Cervical Cancer Awareness

Surgical Correction of Varicose Veins

Video EEG in Temporal Lobe Epilepsy

Drug Induced Pancreatitis
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MEASUREMENTS: All measurements should be in metric units.
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Awareness About Cervical Cancer Among Patients Admitted In Obstetrics And Gynaecology Wards In A Tertiary Health Care Centre, Kerala


ABSTRACT

Background: India is witnessing more than 123,000 new cases of cervical cancer every year and nearly 67,000 women die annually from cervical cancer. Studies have shown that, through cervical cancer screening programmes, mortality rate can be reduced to a great extent. Hence this study is aimed at assessing the knowledge, attitudes and practices regarding carcinoma cervix and its screening.

Methodology: 100 female patients aged above 18 years of age admitted in obstetrics and gynaecology wards in Sree Avittam Thirunal (SAT) hospital, Thiruvananthapuram was given a semi-structured pre-tested questionnaire. Data thus collected was entered in Microsoft excel and analysed in SPSS trial version 18.

Results: The mean age of our study participants was 30 years with a standard deviation of 8 yrs. 54% of the women had educational qualification of higher secondary or above. 65% of study subjects had not heard about cervix and 83% had not heard about carcinoma cervix. Only 3% had heard about Pap smear testing. 82% of our study participants expressed positive attitude towards screening. Educational status and occupation of study participants were found to be associated with the knowledge of study participants regarding carcinoma cervix.

Conclusion: Our study reveals low level of knowledge and practices regarding Carcinoma Cervix. As they show a positive attitude, the administrators should implement programmes for health education regarding carcinoma cervix on a large scale to create awareness and to take preventive measures.

INTRODUCTION

Cervical cancer is the fourth most common cancer among women in the world and most frequent cancer in Indian women accounting to 528,000 new cases in 2012.

An estimated 266,000 deaths occurred worldwide in 2012 due to cervical cancer, constituting 7.5% of all female cancer deaths1. Eighty seven percentage of the cervical cancer deaths occur in the less developed regions. Mortality rate shows a wide variation in different parts of the world ranging from less than 2 per 100,000 in Western Asia, Western Europe and other developed countries to more than 20 per 100,000 in Middle and Eastern Africa. India has reported 123,000 new cases, 67,000 deaths and 309,000 five year survival2.

At any given time, about 6.6% of women in the general population are estimated to harbour cervical Human Papilloma Virus infection (HPV)3. Approximately eighty percentage of the cervical cancer in India can be attributed to HPV serotypes 16 and 18. Nearly 25% of sexually transmitted disease clinic attendees in India suffer from different kinds of warts, but no data exists on the burden of anogenital warts in the general community.

The National cancer registry programme, established by the Indian council of medical research, acts as a surveillance system for cancer in India4.

Cervical cancer prevention requires a comprehensive, multidisciplinary approach with different vertical and horizontal health programmes and state government ministries. These new guidelines combined with HPV vaccination, encourage the Member States to implement cervical cancer prevention programme as part of the 2013-2020 Global Action Plan for the Prevention and Control of Non-communicable Diseases. This will pave the way to ensure that cervical cancer ceases to be a public health problem5.

Hence this study aims to assess the knowledge of women about carcinoma cervix and its screening, attitudes and practices, so as to plan effective health education and awareness campaign to tackle this burden.

METHODOLOGY

A cross sectional study was conducted in a tertiary health care centre in the month of October in 2014. One hundred (100) women aged above 18 years admitted in the obstetrics and gynaecology wards of Sree Avittam Thirunal(SAT) hospital, Thiruvananthapuram, who gave consent to participate in this study were selected.

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A semi-structured questionnaire (interview schedule) comprising of questions on the knowledge related to female genital tract, cervix, carcinoma cervix, screening test for carcinoma cervix and practice of Pap smear test was used to collect data. Knowledge questions were adopted from two other validated questionnaires. The study participants were explained about the study in detail before interviewing them. We asked the questions and marked their responses against the appropriate answers on the questionnaire sheet. Ethical clearance was obtained from the Institutional Ethics Committee. The data was entered in Microsoft excel and analysed with help of SPSS trial version 18.

RESULTS

The mean age group of the study subjects was 30 years with a standard deviation of 8 years. 44% of the study subjects were having only high school education and 54% were having educational qualification of higher secondary or above. 52% of our study subjects belong to low socioeconomic status. 82% of study subjects were homemakers. 4% of our study participants had no access to any kind of print or audio visual media. 89% of our subjects use television as their main medium of information and entertainment.

KNOWLEDGE

Questions related to the reproductive system

91% of our study participants mentioned that the age of attaining puberty by girls was between 9-14 years. When asked about the physical changes during puberty, 14% failed to respond. Ovary, being the site of origin of ovum and uterus being the site of origin of menstrual blood was answered by 23% and 53% of our study respondents. The fact that sexual intercourse leads to pregnancy was not known to one study participant. 80% of our study participants were unaware of the different parts of female genital tract. 75% of them had heard about uterine cancer.

Questions regarding knowledge about cervix and carcinoma cervix

65% of our study subjects had not heard about cervix. 83% had not heard about carcinoma cervix. 5% said that carcinoma cervix is a disease of females above 40 years of age. 6% of our study subjects knew some symptoms of carcinoma cervix. 2% said multiple sexual partners are a risk factor of carcinoma cervix and 1% said smoking is a risk factor of this disease. 2% of our study subjects were aware of a vaccine available for this disease but they did not know its name. 3% women stated that there is a precancerous stage for carcinoma cervix.

Questions about screening test for carcinoma cervix

7% of our study participants have heard about Pap smear test and 3% knew that Pap smear test is a screening test for carcinoma cervix

ATTITUDE

53% of our study participants stated that they approached a doctor only when any disease became severe. 53% adhered to doctor’s instructions. 66% preferred government hospitals. 52% had no difficulty to approach a doctor for disease of female genital tract and 6% of them preferred a female doctor. 82% of our study subjects showed positive attitude towards Pap smear testing.

Practice questions were not answered by the study participants as none of them had done Pap smear testing before.

Bivariable analysis

Chi-square test was used to test the association between different socio-demographic variables and knowledge of study participants. Study participants with educational status of tenth standard and below and occupation being homemakers or unskilled labourers were found to have a statistically significant association with knowledge regarding carcinoma cervix (table 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>p Value</th>
<th>Odds Ratio</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Educational status</td>
<td>0.001*</td>
<td>18.947</td>
<td>2.401</td>
</tr>
<tr>
<td>Occupation</td>
<td>0.001*</td>
<td>7.6</td>
<td>2.204</td>
</tr>
<tr>
<td>Socio-Economic status</td>
<td>0.327</td>
<td>1.69</td>
<td>0.59</td>
</tr>
</tbody>
</table>

*statistically significant

Table 1: Association between different sociodemographic variables and Knowledge of Study Participants regarding Carcinoma Cervix
DISCUSSION

Cancer of cervix is a preventable disease and a key aspect of its prevention is detection of its premalignant form by screening at its earliest stage. The present study evaluates the knowledge, attitude and utilization of cervical cancer screening among obstetrics and gynaecology patients admitted in SAT hospital Trivandrum.

In the current study, majority of women belonged to the age between 22 to 38 years. This age group is important because, if we are planning to create awareness about the screening programme, this should be the targeted age group as screening must be done between 35 - 45 years of age. Most of the chronic diseases are seen in middle age group.

Even though our study mainly concentrated on carcinoma cervix, we had asked some questions regarding whole of the female reproductive tract so as to reduce their inhibitions in responding to our study. Only 17% of study subjects knew about Carcinoma Cervix. One of the reasons for this may be due to the lack of knowledge about the cervix. In a breast cancer study done by Amrita Institute of Medical Sciences, they had found that about half of the sample studied (46.6%) had undergone screening and they concluded that in spite of the absence of a population-based screening program, about half of the study subjects had undergone some type of screening. The older women (35-50 years) in particular were more likely to practice screening. In Kerala commonest cancers affecting females are breast cancer and cervical cancer. In the above study half of their study subjects had undergone screening test for breast cancer but in our study, 83% have not even heard about carcinoma cervix. This clearly depicts the ignorance about cervical cancer.

Responses to further questions related to carcinoma cervix were also very poor. About 5% to 7% gave answer to the questions about age group, symptoms and risk factors. Only 7% had heard about Pap smear and only a meagre 3% knew the use of it. Similar studies done in Yemen by University of Science and Technology shows that 80.6% had heard about cervical cancer. This may be because the awareness given by us about carcinoma cervix is minimal or not effective. The above study subjects also had higher knowledge about preventive measures of carcinoma cervix when compared to our subjects. 53% of our study participants approached a doctor only when disease became severe. This may be due to their lack of awareness about diseases and the need for early treatment. This may also be due to inadequate care for their health from the men in the family and their dependence on the men, being a homemaker. When we asked about the attitude towards the completion of treatment course which was given by a doctor 47% of our study subjects respond that they won't complete the course if the symptoms disappeared earlier. This may be one of the reasons for the emerging antibiotic resistance. 48% expressed a difficulty to approach a doctor and communicate about a disease of female genital tract. This may be due to an inherent inhibition acquired from social and cultural influences in one's character. As the basic knowledge about carcinoma cervix was very poor in our study participants, we gave a pamphlet having all the answers to our questions on knowledge to educate them. Our study shows that though the knowledge regarding Carcinoma Cervix is low among our study participants, they have a positive attitude towards Pap smear testing. So we can conclude that the basic reason for the absence of practice of Pap smear testing in our study subject was lack of knowledge and awareness.

In our study sample, knowledge regarding carcinoma cervix was significantly associated with education and occupation. Lack of awareness about carcinoma cervix is more among women with education 10th standard or below. Education is an important factor which may reduce the burden of carcinoma cervix along with many other diseases. Even though Kerala's female literacy rate is high (97.9%) most of our study subjects had only primary education (45%). So awareness programmes should be conducted actively to educate them about carcinoma cervix. Lack of awareness about carcinoma cervix is more among homemakers and unskilled workers. One of the reasons for their lack of knowledge may be shyness due to the limited awareness and interaction with the community. So we have to plan awareness programmes which can reach up to them. Even though 96% of our study subjects had access to some kind of media, the knowledge about carcinoma cervix and its screening programmes is very low. From this we may infer that awareness about carcinoma cervix is not effectively given through any of these media.

Conclusion

Even though carcinoma cervix is the most common cancer in India among females, knowledge about this disease is very poor. Attitude towards the screening programme (Pap smear) after making them aware about this disease is positive. Currently the practice of screening test is zero percentage in our study subjects. The administrators should implement programmes for health education regarding carcinoma cervix on a large scale, involving print and audio visual media to reach the people and also provide facilities for doing Pap smear test. As the general attitude is positive after health education, by creating awareness and providing facilities for Pap smear testing, we may considerably reduce the burden of carcinoma cervix.

Source of Funding
Nil

Conflict of Interest
None
REFERENCES


Prevalence of tobacco use and attitudes towards tobacco cessation counselling among healthcare professionals: A cross sectional study

R. Venkitachalam*, Arya Prathap*, Hasina CV*, Joe Joseph*

Vijay Kumar S.*

ABSTRACT

Introduction: Behavioural counselling by healthcare professionals is vital in tackling the menace of tobacco. However, studies have revealed that healthcare providers rarely advise and assist tobacco users in quitting due to lack of training, skills and confidence in cessation methods. Moreover, if care providers themselves turn tobacco users, the efficiency of such services are diluted. The primary objective of this study was to assess tobacco use prevalence among dental and nursing students of a medical university in India. Secondary objectives were to assess their knowledge and attitude regarding tobacco cessation.

Methods: A cross-sectional questionnaire based survey was conducted among clinical dental and nursing students of a medical university in India during 2017-18. The study tool was ‘Global Health Professions Student Survey’ questionnaire. Participants were selected using systematic random sampling technique.

Results: A total of 99 dental students and 65 nursing students participated in the study. Prevalence of tobacco use was 16% and 9% among dental and nursing students respectively. Almost all participants agreed that health professionals have a role in giving advice about tobacco cessation and expressed a need for specific training while 85% of them opined that patients’ chances of quitting tobacco use increased if a health professional advised them to quit. Further, 65% and 39% of dental and nursing students reported that they have not received any formal training in tobacco cessation approaches.

Conclusion: Tobacco use among health professionals is a major deterrent for tobacco control activities. There is a pressing demand to include formal training in tobacco cessation counselling in the curriculum.

Key words: tobacco; dentists; nursing; cessation; prevalence; health care providers.

INTRODUCTION

The harmful effects of smoking on health are well documented. There is no dearth of statistics to support this statement. Yet, tobacco use mainly in the form of smoking is prevalent among all ages and more common in the youth. Though efforts to bring about upstream solutions by means of complete ban, taxation of tobacco products and reducing the supply of these products are commendable, focus should also be placed on reducing the present burden of use of tobacco especially among the youth. Tobacco cessation counselling is one of the most effective approach in tackling this serious public health issue.

There has been an increase in the prevalence of tobacco use among health professionals who are supposed to play a critical role in curbing the menace of tobacco epidemic. Tobacco use among health professionals is a major limiting factor in achieving effective outcomes. It is the duty of health professionals to taper the tobacco use among the public by creating awareness about the side effects of tobacco usage and also to encourage tobacco cessation by giving proper advice, support and treatment. Failure to set an example can have negative impacts. Moreover, studies have revealed that most doctors rarely advise and assist smokers in quitting smoking due to a lack of training, skills and confidence in smoking cessation, as well as to other obstacles to performing smoking cessation interventions. Negative attitudes among health professionals may also lead to ineffective counselling regarding hazards of tobacco use. We believe that training health professionals towards tobacco counselling should begin right from their days of medical education.

The Global Health Professional Students Survey was developed by the World Health Organization, Centers for Disease Control and Prevention and the Canadian Public Health Association in 2004 to collect data on tobacco use and cessation counselling among health professional students. It was conducted on a large scale in India during 2005-08 among the medical, dental, nursing and pharmacy students. It has been a decade since the survey and there has been an upscale in the tobacco control activities by the national and state governments, non-governmental organizations, academic institutions and other professional bodies.

The primary objective of this study was to assess tobacco use prevalence among dental and nursing students of a medical university in India. Secondary objectives were to assess their knowledge and attitude regarding tobacco cessation in the routine health care practice.

METHODOLOGY

A cross-sectional questionnaire based survey was designed and conducted among clinical dental and nursing students of a medical university during 2017-18. The
study tool was the ‘Global Health Professions Student Survey’ questionnaire developed by the World Health Organization, US Centers for Disease Control and Prevention and the Canadian Public Health Association. This questionnaire is designed to collect data on tobacco use and cessation counselling among health-profession students and assesses the clinical students on domains like tobacco use among health professionals, exposure to environmental tobacco smoke, attitudes, cessation, training and demographics.

Sample size for the study was calculated using OpenEpi software from the data obtained from GHPSS survey conducted in India in 2005-2009 across medical, dental and nursing colleges using the following information.

- Population size (for finite population correction factor or fpc) (N) = 180 (dental), 150 (nursing)
- Observed % frequency of outcome factor in the population (p): 22% (dental), 12.5% (nursing)
- Confidence limits as % of 100 (absolute ± %) (d): 5%

So, the sample size for dental and nursing students were 108 and 80 respectively. The study was conducted among clinical students of dentistry (third and final year students and house surgeons) and nursing (third and final year students) using systematic random sampling. Ethical clearance was obtained from the Institutional Review Board and informed consent was obtained from participants willing to be a part of the study.

The obtained responses were coded and analysed using SPSS (Version 17) for descriptive and inferential statistics.

RESULTS

A total of 99 dental students and 65 nursing students participated in the study. Response rate was 87%. Non-response was due to absence of sampled participants on the day of data collection and refusal to participate in the study. The demographic characteristics of the study participants is given in Table 1.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Dental</th>
<th>Nursing</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Participants</td>
<td>99</td>
<td>65</td>
</tr>
<tr>
<td>Year of Study</td>
<td>Thired Year 33</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Final Year 35</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Internship 31</td>
<td>-</td>
</tr>
<tr>
<td>Age Group of Participants</td>
<td>19 to 24 Years 98</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>25 to 29 Years 1</td>
<td>0</td>
</tr>
<tr>
<td>Gender Distribution</td>
<td>Male 11</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Female 88</td>
<td>63</td>
</tr>
</tbody>
</table>

Table 1. Characteristics of study participants

Tobacco use prevalence and cessation attempts

It was observed that around 12% of dental and 6% of nursing students had tried/experimented with cigarette smoking. The use of other forms of tobacco like chewing, bidis, snuffs, cigars etc. were 4% and 3% among dental and nursing students respectively (Table 2). It was interesting to note that most (>80%) of the cigarette smokers received help or advice to stop the habit and majority among those who smoked (75%) had stopped smoking (Table 2).

Exposure to second hand smoke

On assessing exposure to second-hand smoke, 32% of dental students reported that people have smoked in their presence in the past 7 days while 26% of nursing students reported the same. More than 80% of the respondents in both groups were aware of an official policy banning smoking in school buildings and clinics and that it was being strictly enforced (Table 2).

Attitudes regarding tobacco cessation

More than 90% of the respondents felt that tobacco sales should be banned for adolescents and smoking should be banned in restaurants and enclosed public spaces. However, around 15% of respondents in each group felt that it could be allowed in discos, pubs and bars (Table 2).

Almost all participants agreed that health professionals have a role in giving advice or information about smoking cessation to patients and expressed a need for specific training on cessation techniques while 85% of them opined that a patients’ chances of quitting smoking increased if a health professional advised him/her to quit. Around 70% of respondents felt that health professionals who were smokers were less likely to advise patients stop the use of tobacco (Table 2).
Knowledge regarding tobacco cessation

Though more than 85% of the students were taught about the dangers of tobacco use, importance of recording patients’ tobacco status in the case records and had heard about tobacco cessation approaches like nicotine replacement therapies, 65% and 39% of dental and nursing students respectively felt that they have not received any formal training in smoking cessation approaches to be used with patients (Table 2.).

<table>
<thead>
<tr>
<th>SL NO</th>
<th>Variables</th>
<th>Dental (n=99)</th>
<th>Nursing (n=65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Ever tried or experimented with cigarette smoking, even one or two puffs?</td>
<td>12 (12.1%)</td>
<td>4 (6.2%)</td>
</tr>
<tr>
<td>b</td>
<td>Ever used chewing tobacco, snuff, bidis, cigars, or pipes?</td>
<td>4 (4%)</td>
<td>2 (3.1%)</td>
</tr>
<tr>
<td></td>
<td><strong>Cessation attempts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Received help or advice to stop smoking</td>
<td>11/12 (91.6%)</td>
<td>4/4 (100%)</td>
</tr>
<tr>
<td>b</td>
<td>Do not smoke now</td>
<td>8/12 (75%)</td>
<td>3/4 (75%)</td>
</tr>
<tr>
<td></td>
<td><strong>Exposure to second-hand smoke</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Exposed to smoking where you live, in your presence</td>
<td>31 (31.3%)</td>
<td>17 (26.2%)</td>
</tr>
<tr>
<td>b</td>
<td>Awareness of an official policy banning smoking in school buildings and clinics</td>
<td>80 (80.8%)</td>
<td>56 (86.2%)</td>
</tr>
<tr>
<td></td>
<td><strong>Attitudes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Tobacco sales should be banned for adolescents</td>
<td>98 (99%)</td>
<td>59 (90.8%)</td>
</tr>
<tr>
<td>b</td>
<td>There should be a complete ban on advertising of tobacco products</td>
<td>93 (93.9%)</td>
<td>56 (86.2%)</td>
</tr>
<tr>
<td>c</td>
<td>Smoking should be banned in restaurants</td>
<td>96 (97%)</td>
<td>63 (96.9%)</td>
</tr>
<tr>
<td>d</td>
<td>Smoking should be banned in discos/bars/pubs</td>
<td>83 (83.8%)</td>
<td>53 (81.5%)</td>
</tr>
<tr>
<td>e</td>
<td>Smoking in all public places should be banned</td>
<td>96 (97%)</td>
<td>63 (96.9%)</td>
</tr>
<tr>
<td>f</td>
<td>Health professionals should get specific training on cessation technique</td>
<td>96 (97%)</td>
<td>61 (93.8%)</td>
</tr>
<tr>
<td>g</td>
<td>Health professionals should serve as ‘role models’ for their patients and public</td>
<td>86 (86.9%)</td>
<td>52 (80%)</td>
</tr>
<tr>
<td>h</td>
<td>Health professionals should routinely advise their patients who smoke to quit smoking</td>
<td>96 (97%)</td>
<td>63 (96.9%)</td>
</tr>
<tr>
<td>i</td>
<td>Health professionals should routinely advise their patients who use other tobacco products to quit smoking</td>
<td>99 (100%)</td>
<td>62 (95.4%)</td>
</tr>
<tr>
<td>j</td>
<td>Patient’s chances of quitting smoking increases if a health professional advises him/her to quit?</td>
<td>84(84.8%)</td>
<td>55 (84.6%)</td>
</tr>
<tr>
<td></td>
<td><strong>Curriculum training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Taught about dangers of smoking during your school training</td>
<td>89 (89.9%)</td>
<td>58 (89.2%)</td>
</tr>
<tr>
<td>b</td>
<td>Received formal training in smoking cessation approaches</td>
<td>35 (35.4%)</td>
<td>39 (60%)</td>
</tr>
<tr>
<td>c</td>
<td>Heard of Nicotine Replacement Therapies in tobacco cessation programs</td>
<td>83 (83.8%)</td>
<td>56 (86.2%)</td>
</tr>
</tbody>
</table>

Table 2. Responses obtained from dental and nursing students for select variables in the questionnaire
DISCUSSION

The growing addiction to tobacco and its products is a global menace. Several strategies have been developed over the years to bring about tobacco control. Some measures have been successful while some have failed. However, the role of health professional in addressing this issue is undisputed. They are ideally placed in the system to facilitate educate the public at large and patients in specific. It is often quoted that health professionals need to “set an example” while dealing with conditions like tobacco cessation and lifestyle modification.

Tobacco use among health professionals is a major deterrent for effective counselling. In this study, we found that 12% and 7% of dental and nursing students smoke. The GHPSS survey done in India in 2005 reports a prevalence of 9.6% and 3.3% respectively. Studies conducted in different parts of India have shown varied results. Among dental students, it was around 15% in Himachal Pradesh[9], 16.3% in central India[10] and as high as 57-65% in a college in South India[11]. In countries like Saudi Arabia, the prevalence of smoking was found to be 18% among dental students[12], 22% among Iranian dental students[13], 17% in Jordanian dental students[14]. A similar study conducted in China reports a smoking prevalence of 6.9% among all health professional students[15]. In an international review of smoking among dental students, the prevalence rates were high in countries like Serbia, Romania and Greece (30-50%), while was relatively low in countries like India (23%), Holland (24%), Bangladesh (22%) and was very low in countries like Brazil, Canada and Great Britain (3-8%)[16]. Among nursing students, a study conducted in two cities of south India report a prevalence of tobacco use around 4% for nursing students[17]. However, studies conducted in across other countries report a prevalence of as low as 3% in Iran to as high as 51% in Italy[18]. Some of the common reasons for tobacco use were stress, boredom, experimentation, peer pressure and as a leisure activity.

Exposure to second hand smoke was common in the present study. This is in accordance with most of studies conducted where almost all participants felt health professionals role was important[11,15,20]. It was consistently observed across studies that most of the dental and nursing students expressed their need for a formal training on tobacco cessation counselling[12,17,21,22]. Tobacco cessation counselling is by far one of the most effective approaches to increase the quit rates. The medical or dental curriculum in India devotes little time for tobacco related issues and there was no formal training or demonstration to improve cessation skills[23]. Experts have called for the need to incorporating tobacco cessation training in health professional curriculum and training of health professionals to offer cessation advice in their routine health care practice[24].

CONCLUSION

Tobacco use among health professionals is a major deterrent for effective counselling. With positive attitude towards tobacco control, there is a need to incorporate tobacco cessation counselling in health professionals educational curriculum.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. Vinita Sanjeevan and Dr. Naveen Jacob Varghese for their contribution towards this study.

FUNDING

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COMPETING INTERESTS

The authors declare none.

REFERENCES


Impact of problem based learning and lecture based learning with respect to clinical microbiology teaching

Anusha Gopinathan*, Anu Sasidharan**

ABSTRACT

Introduction: Problem based learning is an innovative approach which enhances knowledge, critical thinking and enthusiasm in students.

Objective: To compare the impact of problem based learning and lecture based learning in clinical microbiology teaching among second year MBBS students.

Methods: A cross sectional study was conducted among second year MBBS students in clinical microbiology classes to compare the impact between problem based learning (PBL) and lecture based learning (LBL). The students were evaluated using peer reviewed multiple choice questions at the end of both PBL and LBL sessions.

Results: Scores after PBL were significantly higher when compared to LBL scores.

Conclusion: Problem based learning is more effective than lecture based learning for undergraduate teaching

Keywords: Problem based learning, lecture based learning, undergraduate curriculum

INTRODUCTION

Undergraduate medical education is known for its massive portions of didactic lectures. Students fail to understand the topic completely when taught only through didactic lectures. Students spend a lot of time to understand, question and find answers on a topic when it is given as a problem. This will help them to develop in-depth knowledge about the topic. Problem based learning (PBL) is a learner centred, innovative teaching method which increases the practical acumen of learners. PBL is found to increase the critical thinking of students in some studies1,2,3,4. Bate et al, report that students and teachers are responsible for the success of problem based learning5.

This study was devised to assess the gain of knowledge after problem based learning and lecture based learning among students in our institute to understand the effectiveness of problem based learning and inculcate this innovative teaching method more often in the undergraduate curriculum.

MATERIALS AND METHODS

A cross sectional study was conducted in our institute over a period of two months among 89 students of second year MBBS. Students who were absent for at least one session of the study were excluded from the study. There are seven steps to implement problem based learning,

1. Identification and clarification of unfamiliar aspects of the clinical scenario
2. Defining the problems to be discussed during the sessions
3. Brainstorming sessions to research the problem
4. Organising the solutions and explanations to the problem
5. Formulation of learning objectives
6. Private study to gather information for each learning objective
7. Sharing the results and assessment of the PBL6,7

Two sessions of problem based learning (PBL) was planned with the same five faculty. The topics chosen for problem based learning were respiratory tract infections (RTI) and gastroenteritis (GI). The class was divided into groups of five each. Each group was given one question on the concerned topic and allotted 45 minutes for discussion. At the end of 45 minutes team leader from each group was asked to share the views of the group. Each of the session was closed by administering peer reviewed multiple choice questions.

Two sessions of lecture based learning (LBL) was conducted by the same faculty using powerpoint presentation. Blood stream infections (BSI) and Normal flora of human body (NF) were chosen as topics for the classes. The sessions were closed by administering peer reviewed multiple choice questions. Multiple choice questions were totally ten in number for each session. Each question carried one mark. Mean score of the multiple choice question tests was calculated and used for comparison between PBL and LBL sessions. Statistical analysis was performed using paired t test. Institutional ethical clearance was obtained before the conduct of the study.

RESULT

Among a class of 89 students, only 53 were present during all the sessions of the study. Females (30/53, 56%) were the predominant partici-
pants in the study (Figure I). Mean score of the problem based learning sessions and lecture based learning sessions were 8.66, 6.87, 6.13 and 6.64 respectively (Figure II). On performing paired t test, scores of PBL session 1 was significantly higher than LBL session 1 and 2 (p value = 0.00). Scores of PBL 2, was significantly higher than LBL1 (p value = 0.025) but not significantly higher than LBL2 (p value = 0.495) (Table I).

![Fig 1: Gender of participants](image)

![Fig 2: Mean score of participants in lecture based learning](image)

*LBL1 – Lecture based learning session 1, LBL 2 – Lecture based learning session 2, PBL 1 – Problem based learning session 1, PBL 2 – Problem based learning session 2

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig.(2 tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pair 1 RTI(PBL 1)-BSI(L1)</td>
<td>2.528</td>
<td>2.350</td>
<td>.323</td>
<td>1.881</td>
<td>3.176</td>
<td>7.832</td>
<td>52</td>
</tr>
<tr>
<td>Pair 2 RTI(PBL 1)-NF(L2)</td>
<td>2.019</td>
<td>2.325</td>
<td>.319</td>
<td>1.378</td>
<td>2.660</td>
<td>6.323</td>
<td>52</td>
</tr>
<tr>
<td>Pair 3 Gi(PBL 2)-BSI(L1)</td>
<td>.736</td>
<td>2.322</td>
<td>.319</td>
<td>.096</td>
<td>1.376</td>
<td>2.307</td>
<td>52</td>
</tr>
<tr>
<td>Pair 4 Gi(PBL 2)-NF(L2)</td>
<td>.226</td>
<td>2.399</td>
<td>.330</td>
<td>-.435</td>
<td>.888</td>
<td>.687</td>
<td>52</td>
</tr>
</tbody>
</table>

Table 1: Paired t test between PBL and LBL
DISCUSSION

The study was conducted to compare the gain of knowledge between problem based learning and lecture based learning. The study was planned among 89 students but due to absenteeism it could be conducted only among 53 students (60%). Females were predominant in our study (30,57%). This is similar to other studies.

The mean score was higher for problem based learning (8.66, 6.87) when compared to lecture based learning (6.13, 6.64). When analysed with paired t test, PBL 1 was found to cause significant improvement in knowledge compared to LBL sessions. Though PBL 2 did not cause significant improvement in knowledge according to paired t test, the mean score of PBL 2 was higher than LBL1 and LBL 2. Similar to our study, Khoshnevisasl et al, report no statistically significant improvement of median scores between PBL and LBL sessions but the median scores of PBL was higher than LBL sessions. Sayyah et al., conducted a systematic review and meta-analysis of 21 studies which compared PBL with other methods of teaching for undergraduate medical and nursing education. They found that PBL showed statistically significant improvement in students's scores(p value<0) when compared to lecture based learning. A subgroup analysis in their study also showed that PBL as a sole method of learning was more favourable than using a mixed model of learning methods including LBL. Choi et al, did not find improvement in student scores in PBL sessions but critical thinking and self directed learning was significantly seen in students during PBL sessions. Smits et al, showed a significant increase in student performance scores during PBL sessions when compared to traditional lectures.

There were a few limitations to the study. The topics chosen for all the four sessions of the study were different though they were of the same level of hardness. There was a scheduled exam for the students just a few days from the PBL sessions. This might have prevented them from thoroughly researching the PBL topics and hence the lesser score in PBL 2. The study was performed among 53 students using two sessions of PBL. A larger study involving higher number of participants and PBL sessions is required to validate the results of this study.

CONCLUSION

Problem based learning facilitates knowledge gain in students. Students who are taught by problem based learning perform better in exams compared to those taught through the traditional lecture based learning.

REFERENCES

Complications following surgical correction of varicose veins - A Comparison of endovenous laser therapy and Trendelenburg surgery in the Indian setting

Sivasankaran.N*, Riju.R.Menon*

ABSTRACT

Background: Management of varicose veins in present times has multiple modalities, each with its own pros and cons. This is a comparative study between the conventional Trendelenburg procedure and the newer Endovenous laser therapy (EVLT).

Materials and Methods: This is a prospective, comparative study of 40 patients each in two treatment arms conducted between July 2009 to January 2012 in the department of General Surgery. These patients were observed for post operative morbidity, hospital stay and recurrence.

Results: In Trendelenburg group: 27.5% (11 of 40) patients developed haematoma, 47.5% (19 of 40) patients developed infection, 10% (4 of 40) patients developed phlebitis, 10% (4 of 40) patients developed paraesthesia. Mean hospital stay was 3.13 days, mean pain score was 3.08. In EVLT group: 7.5% (3 of 40) patients developed hematoma, 2.5% (1 of 40) patient developed infection, 7.5% (3 of 40) patients developed phlebitis, 5% (2 of 40) patients developed paraesthesia, 5% (2 of 40) patients developed skin burns. Mean hospital stay was 4.85 days, Mean pain score was 6.75 (VA scale). No recurrence in both groups.

Conclusion: EVLT procedure had better results in terms of immediate postoperative morbidity like hematoma, infection; less hospital stay and less pain when compared to conventional surgery.

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INTRODUCTION

Varicose veins of the lower limbs affect many people worldwide. The incidence is as high as 40 per cent in women and 20% in men as reported in literature.1,2,3 The aetiology is usually a refluxing valve or obstruction in the deep venous system. Reflux at the saphenofemoral junction is the commonest cause of venous insufficiency, while a smaller group of patients may also have incompetence of the short saphenous vein or the perforators.4,5,6 Important risk factors for varicose veins include female gender, family history, obesity and prolonged standing.7 The presentation of varicose veins is often variable and its severity is unpredictable, ranging from just an unsightly cosmetic appearance and lower limb discomfort, to its multiple complications such as oedema, skin discoloration, eczema, ulceration and even profuse bleeding.5,7,8

Frederich Trendelenburg described saphenofemoral junction ligation alone, without stripping of the incompetent saphenous vein, in the 1890s. The gold standard for surgical treatment of varicose veins due to saphenofemoral junction (SFJ) insufficiency, together with great saphenous vein (GSV) reflux, is the flush ligation at SF junction and stripping of the GSV.9,10,11,12 Conventional surgery may cause bruising, postoperative pain, and paresthesia due to nerve injury, prolonged recovery periods and significance recurrence.13,14,15

As with the progress seen in all aspects of surgery over the decades, technological advancement has changed the way in which surgery is performed nowadays. Minimally invasive procedures are currently widely accepted. However, this change has only begun to be seen in the treatment of varicose veins in recent years. Techniques such as endovenous radiofrequency ablation, ultrasonographically-guided foam sclerotherapy and endovenous laser treatment (EVLT) have all been described with varying results but minimal morbidity.

AIM & OBJECTIVES

To compare Endovenous Laser Treatment with Trendelenburg procedure in the treatment of the varicose veins with respect to the following aspects:

• Morbidity: Haematoma, Phlebitis, Skin burn, Post-operative pain, Post operative Infection, Nerve Injury/ Paraesthesia, Deep Vein Thrombosis /Thrombo-embolic events

• Postoperative pain
• Hospital stay
• Recurrence

MATERIALS & METHODS

Study Period & Place: This is a prospective, comparative study, conducted between July 2009 to January 2012 in the department of General Surgery, Amrita Institute of Medical sciences (AIMS).

Study Population: Patients with primary varicose veins (with or without complications) belonging to either sex.

Sample size: 40 patients were included in each group (EVLT and Trendelenburg group). Since the procedure was done as per patient preference for type of proce-
procedure, randomization could not be done.

**Inclusion criteria:** Patients with primary varicose veins with or without complications.

**Exclusion criteria:** Patients with recurrent varicose veins

**Data collection technique and tools:** All the patients included in this study were subjected to History and Physical examination, Hand Held Doppler examination and Venous Doppler scan. The nature of disease was explained to the patient and an informed decision was taken by the patient regarding the nature of procedure depending on economic, social and other preferences.

Trendelenburg procedure was done under spinal anaesthesia and EVLT under local tumescent block. During and after the procedure all the patients (both EVLT and trendelenburg procedure) were observed for hematoma, skin burns, phlebitis, wound infection, paraesthesia and deep vein thrombosis.

Post operative pain was recorded in all the patients using a pain visual analogue scoring system. The hospital stay of these patients was also recorded. Most of the EVLT patients were discharged on the first post operative day. In the Trendelenburg group, patients were discharged on the second post operative day after inspecting the wound. If any patient developed hematoma, seroma, wound infection, burns, DVT or other adverse events they were discharged once symptomatically better.

The primary clinical treatment outcome of the EVLT and Trendelenburg was the absence of reflux in the SFJ and saphenous vein, confirmed by a duplex ultrasound examination. All the patients were followed up with clinical examination and Duplex scan at 3 months, 6 months and yearly thereafter. Failure / Recurrence was defined as Duplex scan proven SFJ reflux.

**Data Analysis:** Statistical analysis was performed using SPSS for Windows. For all the continuous variables, the results are given in Mean +/- standard deviation. To compare the means of continuous parameters between groups, Students’ t test was performed. For parameters not following the normal distribution, Mann-Whitney U test was performed. For all categorical variables, Pearson’s Chi-square test was performed. Probability value (p-value) is less than or equal to 0.05 was considered for statistical significance. All tests of statistical significance were two-tailed.

**OBSERVATION & RESULTS**

Patients undergoing either procedure were of nearly the same age range. In the EVLT group the patient’s age ranged from 25-69 yrs with mean value of 50.68 and standard deviation of 12.275. In the Trendlenberg group the patient’s age ranged from 22-69 yrs. The mean value was 51.85 with a standard deviation of 10.411. In the EVLT group, 52.5% (21 of 40) were females and 47.5% (19 of 40) were males. In the Trendelenburg procedure: 47.5% (19 of 40) were females and 52.5% (21 of 40) were males.

Patient clinical profile with CEAP classification is given below in table. Patients with a milder disease tended to opt for EVLT and more aggressive disease opted more for Trendelenburg procedure (p value – 0.0136).

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVLT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>16</td>
<td>40.0</td>
</tr>
<tr>
<td>C3</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>C4</td>
<td>8</td>
<td>20.0</td>
</tr>
<tr>
<td>C5</td>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
<tr>
<td>TRENDLENBERG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>8</td>
<td>20.0</td>
</tr>
<tr>
<td>C3</td>
<td>8</td>
<td>20.0</td>
</tr>
<tr>
<td>C4</td>
<td>15</td>
<td>37.5</td>
</tr>
<tr>
<td>C5</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**CEAP**

<table>
<thead>
<tr>
<th>CEAP</th>
<th>EVLT</th>
<th>Trendlenburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2&amp;C3</td>
<td>27(67.5%)</td>
<td>16(40%)</td>
</tr>
<tr>
<td>C4&amp;C5</td>
<td>13(32.5%)</td>
<td>24(60%)</td>
</tr>
</tbody>
</table>

In our study in Trendelenburg group : 27.5%(11 of 40) patients developed haematoma, 47.5% (19 of 40) patients developed infection, 10% (4 of 40) patients developed phlebitis, 10%(4 of 40) patients developed paraesthesia. No patients developed Deep vein thrombosis and skin burns.
In EVLT group: 7.5% (3 of 40) patients developed hematoma, 5% (2 of 40) patients developed skin burns, 7.5% (3 of 40) patients developed phlebitis, 2.5% (1 of 40) patient developed infection, 5% (2 of 40) patients developed paraesthesia. No patients developed deep vein thrombosis.

Postoperative pain
Postoperative pain is the most common complication following any surgical procedure. Pain was analyzed using visual analogue pain scoring system ranging from 0 to 10, zero being no pain and 10 being worst imaginable pain. In the case of EVLT group, the mean pain score was 3.08 with a standard deviation of 0.616. In the case of Trendelenburg group the mean value is 6.75, SD - 0.630. Data was analysed by Mann-Whitney U test and the p-value was <0.001 which is statistically significant.

<table>
<thead>
<tr>
<th>Pain Score</th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EVLT</td>
<td>3.08</td>
<td>0.616</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Trendelenburg</td>
<td>6.75</td>
<td>0.630</td>
<td></td>
</tr>
</tbody>
</table>

Hospital Stay
All the patients were admitted in the hospital one day prior to the surgery. Most of the EVLT patients were discharged on the first post operative day. In the Trendelenburg group, patients were discharged on the second post operative day after inspecting the wound. If patient developed hematoma, seroma, wound infection or other complications they were discharged once symptomatically better. In EVLT group, the mean hospital stay was 3.13 +/- 0.404 days. In the case of Trendelenburg group, the mean hospital stay was 4.85 +/- 0.834 days. The hospital stay did not follow the normal distribution. So Non Parametric Mann-Whitney Test was applied.

There was a statistically significant. Shorter hospital stay for EVLT group compared to Trendelenburg group (p <0.001).

Recurrence
All the patients were followed up with clinical examination, Duplex scan at 3 months, 6 months and yearly thereafter. Recurrence defined as Duplex scan proven SFJ/ GSV refluxes. At the end of 24 months follow up there was no recurrence in our study.

<table>
<thead>
<tr>
<th>Hospital Stay</th>
<th>p Value</th>
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<tbody>
<tr>
<td>Group</td>
<td>Mean</td>
</tr>
<tr>
<td>EVLT</td>
<td>3.13</td>
</tr>
<tr>
<td>Trendelenburg</td>
<td>4.85</td>
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</table>

DISCUSSION
Chronic venous insufficiency and varicose veins affect a significant proportion of population. Even though it rarely results in any mortality, it often has a detrimental effect on quality of life of the patients. The typical symptoms include significant pain, cramps and skin pigmentation. Though a cosmetic clearance is an indication in the West, most Indian patients do not seek procedure for varicose veins in India for this reason. There is a significant delay in seeking treatment. Although the classic treatment is associated with an excellent early outcome, long-term results of 20%–40% recurrence rates have been reported. Many patients only present to the surgeon after suffering from these symptoms for many years.

The majority of adverse events related to treatment of varicose veins are relatively minor. Most commonly reported adverse events for EVLT are hematoma, bruising and ecchymosis, induration along the course of the great saphenous vein, a sensation of tightness in the treated limb. The common adverse events for Trendelenburg procedure are hematoma, bruising, ecchymosis, nerve injury and recurrence. Complications like DVT, nerve injury or damage, bleeding and infections were considered to be serious post-procedural morbidities as they generally require specific post-operative treatment for resolution.

Post-operative pain
Pain is the most common complication following any surgical procedure. The post-operative pain was record-
ed in a number of ways. Definitions of post-operative pain varied from ‘mild tenderness’ to ‘excessive pain’. Some studies asked patients to report their levels of pain on visual analogue scales, while others used analgesic usage scale.

In our study post operative pain was measured by using visual analogue pain scoring system. In case of EVLT the mean pain score is 3.08. In case of Trendelenburg procedure the mean value is 6.75. There was a statistically significant increased reporting of pain in the Trendelenburg group (p < 0.001).

Rasmussen et al.17 recorded pain levels on a visual analogue scale from 0 to 10. Patients’ results were plotted graphically, not numerically. Their study found patients who underwent stripping reporting significantly higher pain scores across the 10-day follow-up period t(P<0.001). However, there was no significant difference between treatment groups in the number of analgesic tablets required for the 10 days post-procedure.

Mekako et al.19 reported three patients (4.8 per cent) in the surgery group requiring overnight admission to hospital immediately after the procedure for pain requiring parenteral analgesia whereas no EVLT patient required a hospital admission.

de Medeiros16 queried their patients at 7 days post-treatment and found no significant difference in pain levels between treatments.

Vuylsteke et al.18 reported that patients who underwent EVLT required use of non-steroidal anti-inflammatory drugs (NSAIDs) for a significantly shorter period of time post-treatment than their ligation and stripping counterparts.

Wu et al.20 reported 23 patients (76.7 per cent) required post-operative analgesics following stripping, significantly more than the six EVLT patients (30.0 per cent) requiring analgesics (P<0.01).

Post operative Infection

A few of our patients developed surgical site infection at the groin wound in the immediate postoperative period or were detected during the first follow up visit. They were managed with antibiotics on out-patient basis. Infection following EVLT is rare. Post operative groin infection following Trendelenberg procedure has been reported by a few authors.

In our study significantly fewer patient (1/40) of EVLT group developed infection as compared to Trendelenburg group 47.5% (19 of 40) patients (p < 0.05) requiring treatment with antibiotics.

Rasmussen et al.17 reported one patient (1.7 per cent) who suffered infection of their groin wound after surgery and was successfully treated with antibiotics.

Vuylsteke et al.18 reported one case (0.8 per cent) of a groin abscess in a patient who underwent surgery, which required re-admission to hospital for incision and drainage followed by intravenous antibiotic treatment.

Haematoma

This is another common complication following surgical or endovenous ablation for varicose veins. In our study, 7.5% (3 of 40) patients in EVLT group developed hematoma as against a statistically significantly higher 27.5% (11 of 40) patients in the Trendelenburg group (p<0.05).

de Medeiros16 reports that all patients suffered some degree of haematoma but significantly lower rates of large haematoma was seen in patients who underwent EVLT. Rasmussen17 reported no significant difference between treatments in occurrence rate of haematoma. However, significantly fewer patients in the EVLT group suffered bruising compared to the ligation and stripping group (11.3 per cent vs 25.4 per cent, P<0.05). Vuylsteke et al.18 found four cases (3.1 per cent) of haematoma in the groin amongst the ligation and stripping patients treated conservatively, but no incidence of haematoma in EVLT patients.

Phlebitis

Endovenous ablation of the vein results in an aseptic inflammation and fibrosis of the treated vein. Patients usually present with a mild pain and discomfort along the length of the vein. In our study both the EVLT group7.5% (3 of 40) and Trendelenburg group 10% (4 of 40) patients developed phlebitis. The values were not statistically significant. A similar result was reported by Rasmussen et al.17.

Skin Burn

Cutaneous skin burns are best prevented by generous use of tumescent anesthesia that is infiltrated along the entire length of the GSV to be treated. The tumescent anesthesia should be instilled in such a manner that the distance between the GSV and the skin is greater than 1 cm as measured by DUS. Additionally, extra care should be taken when the laser approaches the puncture site. In our study, 5% (2 of 40) patients developed minor skin burns in EVLT group. Many authors report minor skin burns which heal spontaneously following endovenous-treatment 17,18.

Nerve Injury/ Paraesthesia

The saphenous nerve is the largest branch of the femoral nerve. The nerve travels with the femoral artery until the adductor canal, when it travels more superficially with the GSV below the knee. The close proximity of the nerve to the GSV puts it at risk for injury secondary to transmitted heat during EVLT or incision during phlebectomy.

In our study 5%(2 of 40) of EVLT group patients developed paraesthesia and in Trendelenburg group 10%(4 of 40) patients developed paraesthesia. The values are not
significant. Rasmussen et al.,17 reported one self-limiting case of paraesthesia in both the EVLT (1.6 per cent) and ligation and stripping (1.7 per cent) groups. de Medeiros16 reported one case in a patient treated with surgery, which completely resolved in one month. Vuylsteke et al.,18 found 28 cases (22.6 per cent) of paraesthesia amongst the stripping group compared to 14 (11.9 per cent) in the EVLT group.

Saphenous nerve injury can be prevented by cannulating the GSV above the knee, where it remains deep to the GSV. Methods of preventing saphenous nerve injury are successful instillation of tumescent anesthesia within the fascia that completely surrounds the GSV.

**Deep Vein Thrombosis/ Thrombo-embolic events**

There was no DVT reported in our set of patients. Rasmussen et al.,17 reported one case (5.0 per cent) of an EVLT patient presenting with extension of the saphenous thrombosis into the femoral vein, which dissolved spontaneously without anticoagulants. No statistical comparison was made between EVLT and surgery regarding this complication. The patients with a history of DVT or other risk factors for the development of DVT may benefit from a one-time prophylactic dose of low-molecular-weight heparin just prior to the procedure.

This problem is usually anticipated prior to surgery and during procedure the laser fiber is placed just distal to the first tributary (superficial epigastric vein) prior to treating the vein thereby reducing entry of clot into femoral vein. Patient is encouraged to walk as early as possible postoperatively.

**Recurrence**

The primary clinical treatment outcome of EVLT is the abolition of reflux in the saphenous vein, demonstrated by the complete occlusion or obliteration of the vein on duplex ultrasound examination. The main treatment outcome of the stripping procedure is the abolition of reflux achieved by the removal of the saphenous vein. Provided an adequate stripping procedure has been performed, reflux should not be present in the absent portion of the saphenous vein.

In our study: At the end of 24 months follow up no patient developed recurrence. de Medeiros16 reported that duplex ultrasound scan at 30-day follow up showed 19 limbs (95 per cent) treated with EVLT were successfully occluded, while no reflux was reported in the 20 (100 per cent) surgically stripped limbs. Vuylsteke et al.,18 reported that 99 per cent of saphenous veins treated with EVLT were occluded at 4-week follow-up, and 94 per cent of veins remained occluded at 9-month follow-up. Despite stating they experienced ‘100% success in removing the GSV by stripping’, no data were provided regarding the presence or absence of reflux in the limbs that had been surgically stripped. Thus, while the rate of occlusion from EVLT was comparable to the results of other studies, no comparison to surgery could be made.

Rasmussen et al.,17 reported that occlusion rates after EVLT were 100 per cent at 12 days and 1 month follow-up, 98 per cent at 3 months, and 94 per cent at 6 months. Two patients were lost to followup at 12 days, four at 1 month, six at 3 months, and 15 at 6 months. Absence of reflux in surgically stripped limbs was reported in 97 per cent of limbs at 12 days and 1 month, 100 per cent at 3 months, and 98 per cent at 6 months. No statistical comparison was made between EVLT and surgery regarding absence of reflux.

Mekako et al.,19 reported duplex ultrasound scans at 1- and 12-weeks post procedure that showed GSV occlusion rates after EVLT of 99 and 96 per cent respectively, and sapheno-femoral junction occlusion rates of 97 and 96 per cent respectively. No data were provided regarding reflux in limbs that had received surgery. Wu et al.,20 found that at the 12-month follow-up ultrasound examination, 95 per cent of limbs treated with EVLT were reported to be free of reflux, compared to 94 percent of limbs treated with surgical vein stripping that was statistically not significant.

**CONCLUSION**

Varicose veins is a common condition presenting in the General surgery out patient. Males have higher incidence of ulceration and morbidity probably related to outdoor work stress. Trendelenburg procedure is the gold standard for treatment. There are different therapeutic options for this disease with none being foolproof. Trendelenburg procedure has significant problems of recurrence and postoperative morbidity. The newer procedures have significantly reduced the short term postoperative morbidity but long term results are not yet available. Most ulcers heal well with conservative measures but for effective results it has to be combined with surgery or newer procedures like EVLT, RFA and Foam sclerotherapy.

Our study showed EVLT has minimal post operative morbidity (haematoma, phlebitis, infections), minimal post operative pain, less hospital stay when compared to Trendelenburg procedure. Patient needs to be on regular long term follow up and needs to be educated about the disease for optimal results.

**LIMITATIONS**

Due to patient preference and financial considerations, random allocation could not be done.

**RECOMMENDATIONS**

- A larger group, longer follow-up, proper random-
ization is required to ascertain long-term outcome.

- Cost effectiveness of procedures should be analysed in both groups
- EVLT can be advised as a better modality of treatment if the patient can afford the procedure.

REFERENCES
Video EEG in Temporal Lobe Epilepsy
Saxena R*, Anuj Singhal**, NC Borah***, Deka P***, Deb P***, Borthakur M****

ABSTRACT
Introduction: The temporal lobe epilepsy ictal recordings have long been considered a critical component of the pre-surgical evaluation especially in refractive seizure and Mesial Temporal lobe sclerosis. However, Indian studies are limited because of the reasons stated above. In this study, we are trying to correlate the ictal video EEG with semiology of symptoms of seizures related to the Temporal lobe epilepsy (TLE) patients.

Methodology: In this study, 100 patients from NE state of India, who had paroxysmal event or seizure during Video EEG Monitoring were included, however 41 patients who had TLE were studied in detail. The data was collected by taking clinical history of the patients, interviewing the attendant and eye witness. The patient underwent at least 12-hour video EEG and events were recorded and reviewed by electrophysiologist. The clinical semiology of symptoms of seizure was studied by the neurologist. The two semiological classifications were compared with each other.

Results: In the aura of these 41 suspected TLE cases, the common symptoms were staring, looking around, dysamnesia, somato-sensory aura, psychic symptoms, respiratory and gustatory symptoms. In Ictal phase, the various signs were tonic movement, dystonic posture, clonic movements, gyratory movement and facial grimace. In the post ictal phase main signs were confusion, focal motor deficit, amnesia and dysphoria.

Conclusion: The clinical semiology of seizure correlated well with the ictal Video EEG findings and can confirm the localization and lateralization as depicted by the positive predictive value.

Key words: seizures, EEG, video EEG, semiology of seizure symptoms, Temporal lobe epilepsy.

INTRODUCTION
Epileptic seizures are paroxysmal events defined by symptomatology and by a characteristic inter-ictal and ictal EEG. Epilepsies, on the other hand, are defined by a cluster of signs and symptoms (syndromes) which usually include one or more type of epileptic seizures, associated neurological deficits, its onset, seizure recurrence, persistence and its localisation. In most developed countries, video-EEG (VEEG) performed in epilepsy monitoring units for either differentiation between pseudo seizures and epilepsy, presyncope, to diagnose the type of seizure correctly, pre-surgical assessment in preparation for epilepsy surgery, diagnostic assessment of intractable seizures, and sleep disorders1. In India, VEEG is an emerging technology but is available in the major cities and most of the practicing clinicians have had limited experience. The temporal lobe epilepsy ictal recordings have long been considered a critical component of the pre-surgical evaluation especially in refractive seizure and Mesial Temporal lobe sclerosis. However, Indian studies are limited because of the reasons stated above. In this study, we are trying to correlate the ictal video EEG with semiology of symptoms of seizures related to the Temporal lobe epilepsy (TLE) patients. This was the first study involving the population of North-eastern state of India in this field.

AIM
Study the correlation of the symptoms of temporal lobe epilepsy with video EEG.

MATERIAL & METHOD
This pilot study was carried out at Institute of Neurological Sciences, GNRC Hospitals Comprehensive Epilepsy Care Unit, Guwahati from Jan 2011 to July 2013. The study population consists of patient mainly from north eastern region who had been having paroxysmal events or seizures and were referred or admitted to this hospital for Video EEG monitoring. In this study, 100 patients who had paroxysmal event or seizure during Video EEG Monitoring were included. The data was collected by taking clinical history of the patients, interviewing the attendant and eye witness, and Video EEG monitoring. The patient underwent at least 12-hour video EEG and events were recorded. The records were reviewed by electrophysiologist and Clinical semiology of symptoms of seizure was done by the neurologist. Both the semiological classifications were compared. The two semiological classifications were compared with each other and noted the variation by SPSS 07 software. The chi square test was used where ever applicable. We tested the differences of continuous parameters for statistical significance with Mann Whitney U Test. The Z test for two proportions was used to compare two seizure zone symptoms and its localization.

RESULTS
There were 56 males and 44 females out of 100 patients. The base line demographic data is presented in table1.

Epileptic seizures were seen in 90 patients and non-epileptic form events were found in 9 patients. The details
are placed in figure 1. One patient had both epileptic seizures and non-epileptic seizures. There were 1 patient with primary generalized seizures, 35% had secondary generalization after focal onset and 63 % had partial seizures historically and 1 % had mixed seizure. There were 41 patients who were identified to have temporal lobe seizure (TLE) on the clinical semiology of the symptoms and sign.

In the aura of these suspected TLE, the common symptoms were noted. These were staring, looking around; dysamnesia, somato-sensory aura, psychic symptoms, respiratory and gustatory symptoms.

<table>
<thead>
<tr>
<th>Baseline Demographic And Clinical Characteristic Of Patients</th>
<th>Median</th>
<th>Mode</th>
<th>Range</th>
</tr>
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<tbody>
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<td>1 Age (years)</td>
<td>16</td>
<td>16</td>
<td>19.4± SD11.99</td>
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<tr>
<td>2 Male : Female</td>
<td>-</td>
<td>-</td>
<td>56:44</td>
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<tr>
<td>3 Age of onset of epilepsy (years)</td>
<td>10</td>
<td>10</td>
<td>11.9± SD 9.9</td>
</tr>
<tr>
<td>4 Duration of illness (years)</td>
<td>7</td>
<td>7</td>
<td>7.98± SD 7.0</td>
</tr>
<tr>
<td>5 H/o birth asphyxia</td>
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<td>-</td>
<td>11%</td>
</tr>
<tr>
<td>6 H/o Febrile illness.</td>
<td>-</td>
<td>-</td>
<td>11%</td>
</tr>
<tr>
<td>7 Average Length VEEG</td>
<td>-</td>
<td>-</td>
<td>2 days</td>
</tr>
<tr>
<td>8 Average events recorded per</td>
<td>-</td>
<td>-</td>
<td>3</td>
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Table 1: Baseline Demographic and clinical characteristics of the patients

FIGURE 1: MRI BRAIN ABNORMALITIES IN 100 PATIENTS
<table>
<thead>
<tr>
<th>COMPARISON OF SYMPTOMS and SIGNS of ictal phase</th>
<th>TLE</th>
<th>FLE</th>
<th>PLE</th>
<th>OLE</th>
<th>PGE</th>
<th>OTHERS</th>
<th>PNES</th>
<th>TOTAL</th>
</tr>
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<tr>
<td><strong>N= 41 %</strong></td>
<td><strong>N=31 %</strong></td>
<td><strong>N=3 %</strong></td>
<td><strong>N=3 %</strong></td>
<td><strong>N=6 %</strong></td>
<td><strong>N=15 %</strong></td>
<td><strong>N=1 %</strong></td>
<td><strong>N=100 %</strong></td>
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<td>2</td>
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<td>9</td>
<td>29</td>
<td>1</td>
<td>33</td>
<td>2</td>
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<td>19</td>
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Table 2: CLINICAL SEMIOLOGY OF ICTAL SYMPTOMS AND SIGN IN TLE

<table>
<thead>
<tr>
<th>COMPARISON OF SYMPTOMS and SIGNS of POST ICTAL PHASE</th>
<th>TLE</th>
<th>FLE</th>
<th>PLE</th>
<th>OLE</th>
<th>PGE</th>
<th>OTHERS</th>
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<th>TOTAL</th>
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<tr>
<td><strong>N=41 %</strong></td>
<td><strong>N=31 %</strong></td>
<td><strong>N=3 %</strong></td>
<td><strong>N=3 %</strong></td>
<td><strong>N=6 %</strong></td>
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<td><strong>N=1 %</strong></td>
<td><strong>N=100 %</strong></td>
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<tr>
<td>TENDENCY TO VOMIT</td>
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<td>10</td>
<td>2</td>
<td>6</td>
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<td>32</td>
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<td>68</td>
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<td>TENDENCY TO URINATION</td>
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<td>APHASIA</td>
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<td>12</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Table 3: COMPARISON OF SYMPTOMS AND SIGNS OF POST ICTAL PHASE
In the post ictal phase in TLE hallmark was the confusion, focal motor deficit, amnesia and dysphoria. The details are placed at table 3.

In our study, 24 patients out of all TLE had contravertebral ictal head version. among them 17 patients had unforced head turning in the beginning of seizures and out of them, 11/17 patients had head turning on generalization. The 13/17 patients the unforced head turning were ipsilateral which makes 38% of TLE and rest 4 patients (12%) had contralateral early head version.

There were 18 cases of MTLE and 16 of neocortical TLE. The Abdominal sensations, fear, repetitive upper extremities movement, complete loss of consciousness, partial loss of consciousness, looking around, whole body movement and dreamy states are more commonly observed in MTLE but patients with NTLE more often report psychic, visual, auditory, and vertiginous auras. The details are placed in Table 4.

### Table 4: Lateralizing and Predictive Value of Features on VEEG in 34 Patients with TLE

<table>
<thead>
<tr>
<th></th>
<th>MTLE (n = 18)</th>
<th>NL (n = 16)</th>
<th>Total 34</th>
<th>PPV (%)</th>
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<tr>
<td><strong>Semiology</strong></td>
<td></td>
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<td>Dystonic</td>
<td></td>
<td></td>
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<tr>
<td>Posturing</td>
<td>2</td>
<td>11%</td>
<td>8</td>
<td>44%</td>
</tr>
<tr>
<td>Unilateral arm paresis</td>
<td>2 11%</td>
<td>10 56%</td>
<td>0 0%</td>
<td>3</td>
</tr>
<tr>
<td>EarlyHT</td>
<td>8</td>
<td>44%</td>
<td>2</td>
<td>11%</td>
</tr>
<tr>
<td>HT on generalization</td>
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<td>6</td>
<td>33%</td>
<td>0</td>
</tr>
<tr>
<td>Facial clonus/grimace</td>
<td>1 6%</td>
<td>2</td>
<td>11%</td>
<td>4</td>
</tr>
<tr>
<td>Clonic limb movement</td>
<td>2 11%</td>
<td>6</td>
<td>33%</td>
<td>0</td>
</tr>
<tr>
<td>Ictal speech</td>
<td>1 6%</td>
<td>3</td>
<td>17%</td>
<td>0</td>
</tr>
<tr>
<td>Post-ictal dysphasia</td>
<td>2 11%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
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<tr>
<td><strong>Ictal EEG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seizure activity</td>
<td>14 78%</td>
<td>1</td>
<td>6%</td>
<td>2</td>
</tr>
<tr>
<td>Sharp waves (&gt;4 Hz)</td>
<td>16 89%</td>
<td>0</td>
<td>0%</td>
<td>2</td>
</tr>
<tr>
<td>Post-ictal showing</td>
<td>12 67%</td>
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<td>0%</td>
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</table>

**DISCUSSION**

In this study, there were 41 cases of TLE. During history only 34 cases (83%) could be localized to temporal lobe by Video-EEG and clinical semiology. The remaining 07 cases which could not be localized and were further classified into more specific groups like Fronto-Temporal, Temporo-Occipital and psychogenic non-epileptic seizure depending on the video EEG findings and clinical pictures.

In our study, we had 41% patients were suspected of TLE where predominant features were tonic motor movement in 71% patients, motion less stare 27 patients (66%), motor automatism in 23 cases (56%), oral automatism in 21 patients (51%). A similar pattern was noted in the study by Kotagal et al who analyzed 31 patients. He found a strong association of epigastric sensa-
in versive seizures. In TLE, the spread of seizure onset zone (Blume et al. 2001) rather than quickly to the ipsilateral frontal convexity in a frontal lobe seizure as mentioned in Williamson et al. 4 versus automatically. In our study, the oro-alimentary symptoms/signs were seen in 27 cases out of which 52% patients were from TLE. It included lip smacking, lip pursing, chewing, and licking, tooth grinding or swallowing and followed by gestural automatisms. These are characteristic of MTLE only if preceded by epigastric aura, fear and complex internal sensations, alone or in combination. Our results were coherent in the context of MTLE with hippocampal sclerosis. The lateralizing value of versive head & eye movement in our study was seen in 43%. Kahane F et al. found that forced head deviation was contralateral in more than 90% of seizure, when the seizure developed in generalized tonic-clonic seizure or occurred within 10s prior to generalization. Chee et al., 1993 reviewed the lateralising significance of version in 38 selected patients with frontal and temporal lobe epilepsy and found version in 45% of patients with a positive predictive value of 94%. On comparing the head version of both frontal and temporal lobe epilepsy, it showed that the head turning is initiated earlier in FLE and last longer in the TLE. In FLE, the epileptic activity will typically spread quickly to the ipsilateral frontal convexity in a frontal lobe seizure onset zone (Blume et al. 2001) rather than spread to the contralateral hemisphere or other lobes, especially in versive seizures. In TLE, the spread of seizure activity to the FEF is reflected by contralateral head turning (Shin et al., 2002), but the spread occurs only after a considerably longer time than in case of spread within the frontal lobe as described by Gotz- Trabert et al., which may then be reflected by later head turning as shown in our study and also for extra-temporal lobe epilepsy in general.

The lateralizing value of unilateral dystonic posturing was first described in the English literature by Kotagal et al. He further reported that unilateral dystonic posturing was observed in 41 seizures in 18 patients and dystonic posture was always contralateral to the side of seizure onset which was similar to our study. In the Leutmezer et al. study, ipsilateral nose wiping occurred in 86.5% of TLE patients. Conversely, nose wiping was ipsilateral in 54.5% of patients with extra temporal lobe epilepsy. He also found that post ictal paroxysmal was first described as a lateralising sign possibly due to neural exhaustion of the primary motor area.

In our study, the post ictal confusion was seen in 37% cases. This is in concordance with Barba et al., 2007 where he studied 80 consecutives non lesional TLE respectively. We had 5 case of post ictal aphasia in TLE.

Gabr et al. were the first to lateralize the language dominance with Wada testing in all patients and demonstrated that in 92% of patients with postictal dysphasia had localization in the dominant side.

Mesial temporal sclerosis (MTS), hippocampal sclerosis (HS), is the most common cause of TLE, representing greater than 80%. We had 7 patients MTLS & 7 patients hippocampal malformation patient. We had less numbers i.e. 14 patients out of 34 which is only 40% possibly due to our inexperience in detecting the abnormal radiological changes or less occurrence in this part of the country, needs larger study to prove. The sequence of clinical manifestation of behavioral arrest, or alimentary automatism whole body movement & partial loss of consciousness (loc) was characteristic of MTLS. The frontal lobe complex partial seizures which generally is confused with MTLS has complete loc in the beginning followed by hyper motor activity, vocalization & oro-alimentary automatism.

The ictal EEG onset was defined by the occurrence of a low voltage fast beta activity spikes or occurrence of a rhythmic theta in TLE. Fast rhythmic sharp waves and post-ictal slowing occurred more often in patients with MTS than those with NTLE, while bilateral seizures activity occurred more than and earlier in patients with NTLE. There are two previous preliminary reports comparing scalp ictal-EEG in patients with MTLE, noted that its appearance correlated with the spread of seizures activity into the lateral neocortex on simultaneous depth electrode recording. The finding that the scalp-EEG changes become bitemporal earlier in patients with NTLE is likely to reflect greater spread in these patients to the contra-lateral temporal neocortex. The presence of lateralized onset seizure activity, fast rhythmic sharp waves and lateralized post-ictal slowing were all highly predictive for lateralization of the side of the lesion. Previous studies assessing the lateralizing value of ictal scalp-EEG in MLE have found a somewhat lower degree of accuracy (85%)17. A significant higher proportion of seizures in NTLE patients had bilateral onset of both seizures’ activity and fast rhythmic sharp waves, presumably reflecting rapid spread to the contralateral temporal neocortex.

CONCLUSIONS
We concluded some ictal clinical signs in cluster can be used as localization and lateralization of TLE. When the clinical semiology of seizure correlated with the ictal Video EEG findings can confirm the localization and lateralization in 83% of cases of TLE. Therefore, the finding of our study further consolidated the concept that VEEG and semiology of seizures when done together in detail can be accurate as depicted by the positive predictive value. The other modalities like invasive recording and functional MRI would still be required to ascertain the seizure zone before elective surgery.
CONFLICTS OF INTERESTS
NONE
FINANCIAL BENEFITS
NONE
REFERENCES
8. Blume WT, Jones DC Young GB, et al. Seizures involving second-
Acoustic reflexometric profile in patients with cerebellopontine angle (CPA) tumors

G. Prem†, N. Shivashankar‡, B. Indira Devi***, S.G. Srikanth****, V. Shanmugham*****, Pramada Nair†

ABSTRACT

Objectives: The study attempted to characterize acoustic reflexometric profile in cerebellopontine angle (CPA) tumors. The test results were also correlated with the type, size and extent of tumors to understand possible pathological influence of these tumor characteristics.

Material and methods: The clinical group comprised of 98 unilateral CPA tumor patients evidenced by neuroradiological findings. The control group comprised of 100 subjects with normal hearing and with no known ear/neurological/psychiatric disease conditions.

Results: Hearing loss posed constraints for interpretation of acoustic reflexometric test results in tumor ear stimulation. Among patients who elicited acoustic reflex thresholds (ART), the sensation level values (SART (SL)) did not differ with control group in tumor and nontumor ear stimulation. Further, the present clinical data of ART (SL) did not provide much useful information regarding differential effect of tumor type, size or extent in both tumor and nontumor ears.

Conclusion: Absence of reflexes on nontumor ear stimulation (ipsilateral and contralateral) was providing useful information regarding brainstem compression. The relative ineffectiveness of the index ART (SL) in identifying the presence of tumor or brainstem compression was evident from the present study. Absence of acoustic reflexes in probable nontumor ear stimulation with residual hearing should warrant detailed audiological investigations as it could be demonstrating signs of brainstem compression. Further, presence of reflexes does not preclude the presence of tumor/brainstem compression as evidenced by the present study. Thus, while analyzing suspected CPA tumor cases, acoustic reflexometric findings should be correlated with other audiological measures before arriving at final diagnosis.

Key words: Cerebellopontine angle tumor; Acoustic reflexometry; Brainstem compression; Tumor characteristics-type, size, extent

Corresponding Author: Pramada Nair, Tutor, Department of Speech pathology and Audiology, AIMS, Kochi.

INTRODUCTION

The CPA can be considered as a space bounded by the cerebellum, pons and petrous part of the temporal bone. The CPA cistern houses some of the neurovascular structures that are vital for the auditory system. The seventh and eighth cranial nerve complex forms the central cord of the CPA. Other important structures in the CPA cistern are the Anterior Inferior Cerebellar Artery (AICA) and its branches and the Posterior Inferior Cerebellar Artery (PICA). The internal auditory artery (IAA), a branch of the AICA, enters laterally into the Internal Auditory Meatus (IAM) to supply both facial and auditory nerves. The IAA branches within the IAM and supply blood to the cochlea and vestibular end organs. The AICA indirectly supplies the cochlear nucleus (CN). Given this neuroanatomy of the CPA region, it can be expected that lesions of the CPA are potent to cause significant auditory deficits.

The CPA is one of the most common sites of intracranial tumors and approximately 10% of them originate in this region. The CPA tumors are persuasive to cause direct and/or indirect pathological effects on the auditory system. These effects generally are in the form of eighth nerve compression, destruction, infiltration, vascular compression or occlusion of the blood supply to the eighth nerve or to the cochlea, deafferentation, damage to the cochlear efferents, biochemical changes within the inner ear and toxicity of inner ear. Pressure on adjacent structures including compression or displacement of brainstem may also contribute to auditory dysfunction.

In humans, the acoustic reflex involves the bilateral contraction of the stapedius muscles in response to a high-level sound that is presented to either ear. The acoustic reflex arc involves components such as cochlea, auditory nerve, brainstem level auditory nuclei such as Ventral Cochlear Nucleus and Medial Superior olive Complex, Facial Motor Neuron and facial nerve of both sides. In most of the neuroaudiological clinical set-up, the test protocol in CPA evaluation comprises of acoustic reflexometry and the test results may vary depending on hearing acuity and the functional integrity of the acoustic reflex arc. The CPA tumors due to its direct and/or indirect pathological influence on the auditory system could cause hearing loss which may lead to absence of reflexes. In spite of normal or near normal hearing in the stimulated ear, acoustic reflexes may be absent or elevated due to the pathological influence of tumor. Such effects may be noted in the tumor ear due to di-
Acoustic reflexometric profile in patients with cerebellopontine angle (CPA) tumors

direct influence and in the contralateral ear due to indirect pathological effects of brainstem compression. Further, tumor characteristics such as type, size and extent could influence the acoustic reflexometric test results variably.

Hirsch and Anderson\(^4\) have reported the efficacy of acoustic reflex testing in the diagnosis of CPA tumors. Their main findings were absence of acoustic reflex in 60% of the tumor ears. An influence of tumor size on acoustic reflex test results seems intriguing. Abaza et al\(^5\) have reported the low reliability of acoustic reflex tests in diagnosing small and medium sized tumors. Further, Bergénius et al\(^6\) have showed a positive relation between tumor size (range: 6-40 millimeter-mm) and degree of abnormality for acoustic reflex threshold. The most interesting observation was that tumors with a size exceeding 15-20 mm showed a test pattern different from that of small tumors. There was a high probability of no response with stapedius reflex test for tumors above 15-20 mm.

There seems to be definite interplay between tumor characteristics and acoustic reflexometric test results. Hence, the need for a thorough acoustic reflexometric assessment in patients with CPA tumors is warranted. In a busy hospital setup, the acoustic reflexometry could be the initial test of choice for establishing the presence of retrocochlear pathology as it is cost effective, non-invasive, simple and reliable. A thorough study will help audiologists in early identification as well as differential diagnosis of CPA tumors. Further, corroboration of acoustic reflexometric test results with radiological and histopathological findings may help to gain critical insights regarding the auditory pathophysiology involved. Keeping the above views in mind, the present study was formulated in CPA tumor patients and will be limited to reporting of acoustic reflexometric test results alone. The study will attempt to achieve the following objectives:

1. To characterize acoustic reflexometric profile in CPA tumors.
2. To correlate acoustic reflexometric test results with the type, size and extent of tumors.

**METHODS**

The clinical group comprised of 98 patients (39 males and 59 females) with unilateral CPA tumor. Confirmed CPA tumor patients as evidenced by neuroradiological findings on Magnetic Resonance Imaging (MRI) or Computed Tomography (CT) were included. Patients within the age range 15-55 years were only considered. Signed informed consent was obtained from all patients. Patients with history of occupational noise exposure, ear infections or any other neurological/psychiatric conditions were excluded.

The control group comprised of 100 normal hearing subjects i.e., puretone thresholds 25 decibel (dB) or below at octave frequencies from 250-8000 Hertz (Hz) and including 6 kilo Hertz (kHz). Patients’ relatives as well as staff of the hospital constituted this group. Age range of this group was also defined between 15-55 years. Signed informed consent was obtained from all subjects. Subjects with history of occupational noise exposure, ear infections or any other neurological/psychiatric conditions were excluded.

The age range of subjects in the clinical and control group was limited between 15-55 years to avoid confounding effects of auditory maturation and presbycusis. The study was undertaken at National Institute of Mental Health and Neuro Sciences (NIMHANS), an apex tertiary public sector hospital in the city of Bangalore, India. The NIMHANS ethics committee had approved the protocol for the study. Department of neurosurgery was the referral source for the study population.

**Audiological assessment**

Grason Stadler Incorporates (GSI) 61, dual channel clinical-diagnostic audiometer with TDH-50 P earphones was used for measuring the puretone thresholds. Immittance audiometry was performed using Amplaid 728 immittance audiometer with TDH-49 P earphones. Baseline tympanometric measurements were obtained to rule out the presence of any middle ear pathology. Subjects with ‘A’ type tympanogram were only considered for further analysis.

Acoustic reflex thresholds (ART) were obtained at 500 Hz, 1 kHz and 2 kHz both ipsilaterally and contralaterally. A measure of recruitment or dynamic range\(^7\) was calculated by comparing ART obtained by ipsilateral stimulation or contralateral stimulation with air conduction hearing threshold levels (HTLs) from the stimulated ear at each frequency.

**Grouping and statistical treatment of the data**

Histopathological findings categorized the tumors into acoustic (n=61) and nonacoustic (n=37) types.

Tumor volume was estimated from MRI or CT scans. Based on volumetric measurements of the tumor they were classified into Group I (n=23) having tumor volume less than or equal to 30 cubic centimeter (cc), Group II (n=40) having tumor volume 31-60 cc, Group III (n=32) having volume greater than 60 cc and Group IV (n=3) where tumor volume could not be ascertained (Group IV was not considered for statistical analysis due to limited number of cases).

Tumor extent was estimated from MRI or CT scans. The patients were classified into Group A (n=57) having Internal Auditory Meatus (IAM) and brainstem involvement, Group B (n=28) having only brainstem involvement and Group C (n=13) which is an un-assorted group having patients with the lesion extension to IAM only, patients with no involvement of IAM and brainstem and patients in whom the tumor extent could not be esti-
Tumor volume and extent were ascertained by an experienced radiologist (co-author) from MRI or CT scans. The statistical tests employed are demonstrated in Table 1.

<table>
<thead>
<tr>
<th>Grouping for statistical analysis</th>
<th>Statistical tests administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical group versus Control group</td>
<td>ANCOVA (age &amp; gender as covariates)</td>
</tr>
<tr>
<td>Discrete clinical groups classified based on tumor type, size &amp; extent versus control group</td>
<td>ANOVA followed by post hoc (Tukey) test</td>
</tr>
<tr>
<td>Acoustic versus Nonacoustic tumor types</td>
<td></td>
</tr>
<tr>
<td>Group I versus Group II versus Group III tumor volumes</td>
<td></td>
</tr>
<tr>
<td>Group A versus Group B tumor extents</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Statistical analysis of the data

Note: The mean difference between variables was considered statistically significant at p<0.05.

Results

Matched to the age range of the clinical group, the control group (normal hearing) comprised of 100 subjects, 59 males and 41 females, with a combined mean age of 33.6 years.

The results obtained on acoustic reflex test were expressed in terms of sensation level (SL) of ART. The SL of an ART refers to the number of decibels of ART above the patient’s air conduction hearing threshold on the stimulated ear.

In the control group, mean difference in ART (SL) values between the right and left ears were found to be statistically not significant using independent samples t-test. Hence, a combined mean value of ART (SL) of 73.45 dB (SD=7.68), 77.17 dB (SD=7.98) and 87.24 dB (SD=7.57) were considered normative for 500 Hz, 1000 Hz and 2000 Hz for ipsilateral stimulation. The corresponding values for contralateral stimulation were 81.1 dB (SD=9.38), 83.47 dB (SD=9.09) and 86.96 dB (SD=8.54) respectively.

Comparison of ART (SL) values between control group and clinical group for ipsilateral stimulation

In the clinical group, the mean ART (SL) values could not be computed in all the patients due to No Response (NR) in acoustic reflexometry. While 40%, 36% and 42% of nontumor ears elicited NR for acoustic reflexes at 500, 1000 and 2000 Hz respectively for ipsilateral stimulation, the corresponding proportion in tumor ears were 92%, 93% and 94% respectively. Statistical analysis was not done for tumor ears on ipsilateral stimulation due to limited number of ears. Table 2 depicts the mean ART (SL) values in both control and the clinical group for ipsilateral stimulation.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ART (SL) in dB at 500 Hz</th>
<th>ART (SL) in dB at 1 kHz</th>
<th>ART (SL) in dB at 2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of ears</td>
<td>Mean (SD)</td>
<td>Number of ears</td>
</tr>
<tr>
<td>Control group</td>
<td>200</td>
<td>73.45 (7.68)</td>
<td>200</td>
</tr>
<tr>
<td>Nontumor ear</td>
<td>59</td>
<td>70.17 (10.79)</td>
<td>63</td>
</tr>
<tr>
<td>Acoustic nontumor ear</td>
<td>35</td>
<td>69.71 (8.91)</td>
<td>39</td>
</tr>
<tr>
<td>Nonacoustic nontumor ear</td>
<td>24</td>
<td>70.83 (13.24)</td>
<td>24</td>
</tr>
<tr>
<td>Group I nontumor ear</td>
<td>15</td>
<td>67.67 (8.84)</td>
<td>17</td>
</tr>
<tr>
<td>Group II nontumor ear</td>
<td>25</td>
<td>70.8 (13.28)</td>
<td>26</td>
</tr>
<tr>
<td>Group III nontumor ear</td>
<td>17</td>
<td>70.88 (8.88)</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 2: Mean Acoustic Reflex Threshold-Sensation Level (ART (SL)) values in both control group and the clinical group for ipsilateral stimulation
ART (SL) values revealed no significant difference with that of the control group at p>0.05 for nontumor ear ipsilateral stimulation at 500 Hz and 1 kHz. Comparison of the control group with discrete clinical groups classified based on tumor type and size on ART (SL) values revealed no significant difference for nontumor ear ipsilateral stimulation (Table 3).

### Table 3: Statistical significance on comparison of mean ART (SL) values between control group and clinical group for ipsilateral stimulation

<table>
<thead>
<tr>
<th>Variables</th>
<th>p value for ART (SL) at 500 Hz</th>
<th>p value for ART (SL) at 1 kHz</th>
<th>p value for ART (SL) at 2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group versus nontumor ear</td>
<td>0.095</td>
<td>0.313</td>
<td>0.042*</td>
</tr>
<tr>
<td>Control group versus acoustic non-tumor ear</td>
<td>0.092</td>
<td>0.285</td>
<td>0.121</td>
</tr>
<tr>
<td>Control group versus nonacoustic nontumor ear</td>
<td>0.41</td>
<td>0.094</td>
<td>0.069</td>
</tr>
<tr>
<td>Control group versus Group I non-tumor ear</td>
<td>0.101</td>
<td>0.977</td>
<td>0.405</td>
</tr>
<tr>
<td>Control group versus Group II non-tumor ear</td>
<td>0.559</td>
<td>0.135</td>
<td>0.147</td>
</tr>
<tr>
<td>Control group versus Group III non-tumor ear</td>
<td>0.701</td>
<td>0.999</td>
<td>0.759</td>
</tr>
</tbody>
</table>

Note: *statistical significance at p<0.05.

Comparison of ART (SL) values between control group and clinical group for contralateral stimulation

While 77%, 83% and 92% of nontumor ears demonstrated absence of acoustic reflexes at 500, 1000 and 2000 Hz respectively for contralateral stimulation (tumor ear stimulation and nontumor ear recording), the corresponding proportion in tumor ears (nontumor ear stimulation and tumor ear recording) were 38%, 41% and 47% respectively. Statistical analysis was not done for nontumor ears on contralateral stimulation at 2000 Hz, acoustic nontumor ears, Groups I, II and III as well as Groups A and B nontumor ears due to limited number of cases. Table 4 depicts the mean contralateral ART (SL) values for both the control and the clinical group.

### Table 4: Mean Acoustic Reflex Threshold-Sensation Level (ART (SL)) values for the control group and clinical group for contralateral stimulation

<table>
<thead>
<tr>
<th>Variables</th>
<th>ART (SL) in dB at 500 Hz</th>
<th>ART (SL) in dB at 1 kHz</th>
<th>ART (SL) in dB at 2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of ears</td>
<td>Mean (SD)</td>
<td>Number of ears</td>
</tr>
<tr>
<td>Control group</td>
<td>200</td>
<td>81.1 (9.38)</td>
<td>200</td>
</tr>
<tr>
<td>Tumor ear</td>
<td>61</td>
<td>83.36 (15.94)</td>
<td>58</td>
</tr>
<tr>
<td>Nontumor ear</td>
<td>23</td>
<td>72.61 (24.58)</td>
<td>17</td>
</tr>
<tr>
<td>Acoustic tumor ear</td>
<td>37</td>
<td>81.89 (15.15)</td>
<td>37</td>
</tr>
<tr>
<td>Nonacoustic tumor ear</td>
<td>24</td>
<td>85.63 (17.15)</td>
<td>21</td>
</tr>
<tr>
<td>Nonacoustic nontumor ear</td>
<td>12</td>
<td>85.42 (11.17)</td>
<td>11</td>
</tr>
<tr>
<td>Group I tumor ear</td>
<td>18</td>
<td>84.17 (17.59)</td>
<td>17</td>
</tr>
<tr>
<td>Group II tumor ear</td>
<td>24</td>
<td>82.71 (16.28)</td>
<td>25</td>
</tr>
<tr>
<td>Group III tumor ear</td>
<td>17</td>
<td>82.65 (14.91)</td>
<td>14</td>
</tr>
<tr>
<td>Group A tumor ear</td>
<td>38</td>
<td>84.21 (15.22)</td>
<td>35</td>
</tr>
<tr>
<td>Group B tumor ear</td>
<td>16</td>
<td>88.44 (11.65)</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: dB-decibel, Hz-Hertz; kHz-kilo Hertz; SD-Standard Deviation
<table>
<thead>
<tr>
<th>Variables</th>
<th>p value for ART (SL) at 500 Hz</th>
<th>p value for ART (SL) at 1 kHz</th>
<th>p value for ART (SL) at 2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group versus tumor ear</td>
<td>0.205</td>
<td>0.237</td>
<td>0.224</td>
</tr>
<tr>
<td>Control group versus nontumor ear</td>
<td>0.058</td>
<td>0.022*</td>
<td>0.204</td>
</tr>
<tr>
<td>Control group versus acoustic tumor ear</td>
<td>0.94</td>
<td>0.898</td>
<td>0.719</td>
</tr>
<tr>
<td>Control group versus nonacoustic tumor ear</td>
<td>0.241</td>
<td>0.225</td>
<td>0.957</td>
</tr>
<tr>
<td>Control group versus nonacoustic nontumor ear</td>
<td>0.484</td>
<td>0.985</td>
<td>#</td>
</tr>
<tr>
<td>Control group versus Group I tumor ear</td>
<td>0.768</td>
<td>0.858</td>
<td>0.883</td>
</tr>
<tr>
<td>Control group versus Group II tumor ear</td>
<td>0.94</td>
<td>0.956</td>
<td>0.58</td>
</tr>
<tr>
<td>Control group versus Group III tumor ear</td>
<td>0.964</td>
<td>0.967</td>
<td>0.705</td>
</tr>
<tr>
<td>Control group versus Group-A tumor ear</td>
<td>0.324</td>
<td>0.291</td>
<td>0.444</td>
</tr>
<tr>
<td>Control group versus Group-B tumor ear</td>
<td>0.046*</td>
<td>0.576</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Note: # statistical analysis not done; * statistical significance at p<0.05.

Table 5: Statistical significance on comparison of mean ART (SL) values between control group and clinical group for contralateral stimulation.

<table>
<thead>
<tr>
<th>Variables</th>
<th>p value for ART (SL) at 500 Hz</th>
<th>p value for ART (SL) at 1 kHz</th>
<th>p value for ART (SL) at 2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic nontumor ear versus Non-acoustic nontumor ear (Ipsilateral)</td>
<td>0.886</td>
<td>0.696</td>
<td>0.891</td>
</tr>
<tr>
<td>Group I nontumor ear versus Group II nontumor ear (Ipsilateral)</td>
<td>0.714</td>
<td>0.631</td>
<td>0.998</td>
</tr>
<tr>
<td>Group I nontumor ear versus Group III nontumor ear (Ipsilateral)</td>
<td>0.747</td>
<td>0.975</td>
<td>0.961</td>
</tr>
<tr>
<td>Group II nontumor ear versus Group III nontumor ear (Ipsilateral)</td>
<td>1.000</td>
<td>0.34</td>
<td>0.881</td>
</tr>
<tr>
<td>Acoustic tumor ear versus Non-acoustic tumor ear (Ipsilateral)</td>
<td>0.479</td>
<td>0.487</td>
<td>0.948</td>
</tr>
<tr>
<td>Group I tumor ear versus Group II tumor ear (Contralateral)</td>
<td>0.982</td>
<td>0.991</td>
<td>0.433</td>
</tr>
<tr>
<td>Group I tumor ear versus Group III tumor ear (Contralateral)</td>
<td>0.984</td>
<td>0.997</td>
<td>0.518</td>
</tr>
<tr>
<td>Group II tumor ear versus Group III tumor ear (Contralateral)</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Group A tumor ear versus Group B tumor ear (Contralateral)</td>
<td>0.425</td>
<td>0.996</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Table 6: Statistical significance on comparison of ART (SL) values between clinical groups classified based on tumor type, size and extent.
When analyzed for the difference in mean contralateral ART (SL) values between the control group and the patient group, no significant difference at $p>0.05$ was observed statistically for nontumor ear ART (SL) value at 500 Hz and 2 kHz. Comparisons of the mean contralateral ART (SL) values between the control group and discrete clinical groups classified based on tumor type, size and extent revealed no significant difference at $p>0.05$ except for Group B tumor ear ART (SL) value at 500 Hz ($p=0.046$) (Table 5).

**Comparison of ipsilateral and contralateral ART (SL) values between clinical groups classified based on tumor type, size and extent**

No significant difference ($p>0.05$) was noted between all comparisons (Table 6).

**DISCUSSION**

**Acoustic reflex threshold (ART)**

In the current study, the acoustic reflex was considered absent when a response was not obtained at the maximum stimulus intensity. The absence could be due to the hearing loss per se or owing to the pathology itself. This information was extrapolated from the current study by analyzing puretone thresholds and acoustic reflex thresholds at each particular frequency.

Approximately 90% of tumor ears did not elicit reflex responses for ipsilateral stimulation. Among them, approximately 25%-30% would have demonstrated absence of reflex due to the effects of the tumor. The absence of reflexes in others could be attributed to hearing loss. Thus ipsilateral ART estimation was not very useful for identifying the presence of CPA tumors due to the contamination effect of hearing loss in the tumor ears. Very few patients elicited ART on the tumor ear ipsilateral stimulation and hence were not considered for statistical analysis. The main reason for this could be attributed to severity of tumor ear hearing loss in the present study as 2% had moderately severe hearing loss, 8% had severe hearing loss, 11% had profound hearing loss and 43% had no response for puretone average.

The proportion of absent reflexes in the nontumor ears for ipsilateral stimulation was around 40%. Majority of them (approximately 85%) did not elicit reflexes probably due to the effects of the tumor. On comparison with the control group, the nontumor ears on ipsilateral stimulation did not elicit any significant differences for ART (SL) at 500 Hz and 1 kHz. When patient population was sub-categorized based on tumor type and size, ART (SL) for nontumor ears did not differ with the control group at any of the frequencies. Thus, the presence of ipsilateral ART in nontumor ears probably indicates the relative preservation of nontumor ear ipsilateral reflex pathways.

Approximately 75% of the nontumor ears did not elic-
patients with absent acoustic reflexes also increased. For ipsilateral stimulation, the fraction of tumor ears with absent acoustic reflexes was 80%, 90% and 100% in Groups I, II and III respectively. The corresponding proportion for the nontumor ears on ipsilateral stimulation were 30%, 40% and 45% in Groups I, II and III respectively. For contralateral stimulation, the proportion of the tumor ears with absent acoustic reflexes were 20%, 45% and 50% in Groups I, II and III respectively. The corresponding proportion for the nontumor ears on contralateral stimulation were 60%, 85% and 90% in Groups I, II and III respectively. Bergenius et al\(^6\) and Abaza et al\(^5\) have also reported similar findings. Bergenius et al\(^6\) reported a positive relation between tumor size and degree of abnormality for contralateral stapedius reflex test. Their most interesting observation was that there was a high probability of no response with SR test for tumors above 15-20 mm. Abaza et al\(^5\) noted that increased tumor volume was associated with the absence of an acoustic reflex and increases in the superior/inferior (S/I) dimension and the medial/lateral (M/L) dimension of the tumor were the most significant.

In the present study, ART (SL) was not found to be an effective tool for identifying the presence of brainstem compression. However, absence of acoustic reflexes associated with nontumor ear stimulation (ipsilateral and contralateral) provided useful information regarding brainstem compression and could be a valuable indicator for CPA tumor identification. Hearing loss imposed constraints for interpreting acoustic reflexometric findings, particularly in tumor ear stimulation. This is probably a drawback of the present study and in future large number of CPA tumor patients with sufficient residual hearing should be assessed for understanding the efficacy of acoustic reflexometry in CPA tumor identification.

**CONCLUSION**

Due to the constraints imposed by hearing loss, acoustic reflexometric findings on tumor ear stimulation (ipsilateral and contralateral) were not yielding. However, with enhancement in tumor size, the proportion of patients with absent acoustic reflexes increased for tumor ear ipsilateral and contralateral stimulation, providing useful information regarding pathological effect of tumor size. Similarly, absence of reflexes on nontumor ear stimulation (ipsilateral and contralateral) was providing useful information regarding brainstem compression.

Among patients who elicited acoustic reflex thresholds, the ART (SL) values did not differ with control group in tumor and nontumor ear stimulation, providing information about the relative inefficacy of the index ART (SL) in identifying the presence of tumor or brainstem compression. Further, the present clinical data of ART (SL) did not provide much useful information regarding differential effect of tumor type, size or extent in both tumor and nontumor ears.

Acoustic reflexometry is one of the most common tools used by audiologists for differential diagnosis of cochlear/retrocochlear auditory pathology. Due to constraints imposed by hearing loss, scope for detailed audiological investigation in suspected CPA tumor ears may be limited. However, absence of acoustic reflexes in probable nontumor ear stimulation with residual hearing should warrant detailed audiological investigations as it could be demonstrating signs of brainstem compression. Further, presence of reflexes does not preclude the presence of tumor/brainstem compression as evidenced by the present study. Thus, while analyzing suspected CPA tumor cases, acoustic reflexometric findings should be correlated with other audiological measures before arriving at final diagnosis.

**Compliance with Ethical Standards:**

The study entitled ‘Acoustic reflexometric findings in patients with cerebellopontine angle tumors were not funded by any agency.

**Ethical approval:**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

**Informed consent:**

Informed consent was obtained from all individual participants included in the study.

**REFERENCES**

Acoustic reflexometric profile in patients with cerebellopontine angle (CPA) tumors


Profile of Drug Induced Pancreatitis

Jisha Sivadas*, Rajesh Gopalakrishna**, Bhanu Vikraman Pillai**

ABSTRACT

Drug Induced Pancreatitis (DIP) is a rare cause for acute pancreatitis. The underlying pathophysiological mechanisms are not completely understood and may be variable among various classes of drugs. Progression to chronic pancreatitis in humans is not definitely established. We prospectively followed up patients with pancreatitis induced by different class of drugs. The most common cause was azathioprine and most common comorbidity was inflammatory bowel disease.

Key words: Drug Induced Pancreatitis, Acute Pancreatitis, Chronic pancreatitis

INTRODUCTION

Drug Induced Pancreatitis (DIP) is a rare entity and its incidence is reported between 0.1% and 2% of acute Pancreatitis (AP) cases1. DIP may be difficult to diagnose with certainty because of the difficulty of implicating a drug as the (sole) cause. Furthermore, the mechanisms of pancreatic injury are not as well understood as other causes of pancreatitis or are controversial. Exacerbation of chronic pancreatitis can also occur. There is paucity of data on DIP from India. It is unclear whether DIP can progress to chronic pancreatitis (CP) in predisposed individuals.

PATIENTS AND METHODS

We studied patients diagnosed as drug induced pancreatitis followed up prospectively in Pancreas clinic between January 2012 and December 2016. Acute pancreatitis was diagnosed if any 2 of 3 following criteria were met - (i) clinical: typical upper abdominal pain which was aggravated by food and radiating to back (ii) biochemical: elevated serum amylase and/or lipase levels (iii) radiological: typical imaging findings in the pancreas on USG/CT. Other more common causes of pancreatitis like alcohol abuse, gallstones, trauma, hypertriglyceridemia, hypercalcemia, autoimmune pancreatitis were excluded. Drug induced pancreatitis was suspected on basis of suggestive history and temporal profile of ingestion of a drug likely to be implicated. The likelihood of a drug causing pancreatitis as an adverse drug reaction (ADR) was assessed using Naranjo ADR probability scale 2. ADRs were classified as definite (≥9), probable (5-8), possible (1-4) and doubtful (≥0). During follow-up, USG abdomen was performed to look for changes of chronic pancreatitis (CP). CT scan and endoscopy ultrasound (EUS) was done using Olympus echoendoscope when indicated.

RESULTS

The characteristics of the patients are given in table 1. There were 12 patients (10 males, 2 females) diagnosed as DIP. The median age was 18.5 years (range 8 to 73 years). The patients diagnosed to have DIP all had mild acute pancreatitis. There were no major systemic or local complications. The most common classes of drugs were anti-epileptics and immunomodulators. The 2 most common co-morbidities for which the drugs were being used included IBD and seizure disorder (see fig 1). Overall, the most commonly implicated drug was azathioprine and was noted across all age groups. However DIP due to antiepileptics was mostly seen in pediatric population and young adults (<35years age). Azathioprine induced pancreatitis was mostly seen in setting of IBD (Crohn's disease) and the disease spectrum was of a mild acute pancreatitis.
<table>
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<th>Sl.No</th>
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<th>Sex</th>
<th>Implicated drugs</th>
<th>Indication</th>
<th>Diagnosis</th>
<th>Naranjo score</th>
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<td>7</td>
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Table 1: Characteristics of patients with drug induced pancreatitis.

**DISCUSSION**

Drug-induced pancreatitis is a rare entity and difficult to diagnose. Only a minority of cases associated with acute pancreatitis is linked to drugs and clinical presentation and mechanisms of injury to the pancreas are not well understood or controversial. A definitive diagnosis of DIP remains challenging because its occurrence is uncommon and difficulty in determining the causative agent. A high index of suspicion is needed and the drug should be discontinued on clinical grounds with consistent biochemical and/or radiological features of pancreatitis. While re-challenge test of the suspecting drug is a good diagnostic test, the re-challenge test in clinical practice is greatly limited by the risk of a severe attack of pancreatitis. The severity of index pancreatitis could be a reasonable guide on whether to attempt rechallenge. Moreover, it is difficult to establish the direct correlation between resolution of symptoms and drug withdrawal.

The diagnosis of DIP remains possible or probable in many patients. Various case reports and series suggest association of a wide variety of agents with DIP. Trivedi and Pitchumoni classified medications implicated in AP based on the strength of evidence into one of three classes of drugs associated with pancreatitis. Class I medications (medications implicated in greater than 20 reported cases of acute pancreatitis with at least one documented case following reexposure): didanosine, asparaginase, azathioprine, valproic acid, pentavalent antimionials, pentamidine, mercaptopurine, mesalamine, estrogen preparations, opiates, tetracycline, cytarabine, steroids, trimethoprim/sulfamethoxazole, sulfasalazine, furosemide, and sulindac. Class II medications (medications implicated in greater than 20 reported cases of acute pancreatitis with at least one documented case following reexposure): rifampin, lamivudine, octreotide, carbamazepine, acetaminophen, phenformin, interferon alfa-2b, enalapril, hydrochlorothiazide, cisplatin, erythromycin, and...
cyclopentiazide. Class III medications (all medications reported to be associated with pancreatitis).

Our study had 12 patients including 5 in pediatric age group (<18 years) and DIP was associated with immunomodulators and anticonvulsants. In this series, we found that azathioprine was the most commonly implicated drug. Azathioprine-induced pancreatitis was mostly seen in setting of IBD and the disease spectrum was of a mild acute pancreatitis. IBD associated pancreatitis and type 2 autoimmune pancreatitis are usual differential diagnoses for pancreatitis in IBD in addition to DIP. We had 1 case of AZA induced pancreatitis in a setting other than inflammatory bowel disease which was rare among causes of DIP. Furthermore, we had 1 patient who was on long term anticonvulsants who had evidence of chronic pancreatitis on follow up. As DIP is a rare condition, we feel that our study which reflects a hospital-based population cohort could be a good reflection of the clinical scenario of DIP in India. Among 1613 patients treated for acute pancreatitis in 1993 across 45 centres in Germany, DIP was diagnosed in 22 patients (incidence 1.4%) and had a benign course. Drugs held responsible were azathioprine, mesalazine/sulfasalazine, 2',3'-dideoxyinosine (ddI), oestrogens, frusemide, hydrochlorothiazide, and rifampicin.

Azathioprine (AZA) induced acute pancreatitis in the setting of inflammatory bowel disease was reported in 7.5% of IBD patients. DIP seems to be more common when used in treatment of Crohn’s disease – the reasons for which are not clear. Patients suffering from Crohn’s disease had a 2.7-fold increased risk of AZA-induced acute pancreatitis, in comparison with patients having ulcerative colitis in a large prospective study by the German IBD Study Group. In this study which included 510 IBD patients (338 Crohn’s disease, 157 ulcerative colitis, 15 indeterminate colitis), AZA-induced pancreatitis occurred in 37 patients (7.3%) and had a mild course in all patients. Smoking was observed as the most important risk factor. Hypersensitivity has been considered as most likely mechanism. The presence of pancreatic autoantibodies in Crohn’s disease patients has also been considered as a likely cause for development of azathioprine-induced pancreatitis. The utility of thiopurine methyltransferase (TPMT) heterozygosity and enzyme activity as predictive tests for the development of AZA related pancreatitis is not clear.

The likelihood of DIP when azathioprine is used for conditions other than IBD seems to be much lower. Fonseca et al found that in 27 patients with myocardia in elderly treated with azathioprine in conjunction with pyridostigmine and prednisolone for a total of 138 patient years, the need for discontinuation of treatment due to side effects was seen in only four patients but none due to pancreatitis. Among antiepileptics, valproic acid induced AP has been more commonly reported. Metronidazole and tetracycline were most commonly implicated antibiotics. The incretin-based therapies such as glucagon-like peptide-1 agonists (GLP-1) and dipeptidyl peptidase-4 (DPP-4) inhibitors which are now valuable therapeutic options for treatment of type 2 diabetes were considered as having as increased risk for pancreatitis; however this notion is now challenged.

Animal studies indicate have suggested that the cytokine transforming growth factor (TGF) β1 may play an important role in regulating pancreatic fibrosis and atrophy which are key features of chronic pancreatitis. TGF-β1 promotes fibrogenesis by (a) favouring the proliferation and/or activation of collagen forming stellate cells (i.e. myofibroblasts) in the pancreas and other tissue and (b) increasing the production of collagenase inhibitors. Vaquero et al reported that administration of cyclosporin to rats increases TGF-β1 levels in the pancreas and showed that cyclosporin greatly distorts pancreatic repair, transforming caerulein induced pancreatitis into a fibrotic chronic-like disease. However no clinical reports suggest that patients in whom cyclosporin was used for immunosuppression after non-pancreatic transplantation developed chronic pancreatitis. Furthermore, pancreatic atrophy in case of cyclosporin use after pancreas transplantation, probably reflects rejection rather than chronic pancreatitis. There remains a lack of evidence of drugs being implicated in recurrent acute pancreatitis and in chronic pancreatitis in humans. However, 2 case reports suggest development of CP after long term anticonvulsant use. Tropical chronic pancreatitis may initially present clinically as acute pancreatitis or acute recurrent pancreatitis in children. Often DIP may occur in setting of a genetic predisposition of CP. Hence care to exclude early CP may be needed in some cases of DIP.

Clinically, it is important to exclude any alternative possible etiology to avoid unnecessary drug withdrawal. However, drugs suspected to induce pancreatitis should be discontinued or exchanged with an alternative drug, when possible. Drugs even probably associated to pancreatitis should be avoided in patients with previous episode(s) of pancreatitis. The mechanisms underlying DIP need to elucidated better by further studies in a larger cohort. It is likely differ according to drug class. The reasons for a predilection for DIP due to anti-epileptics agents in younger patients may be due to immunological or genetic factors which need closer scrutiny. Identification of good biomarkers for DIP would greatly help in making a positive diagnosis.

Conflict of interest

Jisha Sivadas, Gopalakrishna Rajesh, Bhanu V.Pillai, declare that they do not have any conflict of interest to report.

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A rare case of Austrian syndrome
Gayathri Vasanthakumari Sasidharan Nair*, Prannoy George Mathen**, M Gopalakrishna Pillai*, KP Gireesh Kumar**

ABSTRACT
Austrian syndrome is a rare clinical triad comprising of meningitis, pneumonia and endocarditis, all caused by invasive bacteremia by Streptococcus pneumoniae. It is usually seen in elderly males, intravenous drug abusers, chronic alcoholics and in immunosuppressed states. Diagnosis is based on clinical features, blood culture, chest roentgenogram, cerebrospinal fluid analysis and echocardiography. Treatment includes intravenous culture sensitive antibiotics, early surgical intervention in the form of valvular replacement and other supportive care. Due to its rarity and daunting presentation, Austrian syndrome remains a clinical challenge to the treating physician or intensivist.

Key-words: Austrian syndrome, Streptococcus pneumoniae, Cephalosporins, meningitis, endocarditis, pneumonia

Key Messages: Austrian syndrome is a clinical triad of meningitis, pneumonia and endocarditis caused by Streptococcus pneumoniae, seen in elderly males treated with intravenous antibiotics and surgical valve repair.

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INTRODUCTION
In this case report, we describe a 65-year-old male who presented with fever and headache since one week and altered mentation since three days to the Emergency Department in a Tertiary Care Centre in South India. Initially diagnosed as a case of meningitis, admitted in ICU and started with Ceftriaxone and Vancomycin. His blood culture was positive for Streptococcus pneumoniae. He later developed dyspnea and cough with blood tinged sputum, and his chest roentgenogram and CT thorax revealed features of pneumonia. Echocardiogram revealed moderate mitral regurgitation, severe aortic regurgitation, severe pulmonary arterial hypertension. In view of worsening heart failure, patient was taken for aortic valve replacement on seventh day of admission. Intraoperatively, vegetation of the aortic valve was observed. Postoperative period was uneventful. Patient symptomatically improved with antibiotics and surgery. In the setting of meningitis, pneumonia and infective endocarditis (all caused by Streptococcus pneumoniae) a diagnosis of Austrian syndrome was made.

CASE REPORT
Here we present a rare case of Austrian syndrome in a 65-year-old male, a retired military personnel who is a known case of systemic hypertension for 37 years on regular medication, non-smoker, non-alcoholic, no history of intravenous drug abuse and no previous surgeries. He had visited a nearby hospital with headache and fever, treated symptomatically. In view of persisting symptoms and worsening mentation, he was referred to our hospital.

On arrival to the emergency department (ED), he was found to be agitated with a Glasgow coma scale (GCS) of 13, afebrile, blood pressure of 130/70 mmHg, heart rate of 78 beats per minute, respiratory rate of 18 breaths per minute and an oxygen saturation of 97% in room air. Neurological examination revealed neck stiffness and bilateral plantar reflexes showed extensor response. There was no pupillary asymmetry or limb weakness. Chest examination was clear. Cardiovascular examination revealed a low pitched diastolic murmur. His ECG was normal. No evidence of heart failure was present at time of admission. Routine blood and urine investigations were sent from the ED itself. Initial chest roentgenogram was normal.

Patient was admitted to the medical intensive care unit with a provisional diagnosis of meningitis. A CT brain plain was done, which was reported to be normal. Laboratory investigations revealed a neutrophilic leukocytosis (14,000 cells/ cu mm blood and 80% neutrophils), hemoglobin and platelets were within normal limits. Serum electrolytes were also within normal limits. Renal function and liver function tests were normal. Coagulation profile was normal. His ESR was elevated – 59mm/hr. Serum procalcitonin was 1.48 ng/ml. Peripheral blood smear revealed normocytic normochromic blood picture with neutrophilic leukocytosis. Blood culture and sensitivity revealed significant growth of Streptococcus pneumoniae (pan-sensitive). A cerebrospinal fluid analysis was done, which revealed elevated protein (333 mg/dl), low glucose (24.6 mg/dl), total cell count of 115 cells/cu mm with neutrophilic predominance (67%). CSF was negative for acid fast bacilli, GeneXpert. CSF culture revealed a scanty growth of Streptococcus pneumoniae. Urine examination was normal.

With available history, clinical examination and investigations a diagnosis of bacterial meningitis was made, and patient was treated with Ceftriaxone and Vancomy-
cin in meningitic doses respectively.

Patient subsequently developed dyspnea and cough with blood tinged sputum associated with tachycardia. Chest examination revealed decreased breath sounds bilaterally and crepitations over bilateral infrascapular and infraaxillary regions. Chest roentgenogram revealed bilateral non-homogenous opacities over bilateral mid and lower zones with relative sparing of upper zones with bilateral pleural effusion (figure 1). CT thorax was done which revealed bilateral air space opacities with ground glassing predominantly in perihilar distribution in the middle lobes and superior segment of lower lobes with bilateral pleural effusion. Sputum culture revealed moderate growth of Gram positive cocci. Sputum Acid fast bacilli and GeneXpert were negative. Pleural fluid analysis revealed exudative effusion. Bronchoscopy was done and it showed features of infective etiology. Broncho alveolar lavage(BAL) revealed scanty growth of Streptococcus pneumonia (pan sensitive). Patient was treated as a case of bilateral pneumonia with synpneumonic effusion and Azithromycin was added.

Patient later developed orthopnea and paroxysmal nocturnal dyspnea. Cardiovascular examination revealed an elevated jugular venous pressure (JVP), a new onset pan-systolic murmur over the mitral area and bilateral basal crepitations. Repeat chest roentgenogram revealed cardiomegaly. Cardiology consultation was sought and 2-D echo was done which revealed global left ventricular hypokinesia, severe aortic regurgitation, moderate mitral regurgitation, moderate tricuspid regurgitation and severe pulmonary arterial hypertension. N terminal pro brain natriuretic peptide(NT proBNP) was 6148 pg/ml, cardiac biomarkers CK-MB 5.21 ng/ml, Trop I 0.032 ng/ml, Total CK 154 U/l. Patient was started on Furosemide infusion, but symptoms persisted, hence cardiothoracic surgery consult was sought. Patient was advised emergency aortic valve replacement surgery under high risk and underwent the same on day 7 of admission. Intraoperatively vegetation was found on the aortic valve.

Patient became symptomatically better after surgery and antibiotics. He was observed in ICU for 2 more days and shifted to ward where he had no further episodes of dyspnea, desaturation, or drop in GCS. He was ambulated early and discharged on 14th day with antibiotic, anticoagulant and diuretic. He was advised regular International Normalised Ratio (INR) monitoring and follow up.

This is a unique case of Austrian syndrome diagnosed in an individual without any classically described predisposing factors.

**DISCUSSION**

Austrian syndrome is a rare syndrome which is characterized by a clinical triad of pneumonia, meningitis and endocarditis, all caused by Streptococcus pneumoniae1,2. It was first described by Robert Austrian in 1957 4. It is described classically in chronic alcoholics especially males between 5th to 6th decades. It is also seen in the setting of intravenous drug abusers and immunosuppressed individuals especially post-splenectomy patients, prolonged corticosteroids, retroviral disease, chronic kidney disease, pregnancy and post-partum period3,5. Exact prevalence and mortality of this rare clinical entity remains unknown.

Patients classically present with symptoms of fever,
headache, altered mentation and features of pneumonia such as dyspnea, cough with expectoration and features of heart failure mostly due to severe aortic regurgitation. The patients may present initially with vague symptoms of headache and fever and later on progress to develop other systemic manifestations. Cardiac manifestation includes infective endocarditis predominantly native aortic valve vegetations. All patients require admission and stabilization with sensitive antibiotics. Diagnosis is made based on clinical findings and culture positivity for Streptococcus pneumoniae from blood, CSF, sputum or BAL and echocardiogram (for vegetation). Indications for ICU admission include severely altered mentation, respiratory distress, features of heart failure. 

Management of Austrian syndrome include oxygen supplementation in case of dyspnea and desaturation; intubation in case of severely low GCS, airway compromise, refractory hypoxia. In case of heart failure secondary to endocarditis treat with diuretics and other supportive care. Culture sensitive antibiotics must be given to all patients diagnosed with Austrian syndrome, preferred agent being Ceftriaxone or Cefotaxime with or without Vancomycin (in meningitic doses). Rifampicin maybe considered in case of resistance to Cephalosporins. 

Surgical intervention in the form of valve replacement is most often necessary because of the aggressive course of disease. It is indicated in case of worsening heart failure unresponsive to conventional treatment. Early surgical valve replacement is desirable in endocarditis in Austrian syndrome to reduce complications and mortality. 

Due to the rarity of the disease, a clear discharge criterion is not available. In this case discharge was completely based on treating physicians’ decision. This patient was discharged in view of significant clinical improvement, an overall improvement in laboratory parameters and repeat culture sterility. 

**CONCLUSION**

Austrian syndrome is a rare clinical entity and must be considered in the setting of meningitis, pneumonia and endocarditis caused by Streptococcus pneumoniae even in patients with no predisposing factors as in this case. This case report emphasizes the importance of a multi-disciplinary approach in such patients. Existing knowledge about this disease is based on systematic reviews. Further research is needed to know the incidence and mortality of this disease.

**Financial support and sponsorship**

Nill

**Conflict of interest**

There are no conflict of interest.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**REFERENCES**


A Case of Persistent Delusional Disorder With Empty Sella Syndrome

Janani Sethuraman*, Praveen Arathil*, Dinesh Narayanan*

ABSTRACT
We report an interesting case of 52 year old married female with Hypothyroidism who presented with Tubercular lymphadenitis and referred to Psychiatry department for Persistent Delusional disorder with history of infidelity, persecutory delusion and referential delusion for over 10 years. Despite normalizing thyroid profile, patient continued to have delusions which reduced on starting antipsychotics. On a later date with poor compliance to medications, patient presented with worsening of symptoms when persisting hypotension was newly detected. Further investigations revealed Hypocortisolism with subsequent incidental finding of Empty sella syndrome in MRI, considered secondary to probable hypophysitis. Corticosteroid was started alongside antipsychotics following which there was drastic improvement in symptoms and overall functioning of patient compared to earlier. This new scenario highlights possible role of hypocortisolism in worsening of symptoms thereby giving rise to question of necessity of cortisol work-up in psychiatry patients paving a new path towards Psychoneuroendocrinology.

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INTRODUCTION
Empty Sella Syndrome (ESS) is a condition where radiologically pituitary gland is not visualized implying its absence in pituitary fossa resulting in hypopituitarism1. It is rather compression of pituitary gland when sella turcica is filled with CSF2. ESS can be primary following weakness of the diaphragm sella allowing herniation of arachnoid membrane into fossa or secondary in the background of hemorrhage, infarction, previous surgery or irradiation of pituitary gland3. ESS is mostly asymptomatic and incidentally revealed in brain imaging studies4. Symptomatic cases present with endocrine abnormalities, visual defect, CSF leakage from nose, headache and neuropsychiatric manifestations as well5. In literature, there are case reports of neuropsychiatric presentations following panhypopituitarism from various etiologies such as Sheehan’s syndrome, Russell’s Viper Bite and traumatic head injury6. Oluwole Jegede et al. reported 4.6% prevalence of psychiatric disorders among ESS cases in comparison to 1.3% in general population reflecting strong correlation7. Notably, the spectrum of psychiatric disorders documented comprise of depression, acute psychosis, schizophrenia, delusional disorder, and bipolar disorder6,7. Lynch S et al. described that 46% of cases of hypopituitarism with growth hormone deficiency had definite psychiatric illness with most frequent diagnosis being major depression (32%) and dysthymia8. Psychiatric disorders can present before, after or at the same time as medical symptoms of hypopituitarism. There are only few cases of psychosis associated with hypopituitarism reported. Here, we report one such rare case of delusional disorder later diagnosed with panhypopituitarism.

CASE REPORT
This 52 year old married female, working as school teacher, was referred to Psychiatry for first time when she was admitted in hospital under General Medicine department for Tubercular lymphadenitis in January 2013. She was disoriented with altered behavior and disturbed sleep-wake cycle. Delirium was diagnosed possibly secondary to SIADH (serum osmolality 252 mOsm/kg, urine osmolality 768 mOsm/kg, urine sodium 66.7 mmol/L) with hyponatremia (111 mg/dl). While we managed her on Haloperidol, Medicine corrected hyponatremia with 3% saline. Family members also gave history of patient occasionally suspecting her husband of having extramarital relations. Though she has been suspecting since marriage, it became apparent later, roughly 5 years before. Furthermore, she also began to accuse her coworkers of trying to harm her by poisoning her food and water. Although her beliefs towards neighbors and coworkers were different at the beginning, she later started linking them accusing her neighbors having connection with coworkers to harm her. Previously, she had been taken to several doctors outside but she was poorly complaint to treatment. Worsening delusions impeded her daily functioning, especially at her workplace. However, due to Delirium patient could not be assessed for delusions. There was also history of Hypothyroidism and Dyslipidemia for which she was on Thyroxine supplementation and Atorvastatin respectively for one year then. She had history of Acid Peptic disease with frequent complaints of burning sensation of mouth with recurrent bouts of vomiting. Once her condition improved, she was discharged with corrected sodium and normalized thyroid profile. Subsequently though she was asked to come for further evaluation and management, she did not come.

In April 2014, she was brought to hospital to Psychiatry department for admission with aggravated symptoms. On mental status examination, she was found alert with adequate self care, rapport was established with difficulty, attitude towards examiner was guarded and
cognition was intact. In thought content, delusion of infidelity, persecutory delusion and referential delusion were present. Her mood was angry, affect was irritable with insight of grade 2. Thus, she was diagnosed with Persistent Delusional disorder (PDD). With known prior non-compliance to medications, she was started on depot injection of Paliperidone with loading dose of 150mg followed by monthly doses of 75mg. She showed improvement but after only 3 doses of Paliperidone, she refused to come for review in spite of insistence by caregivers. Thereafter she was lost for follow-up for 2 years since June 2014.

Later on in October 2016, she was brought again to hospital with persecutory delusions increased over the last 4 months and insight remaining poor. Caregivers reported difficulty in bringing her to hospital and managed only when she had become physically weak with acute abdominal pain and vomiting for 3 days. She was admitted under Psychiatry. Hyponatremia (120 mg/dl) was detected in baseline investigations. General Medicine opinion was immediately sought and evaluation revealed hypocortisolism (low morning cortisol of 1.9µg/dl). She was further referred to Endocrinology department who suggested ACTH stimulation test in which cortisol response was found low (8.5µg/dl after 60 minutes and 8.8µg/dl after 90 minutes). Finally, MRI showed non-visualisation of anterior pituitary with normal posterior pituitary bright spot(image 1). She was diagnosed with Empty sella syndrome secondary to probable hypophysitis with panhypopituitarism. She was transferred under Endocrinology and started on hydrocortisone therapy (30mg). With treatment, cortisol levels improved (8.8µg/dl) and sodium normalized (138mg/dl). After stabilization with complete recovery from medical issues, she was shifted back to Psychiatry unit. It was noted that even after cortisol therapy, delusions were still remaining but without any worsening. She was restarted on depot injection of Paliperidone at loading dose of 150mg and 75mg 1 week apart with subsequent monthly doses of 75mg. Her symptoms were observed to resolve much faster. From then on, she has been on regular follow-up for past 1 year taking monthly depot injections amounting to total of 16 doses of Paliperidone till now. Simultaneously, she has been reviewing regularly with Endocrinology department for hydrocortisone therapy. Patient has been maintaining well and currently on Hydrocortisone 15mg, Thyroxine 50 mcg and Calcium supplementation apart from monthly depot injection of Paliperidone 75mg. With significant reduction in delusions, she has been going for work regularly now, not reporting of any issues at workplace or home. She has also been more compliant with medications than before and shown striking improvement in overall functioning.
DISCUSSION

The commonality of asymptomatic clinical picture of Primary empty sella has been described by De Marinis L et al. giving rise to possibility of panhypopituitarism already existing and contributing to PDD in this patient. Moreover, history of worsening of delusions could also be attributed to undiscovered hypocortisolism. Retrospectively looking, episodes of recurrent vomiting with persistent hyponatremia could again be correlated with hypopituitarism. As per Miriam Ciriaco et al., psychotic symptoms can worsen with initiation of steroid therapy. As opposed to the anticipated, here patient showed no further worsening but with delusions persisting required addition of antipsychotic. Also, when patient was initially started only on antipsychotic, her improvement was not as satisfactory as when given along with cortisol therapy and added to this was her poor compliance to treatment. But when given both cortisol and antipsychotic, patient showed drastic improvement with better adherence to medications. This points out towards the likely role of cortisol therapy beyond medical issues in this case. Shruthi Kate et al. has discussed possible role of hormonal therapy in managing psychotic symptoms. In Sheehan’s syndrome which leads to ESS, low levels of cortisol, estrogen and thyroid hormone are implicated for development of psychosis by Leo et al. which is further supported by clinical response following hormonal therapy. The potential mechanisms of psychosis in hypopituitarism postulated as mentioned by Shruthi Kate et al. are combination of hypothyroidism, hypoglycemia and hypocortisolism resulting in complex metabolic and electrolyte changes in central nervous system. Oluwole Jegede et al. delineates the underlying hypothesis as result of interactions between pituitary hormones and dominant neurotransmitters: serotonin, dopamine, GABA and glutamate. While inspecting causality of ESS, with available records and history given by caregivers, Tubercular adenitis could be considered as probable cause for hypophysitis leading to Secondary empty sella syndrome. Yet, odds of delusional disorder as a separate entity cannot be ruled out with certainty.

Therefore, although it is difficult to clearly establish etiology of delusional disorder in our patient, it is of great clinical significance to make note of the several factors favoring panhypopituitarism. With more such case reports of atypical presentations of psychosis, underlying pathogenesis in both systems of neurology and endocrinology can be further explored aiding in formulating a comprehensive work-up for early diagnosis. Further research in this area could unfold new directions paving path to a novel idea of Psychoneuroendocrinology.

REFERENCES

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