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Hypertension is rated as one of the most important causes of premature death worldwide. In India, it contributes to about 57% of all stroke deaths and 24% of all coronary artery disease deaths, thus exerting a substantial burden on the public health.\(^1\) According to the global burden of hypertension: analysis of worldwide data, 20.6% of Indian males and 20.9% of Indian females suffer from Hypertension and is projected to increase to 22.9% and 23.6% respectively.\(^2\) According to the Indian Guidelines of Hypertension III, recent Indian epidemiological studies have shown a prevalence of hypertension to be 25% in urban adults and 10-15% in rural adults.\(^3\) The World Health Organization (WHO) 2008 estimated a higher prevalence of hypertension in Indians, up to 33.2% in men and 31.7% in women.\(^4\) Recognizing the eminent threat of non-communicable disease (NCD), the United Nations (UN) has called for reducing this burden and the WHO has committed to reducing premature mortality from NCDs by 25% by the year 2025 in its 25 × 25 target.\(^4\) The proposed plan is to reduce smoking and tobacco use, harmful alcohol use, salt intake, physical inactivity, and high blood pressure and glucose levels to reduce the risk of premature mortality from NCDs. The most important strategy to control cardiovascular disease (CVD) mortality, apart from smoking cessation, is blood pressure control.

However, Indian studies show on low rates of awareness, treatment and adequacy of control of hypertension. Anchala et al. performed a meta-analysis of studies that reported hypertension awareness, treatment and control in urban area as 42%, 38% and 20% and in rural areas as 25%, 24% and 11%.\(^1\) A study showed that only about 25.6% of treated patients had their BP under control.\(^5\) The BP control among both urban and rural parts of India has been very poor (range of 6.5–15% in rural and 11.6–28.7% in urban).\(^1\) These alarmingly low awareness and treatment levels among hypertensive patients signify inadequate knowledge, practices and attitude among patients. This has an enormous significance to the health care providers and policy makers. Current strategies in blood pressure control are falling short since less than one fifth of hypertensive patients have their blood pressure under control.

In conclusion, in India, one-fourth of urban adults and one fifth of the rural adults suffer from high blood pressure. Less than half of the urban patients and about one-fourth of the rural patients are aware of hypertension. Only one-tenth of rural Indians and one-fifth of urban Indians suffering from BP have their BP under control. Urgent steps need to be
taken to improve the awareness of high blood pressure in India with a special focus on health education and promotion in rural areas as well as urban areas. This calls for a shift in the focus to spreading awareness as an *initial step* in control of high blood pressure in India.

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Prehypertension and Undiagnosed Hypertension Among Rural Population of Kozhikode District

Rabiya Koori¹, NK Thulaseedharan², Priya Chandran³

ABSTRACT
Hypertension is a risk factor for cardiovascular morbidity and mortality; even prehypertension is a risk factor for these diseases and identifying them can help in early intervention like lifestyle and diet modification. The study was conducted to estimate the prevalence, risk factors and co morbidities of prehypertension and hypertension in a rural area of Kozhikode district. It was a cross sectional study and the population was selected by simple random sampling. Out of 300 participants, 51.3% were males, 48.7% were females and mean age was 42.13 years. 43.3% were normotensives, 29.3% were prehypertensives and 27.3% were hypertensives. Out of 82 hypertensives, 54.9% were already diagnosed hypertensives, of which 91.1% were on treatment, in which only 46.3% had controlled BP. 12.3% were newly diagnosed hypertensives during the study. Both prehypertension and hypertension were significantly associated with age, low income, low socioeconomic status, smoking, added salt use, family history of hypertension, physical inactivity, BMI >23 and increased waist circumference. Hypertension was also associated with female sex, low educational status, sedentary work, fast food, stress, diabetes, dyslipidemia. Prevalence of prehypertension and hypertension was high in the population. Health education alone was advocated to the identified prehypertensive people aiming to prevent or delay the onset of hypertension and its complications.

INTRODUCTION
Hypertension is becoming an important public health problem worldwide being the third leading killer and is responsible for one in every eighth death. It is a silent killer¹ and most of the patients are accidentally detected to have high blood pressure during routine physical examination. Many patients are diagnosed when they seek medical advice due to target organ damage. Therefore it is of utmost importance to know the blood pressure (BP) status before target organ damage occurs, and to keep the BP under control.

Prehypertension is defined by the seventh report of the Join National Committee (JNC) as systolic and diastolic BP to be 120–139 mmHg and 85–89 mmHg, respectively.² The
OBJECTIVES

MATERIALS AND METHODS

Study Design and Setting

A community based cross sectional study was conducted in Kozhikode district of North Kerala from April 2014 to March 2015. Kozhikode district consists of 75 panchayats with a population of 3,086,293 with 1,470,942 Males and 1,615,351 Females. Perumanna panchayat was selected for the study, keeping in mind the feasibility of continuous monitoring by the Department of Family Medicine as it comes under the rural field practice area of the department. From the selected panchayat, the first house was chosen by simple random method (currency method) followed by consecutive houses till the sample size was achieved. Subjects who are 18 years and above and residing in the panchayat for more than 6 months were included in the study. Sick and bedridden patients and pregnant women are excluded from the study.

Data collection was done by conducting house visits. Information regarding subject details, sociodemographic variables, behavioral and other risk factors were collected by interviewing individuals with semi structured questionnaire (proforma). A written informed consent was taken from each participant. Blood pressure was measured using mercury sphygmomanometer and stethoscope. Weight was measured with electronic weighing

OBJECTIVES

of individuals with prehypertension and hypertension will be useful so that people can adopt appropriate intervention in the form of weight reduction, changes in diet and lifestyle and pharmacological treatment. This will help to prevent or at least delay the onset of hypertension and complications from it.

So the present study amounts to address the prevalence of prehypertension and undiagnosed hypertension, risk factors and comorbid conditions associated with it in the rural area of Kozhikode district.

The objectives of creating such a category in the classification was to increase awareness of the importance of identifying individuals in whom early intervention by adoption of healthy diet and lifestyles could lower BP and thus decrease the rate of progression to hypertensive levels, in order to reduce risk of cardiovascular disease. An additional rationale for use of this terminology was the greater likelihood of the affected individual to follow healthcare recommendations.

If blood pressures of individual were followed up over a period of years from early childhood into adult life, those individuals with initially high BP tend to continue in the same “track” as adults, i.e. high levels tend to become higher and low blood pressure tends to remain low as individuals grow older. This phenomenon is described as “tracking”. This knowledge can be applied in identifying children and adolescents at risk of developing hypertension in future.

Prehypertension is associated with the same traditional cardiovascular risk factors as hypertension, such as obesity, diabetes mellitus and dyslipidemia. Studies from all over the world have shown that, increasing age, body mass index, waist hip ratio and impaired glucose tolerance/diabetes are independent risk factors for development of both hypertension and pre hypertension.

Lifestyle modifications, such as weight reduction, dietary alterations and exercise, have been shown consistently in randomized controlled trials to effectively lower blood pressure and are recommended for patients with prehypertension. The DASH trial showed that BP was significantly reduced in prehypertensive and stage I hypertensive individuals by simply using a diet rich in vegetables, fruits, reduced saturated and total fat independent of dietary sodium restriction and weight loss.

Little is known about the blood pressure status and its determinants in the rural population of Kozhikode district. There are only few reported community based studies in rural areas from North Kerala. Early identification
machine and height, waist circumference and hip circumference with non stretchable measuring tape.

Statistical Analysis

All the data collected were coded and entered in Microsoft Excel sheet and analyzed using statistical software SPSS 16.

RESULTS AND DISCUSSION

Sociodemographic Profile of the Study Population

A community based cross sectional study was conducted in Perumanna Panchayat of Kozhikode district with a total population of 35,460 and female sex ratio of 1029.7 The study covered a total of 300 (0.84% of 35,460) subjects. Out of 300 subjects, 154 (51.3%) were males and 146 (48.7%) were females with male to female ratio of 1000:948. Kozhikode district population constituted 9.24% of total Kerala population with a male: female ratio of 1:1.1. Present study had a male: female ratio of 1.05: 1. The population in the present study had 20.3% of geriatric population (over 60 years) which is higher than the district average of 12.6%.7 Majority were Muslims 159 (53%) followed by Hindus 132 (44%) and Christians 9 (3%). 95.7% were literate with male literacy rate 96.8% and female literacy rate 94.5%. The rural literacy rate of Kozhikode district was 94.47% with male literacy rate of 97.16% and female literacy rate of 92.04%.7 Literacy rate of Kerala was 93.91% with male literacy and 91.98% female literacy.7 Present study results were comparable to the literacy rate of the district and state.

Only 3.7% of the population was not engaged in any work. Majority were house wives (33.7%).8 Mean number of family members was 4.91.

It was observed that 20% were current smokers which are less than the previous studies.9,10 No females were currently smoking. Smoking prevalence in Kerala was 28% among adult men (24% all India) (Ministry of Health & Family Welfare, GOI).9 Among study subjects 8.75% regularly consume alcohol. In National Household Survey of Alcohol and Drug Abuse (2003) 21.4% were reported to be current users of alcohol.11 Present study showed 8.75% prevalence which was less than this national standard but more than that observed in ENDIRA study (4.2%).12 Other addictions were pan chewing – 5 (1.7%), betel chewing – 20 (6.7%) and intra venous drug abuse – 1 (0.3%). In the study population adolescents, adult males and females had various substance abuses like smoking, alcoholism, pan chewing and intravenous drug abuse. Apart from health problems, it was responsible for social damage, which includes family disorganization, crime and loss of productivity. It was emphasized that more IEC (Information, Education and Communication) activities should be carried out to spread the knowledge about substance abuse and its prevention in the society.

The prevalence of Diabetes Mellitus among adults was 13.3%, which was consistent with the NUDS survey (12.1%), a population based study conducted in six metropolitan cities across India.13 15 (5%) were reported to have Ischemic Heart Disease (IHD) in the present study, which was higher than The Epidemiology of Noncommunicable diseases in Rural Areas (ENDIRA) Study12 (1.4%) conducted as a population based study in rural areas of Kerala. The prevalence of stroke/CVA was 1% in the present study. The prevalence of stroke was reported to be between 143-165/ 100, 000 population in rural India.14 The prevalence of Chronic Kidney Disease (CKD) was 0.7%, the rate being much lesser compared to other studies. These low rates in spite of high case load of diabetes and systemic hypertension may due to under diagnosis and emphasizing the screening for nephropathy at regular intervals.

Asthma was prevalent in 1.7% of the population. The prevalence of COPD among adults was 0.7% which is less than that obtained by Ray et al in 1995(3.5%),15 Jindal in
1993 (6.2% in men and 3.9% in women in rural area)\textsuperscript{16} and the Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in Adults (INSEARECH) study (10% in Thiruvananthapuram).\textsuperscript{17}

The prevalence of people with overweight and obesity was significantly high in the study population (18.7% and 29% respectively) with a female preponderance, which reflects the findings by Deepa et al (2009) in their study on prevalence of obesity in South Indians.\textsuperscript{18}

These findings stress the need for life style interventions in the community.

**Prevalence of Prehypertension**

Prevalence of prehypertension in the study population was 29.3\% which was comparable with other studies from rural areas of India. A study done by Ravi MR et al in Mysore, Karnataka showed the prevalence of prehypertension as 28.8\%.\textsuperscript{19}

This study shows that toward older age the prehypertension prevalence was less meaning that the prehypertension is a predictor of hypertension and prehypertension seen at middle age becomes established as hypertension as explained by tracking of BP. In our study we found a statistically significant association between age group and prehypertension, younger age (18-25) was protective and 26-50 years age was high risk for development of prehypertension. The ratio of hypertensive to prehypertensive individuals increased from 0.6 in the age group 26-50 years to 2.4 in the age group 51-75 years. It is likely that this trend was as a result of progression of subjects with prehypertension to hypertension as age advances. Analysis of the NHANES III data set has provided similar results.\textsuperscript{20}

The proportion of prehypertension was higher among females (41.8\%) compared to that in males (39.2\%). Study showed an association between low educational status and prehypertension, though not statistically significant (OR-1.98, \(P=0.076\)). Higher education can make people more aware of the disease and accept healthy life style. Education can give an insight into necessity for healthy practices to prevent and treat illnesses.

In this study, we found an association between sedentary work and prehypertension but not significant. Population should be educated promptly regarding the importance of physical exercise.

In our study, we observed a significant association between low income and prehypertension (\(P=0.010\), OR-2.1). Most of the caregivers tended to neglect their own health needs to meet the economic and healthcare needs of their family. Above all, due to the financial problems there will be high chance for non compliance to treatment.

Prevalence of prehypertension was high in lower class (58.2\%) families with a significant \(P\) value-0.002 and OR-2.7. This study shows that lower class family is a risk factor for development of prehypertension. In studies by K. Gangadharan in Kerala revealed that, as socioeconomic status falls, the overall morbidity rate rises.\textsuperscript{21}

In this study, we found significant association between prevalence of prehypertension and smoking (\(P=0.047\) and OR-1.9). Tsai et al found significant association between smoking and prehypertension.\textsuperscript{22}

Prevalence of prehypertension was more (57.1\%) in alcoholics than in non alcoholics (37.9 \%) but this association was not statistically significant. A Meta analysis done by Xin X et al found that reduction in alcohol intake reduced blood pressure in prehypertensives.\textsuperscript{23} R.B.Singh et al in their studies in 5 Indian cities observed that the consumption of alcohol was significantly more among subjects with prehypertension when compared with those with normal blood pressure.\textsuperscript{24} People should be educated about the consequences of smoking and alcohol consumption. Instead of wasting money on such bad habits, they should be encouraged to consume more fruits and vegetables which would help keep them away from diseases. This will benefit the whole family and thus the entire community.

The prevalence of prehypertension was
observed to be low among people who consumed adequate vegetables and fruits compared to those in whom consumption was less. But this difference was not statistically significant in both cases. A previous study by Vernay M et al (2007) found inverse relationship between intake of fruits and vegetables and blood pressure values.25

We found a statistically significant association between prevalence of prehypertension and added salt intake (P<0.001, OR-3.7). R.B.Singh et al also observed that the consumption of excess of salt was significantly greater among subjects with prehypertension when compared with those with normal blood pressure.24 People should be encouraged to restrict salt intake and to avoid extra salt intake.25

Statistically significant association found between prehypertension and positive family history of hypertension in first degree relative (P=.026, OR-1.9). R.B.Singh et al found similar strong association among subjects with prehypertension when compared with those with normal blood pressure.24 Xiu-Jun Meng et al26 and some other previous studies also showed family history has been shown to be important in predisposing to prehypertension.27 This may be because apart from genetic predisposition, due to same diet and life style sharing between family members.

In this study, we found an association between stress and prehypertension but was not significant. This might be an acute blood pressure response to recent stress. People should be advised to practice various relaxation techniques like meditation, yoga etc to relieve their stress.

Prevalence of prehypertension was more (45.3%) in inactive group compared to active group (27.1%). This association was statistically significant (P=.015, OR-2.2). The prevalence of sedentary lifestyle was significantly higher among subjects with prehypertension compared to non-hypertensive subjects in R.B.Singh et al study also.24 So by simply increasing the physical activity, progression to hypertension can be prevented.

Prehypertension was more (64.3%) in diabetics compared to people without diabetes (38.7%) though the association was not statistically significant (P=0.059, OR-2.8).27 Yadav et al in their study also found prehypertensive subjects had an increased prevalence of diabetes/IGT compared to normotensive subjects.4 Studies have shown that the risk of development of hypertension is four times in prehypertensives with diabetes as compared to normotensives.28 So it is ideal to check blood pressure frequently in diabetics.29

This study shows that prevalence of prehypertension was more in people with dyslipidemia, chronic kidney disease, cerebrovascular diseases and bronchial asthma.30 But these associations were not statistically significant. No association was found between prehypertension and other co morbidities like ischemic heart disease and bronchial asthma in this study.

We could found a statistically significant association between BMI >23 and prehypertension (P<0.001, OR-3.02). S Yadav et al4 and R.B.Singh et al also found significant association between body mass index and prehypertension.24

This study showed a statistically significant association between prehypertension and abdominal obesity (increased waist circumference) (P=.001, OR-2.6). Xiu–Jun Meng et al also found strong correlation between waist circumference and prehypertension in their study.26 Similar observation was found in Yadav S et al study4 and R.B.Singh et al study also.24

We observed an association between prehypertension and high waist hip ratio but not statistically significant even though the prevalence of high waist hip ratio (apple shaped obesity) was very high in the study population. Need for weight reduction must be highlighted in order to prevent progression to hypertension and many other illnesses.

**Prevalence of Hypertension**

The prevalence of hypertension in the study was 27.3%. (Table 1)
Gupta et al\textsuperscript{31} reported prevalence of 27.2\% in a multi-centric study, conducted in the rural population of India which is comparable to the present study. Meta-analysis of eight studies carried out in rural areas of India gave a pooled prevalence of 15.7\%\textsuperscript{32} Shanthiraniet al,\textsuperscript{33} Mohan et al\textsuperscript{34} and Prabhakaran et al\textsuperscript{35} have observed that the prevalence of hypertension ranged between 20\%-40\% throughout the decade. S.Yadav et al in their study in affluent north Indian population showed a prevalence of 31\%\textsuperscript{4}.

Prevalence of undiagnosed hypertension in our study was 12.3\%. Prevalence of undiagnosed hypertension was also high in females (13\%) than males (11.7\%). As age increases prevalence of undiagnosed hypertension also increases except in age >75 years. This indicates the need for creating awareness among the population regarding hypertension, intensifying screening programs for detection of high BP and regular health checkups.

Out of 300 participants, 45(15\%) had already diagnosed to have hypertension and among them 41(91.1\%) were on treatment. All the 41 subjects were under modern medicine treatment. Among them, 19(46.3\%) participant’s blood pressure was not controlled inspite of treatment. There should be regular follow up and strict compliance to pharmacological and non pharmacological treatment.

Among the 300 participants, 102 (34\%) were aware of the risk factors and complications of hypertension, that is majority 198(66\%) were not aware. Among the 45 already diagnosed hypertensives, only 13(28.9\%) were having awareness and majority 32(71.1\%) were unaware of risk factors and complications of hypertension. This reflects the negligence from the health workers including doctors on making aware of the community and even patients.

### Table 1: Studies-Systemic hypertension

<table>
<thead>
<tr>
<th>Study</th>
<th>Prevalence</th>
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<tbody>
<tr>
<td>ICMR study\textsuperscript{28}</td>
<td>15.7%</td>
</tr>
<tr>
<td>Kutty VR\textsuperscript{30}</td>
<td>18%</td>
</tr>
<tr>
<td>Gupta R\textsuperscript{14}</td>
<td>27.2%</td>
</tr>
<tr>
<td>Present study</td>
<td>27.3%</td>
</tr>
</tbody>
</table>

Among 300 participants, 37 (12.3\%) were not aware about their illness. 45 (15\%) were aware of their illness, among them 41 (91.1\%) were on treatment but 19 (46.3\%) had uncontrolled blood pressure irrespective of treatment. Study by K.R Thankappan in rural Kerala, showed only 20.6\% of men was aware of their hypertensive status, 16.4\% were treated and 4.6\% had their blood pressure controlled.\textsuperscript{36} Avadaiammal Vimala et al in their study on prevalence of hypertension in urban areas of Kerala found that only 16.8\% were aware about their illness, of which only 31.85\% were on regular treatment.\textsuperscript{37} All these data indicates that “Rule of Half” is not applicable in India.

In this study, females had more prevalence of hypertension (58.5\%) than males (41.5\%) which was statistically significant (OR-1.808, \(P=0.037\)). In all age groups females had more prevalence of hypertension than males. Thankappan et al study in Kumarakom also showed similar finding.\textsuperscript{38}

In our study, the prevalence of hypertension increased with age in both sexes(except in males >75 years), consistent with prior reports.\textsuperscript{14,36,39} The age related increase in hypertension might be due to “tracking” of blood pressure with age.

We observed a statistically significant association between low educational status and hypertension (OR-5.6, \(P<0.001\)). A study conducted in Tanzania also pointed out that systolic BP was associated with education, the higher the education, the lower the systolic BP.\textsuperscript{40} Compliance to treatment will be less in low education group because of the lack of awareness.

In this study, we found a statistically significant association between hypertension and sedentary work (\(P<0.001, \text{OR-3.465}\)). This corresponds to findings by Sanjeet Paneswaret et al who found significant association with clerical work and hypertension in a study at Delhi.\textsuperscript{41} So the importance of regular exercise programmes should be emphasized among sedentary workers.

Prevalence of hypertension was more in low
income group (82.9%) compared to high income group (17.1%) with a significant P value (P<0.001, OR-3.9).

In this study, we found statistically significant association between socioeconomic status and prevalence of hypertension. We observed an association between upper class families and hypertension (OR-1.72, P=0.001). The increased prevalence in upper class might be due to unhealthy dietary and sedentary habits. The high prevalence in lower class (P<0.001, OR-5.1) might be due to lack of balanced diet due to financial problems. Coulhoun et al found that low SES linked to high blood pressure.\textsuperscript{37} The high prevalence in lower class family needs special attention as there is high chance of drug default due to financial constrain.

We found a strong association between smoking and prevalence of hypertension (P =0.038 and OR=2). CURES 52 study in Chennai.\textsuperscript{42} and Jenie Z et al\textsuperscript{43} also showed association between smoking and hypertension. Similar observation was found in a study in the urban population of Jaipur also.\textsuperscript{44}

We observed an association between alcohol intake and hypertension though not statistically significant (P=0.145, OR-1.85). R.B.Singh et al in their study in 5 Indian cities observed that the consumption of alcohol were significantly greater among subjects with hypertension when compared with those with normal blood pressure.\textsuperscript{24}

Prevalence of subjects consuming adequate vegetables and fruits were low in the population. Most of them were ignorant about balanced diet and role of vegetables and fruits in preventing diseases. R.B.Singh et al also found that there was high prevalence of subjects consuming lower amounts of fruits, vegetables and legumes (< 400 g/ day).\textsuperscript{24}

Our study shows an association between inadequate vegetables and fruits intake and prevalence of hypertension even though it was not statistically significant. Haidari et al found that intake of adequate fruits and vegetables was associated with lower risk of central obesity and hypertension in their study in Ahvaz, Iran.\textsuperscript{45}

In our study, we found a statistically significant association between regular fast food intake and hypertension (P=.017, OR-2.1). Haidari et al also found that use of pizza, hydrogenated fats and soft drinks are associated with increased risk of central obesity and hypertension.\textsuperscript{45}

We found a statistically significant association between hypertension and regular added salt intake (P=0.012, OR-2.1). R.B.Singh et al\textsuperscript{24} and Prabakaran J et al\textsuperscript{46} also observed a strong association between consumption of excess of salt and hypertension.

Statistically significant association was found between people with family history of hypertension in first degree relative and hypertension (P=0.002, OR-2.4). Same observation was found in R.B.Singh et al,\textsuperscript{24} Yadav et al,\textsuperscript{4} and Sanjeet Panesar et al\textsuperscript{41} and in some other studies.\textsuperscript{47,48} Also, this demands frequent blood pressure monitoring and lifestyle modification in those with family history of hypertension.

We observed statistically significant association between stress and hypertension (P=.014, OR-5.9). This was similar to the finding by Asmathulla S et al who found significant association between psychological stress and high blood pressure.\textsuperscript{49}

Prevalence of hypertension and sedentary life style was positively associated in our study (P=0.003, OR-2.9). The prevalence of sedentary lifestyle was significantly higher among subjects with hypertension compared to non-hypertensive subjects in R.B.Singh et al study.\textsuperscript{24}

In this study, we found statistically significant association between prevalence of hypertension and diabetes (P<0.001, OR-11.6). CURES study in Chennai,\textsuperscript{42} and Avadaiammal et al\textsuperscript{37} also found association between diabetes and hypertension.

Statistically significant association was found between hypertension and dyslipidemia
(P=.000, OR-6.7). Yadav et al (2007) found association between high serum triglyceride level and development of hypertension.4

This study shows that there was more prevalence of hypertension in people with ischemic heart disease, chronic kidney disease, cerebrovascular diseases and bronchial asthma. But these associations were not statistically significant.

Body mass index >23 was significantly associated with hypertension (P<0.001 and OR-3.1). Similarly, in many studies like Yadav et al,4 Prabhakaran et al,46 R.B. Singh et al,24 CURES 52 study in Chennai,42 CUPS study in Chennai33 and Gupta R et al,44 where significant association was found between high body mass index (generalized obesity) and hypertension. So intervention in the form of weight reduction has to be emphasized because the prevalence of overweight and obesity was very high in the study population.

We observed significant association between prevalence of hypertension and central obesity (high waist circumference) (P<0.001, OR-4.5). Prabakaran et al46 and R.B. Singh et al24 also found similar observation.

Prevalence of hypertension was high (42.2%) in people with high waist hip ratio than people with normal WHR but this association was not statistically significant. In the CUPS study in Chennai, age, body mass index, waist hip ratio had a significant association with hypertension.33

**CONCLUSION**

The present study has shown that there was high prevalence of prehypertension (29.3%) and hypertension (27.3%) in rural area of Kozhikode district. 12.3% subjects detected to have high blood pressure during the present study. The high prevalence of prehypertension and hypertension puts the study population at an increased risk of cardiovascular morbidity and mortality.

The awareness about hypertension, risk factors involved, complications of high blood pressure and adherence to treatment among hypertensives were much better as compared to other areas of Kerala. The status of hypertension control was poor despite treatment in our study population.

Overweight, obesity, diabetes and dyslipidemia was very high in the study population. In general diet of our study population was grossly deficient in vegetables and fruits. Prevalence of addictions like smoking and alcohol use was also high among participants.

Limitations

Risk factor estimation by a cross sectional study may not reflect the true risk estimates of the population.

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ABSTRACT
The prevalence of two major NCDs notably type 2 diabetes mellitus and hypertension is on the rise among beneficiaries of ESIC scheme. This study was undertaken to estimate the trends of diabetes and hypertension among the beneficiaries of ESIC scheme attending primary care setting in Puducherry. A total of 213 patients with diabetes and/or hypertension were evaluated by chart review. Mean age of the patients was 57.1 years, median duration of hypertension was 7 years, median duration of diabetes was 5 years, minimum age of diagnosis for hypertension and diabetes were 22 years and 27 years respectively. Majority of the patients had hypertension (41.3%), 39.4% of patients had both diabetes and hypertension, 98.8% of patients also had been suffering from dyslipidemia, coronary artery disease was found in 18.8% of patients.

INTRODUCTION
Diabetes and hypertension are two major non-communicable diseases with significant adverse cardiovascular outcomes. It has been predicted that by 2020, there would be a 111% increase in cardiovascular deaths in India. The burden and effects of the diseases have been well described in literature. Majority of the studies in India have been hospital based and hence represent only a fraction of the magnitude of the actual problem.

Non-communicable diseases in the working population are a major concern and have not been thoroughly studied. Occupational stress, genetic predisposition, obesity and lack of healthy lifestyle all have been associated with increasing prevalence of NCDs in the working population.

Though hypertension is a major public health concern we are short of the knowledge of the prevalence of hypertension in the community
to make any meaningful impact on the policy decisions.

A detailed review of literature on the study of hypertension among different populations in India has revealed the lack of systematic studies on NCDs especially hypertension and type 2 diabetes among the beneficiaries of ESIC scheme in India. This has created a large gap in knowledge on the prevalence of NCD among these patients. As is well known, the long term health consequences of NCDs such as type 2 diabetes and hypertension will have impact on sickness absenteeism, industrial productivity and economics.

**OBJECTIVES**

1. To look for year wise trend in prevalence of two major NCDs, namely hypertension and type 2 diabetes among the patients attending service dispensary of ESIS in urban area

2. To describe the clinical characteristics of such patients along with treatment profile

**METHODOLOGY**

**Study Setting**

The study was conducted at the urban dispensary at Ariyankuppam, a coastal suburb of Pudicherry. Patients with type 2 diabetes and hypertension attending the outpatient clinic with complete treatment records for the last one year were included for study. Patient’s treatment charts and investigation reports were reviewed.

**Study Design- Chart Review**

**Definition of the outcome variables**

Hypertension was defined as per Indian guidelines: Systolic blood pressure >140 mm Hg and/or diastolic blood pressure >90 mm Hg.

Diabetes was defined as per the WHO criteria and a patient had to satisfy any of the following criteria: HbA1c > 6.5%, Fasting Plasma Glucose >126 mg/dl, Prandial Plasma Glucose > 200 mg/dl. Dyslipidemia was defined as per the NCEP-ATP III criteria.

**Statistical Analysis**

For statistical analysis, SPSS version 20.0 was used. All counts were expressed as proportion. Chi-square test was applied to look for association for the categorical data.

**RESULTS**

We evaluated the records of 213 patients. Clinical characteristics of the patients have been depicted in Table 1. Mean age of the subjects is 57.1 years (SD- 10.2). Median duration of hypertension is 7.0 years (SD- 4.4); while it is 5.0 years (SD- 5.1) for diabetes. Mean age of detection of hypertension and diabetes are 50.6 years and 49.9 years respectively. Minimum age of diagnosis for hypertension

---

**Table 1: Clinical profile of the patients**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Young (&lt;40 years)</td>
<td>9 (4.2)</td>
</tr>
<tr>
<td>Middle age (40-59 years)</td>
<td>107 (50.2)</td>
</tr>
<tr>
<td>Elderly (&gt;=60 years)</td>
<td>97 (45.6)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>115 (54.0)</td>
</tr>
<tr>
<td>Female</td>
<td>98 (46.0)</td>
</tr>
<tr>
<td><strong>Chronic diseases</strong></td>
<td></td>
</tr>
<tr>
<td>Hypertension alone</td>
<td>88 (41.3)</td>
</tr>
<tr>
<td>Diabetes alone</td>
<td>41 (19.3)</td>
</tr>
<tr>
<td>Both DM and hypertension</td>
<td>84 (39.4)</td>
</tr>
<tr>
<td><strong>Age of onset of disease</strong></td>
<td></td>
</tr>
<tr>
<td>Hypertension (≤45 years), n=161</td>
<td>53 (32.9)</td>
</tr>
<tr>
<td>DM (≤45 years)</td>
<td>41 (33.3)</td>
</tr>
<tr>
<td><em><em>Dyslipidemia (n= 85</em>)</em>*</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>84 (98.8)</td>
</tr>
<tr>
<td>Normal</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td><strong>Presence of coronary artery disease (CAD)</strong></td>
<td>40 (18.8)</td>
</tr>
<tr>
<td><strong>Presence of Chronic kidney disease (CKD)</strong></td>
<td>1</td>
</tr>
</tbody>
</table>

*Dyslipidaemia is said to be present if any of the lipids viz. total cholesterol, serum triglyceride, high density lipo-protein (HDL) and low density lipo-protein (LDL) is deranged. Lipid profile was present for 85 patients in last one year.*
and diabetes was 22 years and 27 years respectively. The clinical profile of the patients has been shown in Table 1 and the distribution of the patients in two different centres has been depicted in figure 1. However, for analysis of trends of the diabetes and hypertension, we took two years data for Ariyankuppam and five years data for Mudaliarpet.

When dyslipidaemia is considered only based on total cholesterol and serum triglyceride, 30 (34.5%) out of 85 subjects have it. HDL levels were found to be low (<40 mg/dl) in 69 subjects (81.2%), Normal values were noted in 16 patients (18.8%)

Among those who have less HDL, type 2 diabetes was found in 16 patients, hypertension was found in 21 patients, both type 2 diabetes and hypertension were found in 30 patients

Age and gender wise distribution of the metabolic conditions has been shown in Table 2. Gender wise patients distribution has been shown in Table 3

Compliance with the investigations: According to the recommended guideline if a person is diabetic or hypertensive or both, he/she should undergo ophthalmic evaluation once in a year and blood lipid profile at least once in a year. Ophthalmic evaluation was done for 46 patients (21.3%). Lipid profile was checked in 85 (39.9%) of the patients during the study period.

Work-up status for investigations: Review of patients’ clinical records was done to find

![Fig. 1: Distribution of diabetes (DM), hypertension (Htn) and dyslipidemia (DL): New cases attending ESID during 2016 and 2017](chart.png)

Table 2: Age and gender wise distribution of the metabolic conditions

<table>
<thead>
<tr>
<th>Metabolic condition</th>
<th>Gender</th>
<th>Male (n=115)</th>
<th>Female (n=98)</th>
<th>Age group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Diabetes</td>
<td>Hypertension</td>
<td>Both diabetes and hypertension</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>45 (39.1)</td>
<td>22 (19.2)</td>
<td>48 (41.7)</td>
</tr>
<tr>
<td>Male (n=115)</td>
<td></td>
<td>45 (39.1)</td>
<td>22 (19.2)</td>
<td>48 (41.7)</td>
</tr>
<tr>
<td>Female (n=98)</td>
<td></td>
<td>43 (43.9)</td>
<td>19 (19.4)</td>
<td>36 (36.7)</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young (n=9)</td>
<td></td>
<td>5 (55.6)</td>
<td>3 (33.3)</td>
<td>1 (11.1)</td>
</tr>
<tr>
<td>Middle aged (n=107)</td>
<td></td>
<td>27 (25.2)</td>
<td>43 (40.2)</td>
<td>37 (34.6)</td>
</tr>
<tr>
<td>Elderly (n=97)</td>
<td></td>
<td>9 (9.3)</td>
<td>42 (43.3)</td>
<td>46 (47.4)</td>
</tr>
</tbody>
</table>

Table 3: Univariate analysis for non-compliance with investigations

<table>
<thead>
<tr>
<th></th>
<th>None or partial investigation (%)</th>
<th>Complete investigation (%)</th>
<th>Odds ratio (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Older (≥ 45 years)</td>
<td>44 (25.6)</td>
<td>128 (74.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young (&lt;45 years)</td>
<td>6 (23.1)</td>
<td>20 (76.9)</td>
<td>1.1 (0.4-3.0)</td>
<td>0.8</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>68 (59.1)</td>
<td>47 (40.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>44 (44.9)</td>
<td>54 (55.1)</td>
<td>1.8 (1.03-3.1)</td>
<td>0.04</td>
</tr>
</tbody>
</table>
out the status of work-up for general investigations as mentioned earlier. It was noted that complete work-up either during initial diagnosis for newly registered patients or later during follow-up visits were done for 101 (47.4%) patients; partially done for 111 (52.1%) patients and not done in one (0.5%) patient. We have looked at the univariate analysis (Table 3) to find the predictors for non-compliance with the investigations. Male were mostly found to be non-compliant. Although patients in older age-groups outnumbered their younger counterparts for non-compliance with respect to investigations, this was statistically insignificant. Gender was found to be statistically significant (p<0.05) as more females were found to be non-compliant with respect to investigations.

**TREATMENT PROFILE OF THE PATIENTS**

Most of the patients are currently being managed with monotherapy. In majority of patients monotherapy was found to be effective in controlling the disease. Types of therapy currently effective in the patients have been described in Table 4. It was noted that calcium channel blockers (notably amlodipine) are the most frequently used (n=46, 49.5%) as monotherapy and they were effective in controlling blood pressure as monotherapy. Other drugs used as monotherapy include ACE inhibitors (notably enalapril : n=30, 32.3%), beta blockers (most commonly used was atenolol, followed by metoprolol in few patients, n=14, 15.1%) and ARB (notably telmisartan : n=3, 3.2%).

For monotherapy in hypertension, following drugs were used in hypertension- beta blocker (14, 15.1%), ACE inhibitor (30, 32.3%), amlodipine (46, 49.5) and telmisartan (3, 3.2%). In patients with dyslipidemia statins were used in 73 (44%) patients.

**Compliance with medicine:** compliance status is self-reported in the present study. It was available for 198 patients out of which 148 patients (74.7%) were compliant. Non-compliance is uniformly distributed among male (24.1%) and female (26.7%) and in different age groups. 23.1% of the young population (<45 years) are non-compliant; while the proportion is 25.6% among the relatively elderly population (>45 years).

**DISCUSSION**

From the results we noted that there is an increase in the number of new cases with hypertension, diabetes or both together, in the last years. This could be due either to the routine screening for NCD being done more diligently or due to more ESIC beneficiaries seeking health care due to increased awareness for the need for early screening and treatment. Roughly one-third of the patients with hypertension was diagnosed before they reached 45 years of age. This can be attributed to the increasing awareness of blood pressure measurement among the ESIC beneficiaries, and also the fact that blood pressure is checked routinely among patients attending the OPDs.

In our study we found that 4.2% patients are young (<40 years), the mean age of detection of hypertension is 50.6 years, which shows that these patients are diagnosed in the middle age groups. This differs considerably from a study by Ganesh Kumar et al. among bank employees in Pondicherry where the mean age of the participants was 39.5 years. As the complications associated with both hypertension and diabetes can be prevented or at
least controlled better if these diseases are
diagnosed early, it calls for routing screening
of all beneficiaries at an earlier age.

Compliance with Respect to
Investigations
In our study we found that nearly 43% of
patients were compliant with respect to inves-
tigations. This implies that majority of the
patients were non-compliant for investiga-
tions. In our experience the non-compliance
was due to lack of knowledge among the
patients of the need for regular investigations
and follow-up, work shift related issues, as
many insured persons were working in day
shifts when they could not go to the hospital
for the tests. Non-compliance for investiga-
tions was statistically significant for males.

We observed that nearly all patients who
underwent laboratory investigations, have
dyslipidemia. Nevertheless, a good number
of patients didn’t undergo the lab tests and
therefore, proportion of dyslipidemia could
be an over estimation in our study. In our
finding, one out of five patients had evidence
of coronary artery disease based on current
treatment records and angiographic evidence.
This is significant in the light of the fact that
adverse cardiovascular events are the leading
causes of morbidity and mortality among
NCD patients. The increased prevalence of
dyslipidemia in our patients can be explained
by the coexistence of diabetes in these patients.

Therapeutic Intervention
Among the patients with hypertension
lifestyle modification alone was effective in 1
patient whereas in diabetics it was effective
in 3 patients. It was observed that in majority
of patients, monotherapy was effectively
controlling their illness.

Compliance for Therapy
We noted that nearly 75% patients were
compliant with respect to therapy. In the
non-compliant group, nearly 26% of patients
were older, this is explainable due to limited
mobility, lack of caregivers and comorbidities.

In a study by Gupta et al. done in Pondicherry,
the average age of patients with hypertension
was 49.5±14.2 years. In our study the mean
age at which hypertension was detected was
50.6 years. It can therefore be concluded that
the current study and the study by Gupta et
al. had similar results.

In another study by Chauhan et al. involving
3589 patients the prevalence of hypertension
was 26.7% among males and 19.3% among
females, hence males outnumbered females
by 7.4%. In our study, however the difference
was 4.6%. This may not represent true
difference as several patients take treatment
outside and not from the dispensaries.4

In a study by Shrivastava et al. the difference
in the prevalence of hypertension among
males and females was higher than what we
observed in our study (28.7% vs 21% respec-
tively).5

CONCLUSION
This was perhaps the first study of its kind
on NCD prevalence and characteristics
among beneficiaries of the ESIC scheme
in Puducherry. This study yielded several
interesting findings related to diabetes and
hypertension.

Success of any NCD control program depends
on many factors. These include public
awareness about NCDs and the need for early
diagnosis and treatment, regular screening
and early detection of complications and if
possible, prevention of complications through
appropriate lifestyle modification and thera-
peutic intervention. It also depends on the
administrative and political commitment to
detect, treat, prevent, report NCDs, through
uniform guidelines, periodic monitoring and
surveillance, compliance of patients with
respect to treatment and investigations which
also necessitate the uninterrupted supply of
medications at peripheral level and laboratory
facility for patients.

In our study we noted that there has been
an increasing trend in the prevalence of
NCDs, majority of our patients were partially
compliant for investigations, but majority were compliant for therapy. Monotherapy was effective in controlling hypertension in majority of patients. However patients need to be more compliant with respect to follow-up investigations.

**LIMITATIONS OF THE STUDY**

This study had several limitations. First due to lack of uniformity in recording data at the dispensary level, anthropometric data was not included for study, hence it was not possible to allude poor metabolic control to anthropometric characteristics of the patients. Second, several laboratory investigations which otherwise would be necessary for evaluation and monitoring of NCD patients as per existing national and international guidelines such as HbA1c, Urine Albumin to Creatinine Ratio (ACR), serum electrolytes were not possible. Third, several patients had lost their OPD slips of ESI Hospital, hence reports of tests were not available for analysis.

**REFERENCES**

2. www.esic.nic.in
6. Hypertension Society of India, Indian Hypertension Guidelines II; wwwhsiindia.org
## HSICON 2018

### SCIENTIFIC PROGRAMME

**FRIDAY, 31ST AUGUST, 2018**

**HALL - A**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>10.00 am - 01.00 pm</td>
<td><strong>Free Paper Platform Presentation</strong>&lt;br&gt;Dr. P.K. Sinha, Dr. Sekhar Chakraborty, Dr. Radha T.R.</td>
</tr>
<tr>
<td>01.00 - 02.00 pm</td>
<td>Lunch</td>
</tr>
<tr>
<td><strong>Chairpersons:</strong></td>
<td>Dr. R N Sharma, Dr. M K Suresh</td>
</tr>
</tbody>
</table>
| 02.00 - 05.00 pm  | **Workshop 1: B P Monitoring**<br>**Moderator: Dr. B.R. Bansode**<br>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&n...
### SATURDAY, 1ST SEPTEMBER, 2018

#### HALL - A

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Moderator</th>
<th>Chairpersons</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00 - 11.00 am</td>
<td><strong>Symposium - ABCD of Hypertension</strong></td>
<td>Dr. Siddharth N. Shah</td>
<td>Dr. R.L. Sarita, Dr. Ashok Kirpalani, Dr. R. Chandni</td>
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<tr>
<td></td>
<td><em>Moderator:</em> Dr. Siddharth N. Shah</td>
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<tr>
<td></td>
<td>• Alpha Blockers: Role In Hypertension</td>
<td>Dr. Dilip Kirpalani</td>
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<tr>
<td></td>
<td>• Ace Inhibitors And Arbs: Newer Insights</td>
<td>Dr. Nihar P. Mehta</td>
<td></td>
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<tr>
<td></td>
<td>• Beta Blockers: Are They Relevant</td>
<td>Dr. K.G. Sajeeth Kumar</td>
<td></td>
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<tr>
<td></td>
<td>• Calcium Channel Blockers 1st or 2nd Line Drugs In Hypertension</td>
<td>Dr. R. Chandni</td>
<td></td>
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<tr>
<td></td>
<td>• Diuretics In Hypertension</td>
<td>Dr. Anita Jaiswal</td>
<td></td>
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<tr>
<td>11.00 - 11.30 am</td>
<td><strong>Hypertension Management at Primary Care Level</strong></td>
<td>Dr. T.K. Suma</td>
<td>Dr. P.K. Sasidharan, Dr. B.R. Bansode</td>
</tr>
<tr>
<td>11.30 am - 12.00 noon</td>
<td><strong>Role of Vitamin D3 In Hypertension</strong></td>
<td>Dr. R.K. Jha</td>
<td>Dr. C. Rajasekharan, Dr. K. Vijayakumar, Dr. Sreenivasa Kamath</td>
</tr>
<tr>
<td>12.00 noon - 12.30 pm</td>
<td><strong>U. N. Mehta Torrent Oration</strong></td>
<td>Dr. R.R. Chaudhary</td>
<td>Dr. P.K. Sasidharan, Dr. B.R. Bansode</td>
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<tr>
<td></td>
<td><strong>Eyes In Hypertension</strong></td>
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<tr>
<td>12.30 - 01.00 pm</td>
<td><strong>Pregnancy Hypertension</strong></td>
<td>Dr. Siddharth N. Shah</td>
<td>Dr. K.G. Sajeeth Kumar, Dr. Shibendu Ghosh, Dr. Sunil Mathew</td>
</tr>
<tr>
<td>01.00 - 02.00 pm</td>
<td><strong>Lunch</strong></td>
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<tr>
<td>02.00 - 02.30 pm</td>
<td><strong>Resistant Hypertension - Role of Newer Technologies - Renal Denervation, Bat and Experimental Invasive Procedures for Control</strong></td>
<td>Dr. Ashok Kirpalani</td>
<td>Dr. S. Sivasankaran, Dr. Jacob George, Dr. S. Anil Kumar</td>
</tr>
<tr>
<td>02.30 - 03.30 pm</td>
<td><strong>Panel Discussion On Guidelines on Hypertension</strong></td>
<td>Dr. Siddharth N. Shah</td>
<td>Dr. S. Sivasankaran, Dr. Jacob George, Dr. S. Anil Kumar</td>
</tr>
<tr>
<td></td>
<td><em>Panelists:</em> Dr. Ashok Kirpalani, Dr. N. Sudayakumar, Dr. O.S. Syamsundar, Dr. Sunil Prasobh, Dr. Nihar Mehta</td>
<td></td>
<td></td>
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<tr>
<td>03.30 - 04.00 pm</td>
<td><strong>Secondary Hypertension in Children</strong></td>
<td>Dr. Radhika C.R.</td>
<td>Dr. Balakrishnan Valliyot, Dr. Noble Gracious, Dr. Meenakumari</td>
</tr>
<tr>
<td>04.00 - 04.20 pm</td>
<td><strong>Coffee Break</strong></td>
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<tr>
<td>Time</td>
<td>Event</td>
<td>Chairpersons</td>
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<tr>
<td>04.20 - 05.20 pm</td>
<td>PJ Mehta Award Paper</td>
<td>Judges: Dr. B.R. Bansode, Dr. P.K. Sasidharan, Dr. Ashok Kirpalani</td>
<td></td>
</tr>
<tr>
<td>05.20 - 05.45 pm</td>
<td>Hypertensive Urgencies and Emergencies</td>
<td>Dr. Ashit Bhagwati</td>
<td></td>
</tr>
<tr>
<td>05.45 - 06.10 pm</td>
<td>Hypertension in Children</td>
<td>Dr. N.R. Rao</td>
<td></td>
</tr>
<tr>
<td>06.10 - 06.35 pm</td>
<td>Dirty Dozens of HTN</td>
<td>Dr. Ashok Taneja</td>
<td></td>
</tr>
<tr>
<td>06.35 - 07.00 pm</td>
<td>CV Risk in Diabetes Management - Role of DPP4 inhibitors</td>
<td>Dr. Sreejith N. Kumar</td>
<td></td>
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<tr>
<td>07.00 - 07.30 pm</td>
<td>Old Executive Committee Meeting H. S. I.</td>
<td></td>
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<tr>
<td>07.30 - 08.00 pm</td>
<td>General Body Meeting H. S. I.</td>
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</tr>
<tr>
<td>08.00 - 08.30 pm</td>
<td>New Executive Committee Meeting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.30 pm</td>
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<td>09.00 - 09.30 am</td>
<td>Hypertension Quiz for Postgraduates</td>
<td>Dr. R. Chandni, Dr. Amit Saraf</td>
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<td>09.30 - 10.00 am</td>
<td>Hypertension and Kidney Disease</td>
<td>Dr. Kasi Visweswaran</td>
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<td>10.00 - 10.30 am</td>
<td>Endocrine Hypertension</td>
<td>Dr. P. K. Jabbar</td>
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<td>10.30 - 11.00 am</td>
<td>Siddharth N. Shah Epidemiology Oration</td>
<td>Dr. T. Govindanunni</td>
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<td>11.00 - 11.25 am</td>
<td>Management of Hypertension in Cerebro Vascular Accident</td>
<td>Dr. B. R. Bansode</td>
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<td>11.25 - 11.50 am</td>
<td>Obesity and Hypertension</td>
<td>Dr. Soumitra Ghosh</td>
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<td>11.50 am - 12.15 pm</td>
<td>Heart Failure and Hypertension</td>
<td>Dr. George Koshy</td>
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<td>12.15 - 12.40 pm</td>
<td>Autonomic Dysfunction in Diabetes</td>
<td>Dr. Apurba Mukherjee</td>
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<td>12.40 - 01.05 pm</td>
<td>Systemic Diseases And Hypertension</td>
<td>Dr. Mathew Thomas</td>
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Study on Resistant Hypertension in a Tertiary Care Centre in Malabar

Abhay John Gray1, K.G. Sajeeth Kumar2
1Junior Resident, 2Professor, Department of General Medicine, Govt. Medical College, Kozhikode

Background: Resistant hypertension is defined as blood pressure that remained uncontrolled in spite of concurrent use of three antihypertensives of different classes. The true prevalence of resistant hypertension is not known, studies suggest it includes approximately 10–15% of the general hypertensive population. Resistant hypertension is associated with increased mortality and only few studies are available on resistant hypertension from India.

Objectives: To study the demographic factors, clinical profile and comorbidities among patients with resistant hypertension.

Methods: An observational study was done among patients with resistant hypertension admitted in Department of General Medicine in Government Medical college, Calicut over a period of one year from June 2017 to May 2018. A total of 488 cases were obtained and data regarding demographics, clinical profile and comorbidities were collected. Data was analyzed with SPSS software

Results: Of the 488 patients, there were 283(58%) males and 205 (42%) females. Mean age was 59.46 ± 4.28. Mean systolic BP was 157.45 ± 6.28 and mean diastolic BP was 97.19 ± 5.63. 350 (71.7%) of patients had Chronic kidney disease, 161 (33.1%) had diabetes and 143 (29.3) patients had obstructive sleep apnea. 169 (34.6%) patients had dyslipidemia. Mean number of drugs required to control BP was 4.52 ± 0.65. Refractory hypertension (BP not controlled with 5 antihypertensives) was present in 37(7.58%) patients.

Conclusions: Males have higher prevalence of resistant hypertension than females. Majority of patients with resistant hypertension had chronic kidney disease (71.7%). Refractory hypertension was seen in 7.5% of patients with resistant hypertension

Prevalence of Ilio-femoral Plaques and its Correlation with Carotid Intima Media Thickness and Atherosclerotic Risk Factors in Type 2 Diabetic Patients

Arun VJ1, Chandni R2, Noufal Perumpalath3
1Senior Resident, Department of Medicine, 2Professor & Head, Department of Emergency Medicine, 3Senior Resident, Department of Radio Diagnosis, Govt. Medical College, Kozhikode

Background and Objectives: Atherosclerosis is the basic pathophysiologic mechanism underlying macrovascular complications in patients with type 2 diabetes mellitus. Assessment of atherosclerosis in the subclinical stage may have obvious benefits in the prevention of atherosclerotic macrovascular complications. In the present study we analyzed 2 markers of subclinical atherosclerosis namely iliofemoral plaque and carotid intima media thickness using B mode ultrasound in patients with type 2 diabetes mellitus of ≤5 years duration without established macrovascular complications. The objective of the study was to estimate the prevalence of iliofemoral plaque and to assess the relation with carotid intima media thickness and various atherosclerotic risk factors such as hypertension, smoking, dyslipidemia and obesity.

Methodology: This is an observational study done in 127 patients with type 2 diabetes mellitus. All patients were subjected to detailed history and physical examination with regard to various atherosclerotic risk factors followed by relevant lab investigations and B mode ultrasound to detect carotid intima media thickness and iliofemoral plaque. The data was analyzed using SPSS software and Microsoft excel.

Results: The prevalence of iliofemoral plaque was found to be 24% in the study. There was significant association between iliofemoral plaque and CIMT. Patients with CIMT value <0.8mm was found to have very low prevalence of plaque (p=0.001). Both CIMT and iliofemoral plaque showed significant association with poor glycemic control status, hypertension and smoking and found to be useful in the prediction of cardiovascular risk.

Conclusion: Our study showed that both carotid intima media thickness and iliofemoral plaque are reliable markers of subclinical atherosclerosis. The most important risk factors for atherosclerosis identified in this study are hypertension, poor glycemic control status and smoking which are amenable to interventions. Assessment of these risk markers using non invasive imaging modality like ultrasound may aid in the risk stratification and prevention of atherosclerotic macrovascular complications in patients with type 2 diabetes mellitus.
Prevalence of Blood Pressure Variability in Normotensive Type 2 Diabetes Mellitus Patients Using Ambulatory Blood Pressure Monitoring (ABPM)

Ashwin Vijayakumar Nair, R Chandni, Shajit Sadanandan, N K Thulaseedharan
Government Medical College, Kozhikode, Kerala

Background: Ambulatory blood pressure monitoring (ABPM) has now become the standard for detection of blood pressure. ABPM provides more accurate measurement of blood pressure and helps in detecting masked or white coat hypertension, ABPM has been found to be useful for predicting risk of cardiovascular morbidity and mortality. BPV is the strongest indicator of cardiovascular disease (CVD) and for developing target organ damage in patients with diabetes or hypertension. We looked at diabetic patients with normal clinic BP to look for BPV

Objectives:
1. Find the prevalence of blood pressure variability (BPV), nocturnal non-dipping, morning surge in patients without hypertension using ABPM.
2. To find a correlation between these ABPM parameters and BMI, HbA1c, LVH, Urine albumin excretion, diabetic retinopathy etc.

Methods: 70 diabetic patients coming to the OP department of Kozhikode medical college, and fulfilling the inclusion criteria were enrolled in study. These patients’ physical examination and baseline investigations were done. They were put on ABPM for 24 hours and data collected. BPV, Nocturnal dipping, morning surge, mean SBP, were the main parameters calculated.

Results: 70 patients enrolled had h/o type 2 DM for > 5years and normal clinical BP. There were total 38 males and 32 females in study, average age was 51.02 years. Prevalence of BPV was 45.71% (32 out of 70), which is the primary outcome. Non-dipping of nocturnal BP was seen in 61.43% of our study subjects, Morning surge was seen in 40% of study subjects. The relationship between U.ACR (urinary albumin creatinine ratio) and BPV was found to be significant (<0.1). Also the relationship between BMI and morning surge was found to be significant. (<0.1). Conclusion: Hence, we concluded that BPV, non-dipping nocturnal BP and morning surge can be present even without hypertension in diabetic patients, thereby contributing to increased CVD morbidity and mortality.

A Rare Case of Cerebellar Bleed and Refractory Hypertension

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¹Junior Resident, Dept General Medicine, ²Professor, Department of Medicine, ³Associate Professor, Department of Medicine, ACME, Pariyaram

Introduction: Hypertension is one of the leading cause of global burden of diseases. It doubles the risk of cardiovascular disease, ischaemic and hemorrhagic stroke, renal failure and peripheral arterial disease. Secondary hypertension account for 5-10% of the cases. Most common causes are renovascular hypertension, primary kidney disease, primary aldosteronism, sleep apnea. Intra cerebral bleed account for 10% of cases of all stroke. Most common causes are hypertension, coagulopathy, sympathomimetic drugs, cerebral amyloid angiopathy. Hypertensive. Intra cerebral bleed result from spontaneous rupture of small penetrating artery deep in brain. Most common site is basal ganglia, thalamus, cerebellum andpons.

Case Report: 31 year old male who presented with features of left cerebellarbleed. On evaluation found to have refractory hypertension. Further evaluation revealed polycythemia. Evaluation of case of polycythemia and secondary hypertension points to a diagnosis of renovascular hypertension.

Investigations: MRI brain – Large subacute bleed in vermis and left cerebellum. Renal artery Doppler suggestive of Right renal artery narrowing. Hb was 19.7, PCV -58.5. S Creatine 1.8, Echo shows concentric LVH. Fundoscopy-bilateral papillodema.

Discussion: Renovascular hypertension is the most common correctable causes of hypertension. It’s prevalence is higher in acute severe and refractory hypertension. Atherosclerosis and fibromuscular dysplasia account for most causes of renovascular hypertension and are potentially curable. Renovascular hypertension should be suspected in case of refractory hypertension, deterioration of renal function with ACE inhibitors, epigastric or renal bruit, onset of hypertension at younger age and atherosclerotic disease of aorta and peripheral arteries. Antihypertensive therapy, antidyslipidemic therapy and smoking cessation provides benefit in atherosclerotic renovascular hypertension. Invasive treatments includes percutaneous transluminal renal angioplasty (PTRA), surgical revascularization, and nephrectomy.
A Rare Case of Aldosterone and Corticosteroid Co-Secreting Adrenal Adenoma

C. Jayakumari, P.K. Jabbar, Ablash Nair, Geena Susan George, Nandini Prasad

1Additional Professor, 2Professor and Head, 3Assistant Professor, 4Senior Resident, Department of Endocrinology, Government Medical College, Trivandrum

Background: Unilateral, large sized adrenal tumours which secrete more than one hormone are usually adrenal carcinomas. Here we report a case of plurihormonal, large adrenal tumour which presented as hypertension and was proven benign on histopathology.

Case Report: A 19 year old non obese female was incidentally detected to have hypertension prior to blood donation. She didn’t have any symptoms of chronic kidney disease or renal vascular disease. There was no proximal myopathy, clinical symptoms of hypokalemia or the classical spells of pheochromocytoma. On history there were no features of corticosteroid excess such as centripetal obesity, facial plethora or easy bruisability. She denies the use of indigenous medications or any drugs. On examination her BMI was 20.3 kg/m2. Pulse rate was 86/min, regular, all pulsations were felt with no radiodermal or radiofemoral delay. BP was 190/110 mm/hg with no postural fall and no significant difference in other limbs. Fundus examination was normal and systemic examination was unremarkable. Routine investigations revealed a normal hemogram, renal and liver function tests. S. electrolytes showed a S. Sodium – 137 meq/l, S. Potassium – 3.2 meq/l. Hormonal Analysis revealed an Overnight Dexamethasone Suppressed Cortisol (ONDST) – 7.28 ug/dl (<1.8), Low dose dexamethasone suppressed cortisol (LDGST) - 5.3 ug/dl (<1.8), ACTH – 6 pg/ml (<20 pg/ml) suggestive of ACTH independent Cushings syndrome. DHEAS – 28.5 ug/dl (65-368). Plasma Aldosterone – 29.1 ng/dl (<20), Plasma Renin Activity (PRA) - 0.52 ng/ml/hr. Aldosterone Renin Ratio (ARR) - 55.1 ng/dl/ng/ml/hr denoting primary hyperaldosteronism. 24 hr urine metanephrines, normetanephrines, VMA was normal. CT with adrenal protocol showed Right suprarenal mass of 34 HU heterogenous with calcification and a size 6.1 x 4 x 3.4 cm with an absolute washout of – 49 % (<60%) and relative washout – 27% (<40%). FDG – PET showed moderate grade FDG uptake in Right suprarenal region (SUV-8.63). Considering the plurihormonal status and CT features which were suggestive of adrenal malignancy she underwent adrenalectomy after adequate blood pressure control. However, histopathology showed features of adrenal adenoma with a MIB-1 – index of 2%. Post operatively blood pressure normalised and antihypertensive medications were completely withdrawn.

Conclusion: Although plurihormonal adrenal tumours are malignant it is not unusual for such tumours to be benign on histopathology as in our case which was biochemically having hypercortisolism and hyperaldosteronism and had only hypertension as a clinical feature.

ECG Left Atrial Abnormality: A Marker of Stroke Prediction in Hypertension

Harsh Kaushal, Darshan Mehara, R R Chaudhary

1Junior Resident, 2Associate Prof., 3Professor, Dept. of Medicine, Rohilkhand Medical College, Bareilly

Introduction: Stroke is a major cause of mortality and morbidity worldwide and is the second cause of mortality accounting for approximately 20% of all deaths in women and 15% in men worldwide. Hypertension is regarded as the single most important risk factor for stroke; cardiac disease, atherosclerosis, diabetes mellitus.

Objective: ECG left atrial abnormality has been associated with stroke independently of atrial fibrillation, suggesting that atrial thromboembolism may occur in the absence of AF.

Material and Method: We conducted a case-cohort analysis in the Tertiary Hospital of North India – Rohilkhand Medical College, Bareilly, a prospective cohort study of stroke risk factors. P-wave terminal force in lead V1 (PTFV1) was manually measured from baseline ECGs of participants in sinus rhythm who subsequently had ischemic stroke (N = 128) and a randomly selected subcohort without stroke (N = 300). Weighted Cox proportional hazards models were used to examine the association between PTFV1 and stroke etiological subtypes while adjusting for baseline demographic characteristics, history of AF, heart failure, diabetes, hypertension, tobacco use, and lipid levels.

Results: Participants with ischemic stroke had a significantly higher PTFV1 than those in the subcohort. In an unadjusted model, PTFV1 was associated with a higher risk of ischemic stroke. This association did not substantially change after inclusion of potentially confounding or mediating covariates including a history of AF.

Conclusion: In conclusion, the value of PTFV1 in predicting ischemic stroke documented by this study conducted in middle-aged hypertensive patients with ECG-LVH needs to be confirmed in larger studies representative of unselected hypertensive population.

Hypertensive Patients With Chest Pain - Role of POCUS (Point of Care Ultrasound)

Hidayathulla PK, Mohammed Niyas P, Chandni, Rahul KR, Hareesh CR, Rosy Philip, Vipin Das

1Junior Resident, Dept. of Emergency Medicine; 2Professor & Head of the Emergency Medicine Department; 3Assistant Professor, Dept. of Radiology; 4Senior Resident, Dept of Emergency Medicine; 5Associate Professor, 6Junior Resident, Dept of Internal Medicine, Govt. Medical College, Kozhikode

Background: The large number of differential diagnosis for chest pain make the immediate diagnosis challenging. In hypertensive patients apart from typical coronary syndromes, aortic dissection may be the underlying...
pathology, which if not intervened early will be catastrophic. Here we discuss two cases of aortic dissection in hypertensive patients with chest pain in our ED.

**Objectives:** To identify dissection as early as possible by POCUS at ED in hypertensive patients with chest pain.

**Method:** Clinical examination and POCUS with phased array probe

**Case 1:** 53 year old male chronic smoker, alcoholic with no known co-morbid illness, presented in our ED with acute severe pain in upper back of 6 hours duration along with sweating and radiation of pain to left shoulder. On examination pulse volume was decreased in left radial with respect to right radial and high BP in both limbs. Point Of Care Ultrasound (POCUS) from ED showed flap with false lumen in abdominal aorta with normal appearance of root and arch of aorta. CT aortogram showed type B dissection starting just distal to left subclavian artery extending to aortic bifurcation and left common iliac artery with thrombosis of false lumen in thoracic aorta. No evidence of end organ ischemia. Right renal artery shows origin from false lumen.

**Case 2:** 65 year old female known hypertensive presented with chest pain radiating to back of 2 day duration. Pulses not palpable in Right upper and lower limbs. Significant variation in BP in all limbs. Diastolic murmer was present in aortic area. POCUS showed Aortic dissection in root, thoracic and abdominal aorta. CT aortography showed dissection starting from root of aorta till bilateral common iliac arteries with major vessels opening to false lumen.

**Result:**

**Case 1:** Symptomatically better and discharged with dual antihypertensives without any end organ ischemic changes

**Case 2:** Died

**Conclusion:** Point of care ultrasound is very much helpful in rapidly diagnosing aortic dissection and thereby starting treatment at the earliest. All chest pain are not Acute coronary syndromes.

**Hypothyroidism Associated Hypertension**

Kamlesh Ashok Taori¹, R R Chaudhary²

¹Junior Resident, ²Prof. and HOD, Dept of Medicine, Rohilkhand Medical College, Barielly

**Introduction/ Background:** Hypertension is not a typical sign of hypothyroidism, however, hypothyroidism is potentially important but often overlooked cause of hypertension and restoration of euthyroidism with thyroxine therapy usually brings in a substantial reduction in blood pressure. This study describes the relation of thyroid function and blood pressure, compares the age-related increase in blood pressure in euthyroid patients with that of hypothyroid patients and assesses the effect of thyroid hormone replacement therapy on blood pressure in hypertensive hypothyroid patients.

**Objective:** To study the association between hypertension and hypothyroidism and to assess the response of adequate thyroid hormone replacement therapy on blood pressure in hypothyroid hypertensive subjects.

**Material and Method:** Prospective observational study was undertaken in Rohilkhand Medical College and Hospital, Bareilly including 241 female patients aged
19-69 years admitted in the medical wards from 1st June to 31st May 2018. Detailed clinical examination including measurement of blood pressure and routine investigations including thyroid profile were done. The data was expressed as means ± SEM and was statistically analyzed.

**Results:** On the basis of thyroid profile out of 241 cases, 87 were hypothyroid and 154 were euthyroid. Adiposity, age and sex related factor that could influence blood pressure were excluded. Diastolic, rather than systolic blood pressure was significantly higher in hypothyroid patients over 50 years than in euthyroid patients of corresponding age groups. 14 hypertensive hypothyroid patients were followed up, out of which 9 who received adequate thyroid replacement therapy for 6 ± 2 months had reduction in blood pressure. In rest of 5 patients who did not receive adequate thyroid replacement therapy due to poor compliance, blood pressure and thyroid function tests remained unchanged.

**Conclusion:** Hypertension is more often associated with hypothyroidism than euthyroidism in patients over 50 years old. Diastolic blood pressure of hypothyroid patients was significantly higher than that of euthyroid patients. Blood pressure is often reduced in response to adequate thyroid hormone replacement therapy.

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**Thromboembolic Disorders - A Registry of Newly Diagnosed Patients On Oral Anticoagulation Treatment (Vitamin K Antagonists): The CO(N)FIDENCE Registry**

Sanjay Desai¹, Aniruddha Dharmadhikari², B B Bharti³, Manjuprasad MS⁴, Vikrama Raja⁴

¹M.S. Ramaiah Clinical Research Centre, Bangalore; ²Saibaba Heart Institute, Nashik; ³Ford Hospital, Patna; ⁴Abbott Healthcare Pvt. Ltd, Mumbai

**Background:** Oral anticoagulant therapy based on vitamin K antagonists (VKAs) is the current mainstay for the prevention and long-term treatment of thromboembolic disorders. However, considerable variability in individual response to anticoagulant therapy has been noted, which could be attributed to environmental, demographic, clinical and genetic variables.

**Objectives:** Considering the paucity of data from Indian setting, this registry was planned to understand the clinical characteristics, prescription pattern, prothrombin time (PT)/ international normalized ratio (INR) monitoring, and safety profile of Indian patients with thromboembolic disorders prescribed with oral vitamin K antagonists (warfarin and acenocoumarol).

**Methods:** Newly diagnosed patients (18 to 80 years) with atrial fibrillation (AF), venous thromboembolism (deep vein thrombosis [DVT] and pulmonary embolism [PE]), valvular heart disease (VHD), or post prosthetic heart valve surgery (PHVS), on oral VKA (warfarin or acenocoumarol), alone or in combination with other antithrombotics, were enrolled in this multicentric, prospective, non-interventional registry. Demographics, clinical characteristics, change from baseline in PT-INR values (over a period of 1 year), and safety profile were assessed. Data were analyzed using SPSS (version 23.0; SPSS Inc., Chicago, IL).

**Results:** Out of 938 enrolled patients, 530 (56.5%) were diagnosed with VHD and PHVS, 259 (27.6%) with AF, 131 (14.0%) with DVT, and 18 (1.9%) with PE. Mean (SD) age
of the patients was 49.5 (14.6) years. Higher percentage of patients were prescribed with acenocoumarol compared to warfarin (VHD and PHVS: 89% vs. 11%; AF: 81% vs. 18.9%). Significant decrease in PT-INR value from baseline to week-12 was observed in patients with AF who were on warfarin (p<0.001). However, in patients on acenocoumarol, the PT-INR values were stable compared to baseline. In patients with VHD and PHVS, significant increase in PT-INR values from baseline was observed in patients in warfarin group versus acenocoumarol (p=0.001). No adverse events were reported in the study.

Conclusion: Atenocoumarol was found to be well-tolerated and a better therapeutic VKA compared to warfarin in maintaining PT-INR values within prescribed range, in patients with AF, in Indian setting.  

Disclosure: This study was funded by Abbott HealthCare Pvt Ltd. Dr Manjuprasad and Dr Vikrama are employees of Abbott HealthCare Pvt Ltd.

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**Prescribing Patterns and Real-World Effectiveness of Antihypertensive Therapy: A Prospective, Multicentric Registry in India**

K. P. Suresh Kumar1, Harish Manglani2, M.G. Binu3, Sandeep Kumar Gupta4, Sarveswaran5, Topamoy Outta Majumdar6, Manjuprasad MS7  
1Precision Diagnostic Center, Chennai; 2Dr. Manglani Clinic, Indore; 3B. V. Clinic, Coimbatore; 4MV Hospital & Research Center, Lucknow; 5Life Care Medical Center, Coimbatore; 6Medicine Corner, Hooghly; 7Abbott Healthcare Pvt Ltd, Mumbai

**Background:** Although hypertension (HTN) exerts a substantial public health burden on cardiovascular health status and healthcare systems, real-life data on the prescribing patterns and the effect of blood pressure (BP) controlling drugs are scarce, in Indian setting.

**Objectives:** This Pan-India registry was conducted to obtain real-life data on antihypertensive pharmacotherapy, its effectiveness and safety, along with epidemiology and comorbidities, in patients with HTN.

**Methods:** This observational, multicentric, non-interventional, open-label registry was conducted at 67 centers across urban India. Patients (18 to 82 years) were classified into stage-1, stage-2 or uncontrolled HTN based on the Joint National Committee 7 criteria. Patients received antihypertensive treatment as part of routine care as per treating physician’s discretion and were observed from 4 to 6 weeks of treatment. Data were analyzed using SPSS (version 23.0; SPSS Inc., Chicago, IL).

**Results:** Of the 1376 patients enrolled (mean age: 52.9±9.6 years), 35.2% had stage-1, 21.6% had stage-2, and 43.2% had uncontrolled HTN. About 1025 (74.5%) patients reported co-morbid conditions. Angiotensin II receptor blocker (ARB) as monotherapy (37.6%); stage-1: 55.9%; stage-2: 33.0%; uncontrolled: 25.1%) or in combination with calcium channel blocker (CCB: 15.7%; stage-1: 6.4%; stage-2: 17.8%; uncontrolled: 22.2%) were the most commonly prescribed drug class. The mean reduction in sitting BP was 9.6 to 26.1 mmHg and 11.5 to 32.0 mmHg for ARB monotherapy and ARB + beta blocker (BB), respectively. Out of 1376 patients, 558 (40.5%) achieved the BP goal (<140/90 mmHg). Overall, 87.9% of patients were compliant with their medication regimen. No adverse drug reactions were reported in the study.

**Conclusion:** Our registry results illustrate that 40.5% of enrolled patients achieved the BP goal within 46 weeks of treatment. ARB was the commonly preferred class of drug among all stages of HTN as well as in co-morbid condition, either as monotherapy or in combination with CCB or BB.

**Disclosure:** This study was funded by Abbott HealthCare Pvt Ltd. Dr Manjuprasad authored this article in the capacity as an employee of Abbott HealthCare Pvt Ltd.

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**Subject Profile Assessment of Cases Recommended with Nutritional Supplement Containing Red Yeast Rice, Grape Seed Extract and Black Pepper Extract: A Prospective, Multicentric, Post-Marketing Study**

Sidharth Shah1, N. Rajagopal2, Bharat Shah3, Arup D Biswas4, Jagdish Hiremath4, Rajeev Bansal4, MS Manjuprasad5  
1Dr. Sidharth Shah’s Clinic, Mumbai; 2Midland Clinic, Chennai; 3Adit Medical Centre, Gujarath; 4Doctor’s Clinic, Kolkatta; 5Ruby Hall Clinic, Maharashtra; 6Bansal Clinic, Delhi; 7Abbott Healthcare Pvt. Ltd, Mumbai

**Background:** Low-density lipoprotein cholesterol (LDL-C) is a well-established risk factor for cardiovascular disease, as evidenced by epidemiological and clinical studies. However, despite the growing data emphasizing the need for early and effective LDL-C lowering, the best approach to achieve this is not clearly known.

**Objective:** This study was sought to assess the profile and general health indices of subjects prescribed with a nutritional supplement containing red yeast rice, grape seed extract and black pepper extract (NS-YGP; PreLipid®; Abbott Healthcare Pvt Ltd) in routine clinical setting in India.

**Methods:** In this prospective, post marketing observational study, consecutive subjects recommended with NS-YGP at the outpatient department were recruited from 39 sites in India. The primary outcome was to identify the profiles of subjects recommended with NS-YGP. Secondary outcome was to evaluate the changes in lipid profile from baseline to 3 and 6 months of treatment and to assess the safety profile of NS-YGP.

**Results:** A total of 527 (92%) out of 573 enrolled subjects completed the study. Majority of subjects receiving NS-YGP were men (76.6%), non-obese (85.9%) and had borderline dyslipidemia (87.3%) at the time of enrolment. A significant decline in the levels of total cholesterol (TC), LDL-C, non-high-density lipoprotein cholesterol...
(non-HDL-C) and triglycerides (TG) was evident at 3 months compared to baseline, which continued even at the end of 6 month of treatment ($p<0.0001$ each). Furthermore, HDL-C level significantly improved by 6 months compared to baseline ($p=0.0007$). A 2.5% reduction in the body mass index was evident over a period of 6 months. No adverse events were reported in the study.

**Conclusion:** NS-YGP was most commonly prescribed in patients with borderline dyslipidemia and in whom statin therapy was not tolerated. Significant improvement in lipid profile over a period of 6 months was evident with NS-YGP. NS-YGP was found to be safe and well-tolerated in the primordial prevention of borderline dyslipidemia.

**Disclosure:** This study was funded by Abbott HealthCare Pvt Ltd. Dr Manjuprasad authored this article in the capacity as an employee of Abbott HealthCare Pvt Ltd.

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### Malignant Hypertension with Third Nerve Palsy in a Young Adult

**Mary Manju George**, Balakrishnan Valliyot, Sarosh K. K., Sarin S., Khadeeja Beevi, Aswin S.

1. Junior resident, Dept of General Medicine, 2. Professor, 3. Associate Professor, 4. Assistant Professor, Department of Medicine, Academy of Medical Sciences, Pariyaram, Kannur

**Introduction:** Malignant hypertension is a rare condition in young adults and if detected need extensive work up to exclude secondary causes. Uncontrolled hypertension usually present with cardiac and renal failure or intracerebral haemorrhage or infarct. Isolated cranial nerve involvement are relatively rare manifestation of hypertension with only limited case reports. Here we report a rare case of malignant hypertension in a 28 year old male with End stage Renal Disease and intracerebral bleeding presenting as isolated third nerve palsy.

**Case report:** A 28 year old male patient who was a manual labourer presented with head ache, ptosis of right eye. On detailed clinical examination his blood pressure at the time of admission was 240/120 mmHg. He was detected to have hypertension five years back but was uncontrolled with usual medication. No history of diabetes or any cardiac manifestation in the past. Clinical examination suggested oculomotor nerve involvement with pupillary sparing.

**Investigations:** His urea was 145 and serum creatin was 9.4. Liver function test, thyroid function and other endocrinology work up for secondary hypertension was normal. USG showed features suggestive of CKD. Echo showed LVH. No evidence of any vasculitis on evaluation. CT showed left thalamic bleed and periventricular changes and the MRI changes suggestive of hypertensive changes with focal bleed in left thalamus and microbleeds in cerebral and cerebellar hemispheres. A renal MR angiogram was normal. Renal biopsy showed glomerular sclerosis.

**Treatment:** Hypertension was controlled with a combination of anti hypertensives and patient was on regular haemodialysis and ptosis improved with in two weeks of blood pressure control. Patient awaits renal transplant.

**Conclusion:** Isolated third nerve palsy occur secondary to metabolic, inflammatory or secondary to ischemic microangiopathy. But oculomotor nerve involvement secondary to microbleeds in brain as result of malignant hypertension and glomerulosclerosis is very rare. All young adult with malignant hypertension need extensive work up.

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### A Study on Risk Factors and Maternal Complications in Hypertensive Disorders of Pregnancy

**Mini C.H.**

Professor in OBG, Govt. Medical College, Kozhikode

**Introduction:** Hypertensive disorders of pregnancy (HDP) are common complications of pregnancy, affecting 10-15% of all gestations. The spectrum of disease ranges from mildly elevated blood pressures with minimal clinical significance to severe eclampsia and multi organ dysfunction. HDP are among the leading contributors of maternal mortality worldwide.

**Aims:**
- To examine the risk factors for HDP
- To study the gestational age at delivery and associated maternal complications

**Method:** Retrospective, descriptive, cohort study. Period – 1.3.2018 to 31.3.2018

Study done in Dept of OBG, Govt. Medical College, Kozhikode. Antenatal women admitted with hypertensive disorders of Pregnancy were included. Demographic profile, clinical and outcome data were collected.

**Results:** Total 110 patients. Nulliparas were 48(43.7%) and multipara 62(56.3%) - . Age - <19 yrs – 5 pts(4.5%), majority belonged to 20-29 yrs(52.7%), regarding the BMI, normal in 56.36% of patients, overweight and Obese women constituted 43.3%.

Gestational age at delivery was < 37 weeks –preterm- in 54(49.1%) women, and > 37 wks (term) in 50.9%.

**Maternal complications:** 53(48.8%) patients remained in the Gestational Hypertension group. we had 41(37.2%) patients with severe Pre eclampsia. HELLP Syndrome – 7(6.36%). There were 4 patients each with chronic hypertension and Eclampsia.

**Conclusion:** Age and parity were not seen as risk factors for HDP. Overweight and obesity were higher in this group. Fifty (47.7%) of patients had severe form of the disease.
Carotid Artery Intima-Media Thickness in Hypertensive Patients

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Introduction: Hypertension is one of the most common public health problem among developed and developing countries. Early diagnosis and proper treatment of hypertension is important to decrease the rate of mortality and morbidity caused by hypertension. Vascular wall changes are one of the most important and mortal complications of hypertension. Ultrasonography is used for the evaluation of this vessel wall disorder by assessing the thickness of the intima and media layer of carotid arteries.

Objective: The objective is to study the correlation of hypertension and its duration with carotid artery intima and media thickness.

Methods: In a case–control study, 46 patients with documented primary hypertension and 20 healthy subjects were assessed as control. Their hypertension was controlled by the administration of drugs. The mean age was 53.9 years. The intima-media thickness (IMT) of internal and common carotid and outer vessel diameter were assessed with the help of radiologist.

Results: Carotid artery intima media thickness in the case group was more than that of the controls (P < 0.05). It is found that there is no difference between the duration of having HTN and mean CAIMT in the hypertensive, except the right internal carotid (P = 0.024).

Conclusion: The present study found that the mean CAIMT of all carotid arteries in HTN was more than that of the controls. Moreover, the duration of the HTN can accelerate the atherosclerosis process in hypertensive patients.

Biochemically Negative Pheochromocytoma - 2 Case Reports

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Background: Pheochromocytoma is a tumour arising from adrenal chromaffin tissue. It account for 0.2-0.6% of hypertension cases in OPD clinic. It may prove fatal if diagnosis is missed. Biochemically negative Pheochromocytoma is very rare. Here we are presenting two cases which were negative biochemically but proven by histopathology.

Case Report:

Case 1: A 53 year old female was referred to our department when she was accidentally detected to have adrenal mass while evaluating for appendicitis. She was detected to have hypertension with BP in the range of 220/110 three years back but was on irregular treatment. There were episodes of palpitation which were not precipitated by drugs and she never had typical paroxysms. There was no cushingoid features, weakness, polyuria, excessive hair growth. On examination her BP was 170/110 in both upper limbs and 188 systolic in lower limb. Other systemic examination were normal.

Investigations: Routine hemogram and biochemistry including serum electrolytes were normal. CT Abdomen showed a soft tissue density in left adrenal gland of size 36mm×36mm×26mm. It was heterogenous and showed post contrast enhancement (90HU) with significant wash out. PAC/PRA ratio was 6ng/dl/ng/ml/hr(normal). 24 hour urine metanephrine, normetanephrine were 63.19µg/24hours and 455.8 µg/24hours respectively which was normal. Serum Testosterone and DHEAS were normal.

She underwent left adrenalectomy after preparing her like a case of Pheochromocytoma in the preoperative period and the histopathology came as Pheochromocytoma.

Case 2: A 39 year old female presented with incidentally detected adrenal mass in USG while evaluating for menorrhagia. She was a hypertensive patient on medication for past three years. There was no history suggestive of any functioning adrenal mass. MRI Abdomen- right adrenal tumour of size 3.5×3.3×3.3cm homogenous on T2, hypertensive with hypointense rim and hypointense on T1. No signal loss in oppose phase images ruling out adrenal adenoma. All investigations including PAC/PRA were normal. Urine metanephrine and normetanephrine were 146 µg/24hours and 135 µg/24hours respectively. She also underwent adrenalectomy and the mass was a Pheochromocytoma pathologically.

Conclusion: A suspicion of Pheochromocytoma should always be kept in mind while evaluating adrenal incidentaloma despite being biochemically negative as in our cases and should undergo preoperative preparation likewise.

A Case of Enalapril Induced Delayed Angioedema

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Introduction: ACE inhibitors are the most commonly used drugs in Hypertension and Cardiac Failure. Most common side effect being cough. But the rare and alarming late onset angioedema is often misdiagnosed as anaphylactic reaction, resulting in morbidity and mortality.

Case Report: Here, we report a case of 51 year old male Diabetic, Hypertensive – on Enalapril for 2 years presented with acute onset Facial puffiness and Lip oedema of 4 hours duration. No associated itching or rashes. After
coming to hospital, he had partial improvement with i.v steroids and antihistamines, but was followed by difficulty in swallowing and Hoarseness of voice within next 2 hours.

Examination revealed oedema of Uvula, Epiglottis, Arytenoids, Aryepigottic fold & False cords. He was discontinued on Enalapril dose and was asymptomatic 12 hours later.

Discussion: Angioedema caused by ACE Inhibitors generally does not respond to steroids and antihistamines. Angioedema occurring years after starting medication is uncommon but reported very rarely in literature – 1 case with3 years. Reports of same with Enalapril are much rarer, with majority attributed by Lisinopril and captopril. The unavailability of any specific test makes and prompt suspicion makes it a physician’s Challenge. Moreover, its less studied in Asian population.

Reference:

Hypertension The Silent Killer: The Prevalence of Undetected or Poorly Monitored Hypertension in Hypertensive Intracranial Bleed

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Background: Hypertensive intracranial bleed is a condition associated with high mortality and morbidity, the strongest risk factor being uncontrolled hypertension. Most of the patients with a history of unmonitored blood pressure or drug default present to ED in a moribund state with intracranial bleed and usually succumb to their illness.

Objectives: To assess the prevalence of undetected and unmonitored hypertension in patients presenting with hypertensive intracranial bleed.

Methods: This is retrospective study in which we reviewed the case sheets of all patients admitted in Department of General Medicine, Government Medical College Kozhikode with hypertensive intracranial bleed from January 2017 to December 2017. The data collected were Name, Age, Sex, history of hypertension, proper treatment and follow up, history of diabetes. Data was collected and entered in Microsoft excel and was analysed with SPSS

Results: A total of 614 cases of hypertensive intracranial bleed where analysed, the mean age was 63.44 years minimum age 25 years and maximum 100 years. The median was 65 years. Among the 614 cases 439[71.5%] were males and 175[28.5%] were females. The in hospital mortality was 216[35.2%] of which 156 were males and 60 were females. 390[63.5%] had previous history of hypertension and 224[36.5%] was previously undetected hypertensive. Among those who had hypertension previously 176[45.13%] had poor control and monitoring of hypertension and this constitutes 28.66% of total. Total cases of unmonitored and undetected hypertension comes to 400[65.15%]. There was no statistically significant difference [p value > 0.05] in mortality among those with previously undetected or unmonitored hypertension and those with regular BP monitoring.

Conclusion: Undetected and unmonitored hypertension constitutes a major risk factor for life threatening IC bleed. The prevalence of unmonitored or undetected hypertension among hypertensive IC bleed patients is 65.15%. These results emphasises the need of regular monitoring of Blood Pressure and proper control of Blood pressure.
Cerebral Venous Sinus Thrombosis: Four Cases in Young Patients

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Thrombosis of the cerebral venous sinuses can lead to a distinct cerebrovascular disorder, which unlike arterial stroke, most often affects even young adults and children. Symptoms and clinical course are highly variable, etiological factors are even more heterogeneous making cerebral cortical vein thrombosis (CVT) a unique clinical entity. The disorder can occur de novo as the first manifestation or can overlap on another existing clinical problem. In either case it is always multifactorial and is variable in each patient. Each component of the Virchow’s triad (endothelial damage, stasis and hypercoagulability of blood) may in turn have several contributory factors/causes to produce the final manifestation of CVT. These factors, which vary from patient to patient, operate together incidentally or accidentally to produce cerebral cortical vein thrombosis and therefore the patients are often not comparable. Clinical observations based on case series and sharing of such information alone are the alternative to arrive at a consensus. Because of the heterogeneity in the clinical presentation and etiology, the diagnosis of CVT is often missed, and even if a diagnosis is made the contributory factors which are often subclinical are also missed or overlooked. Most often only one of the etiological factors is prominent enough to be picked up and it is a universal practice to look for rarer causes and some inherited causes of venous thrombosis. Diagnosis is often missed unless clinicians maintain a high index of suspicion and be aware of the varied clinical presentations to be able to recognize and manage by prompt and proper application of clinical skill, rather than depending heavily on investigations alone.

Here we report a four cases of cerebral venous sinus thrombosis presented in the month of may 2018.

Introduction: Cerebral venous sinus thrombosis (CVST) is the formation of a blood clot in the dural venous sinuses, which drain the blood and cerebrospinal fluid (CSF) from the brain to the internal jugular vein.

CVST is an uncommon, life-threatening condition that needs early diagnosis and therapy. It has an extraordinarily variable clinical presentations range from headache to seizures and even coma that make it as a challenge of diagnosis and often not diagnosed clinically apresentation.

It can affect any age group even neonates with a younger age at distribution than arterial stroke. It affects females more than males, and it commonly affects the superior sagittal sinus (SSS) and/or the transverse sinuses.

Known risk factors of CVST may be either acquired such as oral contraceptive pills (OCPs), pregnancy, puerperium, and dehydration or genetic such as inherited thrombophilia.

In the first 5 days, the venous thrombus appears as moderate signal intensity (SI) in T1WIs and low SI in T2WIs but from 5th to 15th day, the venous sinus thrombus appears as high SI in both T1 and T2WIs, and it can be diagnosed easily. MR venography (MRV) will show no flow in the veins since the 1st day of thrombosis.

Magnetic resonance imaging (MRI) with MRV is the imaging modality of choice to diagnose CVST.

Anticoagulant drugs such as intravenous heparin are the main treatment of acute venous sinus thrombosis to prevent propagation of the thrombus, pulmonary embolism, and decrease the risk of death or dependency even if there is intracerebral hemorrhage (ICH).

Case Report:

1st case is a 16/F no known comorbidities presented with progressively worsening headache and vomiting of 20 days duration. She had irregular menstrual history. Pallor was present. MRI brain with MRV showed thrombosis of transverse and sigmoid sinuses. Possibility of anemia leading to reactive thrombocytosis is the probable etiology of thrombosis.

2nd case is of a 33 year old male who is a bus conductor, alcoholic presented with chest discomfort and profuse sweating. He was diagnosed with infero postero lateral wall MI. PTCA was done. 3 to 5 days later he developed severe headache not responding to analgesics. P smear showed dimorphic anemia. MRV brain showed cerebral sinus thrombosis. Chronic alcoholism leading to thrombosis was the mechanism behind thrombosis.

3rd case is 22/M with a recent history of Varicella zoster infection presented with headache worsening over one week. MRV showed cerebral venous sinus thrombosis. ANA profile showed positive P-ANCA. Etiology proposed was due to post Varicella / vasculitis.

4th case is 22/M with a recent history of Varicella zoster infection presented with headache worsening over one week. MRV showed cerebral venous sinus thrombosis. ANA profile showed positive P-ANCA. Etiology proposed was due to post Varicella / vasculitis.

Conclusion: We have four cases of cerebral venous sinus thrombosis presented to our department in one month duration, with four different etiologies. Only if a strong clinical suspicion is present this condition can be diagnosed.
Prevalence of Microalbuminuria (MAU) in Hypertension and its correlation with specific Target Organ Damage (TOD).

**Materials and Method:** This is a cross-sectional single centered study of 80 patients of hypertension visited to Rohilkhand Medical College and hospital, Bareilly from 1st June 2017 to 31st May 2018. Asymptomatic adults aged >18 years with Blood Pressure (BP) >140/90 mm Hg were included in this study. Patients were clinically examined and blood pressure was measured after 30 min of rest in quiet room with sphygmanometer (Brachial arterial pressure). Ophthalmoscopy and electrocardiogram (ECG) were done and microalbuminuria was estimated and other routine investigation were done.

**Results:** In this study MAU was present in 36.5% of patient suffering from hypertension. Mean age group of prevalence of MAU was 55.24 ± 9.80 years. Prevalence of MAU increases with age (37.68% in 31-40 years and 60.43% in >60 years). Hypertensive retinopathy was prevalent in 63.6% of patients of MAU whereas ECG changes of left ventricular hypertrophy (LVH) was prevalent in 74.68% of patients. No correlation was found between MAU and in creatinine clearance (CrCl).

**Conclusion:** MAU was present in 36.5% of patients suffering from hypertension. The prevalence of MAU increases with age and hypertension. MAU indicates the presence of early organ damage and can be considered as a sensitive indicator of vascular remodeling in hypertension. The pathogenesis of MAU in hypertension may be result of multiple factor such as atherosclerotic vascular disease, blood pressure level or alteration in its circadian patterns, and the increased activity of circulating and possibly tissue renin angiotensin system substance. Moreover, MAU estimation is cost effective and a predictive marker of target Organ Damage in hypertension. The prevalence of microalbuminuria in hypertensive remains controversial because only the results of a few prospective studies performed in small groups of hypertensive subjects without diabetes mellitus are available, hence this study is done.

**Discussion:** Determination of MAU is recommended in initial work up of subject with hypertension as suggested...
by our study moreover periodic evaluation of which is simple, inexpensive and predictive marker might be valuable and cost effective

**Conclusion:** MAU is quite prevalent (36.5%) in patient suffering from hypertension. MAU had direct correlation with left ventricular hypertrophy and hypertensive retinopathy. MAU in hypertension implicates an early therapeutic intervention modality in the course of disease.

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### Secondary Hypertension – A Case Series

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Secondary hypertension occurs in about 5-10% of hypertensive patients. Secondary hypertension should be considered in the presence of suggestive symptoms and signs, such as severe or resistant hypertension, age of onset younger than 30 years (especially before puberty), malignant or accelerated hypertension, and an acute rise in blood pressure from previously stable readings. Additionally, renovascular hypertension should be considered in patients with an increase in serum creatinine or at least 50% occurring within one week of initiating ACE inhibitor or ARB; severe hypertension and a unilateral smaller kidney or difference in kidney size greater than 1.5 cm; or recurrent flash pulmonary edema. The most common causes in children are renal parenchymal disease and coarctation of the aorta. In adults 65 years and older, atherosclerotic renal artery stenosis, renal failure, and hypothyroidism are common causes. Other underlying causes of secondary hypertension include hyperaldosteronism, obstructive sleep apnea, pheochromocytoma, Cushing syndrome, thyroid disease, coarctation of the aorta, and use of certain medications.

**Case 1**

37 yr old female presented with recurrent episodes of nausea, abdominal fullness, belching and constipation since 5 yrs.

Detected to be have PIH during second pregnancy and continued to be hypertensive since then. Hypertension not controlled with three antihypertensive medications.

O/E – Pulse -70/min, BP-170/120 mmHg BMI -20.4 Kg/m²

Per Abdomen – Gaseous distension, Bowel sounds sluggish, No renal bruit.

CVS-Heaving apex

Fundus – Grade 2 hypertensive retinopathy

Relevant investigations –Na /K-137/2.4, Urea -12, Creatinine -0.7

URE – Alb –Nil, No RBC, ECG – LVH + , U waves, Mg-2.4

Urine potassium creatinine ratio -23.5 mmol/g

TTKG -9.2, Renal Doppler – Normal

ABG – Metabolic alkalosis

Plasma aldosterone -158.74 pg/ml, Plasma renin -2.88 ng/ml

Aldosterone suppression test - Positive

**Diagnosis – Adrenal( Conn’s) adenoma**

Histopathology – Adrenal cortical tumor consistent with aldosterone secreting tumor

**Case 2**

40 yr old female presented with recurrent episodes of palpitation, sweating and headache -1yr, persistent headache since 2 weeks, Breathlessness since 1 day.

H/o weight loss +. Referred from local hospital with Acute pulmonary oedema, BP-240/110mmHg

O/E – Pulse -92/min, BP – 160 /90mmHg

Apex – Forceful

**Fundus – Hypertensive retinopathy**

No renal bruit

Investigations – RFT -21/1, Na/K -138/5, TFT – Normal

Serum catecholamines – Negative, 24 Hr urine metanephrine – Negative

24 Hr urine epinephrine -10.62(4-20), 24 Hr urine noradrenaline -1044(20-105)

USG Abdomen – Heteroechoic lesion 4.5 x 7.7 with solid and cystic areas in right suprarenal area with peripheral vascularity.
**Diagnosis – Pheochromocytoma**

**Case 3**

63 yr old female presented with fatigue of 6 months duration and burning sensation of right foot since 2 months. H/o joint pain since 4 months.

O/E - Pulse -88/min ,BP-160/100mmHg

Nervous system – Touch, pain and temp – Decreased over right big toe, EHL weak – Right big toe.

Investigations – Hb-10.6 , TC-13300 , Plt-4.44l, ESR -89 ,RBS-112 ,RFT- 23/0.8,URE- 10-15 RBC ,Alb – trace

RA factor -20 (positive),ANA – Negative

Nerve conduction study – Assymetric sensory motor axonal neuropathy involving both lower limbs (Sensory more than motor).

Nerve biopsy(Sural)-Vasculitic neuropathy

p-ANCA -3.1(Negative), c-ANCA ->100(Positive >18)

**Diagnosis – Wegners Granulomatosis**

**Case 4**


Blood pressure – R Upper limb-150/90 mmHg , Right lower limb -150 mmHg systolic , L upper limb -110/80 mmHg, Left lower limb systolic -110/80mmHg

Fundus – Left eye – Optic atrophy

Relevant investigations – Hb-12, TC -6100, Plt-2.6L, ESR-35mm 1st Hr

USG Doppler – Left Upper limb – Decreased flow with ischemic flow in left axillary artery and downwards.

MR Aortography – Long homogenous circumferential thickening of the wall of the aorta involving aortic arch, descending thoracic aorta with non contrast opacification of left common carotid artery and narrowing of origin of left subclavian artery – Possible takayasu’s arteritis Type 2 B

**Diagnosis – Takayasu’s Arteritis**
Case 5

27 yr old male presented with resistant Hypertension. Relevant investigations – S.Cortisol-30ug/dl, Low dose dexamethasone suppression test – Not suppressible, ACTH -96 pg/ml

CASE -6

43 yr old hypertension and diabetes since 3 yrs
MRI BRAIN – Pituitary Macroadenoma
Diagnosis – Cushing’s disease

Case 7
41 yr old female presented CVA – Right hemiparesis 17 yrs back, H/o recurrent pregnancy loss, Severe Pregnancy induced hypertension and Eclampsia. Multiple admissions for DVT. Fundus – Bilateral Optic atrophy
ANA – Negative, APLA – IgA-22, IgM -39, IgG-48 (<10)

Bilateral Optic atrophy
Diagnosis – Primary Antiphospholipid Antibody syndrome (APLA)
Case 8

15 yr old, presented with polyarthalgia for 6 months. She now presented with acute breathlessness and decreased urine output.

O/e – Pallor +, PR-130, RR - 60/min BP-170/110 mmHg, JVP – Grossly elevated. Chest – B/L Basal crepitations, CVS – Muffled HS, Pericardial rub present.

Hb-7, TC-10200, Plat-1.8L, ESR-100. Urea -140, S.creat-9.8, URE – Alb-2+, RBC-10-15, Ca-6.5, P-6.8, Uric acid -7.1.

S.C3 - 42, ANA by IF 2+ positive, Antids DNA – Positive, APLA –Negative. USG –B/L shrunken kidneys.

Treated with Emergency dialysis. On MHD thrice a week, low dose steroids and HCQ for joint pains. Planning Renal transplantation.

Diagnosis – SLE – Lupus Nephritis (Class-6) ESRD

Conclusion: Eventhough primary hypertension is more common, failure to recognise secondary hypertension can lead to resistant hypertension, cardiovascular and renal complications or complications of the underlying disorder. Diagnosis and treatment of secondary hypertension can lead to good clinical outcomes.

Evolution of Ischemic Stroke and Its Correlation with Ankle Brachial Pressure Index (ABPI) in a Tertiary Care Centre in Eastern India

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Background: Stroke is the second leading cause of death worldwide. In patients of ischemic stroke presence of peripheral arterial disease (PAD) increases the risk of future vascular events. Hence its prediction through ABPI if possible, then it might be an important non-invasive method in prediction and prevention of stroke.

Objectives: Calculation of ABPI in ischemic stroke patients and analysis to find out any significant correlation between ABPI and ischemic stroke.

Methods: A prospective observational study was done in 34 patients with clinical & imaging based evidence of ischemic stroke patients over 6 months at R. G. Kar Medical College, Kolkata. All patients with conditions affecting ABPI measurement were excluded. ABPI calculated by measuring SBP in ankle and brachial vessels using Doppler device. Clinical and radiological assessment were carried out & data was analysed statistically.

Results: Out of 34 ischemic stroke patients recruited, 13(38.24%) had low ABPI (<0.9) indicating PAD. Among them 8 had mild PAD(0.8-0.9) and 5 had moderate PAD(0.5-0.9). 15(44.12%) patients had normal ABPI(1.0-1.4), rest 6(17.64%) belongs to borderline ABPI(1.0-1.4). Patients with Hypertension, Diabetes Mellitus, Ischemic Heart Disease, past CVA, Dyslipidemia were more in low ABPI group. ABPI significantly correlated with Hypertension, Dyslipidemia, Systolic BP of lower limb, difference of Systolic BP in upper & lower limb at each side.

Conclusion: Hence we infer that early detection of PAD by ABPI can be potentially targeted for different treatment modalities and lifestyle modification and also reduction of mortality, morbidity in stroke patients.
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