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The South Asian Association for Regional Cooperation (SAARC) is an organization of South Asian nations, founded in December 1985 and dedicated to economic, technological, social and cultural development emphasizing collective self-reliance. Its seven founding members are Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. Afghanistan joined the organization in 2007. Meetings of heads of state are usually scheduled annually; meetings of foreign secretaries, twice annually. The headquarter is in Kathmandu, Nepal.

Many organizations/associations after the name of SAARC were formed later. Medical specialty is no exception. There are many SAARC associations in medical fields according to the speciality. However, in ENT it took many years to form a SAARC ENT Association. It was possible in 1998 in Dhaka, Bangladesh for finally form an SAARC ENT Association with the following aims:

- to promote closer ties and friendship amongst the national societies of Otolaryngologists of SAARC countries in particular.
- to organise meetings (Congress, seminar etc)so that otolaryngologists of SAARC can exchange views, information, experiences etc.
- to help elevate the standard of training and practice in otolaryngology and Head Neck Surgery in SAARC countries.
- to encourage exchange of expertise
- to help in exchange of technical know-how and get the industries to exhibit their products in the neighbouring countries.
- to make a directory of experts in different fields over a period of time.

The SAARC ENT Conference is usually held every two years in the capital cities of the member countries. So far Bangladesh has organised it twice - 1st in 1998 and 6th in 2008. Nepal hosted the conference in 2000 and now in 2011, Pakistan in 2002, Sri Lanka in 2004 and India in 2006. Bhutan, Maldives and Afghanistan have yet to open their account in organizing the conference.

Nepal hosted as mentioned previously the 2nd conference and going to host the forthcoming 7th conference in May. We wish the conference a grand success.
New Editorial Board and Peer Reviewers of Nepalese J ENT Head Neck Surg

P Adhikari
Nepalese Journal of ENT Head & Neck Surgery

Correspondence to
Dr. Prakash Adhikari, Managing Editor, Nepalese Journal of ENT Head & Neck Surgery, Kathmandu, Nepal
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Finally, we came with second issue of Nepalese Journal of ENT Head & Neck Surgery (Nepalese J ENT Head Neck Surg), an official biannual publication of Society of Otolaryngologists of Nepal. We got ISSN number both on print and online in this issue. And we are in the process of indexation with various agencies such as NepJOL, AsiaJOL, HINARI, NHRC, Index Copernicus, EBSCO, DOAJ etc.

The second issue is memorable to me as my appointment as a managing editor of this prestigious journal. I have been doing audit on accuracy of references in different national and international journals and found ample amount of references to be incorrect. To address this issue, the editorial board has decided to check the references by the managing editor and work as a reference editor too. I hope the references of our journal will be more accurate by this appointment.

In this issue, we have also added international peer reviewers besides national reviewers. On behalf of the editorial board, I would like to acknowledge all of our pertinent peer reviewers. Peer reviewers of this issue are:
1. Prof. Prepageran, Malaysia
2. Prof. Luiz Alberto Alves Mota, Brazil
3. Dr. Iqbal Khayira, Pakistan
4. Prof. Bimal Kumar Sinha, Nepal
5. Prof. Hari Bhattarai, Nepal
6. Prof. Bibhu Pradhan, Nepal
7. Prof. Chop Lal Bhusal, Nepal
8. Dr. Toran KC, Nepal
9. Dr. Tapas Pramanik, India
10. Dr. Anjan Shrestha, Nepal
11. Dr. Yogesh Neupane, Nepal

Lastly, the editorial board welcomes all types of articles via online submission and invites interested candidates to join our journal as a peer reviewer by submitting their CV (including publications in medical journals) at njenthns@gmail.com.
Comparison of Pre and Postoperative Hearing Results after Cartilage Augmentation Type III Tympanoplasty

Objective: To compare the hearing results of cartilage augmentation type III tympanoplasty with canal wall down (CWD) mastoidectomy pre and post-operatively.

Materials and Methods: It is a prospective, analytical, comparative and longitudinal study carried out from 1st October 2006 to 30th April 2008 in Ganesh Man Singh Memorial Academy of ENT and Head & Neck Studies, Institute of Medicine, Maharajgunj, Kathmandu, Nepal. Patients included were having 3+ years, both gender and diagnosis of chronic otitis media (squamous) with conductive or mixed hearing loss, needing canal wall down mastoidectomy in which stapes superstructure present and no mastoid surgery was performed previously. Patients with sensorineural hearing loss and post-operative graft failure were excluded. Analysis of 34 ear surgeries was performed. Cartilage from conchal area and graft from temporal fascia was harvested. Pre and post-operative average air bone gap (ABG) at frequencies 500Hz, 1000Hz, 2000Hz and 4000Hz were compared. The post-operative hearing was assessed in terms of ABG closure.

Results: The comparison of pre and post-operative ABG in cartilage augmentation type III tympanoplasty at 500Hz was 46.6dB and 37.9dB (p<0.001), at 1000Hz it's 39.7dB and 30.1dB (p=0.001), at 2000Hz it's 29.9dB and 22.8dB (p=0.003) and at 4000Hz it's 35.8dB and 20.2dB (p=0.062). The mean pre and post-operative ABG was 37.4dB and 29.7dB, which was statistically significant (p<0.001). The post-operative ABG ranges from 15-47.5dB. Similarly, the ABG closure was within 30dB in 26 (76%) patients.

Conclusion: Hearing results after cartilage augmentation type III tympanoplasty showed improvement at individual and mean post-operative ABG and also significant improvement in ABG closure suggesting thin cartilage disc increased the effective vibrating area of tympanic membrane graft but there was a great variation, suggesting possibility of effect of multiple other factors.

Keywords: Air bone gap, chronic otitis media (squamous), canal wall down mastoidectomy, cartilage augmentation type III tympanoplasty.

INTRODUCTION: Chronic otitis media (COM) is a chronic inflammatory disease of the middle ear and mastoid. It is complicated as partial or total loss of the tympanic membrane (TM) and ossicles which leads to conductive hearing loss in severity up to 60-70 dB.1 COM is a common condition, affecting 0.5-30% of any community. A conservative estimate of the number of people in the world suffering from COM is over 20 million.2 Chronic otitis media (COM) is still one of the commonest ear diseases in many of the developing countries, among which the prevalence of squamous type of COM is 3.5% in Nepal.3 The goal of tympanoplasty is to restore sound pressure transformation at the oval window by coupling an intact tympanic membrane with a mobile stapes footplate via an intact or reconstructed ossicular chain and to provide sound protection for the round window membrane by a closed, air containing, mucosa lined middle ear.4

Merchant et al, in laboratory model demonstrated that improved hearing results by 5-10dB for frequencies below 1500Hz could be achieved by myringostapediopexy by introducing a third cartilage disc between the graft and stapes head.1 For augmented type III tympanoplasty either cartilage or sculptured cortical bone can be kept between the intact stapes and the fascial graft.5 The cartilage disc was hypothesized to improve the "effective" vibrating area of the graft that was coupled to the stapes head.6 The aim of our study is to compare pre and post-operative hearing results after cartilage augmented type III tympanoplasty since such study was not done previously.

MATERIALS AND METHODS:

This is a prospective, analytical, longitudinal and comparative study performed in Ganesh Man Singh Memorial Academy of ENT and Head & Neck Studies, Institute of Medicine, Maharajgunj, Kathmandu, Nepal from 1st October 2006 to 30th April 2008. The patients who were > 5 years, both gender, intact and mobile stapes superstructure at CWD tympanomastoidectomy surgery for COM squamous type and with conductive or mixed hearing loss were included. Patients with sensorineural hearing loss and post-operative graft failure were excluded.

For hearing assessment, the pure tone audiometry (PTA) test performed within seven days prior to the operation by Hughson and Westlake method. The test was performed through air conduction and bone conduction mode. The air and bone conduction threshold was recorded both pre and post-operatively. The air conduction threshold and the bone conduction threshold averages were calculated by taking the averages of 500, 1000, 2000 and 4000 Hz frequencies. The ABG was calculated by taking differences between air conduction and bone conduction threshold. The audiometry results were reported according to American Academy of Otolaryngology-Head and Neck Surgery guidelines,6 except for thresholds at 3kHz, which were substituted in all cases with thresholds at 4kHz.

For cartilage augmentation, thin disc of conchal cartilage of partial thickness and of 4-6 mm in diameter was interposed between the stapes head and temporaisis fascia graft. Cartilage disc did not touch the external auditory canal or facial nerve canal.

The follow up of patients were performed at/or after 10th week postoperatively. During follow up period, ears with minimal discharge from the mastoid cavity but with healed middle ear were subjected to PTA assessment. The results were analyzed in terms of average postoperative ABG and ABG closure. The pre and postoperative results were compared. The data analysis was performed with the help of SPSS 11.5 software package. p value was calculated using the independent samples test and p value of < 0.05 was taken as significant.

RESULTS:
The total number of patients enrolled during the study period was 36. All 36 (100%) cases had adequate follow up. Among them, 2 (5.5%) cases were excluded from the study because of graft failure as shown in Table-1.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Total cases</th>
<th>Included</th>
<th>Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWD mastoidectomy and cartilage augmented type III tympanoplasty</td>
<td>36</td>
<td>34 (94.4%)</td>
<td>2 (5.6%)</td>
</tr>
</tbody>
</table>

The patients were divided into different groups of age. Patients of 10 years were 2 (5.9%), 11-20 years were 11 (32.4%), 21-30 years were 15 (44.1%), 31-40 years were 4 (11.8%) and >40 years were 2 (5.9%). The average age was 24.88 ± 5.82 years as shown in Table-2. Among 34 patients, 21 (61.8%) were male and 13 (38.2%) were female as shown in Table-3. The pre-operative ABG at frequencies 500Hz, 1000Hz, 2000Hz, and 4000Hz were found to be 46.6 dB, 39.4
### Table 2: Age distribution of patients

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Number of patients (%)</th>
<th>Average age</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>2 (5.9%)</td>
<td></td>
</tr>
<tr>
<td>11-20</td>
<td>11 (32.4%)</td>
<td>24.88 ±</td>
</tr>
<tr>
<td>21-30</td>
<td>15 (44.1%)</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>4 (11.8%)</td>
<td></td>
</tr>
<tr>
<td>&gt;40</td>
<td>2 (5.9%)</td>
<td>5.82</td>
</tr>
</tbody>
</table>

### Table 3: Gender distribution of patients

<table>
<thead>
<tr>
<th></th>
<th>Male (61.8%)</th>
<th>Female (38.2%)</th>
<th>Total (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-30</td>
<td>21</td>
<td>13</td>
<td>34</td>
</tr>
</tbody>
</table>

The four frequency average pre-operative ABG which was 37.4 dB was reduced to 29.7 post-operatively with a net gain of 7.7 dB. This observed difference was found to be statistically highly significant with p value of <0.001. It was observed that the ABG was the smallest at 2000 Hz as compared with other frequencies in both pre and post-operative audiograms. The details are shown in Table 2 & Fig-1. The ABG closure was divided into different categories like 0-5 dB, 0-10 dB, 0-20 dB, 0-30 dB and 0-40 dB. Around 26.5% cases fell within 0-5 dB and 24 (70.6%) cases within 0-20 dB as shown in Table-3.

### Table 4: Evaluation of the pre and post operative PTA/ABG

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Min.</th>
<th>Max.</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-operative ABG 500Hz</td>
<td></td>
<td>46.6</td>
<td>13.75</td>
<td>20</td>
<td></td>
<td>70</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post-operative ABG 500Hz</td>
<td></td>
<td>35.4</td>
<td>10.10</td>
<td>15</td>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Pre-operative ABG 1000Hz</td>
<td></td>
<td>39.4</td>
<td>15.61</td>
<td>5</td>
<td>70</td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>Post-operative ABG 1000Hz</td>
<td></td>
<td>31.5</td>
<td>11.25</td>
<td>10</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-operative ABG 2000Hz</td>
<td></td>
<td>27.7</td>
<td>14.15</td>
<td>5</td>
<td>55</td>
<td></td>
<td>0.002</td>
</tr>
<tr>
<td>Post-operative ABG 2000Hz</td>
<td></td>
<td>20.4</td>
<td>8.74</td>
<td>5</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-operative ABG 4000Hz</td>
<td></td>
<td>35.7</td>
<td>11.42</td>
<td>15</td>
<td>60</td>
<td></td>
<td>0.111</td>
</tr>
<tr>
<td>Post-operative ABG 4000Hz</td>
<td></td>
<td>31.5</td>
<td>12.76</td>
<td>0</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-operative ABG Average</td>
<td></td>
<td>37.4</td>
<td>11.84</td>
<td>16.2</td>
<td>61.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-operative ABG Average</td>
<td></td>
<td>29.7</td>
<td>7.69</td>
<td>15</td>
<td>47.5</td>
<td></td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

### Table 5: ABG Closure in different bins (n=34)

<table>
<thead>
<tr>
<th>Groups</th>
<th>0-5dB</th>
<th>0-10dB</th>
<th>0-20dB</th>
<th>0-30dB</th>
<th>&gt;30dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWD mastoidectomy and cartilage augmented type III tympanoplasty</td>
<td>9 (26.5%)</td>
<td>15 (44.1%)</td>
<td>24 (70.6%)</td>
<td>26 (76%)</td>
<td>1 (2.9%)</td>
</tr>
</tbody>
</table>

### Discussion:

This study was performed to compare the pre and post-operative hearing results in terms of average ABG and ABG closure. The average age of the patients was 24.88, the range being 7 to 50 years. But most of the similar studies done in the literature have included patients in their fourth or fifth decade and the range also shows patients of younger and older age groups.5,7 This variation may be attributed to the socio-cultural context that in our country older adults are a bit hesitant to undergo surgical treatment as compared to patients of younger age. Similarly in our study, there were total 21 (61.8%) males and 13 (38.2%) females with a male female ratio of 1.6:1. Gender wise distribution of patients of our study compare favorably with all other studies published in the literature.5,7

We reported only short-term hearing results, because the long-term success of any ossicular repair is largely dependent on factors outside the control of the surgeon, i.e. patient follow-up rates; eustachian tube function; middle-ear stability; and the condition of the mucosa. The short-term results are hence a more accurate reflection of the actual reconstructive procedures. In each case, post-operative air-bone gaps were calculated using post-operative air conduction and post-operative bone-conduction thresholds at frequencies 500, 1000, 2000 and 4000 Hz. None of the patient in the whole group had an acute worsening of bone conduction post-operatively. During the length of follow up there were no cases of cartilage extrusion.

Different methods have been used by different authors to report the pure tone audiometric post-operative hearing results in middle ear surgery in the literature. Among them, the ABG closure, the post operative ABG presented in 10 dB bins and air conduction threshold gain are commonly reported indicators of tympanoplasty outcome. We had applied average PTA-ABG and ABG closure for audiological assessment.

In our study, the average PTA-ABG was 37.4 dB pre-operatively & 29.7 dB post-operatively with a net gain of 7.7 dB. The postoperative PTA-ABG ranged from 15- 47.5 dB. The difference between the pre and post-operative PTA-ABG results was statistically significant (p<.001). These results are consistent with the study done by Kyrodimos et al6 where pre and post-operative PTA-ABG were 35.41 and 24.33 dB respectively in type III cartilage shield tympanoplasty after CWD mastoidectomy. Similarly, Merchant et al7 reported that cartilage augmented type III tympanoplasty in patients with mobile stapes and aerated middle ear result in mean ABG of 10-25 dB but large ABG of 40-50 are found in ears with mobile stapes and non-aerated middle ear. They had assessed the status of middle ear aeration either by post-operative computed tomography or by pneumatic otoscopy or by autoinflation. In our setting it was not possible to have post-operative computed tomography because of the cost factor.

While analyzing the frequency wise post-operative average PTA-ABG, it was seen that ABG was the smallest at 2000 Hz as compared with other frequencies. Similar findings were also noted by Merchant et al. They explain that a combination of two factors are responsible for smaller ABG at 2000Hz. Bone-conduction threshold are not an exact measure of cochlear function and can be influenced by pathological condition of middle ear; the carhart’s notch phenomenon in otosclerosis is an example. Similarly, there is no clear explanation for the cause of the air conduction thresholds showing to be the lowest at 2000Hz however; it could have resulted from resonances generated in the mastoid cavity and ear canal.

Merchant et al. in their review article state that a canal “wall-down” mastoidectomy poses several considerations from an acoustical and mechanical perspective. First, the canal wall-down procedure i.e., radical or modified radical tympanomastoidectomy results in a significant reduction in the size of the residual middle ear air space. Second, a canal wall down procedure results in the creation of a large air space lateral to the tympanic membrane (TM), i.e., the air space within the mastoid bowl including the external auditory canal. This
mastoid bowl and ear canal air space generates resonances that can influence middle ear sound transmission favorably or unfavorably. A third, after a canal-wall down procedure, the TM graft comes to lie in a more medial position compared to normal, and the TM graft is made to couple to the stapes head or to prosthesis such as a total ossicular replacement prosthesis (TORP). The mechanics of such a TM graft and its coupling to the stapes/TORP are likely to be different from normal and also need to be characterized.1

In our study, it was found that 26 (76%) cases fell within 30 dB ABG closure and 24 (70.6%) cases fell within 20dB ABG closure. Similar studies with some modifications in the technique published in the literature report varying proportions of PTA-ABG. Like our study, Cheang et al.9 in his myringolenticulopexy group (n= 20) achieved an ABG of less than 30 dB in 92% and ABG of 20 dB in 64% of cases. Similarly, Moustafa and Khalifa10 in their myringo-cartilago-stapediopexy group (n = 95) achieved an ABG of less than 20 dB in 84%. Likewise, Kyrodimos et al.7 in their cartilage shield type III tympanoplasty (n=52) using a 0.8 mm thick cartilage piece with no capitulum for stapes head report that post-operative PTA-ABG of 25dB or less was achieved in 41 (79%) of patients and of 20 dB or less in 54% of patients. However, their study included both canal wall up and canal wall down procedures. Malafronte et al.11 in cases of both canal down and up procedures used modified folded double cartilage block with shallow acetabulum for stapes capitulum to augment their type III tympanoplasty procedure. One year after surgery, a post-operative ABG of 20 dB or less occurred in 84.3% (n = 27) of patients and this after a mean follow-up of 7 years, post-operative ABG of 20 dB or less occurred in 81% (n = 26) of patients which correlate with our study, however, we had only short term follow up as explained previously.

CONCLUSION:
The results concluded that mean pre and post-operative air bone gap were 37.4 dB and 29.7 dB respectively with a net gain of 7.7 dB. These differences were statistically significant. The post-operative PTA-ABG ranged from 15- 47.5 dB, also the ABG closure was within 30 dB in 26 (76%) cases. Thus, hearing results after cartilage augmentation type III tympanoplasty showed improvement at individual and mean post-operative PTA-ABG, and also improvement in ABG closure suggesting thin cartilage disc increased the effective vibrating area of tympanic membrane graft but there was a great variation, suggesting possibility of effect of multiple other factors.

REFERENCES:
Quality of Life after Functional Endoscopic Sinus Surgery

Objective: The aim of the study was to evaluate how functional endoscopic sinus surgery (FESS) modifies patients’ symptom profiles and quality of life.

Materials and methods: The patients of chronic sinonasal disease (allergic/inflammatory) attending the Rhinological clinic of Department of Otorhinolaryngology, Nepalgunj Medical College, Banke from 2004-2008 were selected for functional endoscopic sinus surgery (FESS) and were evaluated subjectively regarding the outcome of surgery. Z test of proportion was used to compute statistical significance.

Results: One hundred and twenty patients were selected. Major complaints were nasal obstruction (80%), nasal discharge (75%) and headache (72.5%). Regarding nasal obstruction, 93.7 % (90/96) responded favorably to surgery while success in nasal discharge was 89.9%. In case of headache, 93.1% (81/87) of patient responded, while patients with post-nasal discharge responded least after surgery (82.8%). The overall results reveal that 87.7% patients were asymptomatic or improved following the surgery.

Conclusion: Our center reports a subjective improvement of symptoms following FESS compatible with results attained internationally.

Keywords: Chronic sinusitis, sinus surgery, outcome.

INTRODUCTION: Chronic rhinosinusitis (CRS) is a significant health problem which seems to mirror the increasing frequency of allergic rhinitis and which results in a large financial burden on society. Chronic sinusitis is an inflammatory condition of the sinuses that is either self-promulgated or it may be due to very subtle infections. The traditional approach has been to treat them with an antibiotic once or twice, and then send them to a surgeon.1,2

The surgery today is much better than any surgery that was done until functional endoscopic sinus surgery was started about 25 years ago. So this is a dramatic step forward from the older days. Functional endoscopic sinus surgery (FESS) has revolutionized the way otolaryngologists manage sinus disease in particularly chronic rhinosinusitis (CRS). Chronic rhinosinusitis restricts the quality of life of millions of involved patients. Currently there exists a growing body of literature on the objective and symptom specific efficacy of both medical and surgical interventions for CRS patients. The technique of functional endoscopic sinus surgery (FESS) has been widely accepted and applied to inflammatory diseases and benign tumors of the paranasal sinuses with internationally reported results of this technique having been very good.

Otolaryngologist all over the world are still taking a critical look at what this procedure has to offer to preference over different medical treatment. Recent efforts in measuring outcomes have focused on evaluating not only the physical but also the social and emotional consequences of diseases and their treatments.

There is correlation between the assessment of subjective and objective findings in patients with chronic (CRS) rhinosinusitis before and after FESS. So subjective assessment of improvement is a good method for evaluation of outcome of FESS.3 The aim of the study was to evaluate the outcome functional endoscopic sinus surgery in patients’ symptom profiles and quality of life.

MATERIALS AND METHODS: In this study we have selected patients of chronic sinonasal disease (allergic/inflammatory/allergic fungal sinusitis/nasal polyps/rhinitis caseousa) attending the Rhinological clinic of Department of Otorhinolaryngology, Nepalgunj Medial College, Banke from March 2004 to March 2008. All the patients were pre-operatively evaluated clinically, radiologically as well as endoscopically. A uniform history was documented for every patient and after routine necessary investigations they were subjected to endoscopic and radiological evaluation.

After complete pre-operative evaluation patients were considered to have chronic rhinosinusitis when they had nasal obstruction, recurrent episodes of mucopurulent secretion, headache, facial pain and pressure. Initially patients were managed medically according to their symptoms and were observed for six weeks. The patients who were symptomatic even after medical management were operated upon using the Messerklinger’s approach. All the patients were operated under local anesthesia except two who were uncooperative (12 years and 10 years of age).

Patients were given a course of broad spectrum antibiotics postoperatively for 1 week. Nasal secretions were cleared endoscopically daily for 3 days under direct vision and patient advised saline nasal douches to clean the nose for 3 weeks.

Patients were followed up regularly and after 2 years the complaints were asked and were graded as done by Teris and Davidson.4 The questionnaire were filled up by patients themselves.

Group A: No particular symptoms
Group B: Symptom present but less than previous
Group C: No improvement or worsening of symptoms

RESULTS: In this study we have selected 120 patients of chronic sinonasal disease (allergic/inflammatory). Out of 120 patients included, there were 60 patients (50%) of sinonasal polyps, 51 patients (42.5%) of chronic rhinosinusitis, and 9 patients of expanding cyst of maxilla.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total No.of cases</th>
<th>Male (%)</th>
<th>Female (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 – 20 yrs.</td>
<td>36(30.0)</td>
<td>21(17.5)</td>
<td>15(12.5)</td>
</tr>
<tr>
<td>20 – 30 yrs.</td>
<td>27(22.5)</td>
<td>15(12.5)</td>
<td>12(10.0)</td>
</tr>
<tr>
<td>31 – 40 yrs.</td>
<td>30(25.0)</td>
<td>21(17.5)</td>
<td>9(7.5)</td>
</tr>
<tr>
<td>41 – 50 yrs.</td>
<td>21(17.5)</td>
<td>12(10.0)</td>
<td>9(7.5)</td>
</tr>
<tr>
<td>51 – 60 yrs.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>61 – 70 yrs.</td>
<td>5(5.0)</td>
<td>3(2.5)</td>
<td>(2.5)</td>
</tr>
<tr>
<td>70 – more</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>120(100)</td>
<td>72(60)</td>
<td>48(40)</td>
</tr>
</tbody>
</table>

Table 1: Age and Gender incidence
Predominantly male patient presented, which accounts to 60%. About one fourth of patients were from 31-40 years age group. (Table-1) Major complaints were nasal obstruction (80%), nasal discharge (75%) and headache (72.5%) (Fig-1). Regarding nasal obstruction, 71.8% had bilateral complaints; similarly it was 66.6% in case of nasal discharge. Headache was present in frontal region in 65.5% patients followed by facial region in 20.6% (Fig -1).

Endoscopy in all 120 patients revealed various pathological abnormalities at the middle meatus and anterior ethmoid region. Major findings were mucopurulent discharge in middle meatus in 75 out of 120 cases which was bilateral in 72% cases. Enlarged agger nasi was found in 42.5%. Nasal polyp was seen in 50% of cases in endoscopy which is more in comparison to 32.5% in anterior rhinoscopy (Table-2).

### Table 2: Nasal endoscopic findings

<table>
<thead>
<tr>
<th>Findings</th>
<th>Total No. of Cases (%)</th>
<th>Unilateral Cases (%)</th>
<th>Bilateral Cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mucopurulent discharge in middle meatus</td>
<td>75(62.5)</td>
<td>21(17.5)</td>
<td>54(45.0)</td>
</tr>
<tr>
<td>2. Polypoidal middle Or concha-bullosa turbinate</td>
<td>15(20%)</td>
<td>18(15)</td>
<td>0</td>
</tr>
<tr>
<td>3. Polyp Nasal Cavity</td>
<td>60(50.0)</td>
<td>15(12.5)</td>
<td>45(37.5)</td>
</tr>
<tr>
<td>4. Infundibular mucosa oedematous</td>
<td>27(22.5)</td>
<td>3(2.5)</td>
<td>24(20.0)</td>
</tr>
<tr>
<td>5. Swollen and enlarged Agger Nasi</td>
<td>51(42.5)</td>
<td>15(12.5)</td>
<td>36(30.0)</td>
</tr>
<tr>
<td>6. Maxillary bent of U.P.</td>
<td>6(5.0)</td>
<td>6(5.0)</td>
<td>0</td>
</tr>
<tr>
<td>7. Destroyed U.P.</td>
<td>6(5.0)</td>
<td>6(5.0)</td>
<td>0</td>
</tr>
<tr>
<td>8. Cholesteatoma (Rhinitis caseosa)</td>
<td>2(1.6)</td>
<td>1(0.8)</td>
<td>1(0.8)</td>
</tr>
</tbody>
</table>

Radiological evaluation done by coronal section CT Scanning revealed the different patterns of diseases. Osteomeatal Unit (42%) pattern of disease was the most common. Thirty three cases (27%) were sporic form of disease. In 17.5% diffuse polyp was seen. Sphenoidomal pattern was seen in only few cases (5%) (Fig-2).

In this series, 120 patients were followed up regularly over a period of at least 24 months and up to 48 months (with an average of 36 months) and were also assessed during the follow up with reference to their dominating symptoms.

### Table 3: Post-operative subjective improvement in present study

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Total No.</th>
<th>Group</th>
<th>Total improvement (A+B)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nasal Obstruction</td>
<td>96</td>
<td>42(43.7)</td>
<td>48(50.0)</td>
</tr>
<tr>
<td>2. Nasal Discharge</td>
<td>90</td>
<td>33(36.3)</td>
<td>48(53.2)</td>
</tr>
<tr>
<td>3. Headache</td>
<td>87</td>
<td>36(41.3)</td>
<td>41(47.1)</td>
</tr>
<tr>
<td>4. PND</td>
<td>69</td>
<td>27(39.4)</td>
<td>30(43.4)</td>
</tr>
<tr>
<td>5. Sneezing</td>
<td>54</td>
<td>24(44.4)</td>
<td>24(44.4)</td>
</tr>
<tr>
<td>6. Heaviness in ear</td>
<td>48</td>
<td>18(37.5)</td>
<td>18(37.5)</td>
</tr>
<tr>
<td>7. Ear Discharge</td>
<td>21</td>
<td>6(28.6)</td>
<td>9(42.8)</td>
</tr>
<tr>
<td>Total</td>
<td>465</td>
<td>186(40.0)</td>
<td>222(47.7)</td>
</tr>
</tbody>
</table>

Fig: 1. Symptomatology

Out of 90 patients with nasal discharge, 33 (36.6%) patients got complete resolution of symptom; 48 (53.2%) cases showed marked improvement while 9 cases were not benefited at all. This suggests the overall success in this perspective was 89.91%. Headache was present in 87 (72.5%) cases in which 81/87 (93.1%) responded, while patients with post-nasal discharge responded least, well after surgery (82.84%). The overall results reveal that 87.7% patients considered them asymptomatic or improved following the surgery.

No major complication directly related to FESS occurred in this series. However, one patient presented with ecchymosis, one patient presented with sub-conjuctival haemorrhage and one patient presented with restriction of eye movement. Orbital sub-cutaneous emphysema was seen in one patient. In the less severe group of complications, patients presented post operative adhesion.

### DISCUSSION:

The present study focuses on post operative symptomatic evaluation. During the follow up averaging 3 years, author asked the patient to grade their different symptoms pre and post operatively on the basis of effect over the day to day life.

Patient was also asked to evaluate the quality of life improvement after the surgery and whether they were benefited or satisfied after surgery or not. Follow up period in our study (average 36 months) is better as compared to that of Li et al (24 months)5, Mace et al (12+/2 months)6, Smith et al (1.4 +/- 0.35 years)7, Damm et al (31.7 months).8 Sample size was also better than other study like Mace et al study (102)6, Smith et al study (119).7

The leading symptom nasal obstruction was 80% in our study which is comparable to that of Damm et al (92%)8 while post nasal drip was only 57.5% in our study which is less than that of Damm et al, (87%).8 In our study 87% had improvement though complete relief was in only 40% as compared to Lai et al study, (82%).9 But in our study, sample size was more and also symptoms evaluated was also different than that of Lai et al.9 In our study, 12.3% had similar severity of symptoms or worsening which is comparable to that of Damm et al (15%).8 Nasal obstruction 93.7% were improved which is more than in Bunzen et al study (83.3%).10 Similarly, headache was relieved in 93.1% which is also more than that by Bunzen et al (62%).10

The overall success rate after surgery on patient own evaluation was found to be 94% which is significant (p<0.05). The restriction of quality of life in patient with chronic rhinosinusitis is intense and mainly caused by these main symptoms which can be improved by FESS. Majority of patient were satisfied by the surgery with good quality of life. Teris and Davidson study review 10 different series with total patient of 1730 for the outcome after FESS.4

The results of this study was evaluated in 3 categories:4
1) Very good result as either complete resolution of symptoms or rare episodes of sinusitis (<2episodes/year)
2) Good result when patient report improvement but no resolution of their symptoms and 2-5 episodes of sinusitis per year.
3) Bad result when post operatively there is no resolution or worsening of symptoms.
Although there were no fixed parameters to categorize the preoperative status extent of disease and surgery; the study showed success rate with good result 73-79% result after FESS. Interestingly category 2 was reported to achieve in 26% in comparison to very good result in 63% in the mean value. The later success rate seems to be high which may be attributable to the fact that some results were inadequately classified by Teris and Davidson in 3 categories. For instance the result reported by Kennedy and Atol as marked improvement (>50%) classified these series of Teris and Davidson in Category. On other hand in present series percentage of good result is slightly higher than very good result and depends on repeated and long follow up that was more than 3 years.

One problem of present study was that the tool we use for outcome result is not validated before use. As there is no exact measure of subjective improvement, but the patient satisfaction in toto is objective of surgery. The study shows significant subjective percentage of improvement and can be indication of improvement of quality of life. Many study have tried to define and quality outcome with FESS. However, our understanding of the multiple facet of outcome of FESS remains incomplete.

CRS is a common health problem that leads to frequent visit to primary health care and Otorhinolaryngologists. It contribute significant amount of health care expenditure due to direct cost arising from physician visit as well as indirect cost related to missed days at work and a general loss of productivity due to a decrease quality of life. It is essential to evaluate the outcome verification and therapy effectiveness. Because the disease itself is defined by signs and symptoms, it is logical to use the presence and severity of sinonasal symptom as primary outcome measure for sinusitis and the measurement of symptom require that patient is assessed with a complete self-assessment measures.

Multiple reviews of the result of endoscopic sinus surgery worldwide reported excellent subjective results with overall improvement of 90%. Eighty-six percent of the patients said they would recommend the same kind of surgery on them. Patient with chronic sinusitis have more bodily pain and worse social functioning then those with chronic obstructive pulmonary disease, Angina, congestive heart failure and body pain. Therefore a successful endoscopic sinus surgery can positively influence the life of those individuals. Like in our study, Guerrero et al study also showed no major complications and minor complications occurred in 21 patients (19 %) with the most frequent being adhesion.

There are many case series with large patient populations that have shown significant improvement in short- and long-term symptoms following surgery. These outcomes are expected to improve with even greater refinement of technology, experience, and instrumentation, and the quality of future studies may be improved by determining and using objective measures of success and, possibly, by the use of control groups.

Hence, over the conventional method, FESS has a number of advantages, besides being more accurate in diagnosis namely access to inaccessible areas of nose and sinuses, restoring normal physiology and avoidance of radical surgery. However, the image of sinus is very much different from normal vision, the orientation of directions and depth and magnification have to be acquired by practice. The success depends upon a thorough pre-operative endoscopic and CT coronal screening, evaluation and of course upon the efficiency and skill of the surgeon. In spite of certain serious complications, of which no surgery is exempt, FESS is undoubtedly the beginning of a new era.

CONCLUSION:
In this study the leading complaints within the symptom profile of patients with chronic sinonasal diseases are nasal obstruction, nasal discharge and headache. The restriction of quality of life in patients with chronic sinonasal disease is mainly caused by these symptoms. Our center reports a subjective improvement of symptoms following FESS compatible with results attained internationally.

REFERENCES:
Pattern of Sinonasal Tumors in Eastern Nepal

Objective: This study was carried out to recognize the great variety of sinusal tumors and their frequency in region of Nepal

Materials and methods: A retrospective chart analysis of cases of neoplastic growths in nose and PNS that underwent surgery over four years duration at Department of Otorhinolaryngology, B. P. Koirala Institute of Health Sciences, Dharan, Nepal was done. History, clinical assessment and histopathological examinations were done in all cases supplemented by radiological investigation in most of the cases.

Results: A total of 56 sinonasal tumors presented during the period. Out of which, 43 were benign and 13 were malignant tumors.

Conclusion: Neoplasms of the nasal cavity and paranasal sinuses are rare but require a high index of suspicion for diagnosis due to the overlapping presentation between benign and malignant ones.

Keywords: Carcinoma, maxillectomy, papilloma, sinonasal tumor.

INTRODUCTION:
Sinoonasal neoplasm are very rare, malignant tumors of sinonasal tract in general population constitute 0.2-0.8% of all malignancies, and 3% of malignancies in upper aerodigestive tract. However, such tumors represent both a diagnostic and therapeutic challenge because the presenting signs and symptoms may be indistinguishable from nonneoplastic benign or inflammatory disorders.

A large number of diseases affecting the region are mainly due to several specialized tissues in the region and their aberrations. Inverted papillomas and hemangiomas are common benign tumors while squamous cell carcinoma being the malignant ones. Nickel and chrome refining processes have been implicated in the development of carcinoma of the paranasal sinuses, and exposure to wood dust has been implicated specifically in adenocarcinoma of the ethmoid. Leather workers, especially those involved in the tanning process, show an increased incidence of epithelial sinonasal malignancies. Careful clinico-pathological workup aided by various imaging is essential for a correct diagnosis and timely intervention and to lessen the morbidity to the patient. This study was carried out to recognize the great variety of neoplastic sinonasal tumors, their character and frequency in our region.

MATERIALS AND METHODS:
This is a retrospective study carried out in the department of Otolaryngology, B. P. Koirala Institute of Health Sciences, Dharan, Nepal between April 2005 and March 2009. It includes 56 cases of neoplastic sinonasal growths. The study was approved by the ethical committee of our institution. All cases were thoroughly evaluated including history, head and neck examination including endoscopy, imaging and histopathological examinations. All the nonneoplastic cases were excluded from the study. Details of clinical presentation, examination, radiological and histopathological findings were recorded and data was analyzed using Microsoft Excel 2003.

RESULTS:
Total 56 cases of sinonasal tumors were found during the study out of which 43 (77%) were benign and 13 (23%) malignant. Age of presentation ranged from 1st to 8th decade of life with 46% benign tumors falling under 16-30 years age group while 77% of the malignant cases were between 40 – 60 years age. Of all tumors, sinonasal papillomas outnumbered all benign tumors (45%) followed by hemanginmas (20%) among others while squamous cell carcinoma (9%), basal cell carcinomas (5%) and malignant melanoma (3%) were more common malignant tumors (Table-1). Average duration of presentation was nine months for benign tumors and 7 months for malignant tumors. The male to female ratio were 3:2 and 3:1 for benign and malignant tumors respectively. Race distribution between Mangoloids and Indo-Aryan was almost equal. Nasal blockage (93%), nasal discharge (7%), epistaxis (41%), hemifacial pain/pressure (36%) and facial fullness/external deformities, each (23%) were among the commonest presentation (Table-2).

Out of 43 benign tumors, inverted papilloma was the most common comprising 13 cases (30%) followed by squamous (epithelial) papilloma 12 cases (28%), hemangioma 11 cases (26%), osteoma and fibrous (5%) (Table-2).

<table>
<thead>
<tr>
<th>Benign</th>
<th>n</th>
<th>%</th>
<th>Malignant</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverted Papilloma</td>
<td>13</td>
<td>23.22</td>
<td>Squamous cell carcinoma</td>
<td>5</td>
<td>8.93</td>
</tr>
<tr>
<td>Squamous Papilloma</td>
<td>12</td>
<td>21.43</td>
<td>Basal cell carcinoma</td>
<td>3</td>
<td>5.36</td>
</tr>
<tr>
<td>Hemangioma</td>
<td>11</td>
<td>19.64</td>
<td>Malignant Melanoma</td>
<td>2</td>
<td>3.56</td>
</tr>
<tr>
<td>Osteoma</td>
<td>2</td>
<td>3.66</td>
<td>Adenocarcinoma</td>
<td>1</td>
<td>1.79</td>
</tr>
<tr>
<td>Fibrous Dysplasia</td>
<td>2</td>
<td>3.66</td>
<td>Osteosarcoma</td>
<td>1</td>
<td>1.79</td>
</tr>
<tr>
<td>Ossifying Fibroma</td>
<td>1</td>
<td>1.79</td>
<td>Rhabdomyosarcoma</td>
<td>1</td>
<td>1.79</td>
</tr>
<tr>
<td>Pleomorphic Adenoma</td>
<td>1</td>
<td>1.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angiomyoma</td>
<td>1</td>
<td>1.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>76.78</td>
<td>Total</td>
<td>13</td>
<td>23.22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal blockage</td>
<td>52</td>
<td>92.85</td>
</tr>
<tr>
<td>Nasal discharge</td>
<td>39</td>
<td>69.64</td>
</tr>
<tr>
<td>Nasal bleeding</td>
<td>23</td>
<td>41.07</td>
</tr>
<tr>
<td>Hemifacial pressure/pain</td>
<td>20</td>
<td>35.71</td>
</tr>
<tr>
<td>Facial swelling/external deformity</td>
<td>13</td>
<td>23.21</td>
</tr>
<tr>
<td>Proptosis</td>
<td>1</td>
<td>1.78</td>
</tr>
<tr>
<td>Palatal perforation</td>
<td>1</td>
<td>1.78</td>
</tr>
<tr>
<td>Neck mass</td>
<td>1</td>
<td>1.78</td>
</tr>
</tbody>
</table>

Out of 13 malignant tumors, squamous cell carcinoma was the
commonest malignancy observed in the study. They were five in number (38.5%), followed by basal cell carcinoma in three cases (23%) and malignant melanoma in two (15.5%). Adenocarcinoma, osteosarcoma and rhabdomyosarcoma were each one in number (8%) (Table-1).

DISCUSSION:
Clinical presentation of sinus malignancies is non-specific and often mimics benign disease.6 Indeed, 9-12% of patients with sinonasal malignancies are asymptomatic.7 It is not surprising that delay in diagnosis is common; 75% of all paranasal sinus malignant tumors are Stage T1 or T2 at the time of diagnosis. The most common presenting symptoms were nasal blockage, nasal discharge and epistaxis in study by various series which was in comparable to our study.6,8

Inverted papilloma is characterized best by its predilection for males, local invasion, tendency for recurrence and association with malignancy.9 In his analysis of 30 years of published reports, Krause documents the finding of carcinoma in 9.1% of all patients.10 One case in our study had the histologic feature of malignant transformation. CT scan was done in all cases, most showing the bowing of medial wall with bony erosion at places as was shown in other studies.9,11

Out of 12 squamous (epithelial) papilloma arising from nasal vestibule region, only two cases were biopsied preoperatively due to their suspicious look. In all remaining cases, excision biopsy was done. All turned out to be squamous papilloma subsequently. Abraham et al in their series of 17 cases of intranasal epithelial papillomas found that 13 were epithelial papillomas and four were squamous cell carcinomas associated with epithelial papillomas suggesting that squamous cell carcinoma may occasionally arise from a previously benign epithelial papilloma.12 Sinonasal hemangiomas are uncommon in literature.13,14 In our study, three cases were cavernous hemangiomas, rest being minor arteriovenous malformation and pyogenic granulomas (lobular capillary hemangiomas). All the cases were extremely rare and has rarely been described in the literature.16,17

Squamous cell carcinoma is the predominant malignant sinonasal tumor as reported in most of the series.6,8,18 There is a male predominance and a majority of the patients are older than 50 years of age at the time of diagnosis. Maxillary sinus is the most common site of origin, followed by lateral nasal wall and ethmoid sinuses. Primary carcinomas arising from frontal and sphenoidal sinuses are rare.19 Our study showed the maxilla to be primary site for all the tumors with involvement of ethmoid and nasal cavity. All the cases in our series were of 5-6th decade with male F:M ratio 4:1 which is consistent with series by Goldenberg et al. though in our series male predominance is even higher.20 Nose is the most common site for basal cell carcinoma in head and neck. Clinical appearance can vary from small nodular growths to chronic ulcers or the ulceronodular lesions.21 All our cases presented as chronic ulcers with rolled out border over the dorsum and lateral nasal wall, only one on the dorsum exposing the underlying bone.

Sinonasal malignant melanoma is an uncommon tumor accounting for 0.3-2% of all malignant melanomas, 4% of head and neck melanomas and 4% of all sinonasal neoplasms.22 This was in consistent with our series. w and x reported in their series that at least one third of sinonasal malignant melanoma are amelanotic.23,24 Both of our cases were melanotic however. Thompson et al and De Matos et al in their series reported that sinonasal malignant melanomas have equal gender distribution targeting a patient population of 6 decades of life.22,25 This was in contrast to both the patients were females of 4th decade in our series. They are reported to be arising predominantly from nasal cavity or nasal cavity and sinuses as in our series.26 They have high propensity to disseminate due to the rich lymphatic and vascular network of the sinonasal tract. The metastatic status is the most important factor for prognosis and outcome of the disease.22 One case in our series had neck metastasis.

Adenocarcinoma is the second commonest malignant tumor in sinonasal tract after squamous cell carcinoma, commonly accounting about 15% of all sinonasal cancer.27 They commonly arise from the ethmoid sinus and the roof of nasal cavity. However the only case in our series had its rare origin at the lower part of nasal septum. Osteosarcoma in head neck region is more often encountered in mandible than the maxilla.28 We encountered a case of osteosarcoma in a 30 years old male with classic sunray appearance in CT scan. Surgery with postoperative radiotherapy is the most effective mode of treatment, though chemotherapy has been tried in osteosarcoma of long bones.29

Rhabdomyosarcoma involves the head and neck region in 45 to 45% of cases. The sinonasal tract is involved in about 10% of cases affecting the head and neck.30 Histologically, the embryonal and alveolar types are more common in pediatric population while pleomorphic variety is more common among adults.31 We encountered a case of pleomorphic rhabdomyosarcoma in a 35 years old male whom partial maxillectomy was done and sent for chemoradiation. Accuracy rate of 78-85% have been reported for CT prediction of

Fig. 2. Clinical picture of malignant melanoma nose.

Fig. 1. Photomicrograph of angiomyoma showing variably calibered blood vessels surrounded by vascular smooth muscle. (H&E, 40X) being adolescents and young adults.

Osteoma is the most common benign fibro-osseous sinusonal tumor. In this study there were two osteomas, one each arising from frontal and maxillary sinus, both presented with facial pain/headache and local swelling. There were also two cases of fibrous dysplasia arising one each from frontal and maxillary sinus presenting with local swelling. There was a rare case of psammomatoid ossifying fibroma of frontoethmoid region in a seven year old boy who presented with headache and proptosis for one year.15 His vision was normal. CT scan was suggestive of left frontonasal mucocele with fibro-osseous lesion in the same side frontoethmoid region.

We observed an extremely rare case of angiomyoma (vascular leiomyoma) in a 45-year female who presented with nasal obstruction and recurrent epistaxis of one year duration. Angiomyoma is an uncommon, benign tumor, which usually occurs on the extremities, especially the lower extremities. Occurrence in the nasal cavity is

CONCLUSION: Despite their rarity, sinonasal tumors represent both a diagnostic and therapeutic challenge as the presenting features may be indistinguishable from benign or inflammatory disorders. The similarities of benign and malignant disorders at initial presentation may lead to a significant delay in the diagnosis of malignancy. Key indicators of malignancy such as cranial neuropathies and proptosis are uncommon at initial presentation and signify advanced disease. It is estimated that a span of 6 to 8 months passes on average from the time of initial symptoms until diagnosis is established. A high index of suspicion must be maintained for patients who do not respond to medical treatment of their sinonasal symptoms. Benign tumors like inverted papillomas are potential malignant and timely diagnosis and surgery can prevent them from malignant transformation.

REFERENCES:

Fig: 3. CT scan showing typical sunray appearance of osteosarcoma
Tuberculous and Nontuberculous Cervical Lymphadenitis: A Clinical Review

Objective:
To observe whether there are any differences in clinical characteristic between tuberculous and nontuberculous lymphadenitis and to evaluate the importance of fine needle aspiration cytology (FNAC) in the management of tuberculous cervical lymphadenitis.

Materials & Methods:
A prospective study was carried out among 100 patients of cervical lymphadenitis in ENT department of National Academy of Medical Sciences, Bir Hospital, Kathmandu. The study period was from 15 June 2009 to 15 June 2010.

Results:
There were 52 male and 48 female. The age ranged from 9 to 63 years. Posterior triangles were found to be the most common involved site. The incidences of constitutional symptoms, like malaise, anorexia, weight loss and fever were similar between the two groups. Thirty nine patients were diagnosed as tuberculous lymphadenitis by FNAC, 53 patients diagnosed as reactive lymphadenitis and no definitive diagnosis were made for 8 patients. The excisional biopsy reported 42 patients as tuberculous lymphadenitis. FNAC results were compared and found to be similar between the two groups. X-ray chest revealed parenchymatus lesion in 14% cases. The Mantoux test was positive in 32 cases.

Conclusion:
Patients with tuberculous and non tuberculous lymphadenitis had similar clinical features and hence were difficult to differentiate clinically. FNAC is a highly specific tool in the diagnosis of tuberculous lymphadenitis.

Keywords:
Tuberculous cervical lymphadenitis, fine needle aspiration cytology, biopsy, histopathological examination.

INTRODUCTION:
Tuberculosis is one of the leading causes of death in adults in Nepal. About 10,000 adults die of tuberculosis each year in Nepal. More than 50,000 new cases are reported every year in Nepal. Tuberculous lymphadenitis continues to be a major health problem in our country. In patient with cervical lump, tuberculosis remains a common cause. Tuberculous cervical lymphadenitis is commonly encountered in clinical practice. It is one of the commonest manifestations of extrapolmonary tuberculosis. Tuberculous lymphadenitis is the most common extrapolmonary form of tuberculosis and cervical lymph nodes are the most commonly affected group of nodes.

Differentialiation between tubercular and inflammatory causes of lymphadenitis is important, because the treatments are different. However, definitive diagnosis require either a time consuming mycobacterial cultures or an invasive excisional lymph node biopsy both of which can result in delay in the diagnosis and institute of appropriate therapy. In the present study, we tried to observe whether there are any differences in clinical characteristic between tuberculous and nontuberculous lymphadenitis and to evaluate the importance of FNAC in the management of tuberculous cervical lymphadenitis.

METHODS:
A prospective study was carried out among 100 patients of cervical lymphadenitis in ENT department of National Academy of Medical Sciences Bir Hospital, Kathmandu. The study period was from 15 June 2009 to 15 June 2010. History was taken and details ENT and systemic examination was done. All the patients were sent for the FNAC examination to the Pathology Department. Patients were divided into two groups as tuberculous lymphadenitis (group A) and nontuberculous lymphadenitis (group B). The demographic characteristics such as age, sex, address, signs and symptoms such as fever, anorexia, weight loss, night sweats, and local pain, clinical findings, tenderness and number, site of nodes and results of hematological and cytological investigations were compared between the two groups. All these 100 patients were subjected for the excisional biopsy and their histopathological findings were noted and compared with the FNAC findings.

RESULTS:
There were 53 male and 47 were female. The age ranged from 9 to 63 years. There were no significant differences in sex and age distribution (Table-1). Posterior triangle were found to be the commonest involved site (43%) followed by upper deep cervical (18%), submandibular (13%), supraclavicular (13%), lower deep cervical (11%) and preauricular (2%). The lymph nodes were unilateral in 77% cases and bilateral in 13% cases. The incidences of constitutional symptoms, like malaise, anorexia, weight loss, and fever were similar between the two groups as shown in Table-2. Hemoglobin, total white blood cell count, and differential count values were compared and found to be similar between the two groups. X-ray chest revealed parenchymatus lesion in 14% cases. The Mantoux test was positive in 32 cases.

Thirty nine patients were diagnosed as tuberculous lymphadenitis by FNAC showed caseating necrosis and epithelioid granuloma, 53 patients diagnosed as reactive lymphadenitis and no definitive diagnosis were made for 8 patients (Table-3). The excisional biopsy revealed 42 patients as tuberculous lymphadenitis with caseous necrosis and epithelioid granuloma and 56 were diagnosed as reactive lymphadenitis. Two patients were diagnosed as Non Hodgkin's Lymphoma. Out of the 39 patients, who were diagnosed tubercular lymphadenitis by FNAC, 36 patients showed caseating necrosis and epithelioid granuloma on the histopathological examination and remaining 3 patients showed reactive lymphadenitis. While 2 patients who were diagnosed as reactive lymphadenitis by FNAC were found to be tubercular on histopathological examination. Four patients, for whom no definitive diagnosis was made by FNAC, were diagnosed as tuberculosis on histopathological examination. In this study, sensitivity and specificity of FNAC in the diagnosis of the tuberculosis were 85.71% and 94.82% respectively.

DISCUSSION:
Cervical lymphadenitis has many etiological factors. In the regions where tuberculosis is endemic, tuberculous infection is a common cause. Male to female ratio is found to be minimal in both tubercular
Table 2. Clinical signs and symptoms of study patients with tuberculous and non-tuberculous lymphadenitis

<table>
<thead>
<tr>
<th>Sign or Symptoms</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (%)</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>Tenderness (%)</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td>Fever (%)</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Anorexia (%)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Weight loss (%)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Multiple Nodes (%)</td>
<td>67</td>
<td>56</td>
</tr>
</tbody>
</table>

Table 3. Results of fine needle aspiration cytology

<table>
<thead>
<tr>
<th>Findings</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caseating necrosis+</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Epitheloid granuloma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactive lymphadenitis</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Non diagnostic</td>
<td>08</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>61</td>
</tr>
</tbody>
</table>

and nontuberculous lymphadenitis with no obvious preponderance as in other studies like Dandapat et al.5, Bezabih et al.6 and Pandit et al.7

The definitive diagnosis of tuberculous cervical lymphadenitis had traditionally been difficult. In literature and textbooks patients with tuberculous lymphadenitis were often described as having nodes that were painless and matted, in addition to constitutional symptoms of fever, malaise, weight loss and night sweats.8 There are also no significant difference in terms of local and constitutional profile. This study showed that the classical picture of “scrofula” is no longer seen now-a-days and can probably be explained by the earlier presentation of the disease.9

In our study, posterior triangle group of node was most commonly affected in tubercular lymphadenitis in comparison to nontubercular lymphadenitis. Similar result was reported by Prasad et al.10, Baskota et al.11, Seth et al.12 and Dandapat et al.5. Similarly, mantoux test was positive in 24 and 8 patients of tubercular and nontubercular lymphadenitis. Among the 24 tubercular cases, 10 were children below 5 years. Thus mantoux test was positive in 10 out of total 15 children below five years. This showed that the mantoux test has significance in the diagnosis of tuberculosis in children below 5 years. Similar opinion was made in a study done by Gadre et al.13

Demonstration of mycobacteria by culture, zielh- Neelsen stains or histopathological examination is necessary for the definitive diagnosis of tuberculosis. However, both the methods for the diagnosis are either time consuming or invasive and can result in delay in the diagnosis and are not cost-effective.14 Excisional biopsy may leave an unsightly scar and pose a risk of sinus formation. FNAC has been shown to be sensitive, specific, cost-effective and less invasive.15 Our results support this fact, demonstrating a sensitivity and specificity 85.7% and 94.8% respectively. Thus, surgical excision may be avoided if the FNAC results show characteristic caseous necrosis and epitheloid granulomas. This would reduce the morbidity involved in the diagnosis of this condition. In a similar study done by Jha et al.9, FNAC yielded a positive diagnosis in 52 out of the 56 patients. Chao et al.16 showed that sensitivity and specificity of FNAC in the diagnosis of tubercular lymphadenitis is 88% and 96% respectively. Similar experience was observed in the studies carried out by Weiler et al.14, Ali- Mulhim et al.17, Bezabih et al.6 and Dandapat et al.5.

The efficacy of FNAC has been found to be as efficient as biopsy particularly in cases of tubercular lymphadenitis. FNAC being a simple outpatient diagnostic procedure is well accepted by patients and has practically no complaints.18 Similar opinion was made by Laus et al.19

**CONCLUSION:**

In cervical lymphadenitis, tuberculosis remains a common cause. Patients with tuberculous and non tuberculosis lymphadenitis have similar clinical features and hence are difficult to differentiate clinically. FNAC is a highly specific tool in the diagnosis of tuberculous lymphadenitis. The surgical excision may be avoided if the FNAC results show the characteristic caseous necrosis and epitheloid granuloma.

**REFERENCES:**

Microbiological Evaluation of an Active Tubotympanic Type of Chronic Suppurative Otitis Media

Objective: The purpose of this study was to isolate the organisms associated with a tubotympanic type of CSOM in a tertiary care centre and to detect the antibiogram of the isolates of the aerobic bacteria.

Materials & methods: One hundred and twelve aural swabs from the ears that were actively discharging of 110 patients were analysed from February 2008 to January 2009. Using pre-defined inclusion and exclusion criteria, the smears were obtained using sterile cotton microswabs, and cultured for microbial flora. Drug susceptibility testing was conducted using a modified Kirby Bauer disk diffusion method.

Results: The most common causal organisms isolated were Staphylococcus aureus (20.2%) followed by Pseudomonas aeruginosa (28.3%) amongst the 106 bacterial isolates. Fungi accounted for 1.8% of the isolates while 3.5% were anaerobes. The antimicrobial profile of the major isolates i.e. Staphylococcus aureus and Pseudomonas revealed maximum sensitivity to cephalosporins (83%, 100% respectively) and to fluoroquinolones (76%, 97% respectively).

Conclusion: Most of the isolates showed high sensitivity to cephalosporins and fluoroquinolones and at the same time high resistance to ampicillin and amoxicillin-clavulanic acid.

Keywords: Antibiotics, chronic otitis media, microbiology.

INTRODUCTION: Chronic suppurative otitis media (CSOM) has been a source of a tremendous health predicament since time immemorial and even today it is immensely intricate both for patients and an oto logical to deal with. It is a chronic inflammation of the mucoperiosteum of the middle ear cleft which leads to abundant discharge from the ear and hearing impairment that may have a serious long-term effect on language, auditory and cognitive development and on educational progress.1

In CSOM, bacteria can reach the middle ear from the nasopharynx through the Eustachian tube or from the external auditory canal via a perforated tympanic membrane. Various studies have shown that both gram positive and gram negative organisms are responsible for infection of middle ear, gram negative ones outnumbering the gram positive ones. The most common organisms associated with CSOM are Staphylococcus aureus and Pseudomonas. Others include Proteus, E. coli, Klebsiella, Enterobacter, non-fermenting gram negative bacteria and beta hemolytic Streptococcus.2

The role of anaerobes in CSOM is often questioned. They are mostly detected in cases with extensive cholesteatoma or granulation tissue. Fungal infection of the middle ear and meatus are common as fungi thrive well in moist pus. The most commonly seen fungi are Candida and Aspergillus.3

The basic principles of the medical management of CSOM are aural hygiene and the use of a topical antimicrobial agent. The indiscriminate and haphazard use of antibiotics and poor follow-up of these patients has resulted in the emergence of multiple resistant strains of bacteria and the persistence of low-grade infections.4

Knowledge of the prevailing flora and their susceptibility to antimicrobials will guide the clinician as to prescribing an empirical regimen so that a better and more specific management can be provided to the patients. Hence, this study is relevant in the present scenario. The purpose of this study was to isolate the organisms associated with CSOM and to detect the antibiogram of the aerobic isolates.

MATERIALS AND METHODS: This prospective study was conducted in the Department of Otorhinolaryngology of a tertiary care centre in Uttarakhand over a period of 12 months from February 2008 to January 2009. One hundred and twelve (112) actively discharging ears of 110 patients afflicted with a tubotympanic type of CSOM were included in this study. The age of the patients ranged from six to 70 years old and the median age was 27.17 with a standard deviation of 16.88. The commonest age range of presentation was 11-20 and 21-30, consisting of 25 (22.7%) cases in each category. Males outnumbered females (1.3:1). The disease was more prevalent in the lowest socio-economic group (36.4%) of the patients under study.

Only those patients aged over six and showing an active tubotympanic type of CSOM diagnosed on the basis of an anamnesis of the current disease and an otoscopic examination were included in the study. Patients using topical or systemic antibiotics for more than a week were excluded. Moreover, patients with an inactive tubotympanic type of CSOM, CSOM with cholesteatoma, aural polyp or granulation, inflammatory external ear diseases, malignancy of the ear, an ear that had undergone surgery and those with debilitating diseases such as diabetes or immunosuppressive diseases were also not included in the study.

The external auditory canal of the discharging ear was cleaned by suction. Material for culture was obtained from the affected ear/s using thin sterile cotton wool micro-swabs with full aseptic precautions taken while using a microscope. Swabs were taken from the middle ear in the case of large and medium-sized perforations and from the surface of perforations when these were small. All the swabs were immediately processed in the Department of Microbiology by using Gram’s stain and a KOH mount. They were cultured on Blood agar, MacConkey’s and Chocolate agar for aerobic bacterial culture; and in Robertson’s cooked meat media (RCM) / Thioglycolate media for anaerobic culture. Aerobic bacterial cultures were incubated at 37°C for 24 hours. The reading of the plate, colony identification and the recording of results were performed as per standard microbiological methods.5

A subculture from RCM was cultivated on freshly prepared plates of blood agar and MacConkey’s agar and the plates immediately put into a McIntosh Filides jar with Gaspack for anaerobic incubation. The plates were examined after 48 hours of incubation. Fungal culture was performed on Sabouraud’s dextrose agar as required. Anti-microbial sensitivity of aerobic bacteria was carried out using the Kirby Bauer Disc diffusion technique. The data thus obtained underwent standard statistical analysis.
RESULTS:
From the 110 patients who had a tubotympanic type of CSOM, a total of 112 ear swabs were collected and sent to a laboratory so that the formation of offending organism could be isolated and to evaluate the microbial sensitivity pattern against antibiotics.

Out of the 112 swabs, 22 (19.7%) were sterile, while 90 (80.3%) yielded growth of organisms and a total of 108 organisms were isolated. A total of 106 bacteria were cultured from 88 ears (78.5%) while two (1.8%) ears revealed fungal growth of Candida (Fig-1).

![Culture of swabs](image)

**Fig: 1. Distribution of the groups of the organism in culture**

**bacteria taken from the middle ear culture while material taken from 17 ears had two or more organisms isolated. Out of 17 polymicrobial growths, 16 cultures revealed a combination of two bacteria while one culture possessed three bacteria. The most common combination was that of Staphylococcus aureus with Pseudomonas species in four cultures (Fig-2). Amongst the 88 bacterial culture positive swabs, 79 were pure aerobic, Table: 2. Antibiotic profile of organisms**

![Antibiotic profile of organisms](image)

**Table: 2. Antibiotic profile of organisms**

<table>
<thead>
<tr>
<th>Organism</th>
<th>Amp</th>
<th>Amox</th>
<th>Macro</th>
<th>Amino</th>
<th>Cepha</th>
<th>Fluoro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus</td>
<td>36%</td>
<td>55%</td>
<td>18%</td>
<td>55%</td>
<td>76%</td>
<td>83%</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>41%</td>
<td>63%</td>
<td>23%</td>
<td>11%</td>
<td>59%</td>
<td>34%</td>
</tr>
<tr>
<td>Pseudomonas</td>
<td>23%</td>
<td>15%</td>
<td>22%</td>
<td>60%</td>
<td>97%</td>
<td>100%</td>
</tr>
<tr>
<td>Proteus</td>
<td>17%</td>
<td>19%</td>
<td>34%</td>
<td>67%</td>
<td>86%</td>
<td>90%</td>
</tr>
</tbody>
</table>

**Amp = Ampicillin; Amox = Amoxicillin; Macro = Macrolides; Amino = Aminoglycosides; Cepha = Cephalexin; Fluoro = Fluoroquinolones.**

four pure anaerobic while five swabs revealed a mixed aerobic and anaerobic growth. Out of 106 bacteria isolated after culture, the majority were gram negative (59, 55.6%) as compared to gram positive bacteria (47, 44.4%). Pseudomonas (30, 28.3%) were the commonest bacteria isolated in the gram negative group followed by Proteus in eight cases and E. coli in four cases. However, Staphylococcus (31, 29.2%) outnumbered the other organisms as a whole and in the gram positive group (Table-1).

The antimicrobial profile of the microorganisms tested revealed that both for gram positive and gram-negative organisms, cephalexin and fluroquinolones showed maximum sensitivity with (83%, 76%) and (100%, 97%) sensitivity for Staphylococcus and Pseudomonas respectively (Table -2, Fig-3).

DISCUSSION:
In the present study the age groups with the highest percentage of presentation of these problems were 11-20 and 21-30 years, there being 25 (22.7%) cases in each of these age ranges. These findings were consistent with the findings of Shrestha & Sinha4 and Singh & Safaya. The basis for delayed presentation may be due to the ignorance of and/or the economic restraints on the patients with regard to their seeking health services at an early stage of the complaint.

CSOM was more common in males (56.3%) as compared to females (43.7%). An analogous conclusion has been made by other researchers such as Chandra & Mishra, Mukherjee et al and Hossain et al. The predominant cause of the disease in males was due to their outdoor working habits exposing them to contamination and contagion.

In our study no growth was seen in 22 swabs (19.7%) while 90 (80.3%) swabs were positive for the growth of microorganisms. Similar studies by Gulati & Kumar showed 22% cases with no growth and Nikahkhlagh et al reported no microbial growth in 18% cases. Low positivity rate in our study could be because of the fact that our hospital is a tertiary care centre. Patients usually come to us after having sought medical advice from local doctors and having taken multiple or incomplete course of antibiotics. It may also be because they have not revealed to us the prior administration/ instillation of antibiotics that could have hampered microbial growth in these cases. Secondly, certain organisms like Mycoplasma and Chlamydia are difficult to grow using routine culture methods and may have been missed in the present study.

In our study, out of 88 bacterial cultures, multiple microorganisms were isolated in 17 (19.3%) swabs while, a single bacterium was present in 71 (80.7%). Amongst the polymicrobial culture, two organisms were isolated in 16 cultures with the most common being Staphylococcus with Pseudomonas. The combination of Pseudomonas with Fusobacterium and Peptostreptococcus was seen in one swab. Poorly

![Antibiotic profile of organisms](image)

**Table: 1. Types of Organism is olded**

<table>
<thead>
<tr>
<th>Microbial isolation</th>
<th>Number of ears</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monomicrobial</td>
<td>73</td>
<td>81.1%</td>
</tr>
<tr>
<td>Bacterial</td>
<td>71</td>
<td>18.9%</td>
</tr>
<tr>
<td>Fungal</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Isolate</th>
<th>Number of ears</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudomonas sp</td>
<td>30</td>
<td>28.3%</td>
</tr>
<tr>
<td>Proteus sp</td>
<td>8</td>
<td>07.5%</td>
</tr>
<tr>
<td>E. coli</td>
<td>4</td>
<td>03.7%</td>
</tr>
<tr>
<td>Klebsiella sp</td>
<td>4</td>
<td>03.7%</td>
</tr>
<tr>
<td>Acinetobacter sp</td>
<td>2</td>
<td>01.9%</td>
</tr>
<tr>
<td>Enterobacter sp</td>
<td>3</td>
<td>02.8%</td>
</tr>
<tr>
<td>Citrobacter</td>
<td>2</td>
<td>01.9%</td>
</tr>
<tr>
<td>Bacteroides</td>
<td>1</td>
<td>0.90%</td>
</tr>
<tr>
<td>Fusobacterium</td>
<td>5</td>
<td>04.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Isolate</th>
<th>Number of ears</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>31</td>
<td>29.2%</td>
</tr>
<tr>
<td>Coagulase negative staph</td>
<td>7</td>
<td>06.6%</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>4</td>
<td>03.7%</td>
</tr>
<tr>
<td>Peptostreptococcus</td>
<td>3</td>
<td>02.8%</td>
</tr>
<tr>
<td>Veillonella sp</td>
<td>2</td>
<td>01.8%</td>
</tr>
</tbody>
</table>
& Iyer13 and Kumar et al14 also showed a lesser number of mixed isolates. A lesser number of polymicrobial isolates could perhaps be due to the changing pattern of the process of the disease, the increasing trend of using combined antimicrobials and some other unknown factors that need to be sought out by further research.

Amongst the 106 micro-organisms identified on a bacterial culture, the commonest isolate was Staphylococcus aureus, appearing in 31 (29.24%) ears. A similar number of isolates has been reported by Kukreja et al15 (33.9%), Freidmann et study16 (32.7%), Nikakhlagh et al17 (32.4%) and Ettehad et al17 (31.1%). The commonest pathogen was also observed by Pajor et al18 and Ayon et al19 in their respective studies. These authors give an explanation of how the close relationship between the auditory tube and the upper tract is related to the high incidence of Staphylococcus aureus.

In second place after Staphylococcus aureus was Pseudomonas in 30 ears (28.30%). It was also isolated as one of the predominant organisms by Iyer et al20, Poorey & Iyer21, Maji et al21, Kumar et al14 and Indudharan et al22. The occurrence of Pseudomonas aeruginosa as the prime offender can be attributed to various factors. Pseudomonas, survives competition with other pathogens due to its minimal nutritional requirement and its armamentarium of antibacterial products, pectolin and bacteriocin. Vartiainen & Vartiainen18 postulated that Pseudomonas has the ability to carboxylate a niche for itself in local infection through the necrotizing activities of its extracellular enzymes. The physical characteristics of the niche, a damaged epithelium, interrupted circulation and devitalized tissue provide the organism from normal host defense mechanisms and antibiotic agents. In addition, the organism acts as an opportunistic pathogen, flourishes in the external auditory canal and may cause supplicative disease in contiguous sites.

Anaerobic bacteria were not a significant pathogen in the present study. Pure anaerobic isolation was almost negligible and only seen in four (4.5%) ears. Mixed growth with aerobes was observed in five (5.7%) ears. The most common anaerobic organism isolated was Fusobacterium followed by Bacteroides and Peptostreptococcus. Ibekele et al, Maji et al21 and Indudharan et al22 also found negligible anaerobic isolation. The lower isolation rate can be attributed to the fact that anaerobes are usually associated with cholesteatoma and granulation tissue and our study was on a tubotympanic variety of CSOM.

In our study, the sensitivity of Staphylococcus aureus to ampicillin, amoxicillin-clavulanic acid, macrolides, aminoglycosides, cephalosporins and fluoroquinolones were 36%, 55%, 18%, 55%, 76% and 83% respectively. This was in accordance with studies by Maji et al21 and Bairy et al.20

The microbial sensitivity of Pseudomonas revealed that all the isolates were sensitive to tobramycin. 90% were sensitive to cephalosporin group and 60% to aminoglycosides. Only 23%, 22% and 15% were sensitive to ampicillin, macrolides and amoxicillin-clavulanic acid respectively. Similar data were obtained by Indudharan et al22. Loy et al24 and Ettehad et al.17 Bairy et al20 concluded that amoxicillin (1.5%) and amoxicillin-clavulanic acid (6.3%) were the least effective antibiotics. Data from Ayon et al21 study showed only 35.7% sensitivity to penicillins while 85.7% were sensitive to Fluoroquinolones and 83.3% were sensitive to amikacin.

However, some results have shown a much lower sensitivity pattern for fluoroquinolones. Kumar et al14 reported only 63.2% sensitivity for ofloxacin and 59.6% sensitivity for ciprofloxacin. Similarly, Maji et al21 showed a 46.6% sensitivity rate of ciprofloxacin. The decreased sensitivity of Pseudomonas to the quinolone family, to which it was highly sensitive until recently, is indicative of the rapid appearance of antibiotic resistant strains of Pseudomonas which is a matter of great concern.

Other isolates in the present study also showed high sensitivity to cephalosporins and fluoroquinolones while displaying a high resistance to ampicillin and amoxicillin-clavulanic acid. Thus it can be aptly said that the strains that were sensitive to commonly used drugs like ampicillin, amoxicillin have developed resistance but have retained sensitivity to quinolones, cephalosporins and aminoglycosides.

CONCLUSION:
The result of the present study and its similarity with the number of recent published articles clearly indicate high resistance to various antimicrobials. This might have been due to the widespread and injudicious use of primitive antimicrobials which has led to their having been rendered ineffective. The patients belonging to the lowest socio-economic group for whom health care facilities are greatly lacking in resources avail themselves of indigenous methods or consult unqualified medical practitioners, who recommend they take the more commonly available and cheaper antibiotics of an earlier generation but do not carry out antibiotic sensitivity tests. These factors further increase the chances of the microorganisms being resistant to such antibiotics. However, the new generation of antibiotics have shown an outstanding sensitivity pattern as exemplified both in the published literature and in the present study. Thus judicious use of antibiotics following antibiotic sensitivity tests should be standard practice so as to limit the emergence of drug resistant isolates and to provide an appropriate clinical response.

REFERENCES:
Early Complications of Total Laryngectomy: A Retrospective Study

Objective:
To observe the various complications following total laryngectomy.

Materials and Methods:
This is a retrospective study carried out in 54 patients at Ganesh Man Singh Memorial Academy of ENT and Head and Neck Studies, TU Teaching Hospital, between April 2004 and January 2009. All patients who underwent total laryngectomy for histopathologically proven carcinoma larynx and pyriform fossa sinus of various types were included. Complications during early postoperative period (within 2 weeks) were noted. Statistical analysis was done by simple manual analysis using frequency and percentage.

Results:
There were 54 patients included in the study, 48 males (88.88%) and 6 (11.12%) females. The age of patients ranged from 38 years to 78 years with an average of 58 years. Twenty patients developed complications postoperatively. Most common complications were pharyngocutaneous fistula (6 patients), wound infection (4 patients) and superficial flap necrosis followed by wound haematoma (2 patients) and chylous fistula (2 patients).

Conclusion:
Pharyngocutaneous fistula and wound infections are the most common complications after total laryngectomy. Assessment of risk factors and early recognition of complications are necessary to reduce the complications after total laryngectomy.

Keywords:
Laryngeal cancer, total laryngectomy, early complications.

INTRODUCTION:
Laryngeal cancer is an important malignancy in head and neck region. There are many therapeutic options available for the treatment of laryngeal cancer. These include total laryngectomy, chemo-radiation therapy or combined therapy.1

Total laryngectomy is a radical procedure, which involves removal of whole of the larynx. This procedure is useful in the treatment of advanced laryngeal cancer 2 and as a salvage procedure when previous partial laryngeal surgery or radiotherapy has failed.1 Complications following total laryngectomy can cause serious implications on the final outcome of the treatment, like pharyngocutaneous fistula, wound infection, flap necrosis, haematoma, chyle fistula, and carotid blow out which can prolong hospitalization and increase morbidity. The risk factors involved in the development of these complications should also be recognized and avoidance of these risk factors will reduce the occurrence of complications. This study was done to observe the various complications following total laryngectomy.

MATERIALS AND METHODS:
This retrospective study was conducted at Ganesh Man Singh Memorial Academy of ENT and Head and Neck Studies, TU Teaching Hospital, between April 2004 and January 2009. All patients who underwent total laryngectomy for histopathologically proven carcinoma larynx and pyriform fossa sinus of various types were included. Complications during early postoperative period (within 2 weeks) were noted. Statistical analysis was done by simple manual analysis using frequency and percentage.

RESULTS:
There were 54 patients included in the study, with 48 males and 6 females. The age of the patients ranged from 38 years to 78 years with an average age of 58 years. Out of these 54 patients, 20 patients developed complications. Most common complication was pharyngocutaneous fistula (6 patients, 30%) which was developed from seventh to twelfth post-operative day following surgery. It was managed conservatively in 5 patients and surgical repair was done in 1 patient. Wound infection was second most common complication (4 patients, 20%). Other common complications were superficial flap necrosis (3 patients, 15%), chylous fistula (2 patient, 10%) and wound haematoma (2 patients, 10%). (Table: 1).

DISCUSSION:
Carcinoma of larynx accounts for 40% of all head and neck malignancies.3 Its incidence varies worldwide. In our study, the mean age of patients was around 58 years with male preponderance. The main forms of treatment for head and neck cancer include surgery and radiotherapy. Initially, these are used aiming for cure. However, in some circumstances, they serve as a palliative treatment, depending on the type of tumor, extension, clinical condition and patient preferences. The correct diagnosis and staging are essential in the decision making process.4 Other factors, which should be considered, are age and general condition of patient, hospital facilities available and experience of surgical team.

Table: 1. Types of complications after total laryngectomy

<table>
<thead>
<tr>
<th>Complications</th>
<th>Number of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharyngocutaneous fistula</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Wound infection</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Superficial flap necrosis</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Wound haematoma</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Chylous fistula</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Flap edema</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

Total laryngectomy consists of the complete resection of the cartilaginous larynx, the hyoid bone and the infra-hyoid muscles connected to the larynx. This surgical procedure is associated with bilateral anterior selective cervical dissections, (levels II, III and IV).5 Among postoperative complications after total laryngectomy, hemorrhages, bruises, respiratory obstructions, infection of the surgical wound and pharyngocutaneous fistula are noteworthy.5 The reported incidence of wound complications are 38-53%, and those after pretreatment with radio-therapy alone and in combination with chemotherapy were 37-74% and 46-100%, respectively.6 Although the subjects and methods varied among reports, these findings...
indicated that the incidence of complications was higher when concomitant radiotherapy and chemotherapy was performed. In our study, the incidence of wound complications was 37%. Risk factors of head and neck surgery for wound complications (including fistula) are preoperative radiotherapy, preoperative chemoradiation, preoperative chemotherapy, age, stage, internal medical complications, preoperative weight loss, positive stumps, and a history of habitual alcohol drinking.\(^7\)

Development of pharyngocutaneous fistula (PCF) is the most common and troublesome postoperative complication following laryngectomy. Billroth was the first person to report PCF as a complication.\(^8\) PCF after laryngectomy occurs when there is a failure in the pharyngeal repair resulting in a salivary leak.\(^9\) This is a demoralizing complication not only for the surgeons involved, but also for the patient and his family. Its occurrence leads to increased morbidity, delay in adjuvant treatment, prolonged hospitalization, and increased treatment costs.\(^9,10\) A rate between 13% and 25% has been often reported and only few reports had a rate of less than 10%.\(^10,11\) In our study, six patients (30%) developed this condition.

Preoperative radiotherapy is reported as a significant risk factor in the development of pharyngocutaneous fistula,\(^12\) but some feel that this is not statistically significant.\(^13\) In our study, one patient who received preoperative radiotherapy developed postoperative pharyngocutaneous fistula. Positive surgical margins, extended hypopharyngeal mucosal excision and low haemoglobin level have also been reported as risk factors for the development of pharyngocutaneous fistula.\(^13\) In our study low postoperative haemoglobin level (less than 10 gm/dl) was present in all patients who developed pharyngocutaneous fistula. Spontaneous closure of fistula with conservative measures has been reported in 70% of cases,\(^14\) which is lower than in our study. This recent study revealed that 83.3% fistula closed spontaneously without any surgical intervention.

Postoperative wound infections are major source of infectious morbidity in total laryngectomy patients. The overall incidence of postoperative wound infection after major head and neck surgery is 23% and this becomes higher in those patients who have received preoperative radiotherapy.\(^15\) Administration of prophylactic antibiotics reduces the risk of postoperative infection. In total laryngectomy patients, we gave 1 gm ceftriaxone with 500 mg of metronidazole for surgical prophylaxis. Despite these measures, four patients (20%) developed postoperative wound infection. All the patients who developed postoperative wound infection were given postoperative cephalosporins and metronidazole. Other complications that occurred in our patients include dysphagia, chylos fistula, wound haematoma, superficial flap necrosis and flap edema which is similar to other series.\(^4,15\)

**CONCLUSION:**

Pharyngocutaneous fistula, wound infection and superficial flap necrosis are most common complications following total laryngectomy in early post operative period followed by wound haematoma and flap oedema. Assessment of risk factors and early recognition of complications are necessary to reduce the complications after total laryngectomy. This is a preliminary study in a tertiary care centre of Nepal.

**REFERENCES:**

Neurofibroma of Middle Meatus: A case report and Review of Literature

This is a case report of a 46 years old female diagnosed to be neurofibroma arising from the left middle meatus. She underwent endoscopic sinus surgery and there is no recurrence till 3 months. A short review of literature is also presented.

**Keywords:**
Neurofibroma, middle meatus, endoscopic sinus surgery.

**INTRODUCTION:**
Peripheral nerve sheath tumours are divided into neurofibroma, schwannoma and neurogenic sarcoma. Neurofibroma and Schwannoma are classified as benign and both are believed to arise from a common origin - the Schwann cell.1 Though these neurogenic tumors are found in the head, neck and flexural surfaces of the upper and lower limbs, their affection of nose and paranasal sinuses in the reported literatures have been far and few.2 In this paper, neurofibroma arising from left middle meatus is described along with a review of literature.

**CASE REPORT:**
A 46 years old female from Kathmandu presented to us with left sided nasal obstruction for 4 months. It was insidious, gradually progressive, partial, continuous aggravated by upper respiratory tract infection. There was no history of excessive sneezing, nasal discharge, nasal bleeding or headache. There was no systemic history in the past.

On examination, she was of average built and well nourished. The osteocartilaginous framework of the nose appeared normal with decreased patency on the left side. Anterior rhinoscopy revealed a pinkish, polypoidal mass occupying left middle meatus. It was soft, non shrinkable, did not bleed on touch and probe could be passed superiorly, medially, inferiorly but not laterally. The contralateral nostril and posterior rhinoscopy were normal. There were no enlarged lymph nodes in the neck, and ear and throat examination were normal. Her systemic examination, preoperative investigations and chest radiograph was normal.

Computed tomography (CT) scan was suggestive of a soft tissue density mass obliterating the left nasal cavity (Fig-1). There was no bony erosion or antral soft tissue extension. She underwent endoscopic sinus surgery under general anaesthesia. Per operatively a pinkish, pedunculated, leafy mass was seen arising from the left middle meatus. With a straight forceps the mass was avulsed in toto. On cross section it was firm in consistency. Nasal cavity was packed with gel foam following surgery and the patient was sent home on second postoperative day.

Postoperatively, the histopathology report of the operated specimen showed nasal tissue with submucosal nodules composed of spindle cells with wavy nuclei and scanty cytoplasm separated by wavy collagen fibres and myxoid stroma. Mast cells were also seen. So, histopathological examination was considered to be neurofibroma (Fig-2& Fig-3). The patient has turned up twice for follow up in the OPD- once at one week following discharge and the other three months later and no recurrence has been seen.

**DISCUSSION:**
Neurofibromas are benign, heterogeneous peripheral nerve sheath tumors that arise from the connective tissue of peripheral nerve sheaths, especially the endoneurium.3 In the area of the nose and paranasal sinuses, neurofibroma arises from the first and second division of the trigeminal nerve and from autonomic plexuses.1,2 The olfactory nerve can be excluded as a possible origin for these tumors, since the olfactory nerve contains no Schwann cells.2

They may occur as an isolated, sporadic lesions but are much more common in association with neurofibromatosis type1,4 Solitary neurofibromas of the maxillary sinus are exceedingly rare tumors.4 Therefore, cases suspicious for neurosiroma or neurofibromatosis, i.e., with café-au-lait spots and nodules indicative of cutaneous neurofibroma, should be thoroughly examined to exclude the possibility of neurofiromatosis.5 In our case, the patient showed no skin pigmentation or nodule and was believed to have a solitary neurofibroma.

Depending on their location and size, neurofibromas of the nose and paranasal sinuses may present with a variety of signs and non-speciﬁc symptoms, including nasal obstruction, epistaxis, rhinorrhoea, epiphora, anosmia, facial swelling, headache and serous otitis media.2,4,6,7 Despite their indolent growth rate, neurofibromas can occasionally become very large, resulting in local bony destruction and intracranial extension. The tumours may distort tissues by pressure
vimentin. However in our case, immunohistochemistry could not be done due to lack of readily available facilities, financial constraint, lack of patient compliance and unwillingness on the part of the patient for the same.

Neurofibromas have to be differentiated from schwannomas and malignant peripheral nerve sheath tumors (MPNST). Schwannomas have a typical palisade pattern of the nuclei and tumor cell density is higher compared within neurofibromas, which usually show a mucoid extracellular matrix with only scattered tumor cells. MPNSTs are characterized by hypercellularity and pleomorphic tumor cells and nuclei, features not presented by this tumor. Other spindle cell lesions such as fibrosarcoma, synovial sarcoma, and brous histiocytoma are uniformly S-100 protein-negative.

Solitary neurofibroma should be closely followed up following surgery because the malignant transformation of solitary neurofibroma is also possible. Recurrence is rare, although neurofibroma recurs more often than schwannoma. But malignant transformation is reported to be at the rate of 10 per cent. For this reason the patient has been kept on close follow up.

CONCLUSION:
Neurofibroma of the middle meatus is a rare disease. To the best of our knowledge, this case report is the first of its kind reported from Nepal.

REFERENCES:

or become symptomatic by obstruction of a sinus ostium. Neurofibromas involving the sinonasal tract are predominantly solitary lesions. Their clinical presentation and imaging characteristics are not easily distinguishable from those of other sinonasal tumours. Naso-endoscopy may often add further information by identifying the origin of the tumour. CT scan is particularly important in the initial assessment in order to evaluate the origin, localisation and extension of the lesion.

Microscopically, neurofibromas are composed of a cellular proliferation of randomly arranged, spindle-shaped cells with fusiform or wavy, comma-shaped nuclei distributed on a background of a sibro-myxoid matrix, rich in mucopolysaccharides. Immunohistochemically, neurofibromas show immunoreactivity for S-100 protein, NSE, and...
Gastric Heterotopia Nasopharynx

Gastric heterotopia in the nasopharynx is a rare condition. We present a 5 months baby with nasopharyngeal gastric heterotopia which was treated by excision via transpalatal approach.

**Keywords:** Heterotopia, nasopharynx, excision.

**Introduction:**
Nasopharyngeal mass in infants ranges from hamartoma, encephalocele, dermoid cyst, neurofibroma, lymphangioma, hemangioma and teratoma. But gastric heterotopia in the nasopharynx is rare. We present a rare case of nasopharyngeal gastric heterotopia in a 5 months old baby.

**Case Report:**
A 5 months old female child was brought to the ENT Out Patient Department with complaints of noisy breathing, left nasal discharge since early childhood and left nasal mass since 2 months. Examination of nose and paranasal (PNS) sinuses showed a pale mass occupying bilateral nasal cavity and the nasopharynx. Biopsy was taken from the mass under GA which was suggestive of inflammatory polyp. CT scan of nose and PNS showed a 4.4X2.1X1.7 cm mixed tissue density occupying the left nasal cavity with posterior extension to left choana, posterior half of right nasal cavity and roof of nasopharynx. There was no bony erosion or intracranial extension noted (Fig-1). MRI brain showed heterogeneous signal intensity mass in nasal cavity with dominant involvement of left side with extension in nasopharynx and oropharynx (Fig-2). The nasopharyngeal mass was then excised by transpalatal approach. There was a single pinkish mass in the bilateral nasal cavity (left-right) and in the nasopharynx (Fig-3). The gross specimen showed elongated, tubular mass around 6x1cm in size. On cut section, it contained brownish thick material. Histopathological examination showed full thickness colonic tissue with lamina propria, muscular layer and serosal layer, well formed goblet cells and lymphoid tissue. The lumen contained homogenous proteinaceous material. Nasal mucosa was not seen (Fig -4). Left nasal cavity was stented using endotracheal tube size 3 which was removed post operatively after three weeks.

**Discussion:**
Heterotopia is a benign mass of histologically normal tissue present at abnormal sites.\(^1\),\(^2\) There have been reports of nasopharyngeal heterotopia consisting of brain tissue, cartilage, skin\(^2\), but nasopharyngeal gastric heterotopia is a rare condition. The common sites of gastric heterotopia are upper oesophagus, small and large intestine, Meckel’s diverticulum and less frequently the midline neck.
oral cavity, submandibular gland.\textsuperscript{1} The occurrence of nasopharyngeal gastric heterotopia has been thought to be of developmental origin. Embryologically the nasopharynx is derived from the primitive gut. The gastric heterotopia at this site could originate from islands of endoderm from the primordial stomach which separate and differentiate into gastric epithelium.\textsuperscript{2}

Most gastric heterotopias are asymptomatic\textsuperscript{1,3} but those located in the oral cavity and pharynx can cause dysphagia and airway obstruction.\textsuperscript{1} Our patient had bilateral nasal obstruction without feeding difficulty. Surgical excision is the treatment of choice for gastric heterotopia in nasopharynx taking special attention to maintain the airway.\textsuperscript{1,2,3,4} In our patient, a stent was kept in the left nasal cavity to keep the nasal airway patent and the child has no respiratory difficulty post operatively.

**CONCLUSION:**

Nasopharyngeal gastric heterotopia is a rare condition presenting as nasal obstruction in children surgical excision is the treatment of choice for this condition.

**REFERENCES:**

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**R Acharya**

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**Accuracy of References in Different Speciality Medical Journals of Nepal**

**Objective:**
This study was undertaken to find out the accuracy of references in different speciality medical journals of Nepal.

**Materials and methods:**
Out of 7 speciality journals of Nepal, 90 references were randomly selected from Journal of Nepal Paediatric Society, Nepal Journal of Obstetrics and Gynaecology and Nepalese Journal of Ophthalmology. Thirty references were chosen from volume 30, number 1 and 2, 2010 issue of Journal of Nepal Paediatric Society; volume 4, number 1, 2009 issue of Journal of Obstetrics and Gynaecology; Volume 2, issue 4, Number 2, 2010 issue of Nepalese Journal of Ophthalmology. References were examined in details and compared with the original for accuracy, using six elements. Statistical analysis was done by using frequency and percentage.

**Results:**
Results shows that 33.3% references in Journal of Nepal Paediatric Society, 43.3% references in Nepal Journal of Obstetrics and Gynaecology, and 50.0% references in Nepalese Journal of Ophthalmology (in sample journal issues) were incorrect. Most common errors in all these three journals were the name of the journal name and author’s name. Errors in one element of references were found in 90.0%, 76.9% and 66.7% in the randomly collected issues of Journal of Nepal Paediatric Society, Nepal Journal of Obstetrics and Gynaecology and Nepalese Journal of Ophthalmology respectively.

**Conclusion:**
Errors in citing the references are found in different specialty medical journals of Nepal. The majority of errors are can be avoided if the authors, editors and the reviewers become cautious about it before publication.

**Keywords:**
References, accuracy, specialty medical journals.

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**INTRODUCTION:**
References in a scientific publication are the source of information for the readers. It helps the readers, reviewers and editors to easily locate the publications cited by authors. They serve as an important tool in providing credibility to the published literature and help in retrieval of the cited and related information. To be useful, references need to be cited and quoted correctly.1

It is very important for the references to be correct as incorrect references frustrate the reader while searching for related articles.2 Despite editorial instructions for checking the references accurately before a manuscript submission for publication and availability of various electronic resources, this continues as a major problem in almost all the specialty journals. It is primarily the responsibility of authors to check the references against the original documents and to format these according to the guidelines given by the journal when submitting manuscript. A good scientific journal needs to be accurate in references cited, moreover it is the right of the reader to be faciliated by providing accurate references and hence it becomes the shared responsibility of the contributors and editorial board.3

The errors in citations of medical journals were first identified in 1950 and after that many studies have evaluated the accuracy of references in the published medical journals (general and specialty) in other countries, which reported error rates ranging from 3% to 60%.1,5,6 Nevertheless, no similar studies have been conducted in Nepal regarding the accuracy of references of specialty medical journals of Nepal. So, this study was undertaken to find out the accuracy of references in different specialist journals of Nepal.

**MATERIAL AND METHODS:**
Out of 7 speciality journals of Nepal, 90 references were randomly selected from Journal of Nepal Paediatric Society, Nepal Journal of Obstetrics and Gynaecology and Nepalese Journal of Ophthalmology. Thirty references were chosen from volume 30, number 1 and 2, 2010 issue of Journal of Nepal Paediatric Society; volume 4, number 1, 2009 issue of Journal of Obstetrics and Gynaecology; Volume 2, issue 4, Number 2, 2010 issue of Nepalese Journal of Ophthalmology. The instructions for authors for all these journals were checked carefully. References from Journal of Surgical Society of Nepal, Nepal Journal of Neuroscience and The Nepalese Journal of Psychiatry were not studied. All these journals have not updated their website so that article could not be retrieved. Regarding Nepalese Journal of ENT and Head and Neck Surgery, it has published only the first issue till now.

So, this journal was also excluded from the study. To the best of our knowledge, on extensive search on the internet, we could not find any journals of other specialty in Nepal. References were examined in details and compared them with the original for accuracy, using the following six elements: authors; including spelling, initials, order and number; title, including spelling and punctuation; journal name, including use of correct abbreviation as listed in Index Medicus; year; volume; and page numbers, including first and last page numbers.

Citations were considered incorrect if there was an error in any of these six elements. When there is more than one error, it is counted as one but a multiple error. References not cited from indexed journals were excluded. References from book citation, chapter citation, electronic citation and article in press were excluded. Statistical analysis was done by using frequency and percentage.

**RESULTS:**
Results shows that 33.3% references in Journal of Nepal Paediatric Society, 43.3% references in Nepal Journal of Obstetrics and Gynaecology, and 50.0% references in Nepalese Journal of Ophthalmology were incorrect. Most common errors in all these three journals were journal name and author’s name. Journal name was found to be incorrect in 16.7% in Journal of Nepal Paediatric Society, 13.30% in Nepal Journal of Obstetrics and Gynaecology and 23.4% in Nepalese Journal of Ophthalmology. Least common errors in citing references in all these journals were the year and volume number (Table 1). Errors in one element were found in 90.0%, 76.9% and 66.7% in Journal of Nepal Paediatric Society, Nepal Journal of Obstetrics and Gynaecology and Nepalese Journal of Ophthalmology respectively.

**Table 1. Frequency of reference errors in specialty medical journals**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Author’s name</td>
<td>4 (13.3%)</td>
<td>4 (13.3%)</td>
<td>4 (13.3%)</td>
</tr>
<tr>
<td>Title</td>
<td>0</td>
<td>2 (6.7%)</td>
<td>1 (3.3%)</td>
</tr>
<tr>
<td>Journal Name</td>
<td>* (16.7%)</td>
<td>4 (13.3%)</td>
<td>7 (23.4%)</td>
</tr>
<tr>
<td>Year</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Volume number</td>
<td>1* (3.3%)</td>
<td>1* (3.3%)</td>
<td>1* (3.3%)</td>
</tr>
<tr>
<td>Page number</td>
<td>1* (3.3%)</td>
<td>2 (6.7%)</td>
<td>2 (6.7%)</td>
</tr>
<tr>
<td>Total error</td>
<td>10 (33.3%)</td>
<td>13 (43.3%)</td>
<td>15 (50.0%)</td>
</tr>
</tbody>
</table>

(*) indicates that there was error in that component but it is multiple error and is counted in other element.
Table 2: Types of error in quoting the references

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Error in one elements</td>
<td>9 (90.0%)</td>
<td>10 (10.0%)</td>
<td>10 (66.7%)</td>
</tr>
<tr>
<td>Error in two elements</td>
<td>0</td>
<td>2 (15.4%)</td>
<td>3 (20.0%)</td>
</tr>
<tr>
<td>Error in more than two elements</td>
<td>1 (10.0%)</td>
<td>1 (7.7%)</td>
<td>2 (13.3%)</td>
</tr>
</tbody>
</table>

Table 3: Examples in citing the references in speciality medical journals

The corrected one is indicated by bold letters [1- uncorrected one and 2- corrected one]

**Journal of Nepal Paediatric Society**


**Journal name spelling error**


**Page number error (also author's name and Journal name error)**


**Nepal Journal of Obstetrics and Gynaecology**

**Author's name error**


**Article title error (also journal name error)**


**Page number error**


**Journal name, year, volume number and page number error**

1. Tsai HJ, Chen SC, Wei HY, Chen GD. Hypothyroidism and Hyperlipidemia with a Virilizing Ovarian sterile cell tumor, Not Otherwise Specified.

**Nepalese Journal of Ophthalmology**

**Page number error**


**Journal name error**


**Missing 4th author**


(Table 2). Some of the examples of errors in citing the references in each of the four journals are given in Table 3.

**DISCUSSION:**

List of references are very important part of any publication. This is so because the cited references form the basis on which the reported work intends to build on. Therefore, cited references must be correct. Unfortunately, cited references have been found to be inaccurate in every journal in which they have been examined, in this study. Most medical journals follow the “Uniform Requirements for Manuscripts Submitted to Biomedical Journals,” which follow the Vancouver style for formatting references. The requirements specify that authors are expected to check the accuracy of references against the original article. Accurate references allow interested readers to easily locate additional publications that are relevant to the subject of a specific journal article. To easily retrieve the cited article easily, the accurate reference, i.e. the journal title, the year of publication, volume number, and page number, is essential.

Correct references gives credit to the original researchers and allows readers to easily retrieve cited articles.9-11 The ethics of high quality research methods have been eloquently documented elsewhere and clearly state that accurate referencing is part of a good research practice.12 References can often be traced back over several publications in which they were previously incorrectly cited- the error then becoming repetitive. This may be evidence of authors having drawn incorrect conclusions from another source without even examining the original context of the citation.

Previous investigators have reported on reference accuracy in various general and specialty biomedical journals and found error rates ranging from 3% to 60%.12-11 High error rates (4.1%-40.3%) were even found among leading biomedical journals that check references prior to publication.12 Most errors affect the names of authors, followed by errors in the title element of a reference.8-11 The present study revealed that 33.3% of the references in Journal of Nepal Paediatric Society were incorrect. The error rate in different pediatric journals has been found to vary from 29 to 39%.6,1 There
was 43.3% error in citing the references in Nepal Journal of Obstetrics and Gynaecology which is higher than the study done by Roach et al.13 His study showed that Australian and New Zealand Journal of Obstetrics and Gynaecology and British Journal of Obstetrics and Gynaecology have got inaccuracies in references in 55.6% and 66.7% respectively. Similarly, in Nepalese Journal of Ophthalmology there was 50.0% error in citing the references which is higher than the study done by Buchanan et al.14

Errors in the author’s name may only demonstrate a lack of attention to detail. However, the names of authors are not only critical for retrieving articles but are also relevant when author citations are used to measure research productivity. The majority of errors were spelling mistakes in authors’ names or in the title. These errors would not make it difficult to retrieve the cited article. However, if the cited reference contains an error in a critical element of the reference, this would make it more difficult for the reader or a librarian to retrieve the article. Our study revealed that most common errors in citing the references were journal name and author’s name which is similar to the study done in indexed journals of Nepal.15 Similarly, majority of errors were in only one element out of six elements.

Probable causes of errors in references may include oversight, rush to publish, or the creating of pressure by believing in the concept of ‘publish or perish’.16 However, these reasons hardly justify the presence of errors. Despite the persistent problem of reference errors, no effective solutions appear to have emerged. Although it may be impossible to develop a foolproof system that ensures reference accuracy, checks can be performed at the following points: the authors, the editors, and the referees.15

Various suggestions have been given to reduce the inaccuracy in references. Vargas-Origel et al 6 suggested limiting the number of references and submission of the first page of the article cited to verify the reference. Study of Eichorn and Yankauer4 had earlier observed increased error rates with increased number of references. However, subsequently other studies established that the error rate is independent of the number of references.17,18 On the contrary, limiting the number of references might force the authors to omit some important references. Submission of the first page of the cited article is desired by some journals like Canadian Journal of Anesthesia but in a study conducted by McLellan et al.19 number of errors in Canadian Journal of Anesthesia was similar to that in other Journals. We could not ascertain whether the requirement of first page of the cited article was practiced before the study or introduced later.

CONCLUSION:
Errors in citing the references are also found in different specialty medical journals of Nepal, Nepalese Journal of Ophthalmology citing the highest percentage of errors. The results of all these three journals are comparable with international specialty medical journals. The majority of errors are avoidable. So, the authors, editors and the reviewers have to check for any errors seriously before publication in the journal.

REFERENCES:
Rolling audit: Defensible Record Keeping

**Objectives:**
To observe the completeness and proper documentation of inpatients data, to compare the observed data of present rolling audit to previous rolling audit and also to observe implementation of recommendation made by previous rolling audit.

**Material and Methods:**
Retrospective study done on November 2009. Twenty files from each of eight departments having inpatient ward at TU teaching hospital was analyzed. Files were reviewed for completeness and proper documentation as per protocol laid down by Royal College of Surgeons.

**Results:**
Record keeping was appreciable in department of Pediatrics, Psychiatric and ENT-HNS. There was deteriorating trend of data recorded in admission and investigation form. Progress notes were properly filled daily in department of Medicine, Surgery, Pediatrics, ENT-HNS and Gynecology and Obstetrics. There was no significant implementation of recommendation of previous rolling audit in all the departments.

**Conclusion:**
Good medical practice is defensible practice. Rolling audit must be done at regular basis to implement change and further to confirm improvement.

**Keywords:**
Audit, data, record keeping.

**Introduction:**
The medical record is the primary source of evidence in any malpractice action. The first thing a plaintiff attorney does in the quest for evidence of liability is review the medical record. If the chart is orderly and the information is lucid, concise, consistent and accurate, the case likely will be dropped. Poor charting exposes the physician to significant liability even if the care provided meets the applicable standard of care. It is regrettable when chart inadequacies or inconsistencies make a case with no medical misadventure difficult to defend. Medical record does not simply recall what has happened to patient but should have everything so that anyone coming fresh to that patient care can pick up where other colleagues have left. Audit is a systematic critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and the resulting outcome and quality of life for the patient. Proper record keeping is of increasing importance in medical field. There is a growing need of accurate, legible and understandable maintenance of record. Record keeping is essential for audit, research, in providing data for public health purposes. It is also critical in a variety of legal contexts, including defensible malpractice claims. Thorough medical record keeping can reduce risk of litigation. Styles of record keeping may vary from practitioner to practitioner or in different institution. In our study we have followed protocol laid by the Royal College of Surgeons. The objective of this study was to observe the completeness and proper documentation of inpatients data by various department of TU, Teaching hospital, to compare the observed data of present rolling audit to previous rolling audit and also to observe implementation of recommendation made by previous rolling audit.

**Material and Methods:**
It is a retrospective study conducted in TU, Teaching Hospital, November 2009. Eight departments having inpatient wards were included; twenty files from each department were randomly selected from medical record department for the study. Department included were Medicine, Surgery, Pediatrics, Obstetrics and Gynecology, Orthopedics, Ophthalmology, Psychiatry and ENT-HNS. All files were studied for complete and proper documentation as per inclusion criteria laid down in protocol by Royal College of Surgeons in admission note, daily progress notes, and investigation form. Implementation of recommendation laid by previous rolling audit in October 2008 was analyzed and compared with present audit.

**Results:**
Variable analyzed in admission note were; use of capital letters when specifically asked for, entry of full name of department, avoidance of initials of consultant name, entry of full address of patient, entry of provisional diagnosis, entry of admission date, entry of final diagnosis, entry of age, gender, date of birth, marital status, entry of history of present illness, past medical history, surgical history, family history, social history, and physical examination.

**Table 1: Analysis of the admission note showing the numerical values, which are the percentage of files fulfilling the criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Medicine</th>
<th>Surgery</th>
<th>Gyn&amp;Ob</th>
<th>Ped</th>
<th>Ortho</th>
<th>Oph</th>
<th>Psy</th>
<th>ENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of capital letters</td>
<td>100</td>
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<td>100</td>
<td>90</td>
<td>100</td>
<td>95</td>
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<td>Entry of full address</td>
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<td>100</td>
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<td>95</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Avoidance of initial of consultants name</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>95</td>
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<tr>
<td>Entry of provisional diagnoses</td>
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<tr>
<td>Entry of final diagnoses</td>
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<td>100</td>
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<tr>
<td>Understandability of the Doctor</td>
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<td>100</td>
<td>95</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

P.S. Gyn&Ob= Gynecology and Obstetrics, Ped= Pediatrics, Oph= Ophthalmology, Psy= Psychiatry, ENT= ENT & HNS

**Table 2: Showing in percentage the presence of a progress note in files of various department**

<table>
<thead>
<tr>
<th>Department</th>
<th>Audit October 2008</th>
<th>Audit November 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Surgery</td>
<td>40</td>
<td>90</td>
</tr>
<tr>
<td>Gynecology and Obstetrics</td>
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<td>80</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Orthopedics</td>
<td>95</td>
<td>70</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
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<td>15</td>
</tr>
<tr>
<td>ENT-HNS</td>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>
entry of understandable signature of doctor as shown in Table-1.

Data that were analyzed in daily progress note were; presence or absence of daily note, entry of subjective complaints, entry of objective findings, entry of assessment and plan, over written, erased or tippedex note and presence of understandable signature of doctor as shown in Table -2 and Table -3.

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Surgery</th>
<th>Gyn&amp;Obs</th>
<th>Ped</th>
<th>Ortho</th>
<th>OpH</th>
<th>Psy</th>
<th>ENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry of subjective complaints</td>
<td>75</td>
<td>100</td>
<td>85</td>
<td>88</td>
<td>85</td>
<td>45</td>
<td>100</td>
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<tr>
<td>Entry of objective findings</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<td>100</td>
</tr>
<tr>
<td>Assessment of patient (understandable)</td>
<td>75</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Written over, erased or tippedex notes</td>
<td>25</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>55</td>
<td>50</td>
<td>65</td>
</tr>
</tbody>
</table>

P.S. Gyn&Obs= Gynecology and obstetrics, Ped= Pediatrics, OpH= Ophthalmology, Psy= Psychiatry, ENT= ENT & HN

Table 3. Analysis of the daily progress note showing the percentage of files fulfilling the criteria

The recommendations that were made in rolling audit October 2008 were: use of capital letters in admission note when specifically asked for, avoidance of initials of consultat name, entry of final diagnosis in admission note, proper filling of daily progress note, entry of diagnosis in every investigation form and conclusion of rolling audit in every six month. Implementation of recommendation made by rolling audit October 2008 was also analyzed in this rolling audit. Variable which deteriorated from previous rolling audit were use of capital letters in admission note, entry of final diagnosis in admission note, entry of diagnosis in every investigation form. Daily progress notes were inadequately filled in files from department ophthalmology, psychiatry and orthopedics. Finally rolling audit was done after 13 months which also didn’t follow the recommendation of previous audit.

**DISCUSSION:**

Rolling audit is very important for proper record keeping. Audit is now an integral part of medical practice. One of first ever clinical audits was undertaken by Florence Nightingale during the Crimean War of 1853-1855 health care delivery. The National Institute for Health and Clinical Excellence (NICE) defines clinical audit as a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement. According to General Medical Council we must work with colleagues to monitor and maintain the quality of the care we provide and maintain a high awareness of patient safety. In particular, we must take part in regular and systematic medical and clinical audit, recording data honestly. According to NHS, Defensible documentation policy board, 2005 poor record keeping is the major factor in litigation cases and which hinder the defense of defensible cases. So failure of proper record keeping in results in quality of care, increase chances of litigation and defensible cases becomes indefensible. Communicating with patient, keeping accurate records and actually taking time to examine patients are three of the top10 ways to avoid a lawsuit. Practical implications of proper record keeping and importance of record keeping in peer reviews, audit and research has been highlighted by Hutchinson et al. Proper record keeping is very important in the medical field to avoid the increasing lawsuits. There is a growing need to keep records in medical fields since doctor have to justify their patient management in medical records.1,3

In the present study, medical records regarding proper entry of data in admission form, daily progress notes and the investigation form were analyzed. We followed the protocol laid down by Royal college of Surgeons for analysis of records. Eight departments of TU, teaching hospital having inpatient wards were included for the study. Files were studied on random basis by residents of three different departments to decrease the biasness of the study. Record keeping of patients’ document was appreciable in the department of Paediatric, Psychiatry and ENT-HNS. There was no significant improvement in the medical records as per recommendations of previous rolling audit. There was deteriorating trend of data recorded in admission form. Daily progress notes were properly filled in department of Medicine, Surgery, Pediatrics, ENT-HNS and Gynecology and Obstetrics, but progress notes of department of ENT-HNS fulfilled all the criteria followed by department of Psychiatry and Gynecology and Obstetrics. We also found no improvement in entry of data in investigation forms. This rolling audit was done 13 months after the previous one, which also didn’t follow the recommendation made by previous rolling audit.

**CONCLUSION:**

Challenges to clinical management are a fact of professional life. Every doctor must expect to become embroiled in complaints and claims from time to time, so he should be prepared to justify. Good medical practice is defensible practice, which depends upon staying within the limits of every ones own expertise, keeping up to date and conducting audit. So all the departments must be serious in proper record keeping and should be aware of consequences of poor record keeping. Rolling audit must be done at regular interval to implement change and further monitoring to confirm improvement. Recommendations are made for regular rolling audit at least 6 monthly, new residents joining the programme should be made aware of importance of record keeping and should be provided with opportunity to attain defensible documentation training. Use of capital letters, entry of full name of department and avoidance of initial of name of consultant is must in admission note. Entry of final diagnosis in admission note at time of discharge should be properly done and finally progress note must be written daily with understandable plan and signature and investigation form should be adequately filled.

**REFERENCES:**

Benign Paroxysmal Positional Vertigo: Present Perspective

Objective of this article was to review the current concepts regarding etio-pathogenesis and natural history of benign paroxysmal positional vertigo (BPPV), various diagnostic and therapeutic procedures in use for its different variants and rate of its recurrence after treatment. Representative articles were selected and reviewed. Idiopathic canalolithiasis of posterior semicircular canal is the commonest pathology. Making correct diagnosis of different clinical variants is at times challenging. Once diagnosed most of these conditions respond well to simple office based particle repositioning maneuvers (PRM). BPPV can spontaneously abate in some cases. Recurrence with secondary types of BPPV is more than with that of idiopathic variety. Awareness and recognition of this condition is very important as vertigo is often treated by different specialties in Nepal.

Keywords: BPPV, Benign Paroxysmal Positional Vertigo, Dix-Hallpike procedure and Epley maneuver.

Introduction:
Temporal bone dissection findings dramatically have changed the perception of BPPV.1 The clinical presentation of this common condition is straightforward but the choice of diagnostic and therapeutic maneuvers at times can be challenging.2 Although termed benign, it can be a severe and disabling problem for some of the patients. It affects the quality of life of its sufferers and can be associated with reduced activities of daily life, falls, and depression especially in geriatric patients.3 Barany, in 1921, first described BPPV as episodic vertigo of acute onset and limited duration induced by change in head position in relation to gravity.4 In 1952, otologists Dix and Hallpike described a provocative maneuver to induce positional nystagmus in patients with BPPV. Their work determined the cardinal manifestations of BPPV and helped in the lateralization of the affected ear, and its characterization as central and peripheral. In 1969, Schuknacht proposed the ‘heavy cupula theory’ (cupulolithiasis). Cupulolithiasis theory could explain the linear rotatory nystagmus, its latency and recurrence of nystagmus and vertigo after rest. However, it could not explain the mechanism of brief duration of the nystagmus and reversal of the nystagmus with the return to a sitting position.5 In 1979, Hall et al put forward their view on the mechanism of stimulation of the posterior semicircular canal (PSC) by free-floating particles rather than heavy cupula. This concept was later termed the ‘theory of canalithiasis’ by Epley.6 This theory could explain unanswered questions of cupulolithiasis theory. This led to the evolution of safe canalolith repositioning procedures (CRP), described by Epley in 1980 and Semont et al in 1998. This theory also led to development of a surgical approach of occlusion of PSC as described by Parnes and McClure in 1990. In 1985, McClure reported on several patients with a clinical picture was suggestive of horizontal semicircular canal (HSC) involvement. Anterior semicircular canal (ASC) variant was described by Steddin and Brandt in 1994.1

Incidence
Froehling et al6 have suggested an incidence of 64 cases of BPPV per100,000 residents. Lifetime prevalence of this condition is estimated to be 3.2% in females, 1.6% in males, and 2.4% overall.1 About 20 percent of all dizziness is due to BPPV and it accounts for approximately 24% of all cases of peripheral vestibular disorders.7 Incidence of BPPV increases with each decade and reaches the peak at the sixth to seventh decade of life.6 Women are more affected than men, with a 2:1 ratio.8 Right side is affected more than the left. This may be due to a subjective preference amongst patients for a right head-lying position during sleep.8 The posterior semicircular canal BPPV (PC-BPPV) is seen in most of the cases, likely because the opening and positioning of the posterior canal is in a gravity-dependent position. BPPV may also affect the other semicircular canals (SCC) but with lower prevalence.9 Horizontal semicircular canal (HC-BPPV) accounts for approximately 10% to 20% of all patients presenting with BPPV.10 Anterior canal BPPV (AC-BPPV) is still considered to be a rare variant, and accounting for about 2% of cases.11 Usually, debris within the anterior SCC is self-cleared, because its posterior arm descends directly into the common crus and the utricle.1 Bilateral BPPV is rather rare, accounting for 6% to 26% in the reported BPPV series.8

Etiology
BPPV in most cases, about 50%, is considered to be idiopathic.9 Various predisposing factors that damage and dislodge otocnia have been associated with the development of BPPV. Sudden acceleration or deceleration of head trauma creates ruptures in segments of the macula and is more likely to be associated AC-BPPV.1 In dental implant surgery vibration of dental turbine and forced head positioning induce loosening of otocnia.In cochlear implantation the fall of bone dust particles into the cochlea during the cochleostomy, the vibration caused while boring the cochlea and electric stimulation are sufficient to dislodge the otocnia.12 Labyrinthitis may also cause BPPV by inflammatory effects within or near the macula or by compromise of its vascular supply.9 The likelihood of developing BPPV may relate, in part, to metabolic considerations and the elastic and adhesive properties of the gelatinous otocnia within the maculae.9 In migraine, spasm of the labyrinthine arteries induce local ischemia facilitating otocniaal detachment.13 It has been proposed that endolymphatic hydrops damages the utricle resulting in loose otocnia. Vestibular neuronitis may simultaneously damage the utricle and detach the otocnia and bring upon BPPV.14 Labyrinthine infarction because of blockage of anterior vestibular artery that provides the vascular supply to the ASC, HSC and utricle can also lead to BPPV.9 Vigorous exercises as jogging, treadmill exercise and marathon running can cause BPPV. These conditions seem to lead mostly to PC-BPPV.15 A temporal bone study in humans without vestibular disease showed a substantial decrease of otocnia in elderly persons compared with children. This finding raises the question as to whether all humans lose otocnia with advancing age and are thus prone to develop BPPV.16 Prolonged bed rest, other ear disorders and ear surgeries are also suspected to be etiological factors.17 Finally a positive family history has been described in some patients with BPPV.16
Pathophysiology

The concepts of cupulolithiasis and canalolithiasis have been the working hypotheses of BPPV for the last 30 years; both medical and surgical therapies target this site, with huge success.1 Cupulolithiasismaintains that otolithic debris normally found in the utricle and saccule becomes displaced to the cupula of the PSCC. This then renders the organ gravity sensitive.18 Thecanallithiasis, the most common hypothesis, proposes that otolithic debris float freely between the ampulla and common crus of the PSCC (Fig. 1).18 It has been suggested that the size or mass of the debris within the SCC needs to reach a critical level before BPPV symptoms develop.19 Prolonged head-lying on one side seems to favour the entrance of more otoliths into SSC of the lowermost ear. Anatomical differences in the orientation of the SCC may facilitate or hinder the entrance of otocoria (Fig. 2).20

BPPV can spontaneously abate in some cases, but this typically occurs within the first month of onset. Asawawichaiangda et al showed after 3 months, 84% of patients with PC-BPPV who received no treatment had converted to a negative Hallpike maneuver. 21 It can be explained by the orientations of the canals that the spontaneous remission of HC-BPPV was shorter than that of PC-BPPV. Any debris entering the PSC that hangs inferiorly from common crus is less likely to become trapped within. In contrast, HSC slopes slightly up and has its cupula at the upper end. Therefore, free-floating debris in the HSC would tend to float back out into the utricle as a result of natural head movements.20 Geotropic HC-BPPV disappeared naturally within about 2 weeks without physiotherapy.21

Clinical presentation

Vertigo with nausea and vomiting is the most common symptom that occurs with change of head position especially while looking up, getting out of bed, rolling over in bed, bending, looking up (top-shelf syndrome) and with quick head movements.8 Majority of patients in one study reported that their BPPV started while turning in bed during the night or while rising from bed in the morning (morning dizziness).32 Patients do not always demonstrate the typical complaint of vertigo. It has been reported that some individuals complain of lightheadedness, dizziness or the feeling of being off-balance rather than the typical definition of true vertigo. BPPV may manifest as falls in older individuals so early diagnosis is necessary and dizziness handicap inventory (DHI) may be predictive in some cases.22 BPPV of HSC gives rise to symptoms of episodes of vertigo that usually wakes the patient up during the night, is of a high intensity, and takes a long time to recede spontaneously, forcing the patient to remain almost immobile.33 Side-to-side rolling in bed that causes vertigo in both directions suggests HC-BPPV but can also occur in patients who have bilateral PC-BPPV.

Diagnostic Tests

Differentiation between canalolithiasis and cupulolithiasis and the canal affected can be done with the help various diagnostic tests. Before we embark upon these tests the patient should be warned that this will provoke their dizziness but that they should remain in this position until such symptoms subside.34

Diagnosis of unilateral PC-BPPV due to canalolithiasis, is based on the presence of an upbeating and torsional nystagmus elicited in the Hallpike-Dix position with concurrent experience of vertigo. The nystagmus has a latency of onset of 2 to 20 seconds, lasts <60 seconds, and reverses when the patient returns to the sitting position. The torsional component of the nystagmus beats towards the affected and lowermost ear while a vertical upbeat component is superimposed.35 In bilateral PC-BPPV it is hard to decide which side is more symptomatic.36

It is not always easy to demonstrate observable nystagmus that is typical of BPPV and so it may be necessary to examine the patient more than once. Nurenzet al have suggested that the Dix-Hallpike test can be affected by the speed of the maneuver and the plane of the occiput and that it may vary from day to day. It will be difficult to perform Dix-Hallpike procedure in obese or frail individuals, patients with stroke, anxiety states and neck trauma.32 For such individuals various other diagnostic manoeuvres have been suggested like Li Maneuvre based on subjective vertigo but not on nystagmus,37 andside-lying maneuver.9

HC-BPPV is often, but not always, evoked by Dix-Hallpike maneuver. The nystagmus of HC-BPPV is distinctly horizontal and changes direction with changes in head position. The best way to diagnose HC-BPPV is by a supine head turn maneuver (Pagnini-McClure maneuver), in which the patient in the supine face-up position turns his or her head quickly to the right and left. Geotropic direction

Occasionally, freely mobile otocoria moving within the lumen of one SSC can inadvertently move to one of the adjacent canals during the course of treatment rather than to the utricle as intended. This canal switch changes the appearance of nystagmus from that of the originally affected canal to that of the newly affected.21 The most common canal switches are from PSC to the HSC and PSC to ASC.9

In recent years, two types of HC-BPPV have been recognized. One with geotropic and the other with apogeotropic positional nystagmus seen during diagnostic maneuvers.22 The pathophysiology of the former is thought to be canalolithiasis and that of latter is still controversial, with cupulolithiasis in the HSCC being reported as the most plausible cause.22 Two forms of cupulolithiasis, characterized by otoliths attached either on the utricle-side or the canal-side cupula, have been also identified.23 AC-BPPV is usually transitory and most often seen in the course of treating other more common forms of BPPV.9 In some situations more than one canal is affected at the same time. The most common circumstance is probably bilateral posterior canal BPPV.9 Combined HSC and PSC form of BPPV is seen especially in cases of head trauma.24 Even after successful repositioning free-
changing positional nystagmus is right beating upon turning the head to the right and then left beating when turning the head back to the left side. Conversely, ageotropics indicates the nystagmus is right beating with turning to the left and left beating with turning to the right. The other alternative tests for the diagnosis of horizontal canal BPPV are bow and lean test and Li maneuver.38 The Dix-Hallpike and side-lying tests used for the posterior canal BPPV can also be used to provoke and diagnose anterior canal BPPV.9 During Dix-Hallpike maneuver if patient has anterior AC-BPPV, the head-hanging position generates a burst of downbeating nystagmus.26 The direction of subtle vertical-beating nystagmus underlying the torsional component is critical in differentiating AC versus PC origin. Electro-oculography/videooculography aid in accurate assessment of the torsional component for the diagnosis of canal involvement. Patients with a history of head trauma should be examined closely for AC involvement.39

In some situations more than one canal is affected at the same time. The most common circumstance is probably bilateral posterior canal BPPV. This can be diagnosed by the presence of typical nystagmus with Dix-Hallpike or sidelying maneuvers on both the right and left sides. Combinations of posterior and horizontal canal variants can be recognized based on the maneuver used to evoke the nystagmus and the direction of the nystagmus.5

**Treatment**

For many years, treatment of BPPV involved exercises to induce habituation and compensation. Medical treatment in the form of anti-vertiginous drugs has been generally found to be ineffective.39 Recent controlled studies have clearly established that physical maneuvers based on inner ear biomechanics are highly effective for PC-BPPV. In these maneuvers, the head is positioned such that loose otoconia are allowed to sediment back within the labyrinth.41

Appearance of a nystagmus is probably related to the amount of cupula or canal otoconia particles and might well reflect an advanced or acute stage of the disorder. Therefore, for the purpose of treatment of BPPV by repositioning maneuvers, it is not essential to observe a positional and positioning nystagmus; symptoms of vertigo connected to positional and positioning tests are sufficient.42

Two office procedures are very effective for PC-BPPV. Canalith repositioning treatment (CRT) (synonyms: canalith repositioning maneuver, particle repositioning procedure or maneuver, Epley maneuver or procedure, modified Epley maneuver) is the most commonly used method for treatment of posterior canal BPPV, at least in the United States. The second treatment technique is the SemontLibreman maneuver (synonyms: liberatory maneuver or treatment, Semont maneuver or treatment) more often in Europe.9 In CRT 5th patient is moved through a series of 4 positions. With each position the patient of the otoconia moves towards the posterior canal, resulting in the movement of the otoconia around the arc of the long arm of the PC into the common crus and depositing the otoconia into the insensitive vestibule.26 Although some advocate the use of mastoid vibrator, for head shaking in each position, these appear to make little difference, at least in most patients with BPPV.9

Epley maneuver may be difficult in patients with problems of cervical spine like spondylosis, disc prolapse, previous cervical spine fracture and cervical spine rheumatoid arthritis. Modified Epley with neck collar performed in an adjustable operating table is suggested.46 Those patients who do not benefit from initial CRP may be advised self CRP at home and it is found not to affect the time to recurrence and the rate of recurrence of posterior canal.26

Epley recommended some posture restrictions such as sleeping in a seated position or with 45-degree elevation for 48 hours.47 Since then, several modifications of the original repositioning maneuver and post-procedure instructions have been recommended in order to prevent otoconia from moving back into the semicircular canals. Patients are advised to avoid symptom-provoking positions, to wear a soft cervical collar, to sleep at a 45-degree angle for 2 nights and to avoid lying on the involved side, refrain from rapid head movements,26 turning to the affected side, and flexing or extending their neck for 48 hours.5 In the last few years, several articles have evaluated the convenience of postural restrictions.47 However, based on current evidence; the use of postural restrictions after the canal-repositioning maneuver is unjustified.5

The Semont maneuver may be difficult to perform in some older or obese people because of the quick sweeping movement from one side to the other. It may be used for BPPV of the posterior canal caused by canalolithiasis or for refractory cases presumed to be due to cupulolithiasis.9

The other procedures for PC BPPV are Brant-Daroff redistribution exercises.32 Barnes’ particle repositioning maneuver (PRM)47 and various modifications of Epley. However, there is a significant number of patients who either do not respond to therapy and require repeated maneuvers in multiple sessions or who responded initially but develop rapid recurrence of symptoms.48 Perfelt has the most common reason for failure in these patients with an accurate diagnosis is insufficient extension of the head. If the head is not at least somewhat tilted back, the otoconia particles will not move through the canal properly. Severe kyphosis can make the positioning of the head difficult.9

Several repositioning maneuvers such as the Semont maneuver49 Lemppert’s maneuver360 degree barbecue rotation and forced prolonged position (FPP, or Vannuccimaneuvre)48 Gufoni maneuver 50 have been used for the treatment of HC-BPPV. FPP, which requires patients to lie on the healthy side for 12 hours, is regarded as the most natural and comfortable treatment.

However, the success rate of HSC-BPPV is approximately 60% to 90%; this value is significantly lower than those of PSC-BPPV. As the ASC follows afferent trajectory from the posterior canal, maneuvers to treat AC-BPPV must necessarily differ geometrically from those described by Epley and Semont for PC-BPPV. AC-BPPV can be treated with the same maneuvers used to treat PC-BPPV but it may be difficult to ascertain the affected side unless it developed from canal switch. It is probably advisable to repeat Dix-Hallpike positioning on both sides to be sure no persisting nystagmus or symptoms are present.51

In this regard, there have been several non-controlled studies concerning the treatment of anterior canal BPPV. Honrubia et al52 mention a “Reverse Epley” postural repositioning procedure. The “Reverse Semont” maneuver has also been recommended as head positions with respect to gravity are identical to those of the Epley maneuver, this procedure is likely to be equally effective. Another maneuver for AC-BPPV was described by Rahko.53 Crevits4 described a “Prolonged Forced Position procedure”. Helmstinski and Hain55 proposing a “deep Dix-Hallpike” maneuver for AC-BPPV. Others treatment alternatives, so far without scientific studies proving efficacy, include the Brandt Daroff exercise and the reverse Semont maneuver.51

If one has simultaneous PSC and HSC BPPV the patient should be managed by first addressing the PSCmaneuver and then, three days later, the HSC manoeuvre.37 Epley defined resolution of BPPV as “a negative Hallpike maneuver on follow-up exam and no further positional vertigo for one month following the last treatment.” Although three years’ absence of symptoms is generally considered as a definitive cure.48

**Recurrence**

For PC-BPPV, Marciano and Marcelli56 and Moon et al57 have reported recurrence rates approximately 10% during a short-term follow-up, and Cakir et al58 have reported even higher rates (20%) during a long-term follow-up. Despite the successful application of appropriate CRT at present, it is still controversial which factors are associated with treatment failure. Elderly patients responded less well to initial CRP treatment. This may have been due to poor cooperation, fatigue or limited mobility. Furthermore, disease may be more extensive in older patients and otoconial debris may be produced more frequently and in larger quantities than in younger patients. Patients with a history of head and neck trauma associated with the disease responded poorly to CRP treatment, with a cure rate of only 36 per cent after two treatments. Most reports generally agree that secondary BPPV has a worse prognosis than idiopathic BPPV. 59, 60 It has been reported that in patients with abnormal ENG findings outcome are worse on both initial and repeat treatment. This may be explained by more extensive damage of the labyrinth in such cases.48 Macias et al62 found that BPPV involving any location other than a single PSC required more


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