.*

***Keywords***

*Oral Cancer; Primary Delay; Diagnosis*

Oral cancer has one of the lowest survival rates worldwide, which remains unaltered despite recent therapeutic advances. Unfortunately, half of these neoplasms are diagnosed at stage III or IV with 5-year survival rates ranging from 20% to 50%.[1] Delay in the diagnosis is an important and fatal factor in determining the outcome of the disease. It is a major determinant of mortality and morbidity of oral cancer patients. This is more so for resource-poor countries like India, where the prevalence of oral cancer is very high.

Early detection, by reducing the delay in diagnosis, has widely been recognised as the cornerstone in improving the chances of survival in oral cancer. Identification and elimination of the causes that lead to delay in the diagnosis may help people fight cancer by early identification of the disease. This would make the management less expensive and ensure better survival

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with less deformity.

## Materials and Methods

The hospital based observational study was conducted from 1st August, 2013 to 31st March, 2014 using data collected from 15th November, 2013 to 14th January, 2014 at a specialised cancer hospital in Kolkata to assess the health care seeking behavior of Oral Cancer patients with special reference to primary delay in diagnosis and also to identify the socioeconomic factors associated with delay in diagnosis. Primary delay is defined as the delay between the appearance of first symptom and the seeking of medical advice.[2]

During the period of data collection from 15th November to 15th January, 441 patients of oral cancer attended the hospital. Hospital register was used as the sampling frame to select the study population. Out of the seven days of a week, odd days in odd number of weeks and even days in even number of weeks (Monday, Wednesday, Friday in weeks 1, 3, 5 and Tuesday, Thursday, Saturday in weeks 2,4) were selected for collection of data. The diagnosed patients of oral cancer attending the hospital on these scheduled prefixed days during the period of data collection were considered for the study. Patients who were non-cooperative (exhausted due to prolonged waiting, stressed with the thought of having cancer) or were physically unfit to respond to the interview (with bleeding, tracheostomy, unable to open mouth properly) were excluded from this study, as also the terminally ill patients.

The patients were examined clinically, relevant medical records were reviewed and the disease was staged after getting informed consent from them. The patients were interviewed with a pre-designed, pre-tested, semi-structured questionnaire.

Considering the prevalence of primary delay of > 3 months (90 Days) in attending the Oncology Department to be 20%,[3]

That is p=0.20 (p = prevalence)

Then, q =1-0.20=0.80(where, q = 1 – p)

Taking 95% level of confidence and 10% allowable error (absolute) = (d), using the formula[4] for Z test, $n = (z1-\alpha/2)^2 x\ pxq/d^2 = (1.96)^2x0.2x0.8/\ (0.10)^2=61.44\sim62$

[Where, p = prevalence, q = (1 – p), d = allowable error (absolute), n = sample size,

z =follows normal distribution with mean 0 and variance 1, α=level of significance]

Taking Design Effect (62x3) =186 is the minimum sample size and hence 200 diagnosed oral cancer cases were included in this study.

To assess the factors related to primary delay, data were analyzed by dividing the patients into two groups; e.g., patients having primary delay >90 days (3 months was the Median) and primary delay ≤ 90 days.

Statistical Analysis was performed with help of Epi Info® 3.5.3 software of the Centers for Disease Control and Prevention (CDC). Chi-square test was used to test the association of different study variables. Z-test was used to test the significant difference between two proportions. Odds Ratio (OR) with 95% Confidence Interval (CI) was calculated to measure the different risk factors. Multiple Logistic Regression was used for multivariate analysis. Confidence Intervals were at 95 percent level, $p < 0.05$ was considered statistically significant.

## Results

The present study is an observation of factors influencing delay (primary) in the diagnosis of oral cancer patients. This study was conducted with a sample size of 200 diagnosed cases of oral cancer attending a Specialised Cancer Hospital in Kolkata from 15th November, 2013 to 14th January, 2014.

The median value for primary delay of the patients was 90 days. To find the factors related to primary delay we have analyzed data by dividing the patients into two groups: patients having primary delay >90 days and primary delay ≤90 days. In this study the primary delay was >90 days in 42.5% of patients and in 57.5% the primary delay was ≤90 days. The median age (mean ± standard deviation) of the patients was 56 years with age range of 25 - 86 years. People in the age group of 45-54 years were affected most (37%) and the least affected age group was 25-34yrs (2.5%). (Table I)

The risk of primary delay was 2.60 times more for

**Table I : Age distribution of the patients**

| AGE GROUP (IN YEARS) | NUMBER | PERCENTAGE |
|---|---|---|
| 25-34 | 5 | 2.5% |
| 35-44 | 32 | 16.0% |
| 45-54 | 74 | 37.0% |
| 55-64 | 52 | 26.0% |
| 65-74 | 23 | 11.5% |
| >74 | 14 | 7.0% |
| **TOTAL** | **200** | **100.0%** |

the patients with age >50 years as compared with the patients with age ≤50 years and the risk was significant. (Table II) There was significant association between gender and primary delay of the patients. It was noticed that the risk of primary delay was 1.89 times more for females in comparison with males. The risk was significant [OR = 1.89, p =0.03] (Table III)

In this study most of the patients (52.0%) were found in advanced stage of oral cancer, Stage-III. There was significant association between stage of cancer and primary delay of the patients (p=0.00001). (Table IV) Level of education and primary delay of the patients (p=0.003) shows significant association too. The risk

**Table II : Age and primary delay**

| AGE GROUP (IN YEARS) | DELAY | | TOTAL |
|---|---|---|---|
| | >90days | ≤90days | |
| >50 | 58 (52.7%) | 52 (47.3%) | 110 (100.0%) |
| ≤50 | 27 (30.0%) | 63 (70.0%) | 90 (100.0%) |
| **TOTAL** | **85 (42.5%)** | **115 (57.5%)** | **200 (100.0%)** |

**Table III : Gender and primary delay**

| GENDER | DELAY | | TOTAL |
|---|---|---|---|
| | >90days | ≤90days | |
| Female | 34 (53.1%) | 30 (46.9%) | 64 (100.0%) |
| Male | 51 (37.5%) | 85 (62.5%) | 136 (100.0%) |
| **TOTAL** | **85 (42.5%)** | **115 (57.5%)** | **200 (100.0%)** |

of primary delay is 3.53 times more among illiterate in comparison with literate and the risk was significant [OR=3.53(1.95, 6.38); p=0.000002]. (Table V) 97.5% of the study population had no knowledge at all about

**Table IV : Comparison of the primary delay in relation to the stage of cancer**

| COMPOSITE STAGE | DELAY IN DAYS | | TOTAL |
|---|---|---|---|
| | >90 | ≤90 | |
| Stage-I (No. of patients) % | 1 (11.1%) | 8 (88.9%) | 9 (100.0%) |
| Stage-II (No. of patients) % | 5 (6.7%) | 70 (93.3%) | 75 (100.0%) |
| Stage-III (No. of patients) % | 69 (66.3%) | 35 (33.7%) | 104 (100.0%) |
| Stage-IV (No. of patients) % | 10 (83.3%) | 2 (16.7%) | 12 (100.0%) |
| **TOTAL (NO. OF PATIENTS) %** | **85 (42.5%)** | **115 (57.5%)** | **200 (100.0%)** |

**Table V : Level of education and primary delay**

| LEVEL OF EDUCATION | DELAY IN DAYS | | TOTAL |
|---|---|---|---|
| | >90 | ≤90 | |
| Illiterate (No. of patients) % | 49 (60.5%) | 32 (39.5%) | 81 (100.0%) |
| Literate (No. of patients) % | 36 (30.3%) | 83 (69.7%) | 119 (100.0%) |
| **TOTAL (NO. OF PATIENTS)%** | **85 (42.5%)** | **115 (57.5%)** | **200 (100.0%)** |

oral cancer. (Table VI)

There was significant association between referral from the first physician and delay in patients attending the Specialized Cancer Care Hospital (Chi-square test = 12.04, p=0.03). (Table VII) Among the causes of delay in reporting to the Specialized

**Table VI : Idea about cancer (n =200)**

| IDEA ABOUT CANCER | NUMBER | PERCENTAGE |
|---|---|---|
| Ill-fated | 2 | 1% |
| Small mouth ulcer | 163 | 81.5% |
| Prolonged treatment | 80 | 40% |
| Avoidance due to fear | 20 | 10% |
| Lack of knowledge | 195 | 97.5% |
| Others | 7 | 3.5% |

**Table VII : Referral from the first physician and primary delay**

| REFERRAL FROM 1ST PHYSICIAN | DELAY IN DAYS | | TOTAL |
|---|---|---|---|
| | >90 | ≤90 | |
| Yes | 36 (39.6%) | 55 (60.4%) | 91 (100.0%) |
| No | 53 (48.6%) | 56 (51.4%) | 109 (100.0%) |
| **TOTAL** | **89 (44.5%)** | **111 (55.5%)** | **200 (100.0%)** |

Cancer Care Centre, financial constraint is the main cause (84%) followed by operational delay (70%) (Table VIII) Significant association between monthly family

**Table VIII : Cause of delay in reporting to Specialized Cancer Care Hospital with relation to literacy**

| CAUSE OF DELAY IN REPORTING TO CNCI | ILLITERATE | LITERATE | TOTAL (PERCENTAGE) |
|---|---|---|---|
| Financial | 73 (43.5%) | 95 (56.5%) | 168 (84%) |
| Operational | 58 (41.4%) | 82 (58.6%) | 140 (70%) |
| Disbelief | 4 (33.3%) | 8 (66.7%) | 12 (6%) |
| Belief in other medicine | 14 (31.1%) | 31 (68.9%) | 45 (22.5%) |
| Ignorance | 58 (43.6%) | 75 (56.4%) | 133 (62.5%) |
| Others | 40 (39.2%) | 62 (60.8%) | 102 (51%) |

**Table IX : Monthly family income and primary delay**

| MONTHLY FAMILY INCOME (IN RS.) | NO. OF PATIENTS | | TOTAL |
|---|---|---|---|
| | Delay in days >90 | Delay in days ≤90 | |
| ≤2000 | 66 (69.5%) | 29 (30.5%) | 95 (100.0%) |
| >2000 | 19 (18.1%) | 86 (81.9%) | 105 (100.0%) |
| **TOTAL** | **85 (42.5%)** | **115 (57.5%)** | **200 (100.0%)** |

income and primary delay of the patients was noted. The risk of primary delay was 10.30 times more among the patients having monthly family income ≤ Rs.2000, in comparison with the patients having monthly family income >Rs.2000 and the risk was significant [OR = 10.30(5.31, 19.96); p=0.000001]. (Table IX)

Under multivariate analysis, Logistic Regression (Table X) showed that the risk of primary delay was 1.66 times for age > 50 [OR=1.66 (1.82, 3.38);p=0.015], 9.04 times for patients with monthly family income < Rs.2000 [OR=9.04 (4.39, 18.61);p=0.00001], 2.54 times for illiterate [OR=2.54 (1.25, 5.18);p=0.009] and 2.14 times for females [OR=2.14 (1.02, 4.48); p=0.00001].

## Discussion

Over 2,75,000 of Oral Cancer cases are diagnosed yearly worldwide.[5] About 40% of all malignancies are oral cancer in Southeast Asia.[6] Men are more affected due to tobacco use and sunlight exposure from

**Table X : Result of Multivariate Analysis**

*[B = Beta or Regression Coefficient, SE = Standard Error, Wald = Wald Statistic for Testing Regression Coefficient, df = Degrees of Freedom required to calculate p-value, Sig = Level of Significance or p-value, R = Logistic Regression, Exp (B) = Exponential of Beta to estimate Odds Ratio for Risk, CI = Confidence Interval]*

| VARIABLES | B | S.E. | WALD | DF | SIG | R | EXP (B) | 95% CI FOR EXP (B) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | LOWER | UPPER |
| Age | 0.5112 | 0.3615 | 2.0001 | 1 | 0.01573 | 0.0005 | 1.6674 | 1.8210 | 3.3864 |
| Sex | 0.7609 | 0.3779 | 4.0531 | 1 | 0.0441 | 0.0868 | 2.1402 | 1.0203 | 4.4891 |
| Religion | 0.1324 | 0.3937 | 0.1130 | 1 | 0.7367 | 0.0000 | 1.1415 | 0.5277 | 2.4693 |
| Illiteracy | 0.9347 | 0.3625 | 6.6500 | 1 | 0.0099 | 0.1306 | 2.5464 | 1.2514 | 5.1815 |
| Family income | 2.2022 | 0.3683 | 35.7616 | 1 | 0.00001 | 0.3518 | 9.0448 | 4.3948 | |
| Constant | 2.4326 | 0.3995 | 37.0860 | 1 | 0.00001 | | | | |

outdoor occupation. Chewing or smoking of tobacco as specified earlier combined with unhealthy oral habits, poor nutritional status, weak financial standing, difficult access to medical care add to the burden of oral cancer in India. India tops the list in reported oral cancer cases.[7]

The prevalence rate of Oral Cancer in India is 12.8 (male) and 7.5 (female) / 1, 00,000 populations.[8] Oral cancer prevalence rate in Kolkata is 8 (total), 12.10 (male), 4.71 (female) / 100,000 population.[5,9] In 2010, around 5,55,000 people died of oral cancer in India.[7]

Delay in diagnosis is undoubtedly a major determinant of mortality of oral cancer patients and also adds to its morbidity. The factors that induce delay (primary) are multiple and varied. Present observational study was conducted with the objective of studying the factors influencing delay of oral cancer patients as well as their health seeking behaviour with a hope to modify that behaviour. But in Eastern India adequate statistical modelling for multivariate data has often not been done to elicit the most important factors that lead to delay in diagnosis in oral cancer patients.

Many factors are found to be significantly associated with the delay. Many of these factors are found to be interrelated and they can confound the results. So, multivariate analysis has also been done to calculate unadjusted Odds Ratio. In this hospital based study, the median primary delay was 90 days. Similar result was found in retrospective – descriptive study of Jafari et al[3] (2013); Willams et al[10] (1981) and Elwood et al[11] (1985) also have seen in their study that cut off value for primary delay in diagnosis was 3 months. According to the present study 57.5% patients came within 3 months and 42.5% after 3 months.

Agarwal et al [12](2011) noticed in his study that 39% patients came in 2 months, whereas 61% came at around 4.5 months. Similarity is also found when it was seen that maximum patients came in stage III(52%), stage IV (6%) according to the present study and Agarwal et al [12](2011) noticed that 61% patient presented in late stage(III, IV). Squamous Cell Carcinoma (SCC) is the most common type of oral cancer noticed in almost all the studies done on oral cancer.[9]

A very clear gender discrimination is seen where it was found that among females 53.1% presented late, whereas male contributed to only 37.5% in late presentation. According to some other studies same gender inclination was noticed.[12,13]

As buccal mucosa cancer constitutes majority (42.5%) of cases and the common symptoms are ulcer and pain (49.6%), a non-healing ulcer and pain were the most common early presenting symptoms of oral cancer.[2,14] If the patients were aware of these symptoms they would consider them serious enough to perform self-examination. This can be the basis of an educational programme. Therefore, one cannot accept that late detection of the majority of cases of oral cancer is inevitable. Similar studies also agreed with the same.[2,10]

Regarding literacy it was seen that in the delayed group (>90 days), 56.4% were illiterate and 43.6% were literate.[9] This study found that in the delayed group of >90days, 57.5% were illiterate and 42.5% were literate. These two values are very close to each other.

Regarding Socioeconomic (SE) status 69.5% of lower class fell in delay > 90 days and 30.5% in delay ≤ 90days. On the contrary only 18.1% of high SE class fell in Delay > 90 days and 81.9% fell in Delay ≤ 90days. The results are similar in a few studies[9,15] whereas, some other studies have found no significant effect of socio-economic status or literacy on treatment delay.[11,12] Thus the literacy and socio-demographic status is strongly associated with delay.

The proportion of delay was significantly higher in never married (77.8%) and widows (53.8%).

The correlation observed between primary and secondary delay shows that there is a large scope for educating primary care physicians and dentists for an early referral of patients. In a study published from the UK, it was reported that 70% of medical and dental general practitioners were unable to recognize carcinoma of the mouth.[16] In his study, Kumar et al (1993) reported that 22% of patients delayed reporting to hospital for more than 6 months after seeing their family doctor.[17]

Treatment by Homeopathy was 18% and 3% received no treatment despite attending a clinician.The use of alternative medicine and the treatment delay caused by that has been well documented in the past.[18,19,20] In our study the consultation of unqualified local practitioners / alternative medicine could be attributed

to the sheer ignorance and lack of primary health care facilities as most of such consultations were sought by the individuals with low literacy levels or who had no access to a registered practitioner or who were unaware of their probable diagnosis.

Thus, we would like to comment that illiteracy, low socio-economic status and female gender are significantly associated with primary delay in oral cancer patients in our population. Similarly, unavailability of primary qualified physician also seems to be contributory towards this delay. These identified predictors of delay may be used for designing an educational intervention program for patients with oral cancers.

## Conclusion

Among the causes for delay in reporting to hospital, financial constraint (84%) and illiteracy (56.5%) have been found to contribute the most. 97.5% of the patients had no knowledge about cancer whatsoever and 59% of the literate were lacking proper knowledge about cancer.

Age, gender, stage of cancer, literacy, religion, caste, tobacco use and delayed referral from the first physician were the other factors found to be significant in relation to primary delay. Difficulty in access to health care facilities and inadequacy of knowledge of cancer screening on part of the doctor and ignorance of patient are major contributory factors for the delay in the diagnosis of oral cancer as found in this study.

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# Endoscopic Skull Base Surgery : Our Initial Experience

*Rajarshi Chakraborty,[1] Mukesh Kumar Singh,[1] Swapan Kumar Ghosh,[1] Indranath Kundu[1]*

**ABSTRACT**

***Introduction***

*Patients with lesions of the skull base form a minor but very important subgroup of patients presenting to the ENT surgeon or are referred from other departments with complaints such as headache, nasal discharge and nasal obstruction. This study was done to study the clinical presentation of the patients with lesions of the skull base, assess intra operative findings and complications, and to document post operative clinical course and histopathological reports.*

***Materials and Methods***

*A prospective study was conducted on 10 patients with skull base lesions, who were operated on at our institution between August 2014 and August 2015. Patients with clinically and radiologically documented skull base lesions operated by endoscopic methods were included, while those operated on with open methods or those having involvement of the cavernous sinuses and the internal carotid arteries were excluded.*

***Results***

*All patients in the group were successfully operated on with no major intra operative or post operative complications encountered. Adequate tissue was obtained for biopsy with adequate sellar decompression and plugging of CSF leaks was done as required.*

***Conclusion***

*Endoscopic interventions for the skull base lesions can be safely performed in tertiary care set ups with minimal intra operative and post operative morbidity and have a better prognosis than other open procedures.*

***Keywords***

*Skull Base; Pituitary Neoplasms; Cerebrospinal Fluid Rhinorrhea; Endoscopic Surgical Procedure*

Patients with lesions of the skull base form a minor but very important subgroup of patients presenting to the ENT surgeon with complaints such as headache, nasal discharge and nasal obstruction, as well as referred cases from other departments. In 1910, Oskar Hirsch, an otolaryngologist, introduced a trans-septal, trans-sphenoidal approach to the pituitary gland,[1] an operation which is still in use today. Cushing rapidly adopted Hirsh's approach adding a sublabial incision and a headlamp to improve visualization of the sella. Using this approach he performed 231 operations with a 5.6% mortality rate.[2]

However, because of difficulties with cerebrospinal fluid (CSF) leak, hemorrhage control, post operative cerebral edema, and concerns regarding vision outcomes and recurrence, he eventually abandoned the trans-sphenoidal approach and went to a transcranial approach. This was a huge setback for the trans-sphenoidal approach as it led to the vast majority of pituitary operations being performed transcranially for the next 35 years.

The modern rigid endoscope was developed by Harold Hopkins in 1960 and was then improved upon by Karl Storz in 1965 using the principles of fiber optics. Jankowski, et al in 1992 described the successful use of nasal endoscope in the operation of pituitary tumors.[3]

Since 2005 the expanded endonasal approach has been established as a feasible approach to the middle third of the clivus, petrous ICA, cavernous sinus, and medial infratemporal fossa in cases in which the lesion is located centrally, with neurovascular structures displaced laterally.[4]

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*Surgical anatomy*

The skull base has been traditionally divided into three regions, based on their intracranial relations to the overlying cranial fossae, namely the anterior, middle and posterior skull bases. The anterior and middle skull bases can be considered together from the surgical point of view, as both share anatomic relationship with the orbits, the nasal cavities and the paranasal sinuses. Hence, they are also affected by many related pathologic processes.

The anterior skull base: Intracranially, the anterior skull base is composed of the frontal bone, orbital plates of the frontal, ethmoid and the sphenoid bones. Important landmarks include from anterior to posterior, the frontal sinuses, the foramen caecum, the crista galli, the cribriform plate with olfactory fossa forming on either side of crista galli, the plenum sphenoidale overlying the sphenoid sinuses. The anterior skull base is posteriorly delineated by the lesser wings of sphenoid and the anterior clinoid processes, which are closely related to the optic canal and internal carotid arteries.

Extracranially, the anterior skull base is related to the orbits, ethmoid sinuses, sphenoid sinuses, and the nasal cavities. The orbit contains the superior orbital fissure communicating with the middle cranial fossa, the inferior orbital fissure communicating with the pterygopalatine fossa, and the optic canal.

The middle skull base: Intracranially, the middle skull base consists of posterior border of the lesser wing of sphenoid, the greater wings of sphenoid, the squamous part of temporal bone and the petrous part of temporal bone. Extracranially, the middle skull base is related to the posterior wall of maxillary sinus, the infratemporal fossa , and the pterygopalatine fossa.

*Skull base lesions*

Benign lesions: These may be classified into extracranial (such as inverted papillomas, nasopharyngeal angiofibromas, paragangliomas, salivary gland tumours), intracranial (such as pituitary adenomas, craniopharyngiomas, meningiomas, aneurysms), and primary basicranial (fibrous dysplasias , osteomas , encaphaloceles, dermoids, CSF fistulas).

Malignant lesions: These may be classified as extracranial (such as carcinomas, sarcomas, hemangiopericytomas), intracranial (such as malignant schwannomas and esthesioneuroblastomas), primary basicranial such as chondrosarcomas, and metastatic tumours.

**Materials and Methods**

A prospective study was conducted with the aim to evaluate the clinical and radiological findings in different cases undergoing endoscopic skull base operations and to assess intra-operative access to various sites and document operative findings and complications as well as documentation of the histopathological findings or culture reports of intra operative tissue specimens obtained with follow up off all the cases for monitoring the postoperative clinical course.

Ten patients were selected by simple random sampling. The study period was between August 2014 and 2015. The inclusion criteria included patients attending OPD of Department of Otorhinolaryngology with complaints like blockage of nose, nasal discharge, headache, diplopia, diminished vision and radiologically proven to have skull base involvement by CT or MRI scans. The exclusion criteria included patients under 5 years of age, patients with involvement of areas such as cavernous sinus, internal carotid artery, dural venous sinuses and cerebral and brainstem areas.

On obtaining the informed consent, the patients were subjected to detailed history taking and thorough clinical examination to come to a diagnosis. The study tools also included rigid 4mm Nasal endoscopes (0° and 30°), standard FESS and skull base instrument sets with video recording system, CT scan-2mm cuts without contrast in coronal and axial planes with parasagittal reconstruction of bone windows and histopathological reports of the samples.

*Preoperative Considerations*

Diagnostic nasal endoscopy: to assess the size, adequacy, and presence or absence of normal anatomy of the nasal cavities.

*CT scan:* for assessment of critical anatomic information

important during surgery including the presence and extent of erosions of the skull base; integrity of the medial orbital wall; position of the anterior skull base vessels.

*MRI scan:* to differentiate between neoplastic or inflammatory tissue and retained secretions, and to assist in clarifying the diagnosis of skull base malformations when meningoencephalocele, meningocele, or nasal glioma is suspected.

*CT angiography:* is a robust technology that allows simultaneous visualization of bony and vascular structures.

*Special tests:* including CT cisternography and biochemical assays for suspected CSF rhinorrhea and hormonal assays (including serum cortisol, ACTH, prolactin, IGF-1) for pituitary adenomas.

*Operative technique*

We have used a purely endoscopic technique for all the skull base surgeries that have been included in this study. For CSF fistula repair we have mostly used the 2F repair consisting of plugging by a fat graft and a fascia lata graft. For endoscopic pituitary operations, we start with decongestion of the nasal cavity with adrenaline soaked neuropatties and identification of the sphenoid sinuses bilaterally. This is followed by widening of the sphenoid sinus by sphenoidotomy and dislocation of the posterior septum followed by breaking off the rostrum of sphenoid.

The intersinus septum is then drilled down to the level of the sellar floor and the sellar floor is identified between the planum sphenoidale anteriorly and the clivus posteriorly and the cavernous carotids bilaterally. Drilling of the sellar floor is done and a plane created between the bony sellar floor and the dura. The gap in the sellar floor is widened and a cruciate shaped incision made on the dura. Pituitary tissue is then curetted out. The skull base defect is then repaired with the 3F technique comprised of fat, fascia lata and the posterior nasoseptal mucosal flap (Hadad flap).

Post-operative care of the patients included Nasal cavity packing and broad spectrum antibiotic. Antihistaminic was prescribed to prevent nasal airway irritability and fibre-rich soft diet to prevent constipation. The CCU setup was used for proper monitoring of various physiological parameters, if required.

## Results

Out of the 10 patients in our series 3 patients presented with headache, 2 had visual problems, 4 patients presented with watery nasal discharge, 2 had symptoms of nasal obstruction while 1 patient presented with epistaxis (Fig. 1). Further two patients also had Acromegalic features (Fig. 2). The patients presenting with visual problems underwent visual acuity and field testing, none of which revealed significant findings.

Both CT and MRI scans were done in patients presenting with nasal mass or headache. Sellar mass was found in 3 patients (Fig. 3) while sinunasal mass was found in 2 patients. CT scans as well as CT cisternography was done for patients with nasal discharge. CSF leak was detected by CT cisternography in 4 patients while plain CT scan detected CSF leak in 1 patient. (Fig. 4)

Diagnostic nasal endoscopy was done in all patients, which revealed septal deviation in 4 patients, CSF leak in 4 patients, sinunasal mass in 2 patients, and normal anatomy in 2 patients. (Fig. 5)

During the course of operations we did not encounter any major intra-operative complications like major bleeding or brain injury. There was minor bleeding in 3 patients, which was controlled with Surgicel®, and CSF leak in 2 patients which was repaired using fat graft.

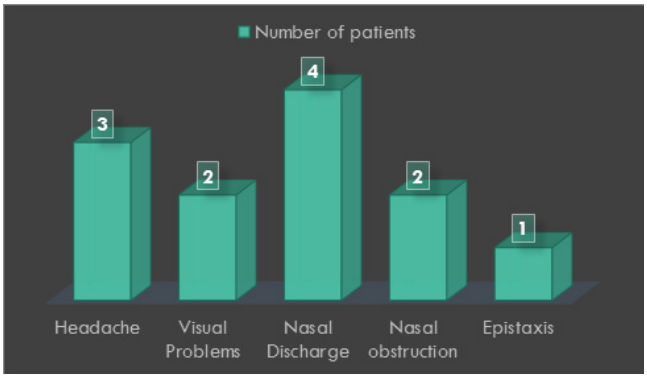


**Fig.1 Presenting symptoms of the patients**

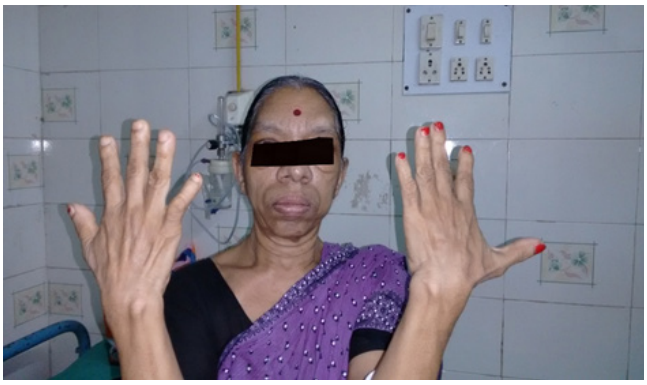

**Fig.2 Patient with Acromegalic features**

(Fig. 6)

In all patients of sellar and sinunasal mass tissue specimens were sent for histopathological examination, and fungal culture where fungal infection was suspected. Tissue diagnosis obtained was pituitary adenoma in 3 patients, squamous cell carcinoma in 1 patient, sinunasal undifferentiated carcinoma in 1 patient. Fungal culture was positive in 1 patient. (Table I)

## Discussion

The field of skull base surgery has undergone a rapid expansion in the last two decades. Initially starting

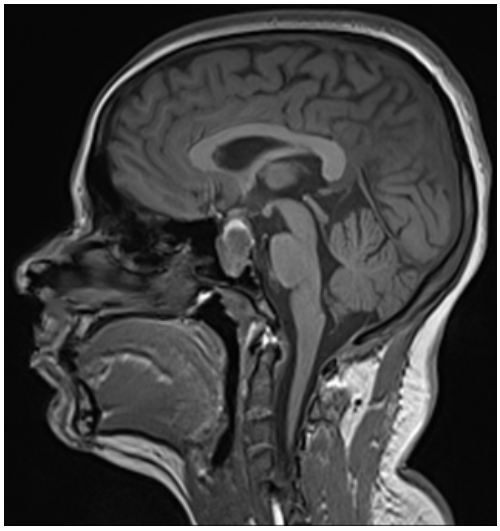

**Fig.3 MRI scan showing sellar lesion eroding into sphenoid sinus**

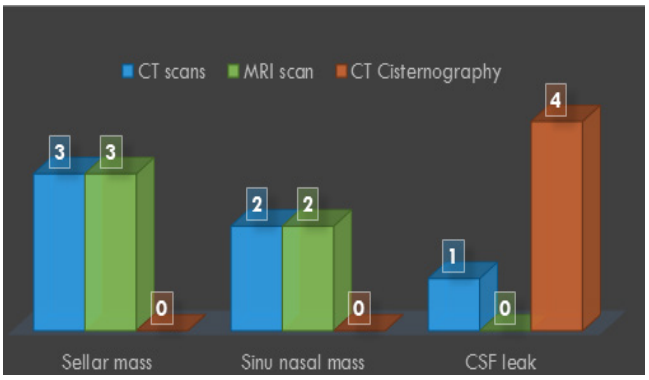


**Fig.4 Radiological findings**

with CSF rhinorrhea repair and pituitary surgery, the discipline has now expanded to include suprasellar, parasellar, clival, petrous apex and cervical spine lesions.

The endoscopic technique of CSF fistula repair has been reported to be a successful intervention by Lopatin et al in 2003,[5] which is also confirmed by our experience. Jho and Carrau in 1997 published the seminal paper describing endoscopic transsphenoidal pituitary operation in 50 patients, and demonstrated that what was earlier considered to be a major operation could now be achieved with minimal morbidity through minimally invasive endoscopic techniques.[6] Cappabianca et al in 1998 also confirmed similar results.[7]

In our experience, based on the limited number of patients we have handled, we have been able to confirm the findings of the authors mentioned above, regarding

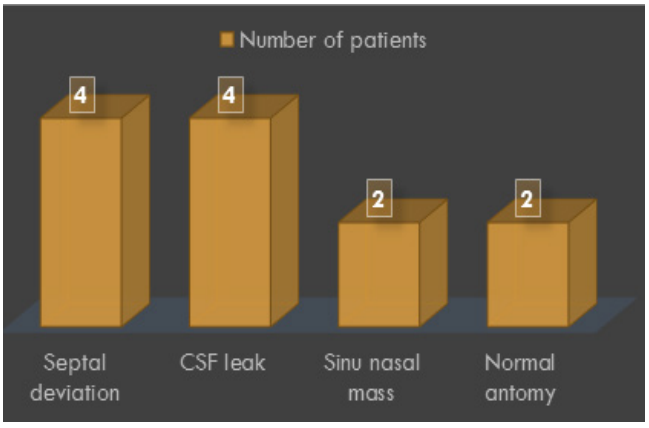


**Fig.5 Findings on Diagnostic Nasal Endoscopy**

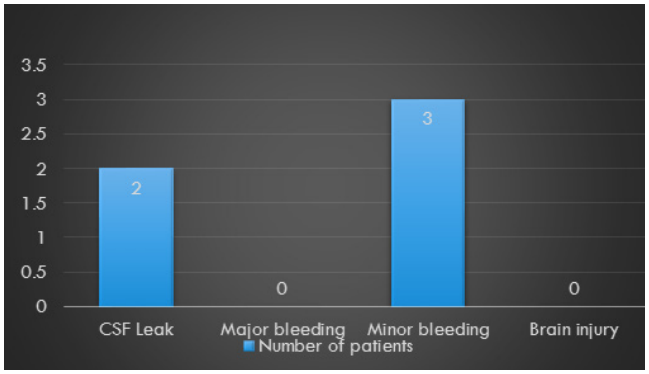


**Fig.6 Intraoperative complications**

the operative success and postoperative clinical course. In all the patients we have operated on, the postoperative urine output, serum electrolytes, day 3 fasting cortisol levels were normal. Operative success was demonstrable in the postoperative CT scans which showed adequate sellar clearance.

One key area of skull base surgery is skull base reconstruction. For small sized encephaloceles or CSF leak defects, we used fat graft and fascia lata graft with a strut of cartilage if required. For larger sized defects a vascularized flap is required due to high rate of postoperative CSF leak. The flap that we have used is the vascularized septonasal flap based on the posterior septal branch of sphenopalatine artery, also called the Hadad flap.[8]

**Table I : Final diagnoses**

| FINAL DIAGNOSIS | NO. OF PATIENTS (N=10) |
|---|---|
| CSF rhinorrhoea | 4 |
| Pituitary macroadenoma | 3 |
| Sinunasal undifferentiated carcinoma | 1 |
| Squamous cell carcinoma | 1 |
| Fungal sinusitis with intracranial extension | 1 |

In all the pituitary operations done at our institution, we did not encounter any major complications. Minor bleeding was stemmed using Surgicel®, while CSF leak was repaired with fat graft.

## Conclusion

In this study we have intended to show that it is feasible to carry out skull base interventions in our existing tertiary care setups with minimal complication rates and postoperative morbidity. While this study is limited in scope, based on the fact that our initial experience largely corroborated the findings of many other workers from the same field, 5,6 we have made an endeavour to demonstrate that the ENT surgeon with standard endoscopic skills can easily handle these type of cases with assistance from the Neurosurgeon in the existing tertiary care set-ups.

This has become even more relevant today as minimally invasive endoscopic techniques are being favoured over the more invasive transcranial and other techniques by most Neurosurgeons nowadays, resulting in more number of cases being referred to the ENT surgeon. Therefore, we also believe that more studies are required in this direction as more and more experience is gained by the ENT fraternity in endoscopic skull base surgery.

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# Review of the Multidisciplinary Voice Clinic in a District General Hospital of the United Kingdom

*Louise Marie Evans,[1] Parry Haf Beca,[1] Helen Patterson,[1] Alagar Chandra Mohan[1]*

**ABSTRACT**

***Introduction***

*The Voice Clinic is a multidisciplinary specialist voice clinic. Our aim is to review patient demographics, subjective symptoms both at presentation and 16 months post clinic and patient satisfaction.*

***Methods***

*A retrospective review of all pre treatment voice clinic questionnaires for all new patients who attended the voice clinic over a 3-month period. A telephone interview was conducted 16 months after first presentation to determine patient satisfaction and whether patient's symptoms had improved.*

***Results***

*A total of 25 patients who had completed a pre clinic questionnaire were identified, 17/25 completed the follow up interview. 88% of patients reported symptoms of ≥ 6 months duration. 41% underwent Speech and Language Therapy (SALT), 24% had medical management, 6% surgery, and 30% were given advice only. On a severity scale of 1- 10 (10 most severe) 40% rated their voice severity to be ≥5/10 at presentation, 16 months later this was 11% of patients. 56% rated the impact of their voice on their life to be ≥ 5/10 at presentation, 16 months later this was 6%.*

***Conclusion***

*Although limited the review shows that for the majority of patients their symptoms and quality of life improved after review at the multidisciplinary clinic.*

***Keywords***

*Voice; Speech; Patient Satisfaction; Quality of Life*

The Voice Clinic aims to provide patients with a multidisciplinary specialist approach to the evaluation of voice disorders in a District General Hospital. Patients are referred via the GP or the general ENT clinic if a specialist voice assessment is required.

Prior to the appointment whilst in the waiting room all patients are given a pre treatment voice clinic questionnaire which asks questions regarding their symptoms, their severity, the impact these symptoms may have on their lives, their lifestyle and their past medical history. Each patient is given a twenty-minute appointment and is seen by both a Speech and Language Therapist and a Consultant Otolaryngologist. After discussion of the presenting complaint and the context of the symptoms a discussion is had exploring the impact this has on the patient's lives.

The larynx is examined using Stroboscopy (Fig. 1) and the voice analysis is recorded and viewed by the patient and the pathology or indeed the normal examination explained. This provides immediate feedback and often reassurance for the patient. The aim of this study is to review patient demographics, subjective symptoms both at presentation and 16 months post clinic and patient satisfaction.

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## Materials and Methods

A retrospective review of the pre treatment voice clinic questionnaires for all new patients who attended the


**Fig.1 Stroboscopy equipment**

voice clinic over a 3-month period was conducted and patient demographics and subjective symptoms noted. A telephone interview was conducted 16 months after the first clinic appointment to determine patient satisfaction, the severity of symptoms and the impact of the symptoms on the patients' lives.

## Results

25 patients who had completed a pre-clinic questionnaire were identified, 17/25 completed the follow up interview. The pre treatment patients F: M ratio was 3:1 and 48% of patients were >60 years old. 88% of patients reported symptoms of ≥ 6 months duration. 41% underwent SALT, 24% medical management, 6% surgery, and 30% advice only. On a severity scale of 1- 10 (10 most severe) 40% rated their voice severity to be ≥5/10 (Fig.2), 16 months later this was 11%. 56% rated the impact of their voice on their life to be ≥ 5/10, 16 months later this was 6% (Fig. 3). The most common symptom (excluding hoarseness) was a voice that fades, changes in pitch and inability to sing, on follow up the

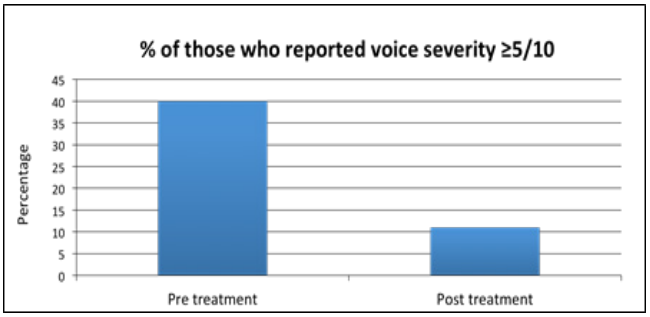


**Fig.2 Percentage of those who reported voice severity ≥5/10, pre and post treatment**

most common symptom was postnasal drip. 76% of patients felt that the clinic was good or very good and 88% felt that their concerns were addressed.

## Discussion

A review of the voice clinic has not been conducted before. Although a small study, limited by size it has shown the specialist clinic to be largely successful with good patient satisfaction scores. It is felt in the literature that access to specialist consultant led served allows for more rapid and appropriate decision making, improved outcome and fulfills patient expectations for access to skilled clinicians.[1] Such consultant led clinics can also benefit the training of more junior doctors. The Voice Clinic is used to deliver one to one training by the Consultant for the Specialist Registrar for which there has been very good feedback from the trainees.

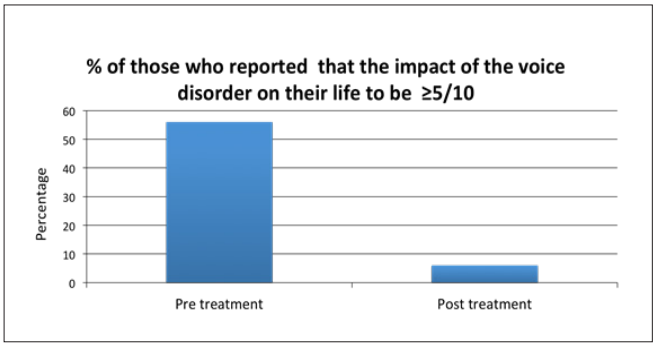


**Fig.3 Percentage of those who reported that the impact of the voice disorder on their life to be ≥5/10, pre and post treatment**

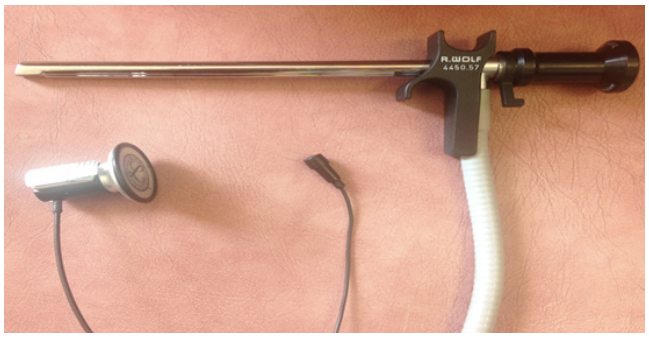


**Fig.4 Rigid scope and microphone**

The voice clinic as a specialist clinic allows the concentration of resources and expertise so that patients have a multidisciplinary approach to the treatment plan. The importance of the team approach cannot be over emphasised as both the examination and the interpretation of the data collected for each patient requires multi-disciplinary input to arrive at both a diagnosis and plan for treatment (Fig. 4). Cognitive Behavior Therapy (CBT) is a very well evidenced therapy and recommended by The National Institute for Health and Care Excellence (NICE) as the treatment of choice for mental health difficulties and medically unexplained symptoms.[2] The benefits of CBT for patients with psychological voice disorders such as functional dysphonia has been discussed and a few studies have shown that it can be clinically effective in the treatment of functional dysphonia.[2,3] This is an area that we would like to explore further as we feel that the clinic may benefit from some specialist psychological input.

Giving the opportunity for patients to self-report symptoms using the questionnaire is a vital tool as it allows the clinician to gain as much information as possible on the problem. The questionnaire gives the opportunity for the patient to discuss how their voice is affecting their life and their voice severity for the majority of the time as their voice on the day of the consultation may not be representative of their voice on a day-to-day basis.[4] Also unless patients are satisfied with their own voice, we cannot claim that the clinic or indeed or management of the patient is successful and therefore self-reporting scales allow us to compare the effect of intervention.[4] Such reporting is also vital in the current NHS climate, as we must monitor our service to show it is beneficial to patients and explore how improvements can be made to maximise the effectiveness of the service.

## Conclusion

Although limited the review shows that for the majority of patients their symptoms and quality of life improved after review at the multidisciplinary clinic. The clinic allows direct audiovisual investigation of the voice in a teaching environment. The multidisciplinary approach allows SALT to have direct input into diagnosis and management of patients. The input of a psychologist to assist us in exploring causative factors of voice disorders in some patients we feel may also benefit patients and improve access to treatments such as CBT.

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# Collaural Fistula : A Case Report

*Kalyan Pal,[1] Dipanjan Chakraborty,[1] Sohag Kundu,[1] Subrata Mukhopadhyay[1]*

**ABSTRACT**

***Introduction***

*Collaural fistula or cervico-aural fistula is rare and accounts for less than 8% of branchial cleft anomalies. Their rarity and diverse presentations have frequently led to misdiagnosis and inappropriate treatment.*

***Case Report***

*We report one such case of a 7 year old girl who presented to us with two discharging cutaneous openings on the left side; one in the floor of the left external auditory canal and another in the upper neck and lower face (infra-auricular region).*

***Discussion***

*Surgical exploration and excision is the definitive treatment of a collaural fistula. A sinus/ fistula opening into the external auditory canal, should be removed with skin and cartilage. If more than 30% of the circumference of the external auditory canal is denuded, split thickness skin grafting and stenting are recommended. The potential post-operative complications are facial nerve paralysis and recurrence of the lesion. Fistulogram is a useful diagnostic tool.*

***Keywords***

*Branchial Region/abnormalities; Collaural Fistula*

The external ear canal is a derivative of the first branchial arch. Anomalies of the first branchial cleft, therefore involve external ear structures which are normally managed in otology practice. However in duplication anomalies, clinical features are varied and patients may present to a General Surgeon or a Maxillofacial Surgeon.

Embryological anomalies of the first branchial cleft usually present as cysts, swellings or fistulas in the preauricular or postauricular area or high in the neck, which may become infected. Failure to recognize these unusual cases may result in misdiagnosis, inadequate treatment and subsequent recurrence. This paper reports a case to highlight specific diagnostic clinical features of collaural fistula with special reference to embryology and histological classification and relevant surgical management in Otorhinolaryngology.

## Case Report

A 7 year old girl, presented with a discharging sinus in the left external auditory canal. (Fig. 1) But on careful examination, it was found that there were two cutaneous openings; one opening in the floor of the external auditory canal in the cartilaginous portion and another on the left upper neck/ lower face in infra-auricular (parotid) region. At presentation there was serous discharge from both the openings.

Before surgical excision, Methylene Blue injected from the cervical opening was seen coming out of the opening in the external auditory canal. Surgical excision was carried out through a horizontal skin crease incision including an ellipse surrounding the cutaneous neck opening. Dissection was done along the subcutaneous plane, with the track being carefully separated from the surrounding tissue. (Fig. 2) Methylene blue, which was injected prior to surgery served as a useful guide to trace the tract. It was found that the tract was passing immediately lateral to the trunk of the facial nerve just before it entered the parotid gland, inferior to the angle of mandible. Hence, nerve preservation was accomplished.

On tracing it higher, the fistulous tract was found to be attached to the floor of the external auditory canal. The fistula was completely excised and sent for HPE. Post-operative recovery was uneventful. Histopathological examination of the excised fistula confirmed that it was

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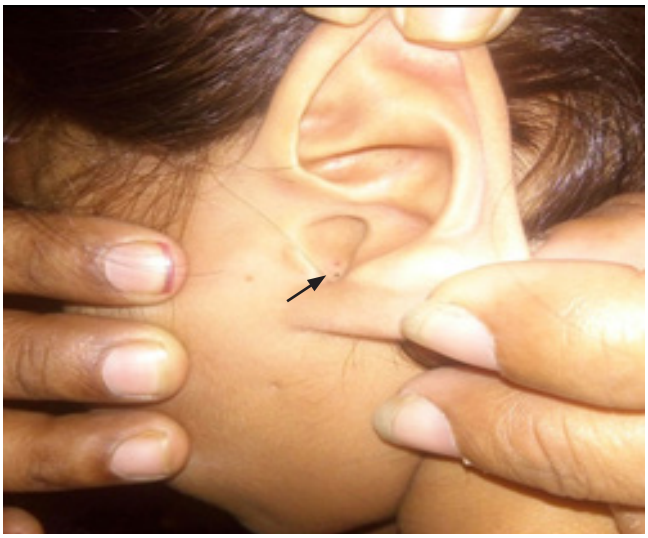

**Fig.1 The opening in the floor of the external auditory canal (black arrow)**

lined by squamous epithelium with adnexal structures. (Fig. 3)

## Discussion

Incidence: More than 200 cases are reported in the literature. It accounts for less than 8% of all branchial abnormalities.[1,2]

Embryology: During the 4th week of human embryological development, 6 pairs of branchial arches appear which will form the future lower face and neck,[2] and they disappear by the 7th week. Mesodermal in origin, these arches are separated from each other by the 5 branchial clefts (ectoderm) externally and 5 pharyngeal pouches internally (endoderm). First branchial cleft anomalies are a result of incomplete closure of the cleft.[3] The chance of malformations occurring nearer the ear and parotid is greater than that occurring at the hyoid region, as obliteration of the cleft proceeds from ventral to dorsal.[4] Although the lesion normally has a close relationship to the parotid and facial nerve, the relationship is variable, presumably because of temporal differences during development.[3]

Classification: In 1971, an anatomic classification by Arnot[5] designated Type I anomalies as defects in the parotid region, appearing during early or middle adult life. Type II defects appear in the anterior cervical triangle with a communicating tract to the external auditory canal and usually develop during childhood.

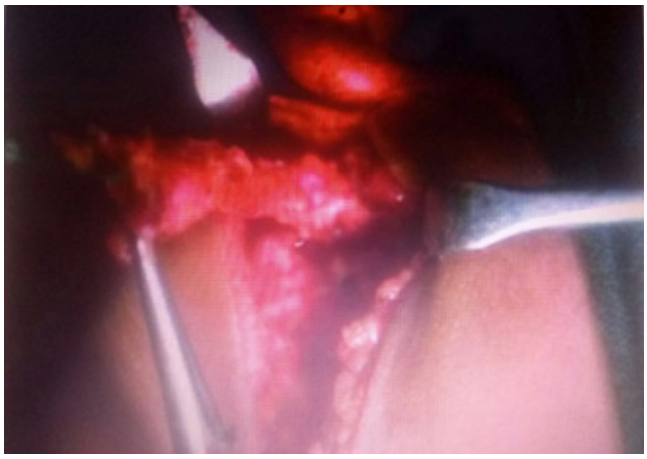

**Fig.2 Sinus tract being excised**

In 1972, Work proposed a histological classification.[6] Type I anomaly is a defect of ectodermal origin, arising from duplication of the membranous external auditory canal. It can have a tract running medial and parallel to the external auditory canal, superior to the facial nerve and sometimes extend to the mesotympanum. Type II defects are ectodermal and mesodermal in origin, containing skin with adnexal structures as well as cartilage. They present as cyst, sinus, fistula or a combination. They are associated with a sinus/ fistula

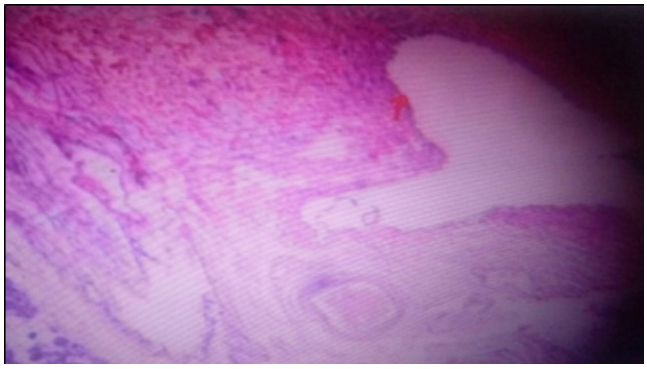

**Fig.3 Histopathology slide showing the tract lined by squamous epithelium with adnexal structures (H&E, 100x)**

opening in the region of the submental triangle, extend superiorly through the parotid gland towards the floor of the external auditory canal at the level of bony-cartilaginous junction or the cartilaginous portion.

Although congenital in origin, first branchial cleft anomalies can present later in life, at a mean age of 18.9 years.[1] Clinically, they may manifest as a cystic swelling or discharge from a fistulous opening either pre-auricularly, in the cheek, or post-auricularly, or high in the neck.

Otorrhoea is the most frequent otological symptom. A thorough otological examination should be performed in all cases as this may reveal a pit visible in the external canal. A sinus/fistulous opening in the external auditory canal is present in only 44% of patients, and even if such an opening exists, it may not necessarily appear obvious.[4] Sinuses and fistulae arise from incomplete closure of the first branchial groove. In 2 out of 3 cases reported by Sichel et al, first branchial cleft anomalies were associated with a myringeal web, an epidermal structure which extends from the floor of the external auditory canal to the umbo of the tympanic membrane.[7] However, in a larger series reported by Triglia et al, it was found in only 10% of the patients.[4]

For a Type II lesion, an early identification of the facial nerve at the stylomastoid foramen is recommended. If this part is affected by a disease, identifying the facial nerve proximally in the temporal bone and tracing it distally are probably the safest option. The relationship of the lesion to the facial nerve is variable. In a series of 10 patients with first branchial cleft anomalies reported by Solares et al, 7 lesions ran medial to the facial nerve, 2 were lateral and 1 ran in between the branches of the facial nerve.[3] Fistula has a tendency to run deep into the nerve, whereas sinus tracts tend to run laterally to it. Due to its variable relationship with the nerve, its removal warrants an early identification and a wide exposure of the nerve,[4] and/or the use of facial nerve monitoring.

Accurate diagnosis of first branchial cleft cysts located in and around the parotid gland can be difficult without surgical exploration.[4] Poncet's triangle is the anatomical triangle where first branchial cleft cysts or sinus orifice are typically located.[7] The limits of the Poncet's triangle are the external auditory canal above, the mental region anteriorly and the hyoid bone inferiorly.

Should the sinus/ fistula opening involve the external auditory canal, it is removed with skin and cartilage. A primary closure is normally possible but if more than 30% of the circumference of the external auditory canal is denuded, split thickness skin grafting and stenting are recommended. If tympanic membrane or middle ear structures are involved, a reconstructive otologic surgery may be necessary.

Surgical exploration and excision is the definitive treatment of these defects.[6] The potential post-operative complications are facial nerve paralysis and recurrence of the lesion. Fistulogram is a useful diagnostic tool. Imaging studies especially CT Scan and MRI is useful for showing the tract near to the facial nerve.[7]

## Conclusion

Cysts, sinuses or fistulous tracts which are pre-auricular or post-auricular or high in the neck, may represent a branchial cleft anomaly. An inflammatory process in the region of Poncet's triangle should immediately raise an index of suspicion. The usefulness of various anatomical and histological classifications is limited and it is often difficult and confusing trying to correlate the clinical picture with various classifications. The conventional operation for first branchial cleft fistula is highly complicated and facial nerve palsy is a frequent complication.

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# Unilateral Acquired Posterior Maxillary Mandibular Syngnathia

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**ABSTRACT**

***Introduction***

*Congenital bony fusion of the maxilla and mandible, especially as an isolated occurrence, is a rare condition while acquired fusion being even rarer.*

***Case report***

*A rare case of a 32 year old female patient with acquired unilateral bony fusion between the zygomatic arch of maxilla and ramus of mandible is reported.*

***Discussion***

*Forty one cases of syngnathia has been reported in the international literature from 1936 to 2009, of which 39 cases are congenital and two were acquired, case 1 probably as a result of a fibrotic tubed pedicle and in case 2 from myositis ossificans. According to several case series, bony ankylosis of the mandible and maxilla has also been found to occur in 30%-43% of cases of NOMA.*

***Keywords***

*Syngnathia; Maxillo-mandibular*

Bony fusion of the maxilla with the mandible, also called maxillo mandibular syngnathia, is a rare clinical occurrence. It is classified into anterior or posterior, partial or complete, and unilateral or bilateral. Various synonyms for this condition include mandibulo-maxillary synostosis, congenital bony syngnathia, congenital fusion of jaws or gums, intra-oral band, intra-alveolar synechiae and zygomaticomandibular fusion.[1,2]

According to several case series, bony ankylosis of the mandible and maxilla has been found to occur in 30%-43% of cases of noma.[3] Two cases of acquired syngnathia have also been reported due to different causes, case 1 probably as a result of a fibrotic tubed pedicle and in case 2 from myositis ossificans.[4]

The aim of this report is to bring to light a very rare case of acquired maxillary mandibular syngnathia with no other intra-oral or systemic anomalies and to introspect on the ideal mode of treatment of such a case.

## Case report

A 32 year old female presented with the complains of inability to open mouth since 3 years of age .The lady had no difficulty in mouth opening at birth, but at the age of 3 years she developed an abscess in the right side of the cheek on the buccal surface. There was spontaneous drainage of the pus but the trismus was progressively increasing. By 14 years of age there was complete absence of mouth opening. However, all her permanent dentition erupted at appropriate age as also her speech. She had modified her food habits and used to take only liquid and soft diet with great difficulty by pressing with her fingersand chewed it between tongue and palate. (Fig. 1)

On examination, there was reduction in lower third facial height, retrognathia of the mandible with a firm, non-tender scar in the right angle of mandible, severe limitation of mouth opening with only 6 mm interridge distance in the midline and left side was observed. Maxilla and mandibular dentition were maloccluded

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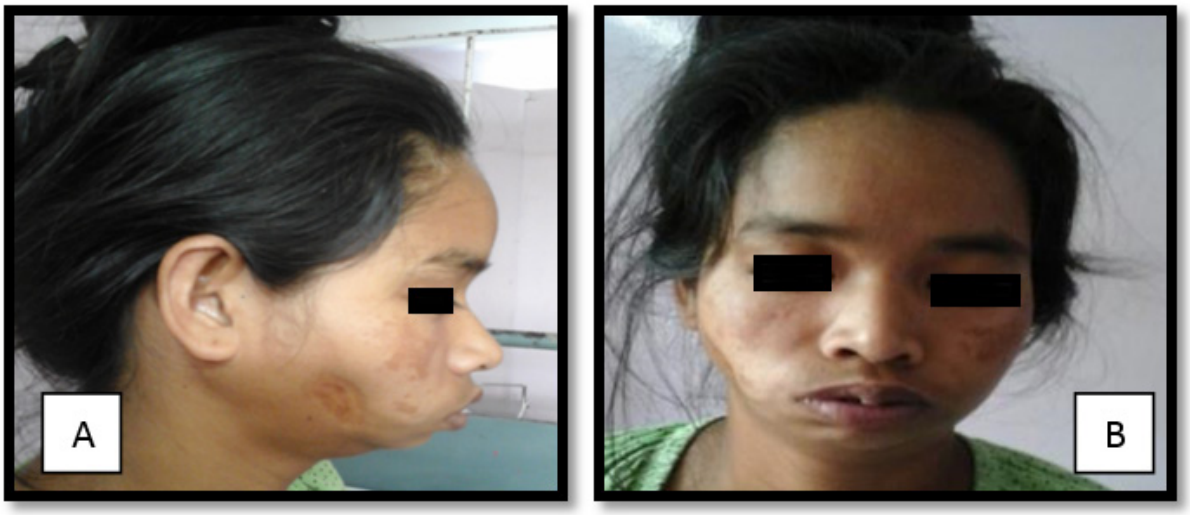


**Fig.1 (A) Lateral view of face showing reduction in lower third facial height, retrognathia of the mandible. (B) Front view showing reduction of height, maloccluded maxillary and mandibular dentition.**

with hypoplasia of masticator muscles of the right side. The mandible was completely immobile; however, tongue movements were normal.

The CT scan of the skull was done along with a 3D reconstruction which demonstrated bony synostosis between the zygomatic arch of maxilla and the ramus of the mandible on the right side extending from the angle of the mouth to the maxillary tuberosity in the anterior-posterior dimension and from the body of the zygoma to the mandible in the superior-inferior dimension. (Fig. 2) In addition, an exostotic mass was seen in the inner table of the right mandibular ramus. There

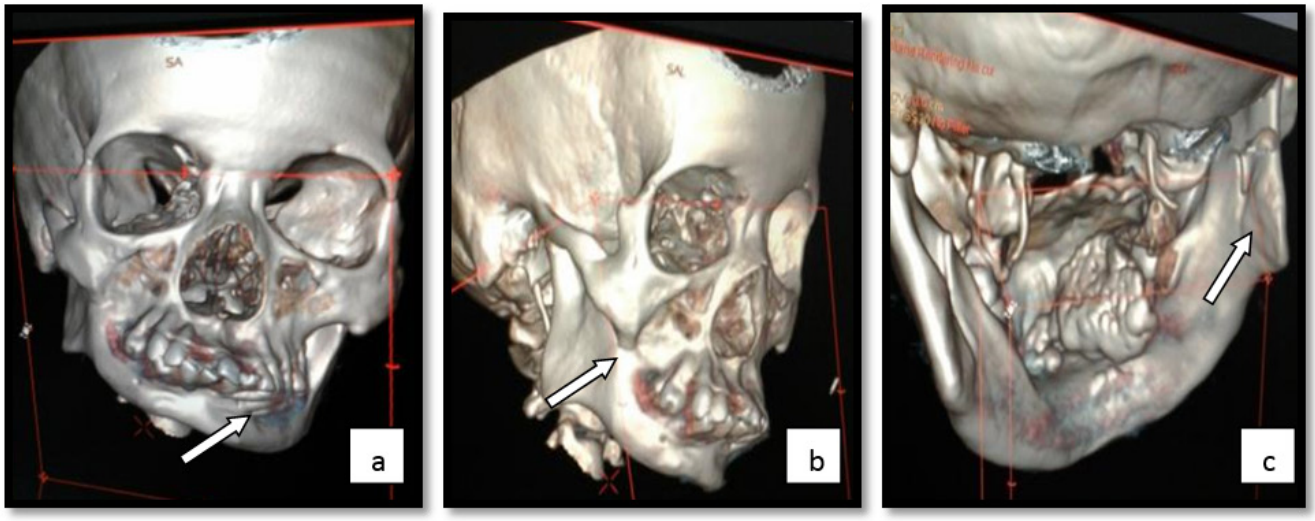


**Fig.2 Reconstructed CT scan of face showing (a) Facial asymmetry, protruding upper central incisors. (b) Bony synostosis between the right zygomatic arch of maxilla and the ramus of the mandible. (c) Normal temporomandibular joint on right side is seen.**

was fatty infiltration of masseter muscles suggestive of disuse atrophy. No anatomical defects of bilateral temporomandibular joints were noted.

The patient was assessed by us in collaboration with our maxillofacial colleagues. She was planned for tracheostomy followed by release of synostosis. Since the height of the mandibular ramus would be compromised a pedicled muscle graft would be transposed. Alternately the defect could also be bridged with plate and screw. Post operatively patient would receive physiotherapy and speech therapy. But unfortunately the patient refused surgery.

**Discussion**

Since the first case of syngnathia was reported by Burket in 1936,[5] confusion exists over the incidence of this condition. Only 55 cases of congenital maxillo-mandibular fusion are reported till 2012.[1] These include cases of both synechiae and syngnathia. Out of these, only 28 cases had no associated congenital or systemic defect.[1,2,6-9] Forty one cases of syngnathia has been reported in the international literature from 1936 to 2009, of which 39 cases are congenital and two were acquired, case 1 probably as a result of a fibrotic tubed pedicle and in case 2 from myositis ossificans.[4] Also according to several case series, bony ankylosis of the mandible and maxilla has been found to occur in 30%-43% of cases of noma.[3] Most reported cases were neonates with only five cases being older children and adults.[1,2,8,10,11] However in this case mouth opening was decreasing progressively till age of 14 years.

Fusion of the maxilla and mandible is an extremely rare and unusual condition that can be congenital or acquired. It may be either simple soft tissue fusion (synechiae) or bony fusion (syngnathia).[12,13] Soft tissue fusions of the jaws are more common and require relatively uncomplicated treatment with favorable results. Bony fusion is an extremely rare anomaly and only a handful of case reports exist in the literature. This case is an acquired syngnathia on the right side.

Fusion can be classified on basis of location into anterior or alveolar type (fusion of alveolar ridges of maxilla and mandible) and posterior or mandibulo-maxillary (fusion of ascending ramus of mandible to maxilla or zygomatic complex). Posterior fusion is less frequent than anterior bony fusion.[14] The extent of fusion between the alveolar processes is variable, including complete fusion, unilateral fusion leaving a slit like opening on the opposite side of the mouth, and bilateral fusion with a small anterior slit. Review of existent literature reveals 26 cases of bilateral or complete bony syngnathia, while unilateral cases have been reported in seven instances and anterior fusion in six instances.[1] A literature survey revealed just 26 cases to have been reported since 1936, of which 19 were anterior and only seven were posterior.[15] Our case is an example of unilateral posterior fusion of the right side with a slit like opening on the left and an exostotic mass seen in the inner table of the right mandibular ramus.

Two classification systems have been proposed. Classification by Dawson et al[16] (1997) (Table I) according to the nature of the fused tissues into either fibrous or bony. Laster et al[17] (2001) modified the classification. (Table II)

In patients with syngnathia one of the major problems is the difficulty while gaining access to the airway for the purpose of intubation. Tracheostomy is the only option if other means such as blind nasal and fiber-optic bronchoscope–assisted intubation fails.[18]

Treatment options include surgical division of bony and soft tissue fusion and interpositions of flaps like that of temporalis muscle or buccal mucosa. Additionally, implants like silastic sheets can be inserted to prevent refusion.[2] Adequate mouth opening exercises have to be performed to prevent post-operative complications of temporomandibular joint ankylosis and atrophy of muscles of mastication. However, there exists no standardized treatment protocol for this condition and surgical division has to be optimized, depending on the bony fusion. Recently, Choi et al. reported a case of using radial forearm free flap to prevent re-fusion and secure proper mouth opening after surgery in the acquired syngnathia.[4] The patient in our hospital refused surgery and is started on physiotherapy with no improvement.

Although early intervention seems desirable to ensure a secure airway, reports have described repeated

**Table I : Classification of syngnathia (Dawson et al, 1997)**

| TYPE | DESCRIPTION |
|---|---|
| 1 | Simple syngnathia is bony fusion in the absence of other anomalies in the head and neck |
| 2 | Complex syngnathia is bony fusion with other anomalies in the head and neck<br>a) Co-existent with aglossia<br>b) Co-existent with agenesis or hypoplasia of the proximal mandible |

**Table II : Classification of syngnathia (Laster et al, 2001)**

| TYPE | DESCRIPTION |
|---|---|
| 1a | Simple anterior syngnathia characterized by bony fusion of the alveolar ridge only and without other congenital deformity in the head and neck |
| 1b | Complex anterior syngnathia characterized by bony fusion of the alveolar ridges only and associated with other congenital deformity in the head and neck |
| 2a | Simple zygomaticomandibular syngnathia characterized by bony fusion of the mandible to the zygomatic complex, causing only mandibular micrognathia |
| 2b | Complex zygomaticomandibular syngnathia characterized by bony fusion of the mandible to the zygomatic complex and associated with clefts or TMJ ankylosis |

bony re-fusion after early surgery, requiring multiple surgeries. At the same time, delayed release of the maxillomandibular fusion can pose great risks such as asphyxia, aspiration pneumonia, severe malnutrition, stunted growth, poor growth of the facial skeleton, and disordered eruption of the.[14]

## Conclusion

Our case is unique in that all rare possibilities of syngnathia in literature is present in this case i.e. it is acquired, unilateral, presenting at an age of 14 years with zygomaticomandibular (posterior) bony fusion with an exostotic mass seen in the inner table of the right mandibular ramus. Hence, more cases of this nature need to be reported to improve theoretical knowledge so that standardized management protocols can be devised and implemented.

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