



ORIGINAL RESEARCH PAPER

General Medicine

TO STUDY THE INCIDENCE OF HYPERTENSION IN DIABETES MELLITUS AND PATTERN OF DIABETIC COMPLICATIONS IN RURAL POPULATION

KEY WORDS: hypertension, type 2 diabetes mellitus

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ABSTRACT

INTRODUCTION: The incidence of type 2 Diabetes (T2D) is increasing globally from 2.8 % in 2000 to 4.4 % in 2030.2 The prevalence of T2D in Asians Indians ranges from 2.7 % in rural India to 14 % in urban india. India has the highest number of diabetics in the world 2.. Currently , there are limited epidemiological studies edifying the relationship between T2D and HTN in Indian context. There is an ongoing debate regarding the consideration of high blood pressure over the metabolic components as a predictor of T2D in Indians. Further , social and cultural diversity in India necessitates the exploration of the mentioned relationship in various sections of the country. Therefore we hypothesize that the risk of incidence of HTN is higher in the subjects with T2DM . The present study aims to assess the prevalence of complications in hypertensive subjects with co – existing diabetes at PESIMSR, Kuppam.

MATERIALS AND METHODS

A hospital based observational descriptive study in patients who were diagnosed as Type 2 Diabetes mellitus attending to diabetic OPD during 6 months (1.1.2017 – 1.7.2017) in PESIMSR, Kuppam were taken into the study.

Diabetic patients in the age group of 30 to 75 YEARS with both gender were included in the study, gestational diabetes, CKD on MHD and age less than 30 and more than 75years are excluded

RESULTS

Majority of the patients in our study group were 56-65 (58/120), ion which female patients outrighted male in the study population (4:3). The incidence of hypertension was found to be 79%. The maximum number of patients in the study were having uncontrolledHbA1c (87.5%). In the distribution of complications were as follows: retinopathy – 35%, neuropathy – 17.5%, nephropathy – 27.5%, diabetic foot ulcer – 10.8%. Majority of the patients (45) 37.5 % had more than 1 complication with duration of diabetes of 6 – 10 years , followed by 39 with duration of 11 – 15 years i.e 32.5 %.

CONCLUSION

The incidence of hypertension was 79%, with majority of the patients between 56 – 65 with poor glycemic control and majority of them had more than one diabetic complications. As the study population is less and single center study, we need to have a multicenter study with larger population to make a dramatic change in the identification and treatment of hypertension and diabetes.

INTRODUCTION :

The incidence of type 2 Diabetes (T2D) is increasing globally from 2.8 % in 2000 to 4.4 % in 2030.2 The prevalence of T2D in Asians Indians ranges from 2.7 % in rural India to 14 % in urban india. India has the highest number of diabetics in the world 2. The national diabetes survey reported 12.1% of diabetes and 14.1 % of impaired glucose tolerance.The prevalence varies across different studies and religious groups in Asia ; the co –occurrence of diabetes with HTN shows an increasing trend and has become an epidemic of a great concern 1, 2.About 50 % of diabetes cases in India show the co-occurrence of HTN. Hypertension in other Asian countries such as Singapore (73 %). Korea (68.7 %), Bangladesh (65 %) , Taiwan (60.4 %) , Thailand (51.5 %) and China (48.8 %). Currently , there are limited epidemiological studies edifying the relationship between T2D and HTN in Indian context. There is an ongoing debate regarding the consideration of high blood pressure over the metabolic components as a predictor of T2D in Indians. Further , social and cultural diversity in India necessitates the exploration of the mentioned relationship in various sections of the country. Therefore we hypothesize that the risk of incidence of HTN is higher in the subjects with T2DM . The present study aims to assess the prevalence of complications in hypertensive subjects with co – existing diabetes at PESIMSR, Kuppam.

METHODS AND MATERIALS :

A hospital based observational descriptive study in patients who were diagnosed as Type 2 Diabetes mellitus attending to diabetic OPD during 6 months (1.1.2017 – 1.7.2017) in PESIMSR, Kuppam were taken into the study.

Diabetic patients in the age group of 30 to 75 YEARS with both gender were included in the study, gestational diabetes, CKD on MHD and age less than 30 and more than 75years are excluded. Detailed clinical examination and baseline investigations were

performed among the selected patients (BMI, BP, HbA1c, renal function tests, urine routine, fundus examination and certain other investigations in selected patients were done.

RESULTS :

TABLE – 1 : AGE – DISTRIBUTION

AGE GROUP	NUMBER
35 – 40	03
41 – 45	14
46 – 50	13
51 – 55	21
56 – 60	34
61 – 65	24
66 – 70	06
71 – 75	05
TOTAL	120

Table – 2 Gender Distribution

GENDER	NO
MALE	52
FEMALE	68
TOTAL	120

The above table suggests Females out numbered males (F : M = 4: 3).

Table :3 BMI

BODY MASS INDEX	NUMBER
NORMAL (< 25)	52
OVER WEIGHT (26 – 30)	50
OBESE (> 30)	18
TOTAL	120

TABLE 4: DURATION OF DIABETES MELLITUS:

DURATION OF DIABETES	NUMBER
0 – 5 YEARS	14
6 – 10 YEARS	50
11 – 15 YEARS	35
16 – 20 YEARS	12
21 – 25 YEARS	05
26- 30 YEARS	02
GREATER THAN 30 YEARS	02
TOTAL	120

TABLE – 5 : INCIDENCE OF HYPERTENSION IN DIABETES MELLITUS:

DURATION OF HTN	NUMBER
0 – 5 YEARS	24
6 – 10 YEARS	36
11 – 15 YEARS	21
16 – 20 YEARS	04
21– 25 YEARS	02
26- 30 YEARS	01
GREATER THAN 30 YEARS	0
TOTAL	88

TABLE-6 : HBA1C

HBA1C	NUMBER OF PATIENTS
CONTROLLED	15 (12.5%)
UNCONTROLLED	105 (87.5%)
TOTAL	120

Majority of the patients had uncontrolled sugars (87.5%)

TABLE – 7 : RETINOPATHY

RETINOPATHY	NUMBER
PRESENT	42 (35%)
ABSENT	78 (65 %)
TOTAL	120

TABLE – 8 : FOOT ULCER

FOOT ULCER	NUMBER
PRESENT	13 (10.8%)
ABSENT	107 (89.2%)
TOTAL	120

TABLE – 9 : COMPARISON OF DURATION OF DIABETES IN RELATION

TO COMPLICATIONS :

DURATION OF DM	NO Complications	Only one complication	Two complications	Three complications	More than 3	total
0 – 5	2	9	2	2	1	16

6 – 10	14	15	13	3	0	45
11- 15	06	18	10	4	1	39
16 – 20	01	5	5	3	1	15
21 – 25	0	2	0	0	0	02
26 – 30	01	2	0	0	0	03

Majority of the patients (45) 37.5 % had more than 1 complication with duration of diabetes of 6 - 10 years , followed by 39 with duration of 11 – 15 years i.e 32.5 % .
P value for the above mentioned data is : 0.56.

DISCUSSION :

Mortality and morbidity are heightened in diabetes patients who do not achieve BP control (A target value of less than 130 / 80mm Hg). Large randomized controlled trials and meta – analyses of randomized controlled trials have shown that reducing BP pharmacologically is single – handedly the most effective way to reduce rates of death and disability in patients with diabetes , particularly associated cardiac risk factors.⁴

In an analysis of world wide data for the global burden of HTN, 20.6 % of Indian women were suffering from HTN in 2005. The rates for HTN in percentage are projected to grow up to 22.9 and 23.6 for Indian women and men, by 2025.^{4,5} Recent studies from India have shown the prevalence of HTN to be 25 % in urban and 10 % in rural people in India . According to WHO 2008 estimates , the prevalence of raised BP in Indians was 32.5%. In patients, Diabetes and hypertension are well known to co – exist . The prevalence of hypertension is 1.5 to 2 times more in those with diabetes than in those without diabetes , whereas almost one third of the patients with hypertension develop diabetes later . This co existence presents as an increased risk and can accelerate vascular complications.⁶ According to the Screening India's Twin Epidemic study , the prevalence rate of the co – occurrence of HTN and T2DM in individuals of eight states was 20.6 % with 34.7 % of T2DM and 46 % of HTN. In Karnataka , the frequency of co – occurrence of HTN and T2DM is 17.4 % . Where as HTN and T2DM occur alone at 32.1 % and 34.5 % respectively.⁷ It has been established that co – existence of T2DM and HTN accelerates the progression of metabolic abnormalities more than their independent outcomes. Hence, there is always a chance of significant variability in metabolic characteristics between individuals suffering independently with both disorders or with co – existence.^{7,8}

Mean age in the current study is 56 .86. In the study done by Venugopal et al ⁵, in the year 2014 at Vijayanagara institute of medical sciences , Bellary, Karnataka the mean age was 56.9. In the study done by Ahsana Shah et al ⁹, in the muslim population in Manipur in the year 2013 , the mean age was 53.77. In this study, females outnumbered the males .The percentage is comparable to Shankar et al study¹⁰ done in the tribal population in Tamil nadu in the year 2015. Mean BMI in the current study correlates with most of other studies particularly, Venugopal et al study.⁵ done at Vijayanagara institute of medical sciences in the year 2014. The mean HbA1c of the current study was 8.81 % indicates the poor glycemic control in the population and is comparable to other studies , mainly with Vishwanath mohan et al study. ¹². In Mohammed Salman et al study ¹³. The HbA1C in diabetic normotensive subjects was compared with HbA1c and are 7.25 and 7.45 respectively. Recently presented preliminary results from the Diabcare India 2011 study also showed mean Hba1C of 8.97, where data of more than six thousand diabetic patients from India was analysed indicating the poor glycemic control in India. The results of Hba1c study substantiate the observations of previous studies with mean Hba1c of 9.2 at the baseline.

In the present study, the incidence of hypertension was 73% among the diabetic population were as in 1988, Turner et al noted 39% of incidence of hypertension were noted in newly diagnosed T2DM patients. There is a two-fold rise of hypertension among the diabetics. The mean systolic blood pressure in the current study

was 139.4mmHg and the diastolic blood pressure was 86.7 mmHg this is similar with Danilo Ramos Haun et al study in Brazil (2010) 14. In our study we have found that nearly (35 %) of the total patients had retinopathy and hence can be used as a screening tool to predict microalbuminuria.. In a population based study in Singapore 16 the prevalence of retinopathy was more in African– Americans than the Caucasian population (7.7 % versus 4.1 %),

In a study in Italy 17 on patients with grade I and Grade II retinopathy, it was concluded that the high prevalence of retinal changes in untreated hypertensive patients shows new evidences which cannot be seen in other target organs. In a study in Taiwan 18, 4 of 6 patients were diagnosed as malignant hypertensive patients by ophthalmologists, which represent the importance of fundoscopy in management of malignant hypertension. In a study done in Singapore 16. it was evident that retinal microvascular abnormalities process is associated with high blood pressure and is independent of atherosclerosis.. In a study done by Rathendra et al 15, 3 patients developed blindness in one eye due to ischemic optic neuropathy, In the current study in 2017 at PESIMSR, Kuppam of the 120 patients analysed only 1 patient had developed blindness due to ischemic optic neuropathy which shows the critical consequences of high blood pressure complications.

Therefore , extra monitoring and attention is recommended In patients with these risk factors. In the current study Nephropathy was noted in 27.5% of the patients. The Chennai Urban Rural Epidemiological Study (CURES – Part I 2003) conducted by V. Mohan from Madras Diabetic Research Foundation covered 50,000 patients revealed that 16 % of the above the age of 20 years developed Diabetes and 23 % of the survey population had Hypertension 58. Screening and Early Evaluation of Kidney Disease (SEEK) 19. Which started in 2006, covered 21 centers with 53 community camps including rural, semi-rural , semi-urban and urban communities where Diabetes and Hypertension were the main causes of Nephropathy which is well comparable with the current Study where Diabetes and Hypertension were the common causes. In the journal published by Navneet-et al , 300 newly diagnosed T2DM taking microalbuminuria in 2 samples over 6 months period as early evience of nephropathy. He has found an incidence of 17.5 % of nephropathy and had reported Hypertension as the most important associated factor contributing to development of nephropathy.. The complications noted are : Retinopathy (35%), Nephropathy (27.5 %) and IHD (25.8 %) are the most common Complications in the current study. Majority of the patients had more than 1 complications at 6-10 years of duration of the illness. The incidence of majority of complications noticed in the current study are highly comparable with Venugopal et al study done at vijayanagara institute of medical sciences , Bellary and Kesavamoorthy et al 19 done at Saveetha medical college, Chennai (2015)

LIMITATIONS OF THE STUDY :

The number of patients selected is inadequate, multicentric approach is required.

REFERENCES :

1. The global health observation data (GHO) of raised blood pressure – Situation and trends.
2. A. Ramachandran, R.C. M.A and C. Snehalatha, Diabetes in Asia . Lancet vol 375 no: 9712, 2010, PP 408 -448.
3. The health care burden of Hypertension in Asia – Pubmed 2013 , November – 19 , Page 238 – 243.
4. Sowers JR, Zemel M. Clinical implications of hypertension in the diabetic patient . Am J Hypertens 1990; 3, 415 – 424.
5. Venugopal et al – Prevalence of T2DM and HTN – chrismed – 2014, vol-4, pg 223-227.
6. Berratho et al, cross-sectional study in Morocco (EPIDIAM Study), Hypertension and type 2 diabetes: Pan –african journal of medicine, 2012.
7. S.R. Joshi , B. Saboo, M. Vadivale, S.I. Dani, A. Mithal, U. Kaul, M. Badgandi, Site Investigators Prevalence of Diagnosed and Un-diagnosed Diabetes and Hypertension in India Results from the screening India's Twin Epidemic (SITE) study,

Diabetes technology and therapeutics vol. 14, No 1, 2012, pp 8-15.

8. Hayon Michelle Choi, 2015. Korea National Health and Nutrition Examination Survey Sex differences in hypertension prevalence and control: Analysis of the 2010-2014.
9. Ahsana – Shah et al, Prevalence of T2DM and HTN and association with risk factors among muslim population of Manipur, India
10. Shankar et al – Prevalence of HTN and T2DM in a tribal population in Tamilnadu
11. H.E. Bays , RH Chapman & S. Grandy the relationship of EMI to HTN , T2DM & Dyslipidemia, Comparison of data from two national surveys, International journal of clinical practice , 2007 , May 1 : 61 (5): 737 – 747.
12. Mohan V. et Al : current status of management of diabetics & glycemic control in India : preliminary results from the diabcare India 2011 study, diabetics 2012: 61 : A 645 – A 677 (2634-po).
13. Mohammed Salman , Shruthi Dasgupta et Al , Impact of HTN on DM in Mysore population of South India, International journal of clinical medicine 2013, 561-570.
14. Misra A, Pandey RM, Devi JR, Sharma R, Vikram NK et al (2001) high prevalence of diabetes, obesity and dyslipidemia in urban slum population in northern India. Int Journal Obesity related Metabolic disorders 25: 1722-1729.
15. Rathendra .et al – journal of hypertension , prevalence and risk factors of hypertension – retinopathy .
16. Wong TY , Klein R , Duncan BB , Nieto FJ , Klein BE , Couper DJ , et al . Racial differences in prevalence of hypertensive Retinopathy , hypertension ; 2003 ; 41: 1086-1991.
17. Cuspidic . Saleruo M, Saleruo DE , Meani S , Valerio C. Esposito A , et Al , High prevalence of Retial vascular changes in never treated essential Hypertensive , an Inter and Inter –observer Reproducibility study with Non –Mydriatic Retinograph . Blood – press 2004 ; 13 : 25.30 .18. Cheu YH , KUO HK , KAO MC . Malignant Hypertensive Retinopathy – Clinical and fundus Manifestations
19. Gowtham kesavamoorthy et al , sep 2015. A Comparative Study, Burden of Diabetes Related Complications Among Hypertensive and Non Hypertensive Diabetics. Journal of clinical and diagnostic research, 2015 sep , vol-9: LC 10-Lc 14