

- 4) 7/12 patients receiving plasmapheresis and 18/24 patients receiving IVIg made complete recovery, average time to improvement being 11 and 10 days respectively. Mortality was 5/46 related to axonopathic GBS and ventilator associated pneumonia.

## Diabetes

### 44 A Study of Prevalence of Complications in Newly Detected Diabetic Patients

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**Aim :** To study prevalence of long term complications of diabetes mellitus at the time of detection of the disease. The influence of variables like WHR, obesity, BMI, severity of hyperglycaemia on these complications will also be evaluated.

**Material and Method:** One hundred and eighty six patients with type-2 diabetes detected within 6 months were recruited into this study. All subjects underwent detailed clinical evaluation, and laboratory investigations, which included screening for micro and macrovascular complication. Microalbuminuria was estimated by micral strips (Micral II BM strips). Plasma insulin was estimated by radioimmunoassay and beta cell function and insulin resistance was calculated using the homeostasis model assessment (HOMA). All statistical analysis was done by SPSS (version 10.0) statistical analysis system.

**Results :** The mean age of the study group was  $55.98 \pm 11.15$  years (M :  $50.68 \pm 11.15$  years; F:  $48.42 \pm 8.57$  years). Of all the complications the highest prevalence was of neuropathy (47.3%). The prevalence of microalbuminuria was 34.4%, being higher in males than females ( $p < 0.05$ ). The overt proteinuria was present in 12.8% of the males and 14.5% females (the difference was statistically significant). Retinopathy was present in 28% of the patients being significantly higher in males (32.5%) than in females (20.3%). Coronary artery disease and peripheral vascular disease (PVD) were present in 14 % and 17 % of subjects respectively being -more common in males. Mostly subjects with micro and macrovascular complications were in high risk group ( $\geq 45$  years for males and  $\geq 55$  years for females). A positive family history was present in 36.21% of female and 47.86% of males. The prevalence of CAD, retinopathy and neuropathy was higher in subjects with higher WHR. The subjects with CAD and PVD had a higher BMI. Systolic pressure was more in subjects with CAD, retinopathy and neuropathy. The mean fasting blood sugar was found to have a significant positive influence on retinopathy and PVD only. The mean serum cholesterol was  $175.20 \pm 44.62$  mg/dl but statistically higher in subjects with nephropathy. The prevalence of different complications were more in subjects with triglyceride levels above 150 mg/dl, although the significant difference was found only in subjects having nephropathy ( $p < 0.05$ ). The mean serum HDL was  $37.00 \pm 8.18$  mg/dl (range 12-63 mg/dl). The prevalence of CAD and PVD was significantly higher in group having serum HDL of less than 35 mg/dl ( $p < 0.05$ ). The mean  $HbA_{1c}$  of the study group was  $8.64 \pm 1.19\%$  (range 4.1-13.5%). Those who had  $HbA_{1c}$  levels of more than 7.1% had higher complications. HOMA-R and HOMA-B did not show any statistical difference in male and female subjects with different micro and macrovascular complications, In subjects having neuropathy both insulin resistance and b cell dysfunction was found to be statistically significant as compared to subjects without neuropathy. The subjects with retinopathy had more of b cell dysfunction than subjects with normal fundus and this was statistically significant ( $p < 0.05$ ). The subjects having CAD had more of insulin resistance which was significant ( $p < 0.05$ ).

**Conclusion:** In conclusion, this study shows that increasing age predisposes the person to develop diabetes and different micro and macrovascular complication are prevalent at the time of diagnosis itself, of which neuropathy was the commonest. These complications are influenced by many factors such as age, waist circumference, WHR, BMI, systolic blood pressure, fasting blood sugar, high serum triglycerides and low HDL and  $HbA_{1c}$ . The subjects Slaving these complications had moderate insulin resistance, insulin secretory abnormality or both.

### 45 Prevalence of Coronary Artery Disease in Impaired Glucose Tolerance (IGT) and Impaired Fasting Glycaemic (IFG) Individuals

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In this cross sectional study we included 215 cases having one of the following risk factors for coronary artery disease namely hypertension, obesity  $BMI > 25$ , hyperlipidemia or family history of diabetes, know diabetics were excluded from the study. They were subjected to detailed history physical examination and ECG to detect any recent or past evidence of coronary artery disease (CAD). Fasting and 2hr post 75gm glucose blood levels were obtained. On the basis of plasma glucose cases were categorized into IGT, IFG, or Diabetic, according to recent ADA/WHO-1998, criteria.

**Results :** There were 114 (53%) normoglycemic, Impaired glucose tolerance was present in 23 (10.7%), Impaired fasting glycaemia in 14 (6.5%) and 64 (29.8%) were diabetic. Coronary artery disease was present in 26.08% of IGT cases and 35.71% IFG cases. Comparison between IGT/CAD association with IFG/CAD association by two samples 't' test was statistically significant ( $p < 0.05$ ).

**Conclusion :** (i) Impaired glucose tolerance was present in 10.7% and impaired fasting glycaemia in 6.5% of undiagnosed high risk individuals. (ii) prevalence of CAD in IFG is significantly higher than that in IGT, suggesting that IFG is an advanced state of hyperglycemia in comparison with IGT. This can be explained by the sequence of pathophysiological derangement in which gradual development of insulin resistance in muscles is followed by insulin resistance in liver which is responsible for the presence of post prandial hyperglycemia (IR in muscle) before the development of fasting hyperglycemia (IR in liver) and therefore IFG is likely to be associated with higher prevalence of coronary artery disease.

### 46 To Evaluate the Intima-Media Thickness of Common Carotid Artery in Indian Subjects with Impaired Glucose Tolerance

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**Aims and Objectives :** As impaired glucose tolerance (IGT) is regarded a risk factor for increased mortality from CAD, the present study was undertaken to evaluate the intima-media thickness (IMT) of common carotid artery (a surrogate marker for atherosclerosis) in Indian subjects with IGT. In addition factors modifying IMT such as conventional risk factors for atherosclerosis including in particular two-hour post-glucose challenge (75gm) plasma glucose would be examined as there is paucity of data regarding these.

**Material and Methods:** The present study was prospective cross-sectional study, comprising 50 IGT cases (impaired glucose tolerance) based on ADA criteria selected from amongst first degree blood relatives of known type 2 diabetes mellitus and 30 normal healthy controls (NHC). All the subjects showing IGT state in first 75 gm glucose test were subjected to second challenge to confirm the IGT state. NHC were

also screened with 75 gm glucose challenge and only if found negative, formed part of study. Both study and control groups were assessed clinically (by detailed history and examination) and subjected to following investigations: glycemic, lipid, hematological and biochemical parameters. IMT of the common carotid arteries was measured in both study and control group by high resolution B mode ultrasound. At each longitudinal projection bilaterally, three determinations of IMT were conducted at the site of maximum thickness and at two points, 1 cm up stream and 1 cm down stream from the site of maximum thickness. The six values were averaged to get the mean IMT.

**Results:** Mean carotid IMT in the IGT group  $\{0.6793 \pm 0.0541 \text{ mm}\}$  was found to be statistically significantly higher ( $p < 0.001$ ) than that of normal healthy controls  $\{0.5142 \pm 0.0371 \text{ mm}\}$ . On univariate analysis in IGT group, taking mean IMT as dependent variable age, BMI, systolic blood pressure, diastolic blood pressure, 2h post challenge plasma glucose and serum triglyceride showed statistically significant positive correlation with mean IMT. After age and sex adjustment statistically significant correlation of same variables with mean IMT persisted. Further, on multivariate linear regression analysis, the 2h post-challenge plasma glucose ( $p < 0.001$ ), systolic blood pressure, age and serum triglycerides emerged as independent risk factors for IMT in IGT subjects in decreasing order of statistical significance. By using one-way ANOVA statistical analysis with respect to quintiles of 2h post-challenge plasma glucose, mean IMT showed linear relation with 2h post-challenge plasma glucose. Further a clustering of risk factors for atherosclerosis in IGT group as a whole was observed as evident from high prevalence of hypertension (50%), smoking (26%), overweight (56%) and various types of dyslipidemia (66%) in IGT group.

**Conclusions :** The present study clearly demonstrated that the carotid IMT is significantly increased in Indian subjects with impaired glucose tolerance and that 2h post-challenge plasma glucose, besides, systolic blood pressure, age and serum triglycerides emerged as an independent risk factors with linear relationship being observed only with blood glucose levels in IGT range. Finally it may be concluded that IGT subjects constitute a high-risk group for development of early atherosclerosis as there is clustering of risk factors along with postprandial hyperglycemia in non-diabetic range.

#### 47 Crossroads for Diabetologists : Insulin Sensitizers v/s Secretagogues

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Diabetes mellitus is the commonest metabolic disorder with a alarming increase in it's worldwide incidence and by year 2025 diabetes load in India will equal that of the rest of the world. Hyperglycaemia results either from insulin resistance or defect in insulin secretion. Rosiglitazone is an insulin sensitizer and enhances insulin sensitivity in liver, adipose tissue and muscle. Gliclazide is a second generation sulphonyl urea and acts by stimulating the release of insulin from  $\beta$  cells. The present study was conducted in 100 newly detected cases of type 2 DM having FBS  $>126 \text{ mg\%}$  or casual plasma glucose  $>200 \text{ mg\%}$  on more than one occasion. The patients with DK, severe complications, CV disease, and active liver disease and pregnant and active mothers were excluded. Selected cases were divided into two age and sex matched groups. After thorough history, clinical examination and baseline investigations, 50 cases of group I were treated with Rosiglitazone at a starting dose of 4mg/day and group II cases were treated with Gliclazide 40mg/day. The dose was titrated weekly to a maximum of 12mg/day and 320mg/day respectively. Total duration of study was 12 weeks. All the cases were in the age range of 40-57yrs with M:F ratio of 2:1. In group I treated with Rosiglitazone, mean fall in FBS at the end of 12 wks was  $43.85 \pm 3.77 \text{ mg\%}$  (26.4%) from a mean starting level of  $166.05 \pm 9.26 \text{ mg/dl}$ . At

the same time glycosylated haemoglobin ( $\text{HbA}_{1\text{C}}$ ) declined from 7.6-9.25% to 6.8-8.7% corresponding to a mean change of  $0.67 \pm 0.20\%$ . Levels were estimated in all cases as well as controls. In group II cases treated with Gliclazide, mean FBS declined from  $166.87 \pm 9.61 \text{ mg/dl}$  to  $118.22 \pm 9.28 \text{ mg/dl}$  (29.15%).  $\text{HbA}_{1\text{C}}$  also declined significantly from 7.5-9.2% to 6.9-8.7%. However there was no significant difference in FBS and  $\text{HbA}_{1\text{C}}$  in both groups when compared with each other. Rosiglitazone and Gliclazide are both effective in lowering the FBS and  $\text{HbA}_{1\text{C}}$  but Gliclazide is more effective than Rosiglitazone. However, Gliclazide had hypoglycaemia in 3 cases (6%) whereas Rosiglitazone raised HDL and LDL levels.

#### 48 Clinical Profile of Autonomic Neuropathy in Diabetes Mellitus with Special Emphasis on QTc Prolongation as an Indicator of Cardiac Autonomic Neuropathy

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Diabetic neuropathy is the most common and trouble-some complication of diabetes mellitus (DM) leading to the greatest morbidity and mortality. The clinical spectrum of this neuropathic syndrome has protean manifestations including autonomic neuropathy which involves multiple systems including the cardiovascular, gastrointestinal, genitourinary, sudomotor and metabolic systems. It has been said that to know autonomic neuropathy is to know whole of medicine and involvement of autonomic nervous system (ANS) in DM can occur as early as the first year of diagnosis and therefore it is important to detect autonomic neuropathy before the advent of irreversible change occurs. 80 patients were evaluated by 5 clinical tests at G.G. Hospital, Jamnagar and following conclusions were derived. (1) Forty percent of the studied patients had cardiac autonomic neuropathy and its incidence were higher above the age of 40 years without any relation to sex. (2) 75% patients had post prandial fullness and nocturnal diarrhoea. Statistically, correlation was found to be significant ( $P < 0.005$ ). (3) 59.37% patients had postural giddiness and correlation was found to be significant ( $P < 0.001$ ). (4) Cardiac autonomic function tests viz., valsalva ratio was positive in 84% patients with cardiac autonomic neuropathy, heart rate response to deep breathing was positive in 75% and in standing 81% patients with cardiac autonomic neuropathy, blood pressure response to sustained hand grip was positive in 56.25% and to standing in 16% patients with cardiac autonomic neuropathy. (5) The above cardiac autonomic function tests were highly significant statistically ( $P < 0.001$ ). Among the 32 patients having cardiac autonomic neuropathy, 53% had definite QTc prolongation at rest and 60% had QTc prolongation after exercise. (6) The degree of QTc prolongation was positively correlated to the degree of dysautonomia (7) None of the control (25) and patients without CAN (48) had any QTc prolongation while at rest or after exercise.

#### 49 Clinical Profile of Lean Body Weight Type 2 DM Patients in Comparison with Obese and Non-obese Type 2 DM Patients

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Type 2 is the commonest and most prevalent metabolic and non communicable disorder, constitutes nearly 90% of all diabetic population. Lean body weight (LB) type 2 DM is a specific variant which has an incidence of 11-26%. We studied 75 cases of Type 2 DM [Group A : BMI  $< 18.5 \text{ kg/M}^2$  (LB type 2 DM); Gr.B: BMI  $< 25 \text{ kg/M}^2$  (but  $> 18.5$ ) (non obese) and Gr.C : BMI  $> 25 \text{ kg/M}^2$  (obese type 2 DM)] and

following cardinal conclusions were drawn : (1) Majority of patients were from 30-40 years of age in Gr. A and B (40% versus 32%) while 50-60 years in Gr. C. (2) Male to Female ratio was 3 : 2 in Gr. A (60% versus 40%). (3) There was low incidence of positive family history of Type 2 DM in Gr. A (20%) compared to Gr. B (40%) and Gr. C. (44%). (4) Most risk factors of atherosclerosis and CAD. are less prevalent in LB type 2 DM (Normal HDL; total cholesterol on lower side and TG on higher side). (5) There was an increased incidence of higher FPG ( $239 \pm 42.5$ ), PP<sub>2</sub>PG ( $294 \pm 52.6$ ) and HBA<sub>1c</sub> ( $9.15 \pm 0.9$ ) in Gr.A. (6) There was higher incidence of compromised renal status in Gr. A compared to both other groups (16% versus 4%). (7) Prevalence of diabetic retinopathy was almost similar (Gr. A - 16%, Gr. B - 8%, Gr. C - 16%). (8) Peripheral neuropathy (52%) and infections (42%) were the commonest presenting clinical features in Gr. A. (9) There was higher incidence of patients of LB Type 2 DM on insulin therapy (Gr. A - 28%, Gr. B - 12%, Gr. C - 8%) with more irregularity in treatment (Gr. A - 40%, Gr. B - 20%, Gr. C - 12%).

Thus, LB type 2 DM patients appear to be a distinct variety and a great deal of emphasis is to be given on its clinical profile and natural history. Prevalence of LB type 2 DM is much higher than any form of secondary DM or type 1 DM seen in the population and deserves special attention.

## 50 Prevalence of Impaired Fasting Glucose (IFG) and Type-2 Diabetes Mellitus (DM) among High Risk Female Population of Railways

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In view of rising trend in the prevalence of DM and associated morbidities, it is imperative to screen high risk group and the population at large. DM is an even stronger risk factor for CHD in women than in men. Railway population is a mixed population representing a mini India. The present study was undertaken to determine the prevalence of DM and IFG in high risk female population of railways and to determine to what extent prevalence rates are affected by various factors. Five hundred thirty two females (Mean age- $49.13 \pm 10.05$  yrs, Range-31-80 yrs. Majority - 45.4% - in 41-50yrs age group, Mean BMI- $24.48 \pm 5.62$  kg/m<sup>2</sup>, WHR- $0.84 \pm 0.02$ ) confirming to the criteria of high risk group were screened as per ADA criteria. Based on the FPG, the study subjects were categorized as having normal glucose tolerance (NGT), IFG or DM. Overall prevalence of IFG and DM was 12.21% and 24.43% respectively. IFG and DM was more prevalent in the age group of 41-50 yrs. Higher prevalence (33.73%) of DM was found in Telgu community and IFG (33.33% each) found in Chirstian and Keralite community. Lower prevalence (5%) was found in tribal community. DM and IFG was more prevalent in employees/ dependants belonging to group-B category. Prevalence was more (DM-27.08% Vs 24.17%, IFG-20.83% Vs 11.36%) in employees than dependants. Majority (67.69%) of females with IFG and 74.6% with DM were post-menopausal. Obesity as defined by a BMI > 25 was more commonly found in women with IFG (36.92% Vs 20.17%) and DM (51.53% Vs 20.17%) than NGT group. To conclude, higher prevalence of IFG and DM was found in screening females belonging to high risk group and the prevalence was influenced by factors such as age, social class, community, menstrual status and BMI.

## 51 Lycopene Supplementation in Losartan Treated Normotensive Type 2 Diabetes Mellitus Patients with Microalbuminuria and it's Effect on Endothelial Function Markers

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**Background :** Oxidative stress is an established cause of endothelial dysfunction in patients with type 2 diabetes mellitus (DM). Endothelial dysfunction has been identified as the key determinant of development of micro and macrovascular complications in type 2 DM, the evidence being very strong for microalbuminuria. Lycopene is the most powerful naturally occurring antioxidant. It has been demonstrated that diabetics have low serum lycopene levels which correlated inversely with coronary artery disease risk implying ongoing oxidative stress. Serum C-reactive protein and nitrite + nitrate are established markers of endothelial function. Losartan, a blocker of proinflammatory AT1 receptor improves endothelial function in type 2 DM. The aim of this study was to evaluate the additive effect, if any of lycopene supplementation in type 2 DM patients with microalbuminuria already receiving losartan.

**Material and Methods :** Fifty normotensive type 2 diabetes mellitus patients with microalbuminuria were divided into 2 age and sex matched groups of 25 each. All the subjects underwent the following baseline investigations-haemogram with ESR (to rule out chronic inflammatory states) blood sugar fasting and post prandial, HbA<sub>1c</sub>, lipid profile and markers of endothelial function - serum CRP (ELISA) and serum nitrate + nitrite by Griess reaction Serum lycopene was estimated by HPLC method. Both groups received Tab. Losartan (50mg/day). In addition 25 patients were given placebo (group 1) and 25 patients were given tab. Lycopene (2000 i.u/ day) (group2). All the parameters were repeated after 3 months of therapy. Results were analysed statistically.

**Observation and results:** Both the groups were statistically comparable at baseline with respect to haemogram with ESR, blood sugar fasting and post prandial, HbA<sub>1c</sub> and lipid profile. There was significant improvement in serum lycopene levels (before supplementation  $43.62 \pm 25.55$  ng/mL, after supplementation  $07.29 \pm 57.22$  ng/mL,  $p < 0.0001$ ). There was significant reduction in the serum CRP levels  $10.42 \pm 5.45$  to  $1.83 \pm 1.33$  mg/L ( $p < 0.01$ ) in Gr1 and  $11.82 \pm 3.9$  mg/L to  $2.07 \pm 1.75$  mg/L ( $p < 0.01$ ) in Gr2 respectively after supplementation in both groups implying improvement in endothelial dysfunction. The rise in serum nitrite + nitrate levels was  $61.68 \pm 4.5$  to  $62.8 \pm 1.9$  micromoles/dL ( $p = 0.89$ ) in Gr1 and  $49.2 \pm 12.37$  to  $72.56 \pm 16.31$  micromoles/L ( $p < 0.01$ ) in Gr2 respectively after supplementation respectively) was significant only in lycopene group showing its oxygen quenching action and nitric oxide generating capacity. Overall the improvement was more for Losartan + Lycopene group than Losartan + placebo group and the difference between the two groups was statistically significant ( $p < 0.5$ ).

**Conclusion :** There was greater improvement in endothelial function markers on addition of lycopene which was statistically significant. Hence addition of Lycopene gives added benefit in type 2 DM patients with microalbuminuria especially with respect to its nitric oxide generating capacity in Indian population.

## 52 Carotid Intima Media Thickening and Diabetic Retinopathy

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**Aim:** Association of increased carotid intima media thickness (IMT) with coronary artery disease and ischemic stroke is well established. The

present study was aimed to find correlation between the carotid IMT and diabetic retinopathy (DR).

**Material and Methods:** We evaluated 44 (32 male, 12 female) type 2 diabetics (WHO 1999 criteria). All subjects were non-smokers, normotensive and had a normal lipid profile. Of these, 15 patients had a normal fundus (Gp A), 18 had nonproliferative DR (Gp B) and 11 had proliferative DR (Gp C). Clinical, biochemical and a detailed fundus evaluation was done. IMT was measured in both carotid arteries using B mode USG.

**Results:** Mean age of onset of the disease, BMI and glycemic control were similar in all the groups, whereas, mean duration of diabetes was more in those with DR (Gp A - 35.6±45.97 months, Gp B 80.83±70.35 months, Gp C 172.54 ± 80.44 months). IMT in left internal carotid- was more in those without DR, as compared to those with DR (Gp A 0.95±0.4 mm, Gp B 0.67±0.16 mm, Gp C 0.67±0.15 mm). Mean IMT<sub>max</sub> in Gp A, Gp B and Gp C was 0.95±10.17 mm, 0.78±10.16 mm, 0.13±10.16 mm respectively. Percentage of carotid arteries with increased IMT (>0.8 mm) was 25% in Gp A, 8.33% in Gp B and 6.82% in Gp C.

**Conclusion:** IMT was significantly increased in patients with normal fundus than those with DR. It was soon that patients with increased carotid IMT are at a lower risk of developing proliferative DR.

### 53 Anthropometric and Insulin Sensitivity Correlation with Intramyocellular Lipids in Type 2 Diabetic and Healthy Asian Indian Males

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**Objective:** The aim was to analyse intramyocellular lipid (IMCL) content of the soleus muscle of healthy and type 2 diabetic Asian Indian males and to correlate it with anthropometric parameters, fasting blood glucose, lipid profile, and insulin sensitivity.

**Methods :** In this case control study, thirty-eight males (19 with type 2 diabetes and 19 healthy controls, matched for age, smoking, and alcohol intake) were evaluated with anthropometry (body mass index [BMI], percentage of body fat [% BF], waist-to-hip ratio [W-HR], and skinfolds at 4 sites) and oral glucose tolerance test for blood glucose and insulin. IMCL was measured by proton nuclear magnetic resonance spectroscopy of soleus muscle. Insulin sensitivity was calculated using homeostatic model assessment (HOMA).

**Results :** Type 2 diabetics compared had a higher mean %BF (32.3 vs. 28.5, p<0.02), % BF/BMI ratio (1.35 vs. 1.21, p<0.02), fasting serum insulin (171.7±64.1 vs 121.2±41.3, p< 0.007) and were more insulin resistant by HOMA (8.3±3.8 vs. 4.2±1.5, p<0.0002) as compared to healthy subjects. The mean IMCL content was higher in type 2 diabetics (20.3±13.5) as compared to healthy (15.2 ± 8.2), but it was statistically not significant. IMCL content correlated significantly with age (r=0.49, p<0.05), and W-HR (r=0.48, p<0.05) in healthy subjects, and BMI (r=0.76, p<0.05) and waist circumference (r=0.64, p<0.05) in diabetic subjects. No significant correlation between IMCL content and insulin sensitivity emerged in the pooled data.

**Conclusions :** IMCL content tended to be higher in type 2 diabetics as compared to control, and correlated with obesity, particularly abdominal obesity in both groups. Unlike Caucasians, however, we observed no correlation between insulin sensitivity and IMCL.

### 54 Post-prandial Hyperglycemia (PPHG) in Drug-treated, Type 2 Diabetes Under Control and its Correlation with Type of Treatment and Diabetic Complications

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**Objectives :** To estimate the correlation between type of oral hypoglycemic agent (OHA) used, PPHG and diabetic complications in controlled, type 2 diabetics.

**Research Design and Methods :** Twenty-six type 2 diabetics on OHAs, satisfying the ADA criteria of good control, were selected from the Cardio-Diabetic Clinic at SSKMH and were grouped, according to the type of OHA used - sulfonylureas (n=8), biguanides (n=6), thiazolidinediones (n=5), repaglinide(n=4), acarbose(n=3).

Defining criteria: A) Cases: those satisfying the ADA criteria of good control. B) PPHG: Venous plasma glucose >200mg/dl at 2hrs post-meal. C) Diabetic dyslipidemia: according to the ADA criteria. D) Hypertension: > 130/85mm Hg without diabetic nephropathy and > 125/75 mm Hg with diabetic nephropathy, according to the JNC VI criteria. E) Coronary artery disease: typical or atypical symptoms, or a resting ECG indicative of ischemic heart disease, with or without a positive tread-mill test (Bruce protocol). F) Cerebrovascular disease (CVD): CT scan proven cerebrovascular accident. G) Peripheral vascular disease(PVD): History of intermittent claudication, with Doppler ultrasound evidence of lower extremity artery involvement. H) Nephropathy: overt proteinuria or microalbuminuria. I) Neuropathy: Symptoms with abnormal nerve conduction velocity studies; autonomic neuropathy, in the form of resting tachycardia or postural hypotension. J) Retinopathy: Routine ophthalmoscopy, and fluorescein angiography in cases of proliferative retinopathy.

**Results:** (See table below)

Complication	PPHG	Dyslipidemia	Hypertension	CAD	CVD	PVD	Nephropathy	Neuropathy	Retinopathy
Sulfonylureas	5	7	7	7	0	1	2	1	1
Biguanides	5	5	4	5	1	0	4	0	5
Thiazolidinediones	4	4	4	4	0	0	4	3	3
Repaglinide	0	0	0	1	0	0	0	0	0
Acarbose	0	0	1	0	0	0	0	0	0
P Values	<0.01	<0.001	<0.005	<0.02	<0.5	<0.5	<0.02	<0.02	<0.005

[calculated from A<sup>2</sup>-test]\*

• p value <0.05 is significant

**Conclusions :** The p-values calculated, show that, except for PVD and CVD, all other complications are significantly reduced by those drugs that specifically target PPHG (repaglinide and acarbose). This discrepancy probably arises because, as yet, there are too few cases in these two categories, as the study is still in its infancy.

### 55 The Role of Various Hatha Yoga Exercises on the Glycemic Control and Autonomic Dysfunction in NIDDM Patients

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**Material and Methods:** The study was conducted at Himalayan Institute of Medical Sciences, Swami Rama Nagar, Dehradun. It included 100 patients suffering from NIDDM divided into two groups of SO each (Group A and B). A detailed history and thorough clinical examination

was done in each case with special emphasis on the neurological examination. Autonomic functions were evaluated and were given a score (according to the scoring system devised to quantitate the autonomic functions) Fasting and postprandial blood sugar levels were assessed in each case at the beginning of the study, in addition to other investigations as per the protocol. Group A was taught and subjected to various yoga exercises as per the protocol and were monitored on subsequent follow-up visits. Both the groups were continued to be treated by the respective consultants. At the end of one year. Fasting and post-prandial blood sugar levels and autonomic function score were again evaluated. In addition, both the groups were also evaluated for any reduction of the dosage of OHA. This reduction in the dosage was based on the mean reduction of the total tablet-units (e.g.. 5 mg glibenclamide as one tablet unit) and/ or the dose of insulin.

**Results:** The mean fasting and post-prandial blood sugar levels in group A at 0 month was 158.32 +/-8.32mg% and 213.5 +/- 9.14 mg% and at 12 months it was 114.6+/- 7.76mg% and 135.15+/-14.39mg% respectively. In group B the fasting and the post-prandial blood sugar levels at 0 months was 156.76+/- 9.56mg% and 219.11+/-8.46mg% respectively and at 12 months, it was 114.8+/-8.62 mg% and 158.60+/-14.78. The post-prandial blood sugar levels at the end of the study (12 months) was found to be statistically significant (p<0.01).

The mean reduction in the dosage of OHA was found to be 16.12% in group A.

There was no statistically significant difference in the autonomic function score in the two groups at 0 and 12 months.

#### Conclusion:

1. Yogic exercises play a beneficial role in achieving glycemic control in NIDDM patients as evidenced by blood sugar levels and the reduction of dosage of OHA.
2. It failed to show a beneficial role in reversing the autonomic dysfunction (autonomic neuropathy) over one year period.

## 56 Cross-Section Study of Newly Detected Type 2 Diabetes Mellitus

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**Aim:** To study

- The complication profile of Type 2 diabetes mellitus at diagnosis.
- Association of diabetes to obesity and family history.

**Material and Methods:** Freshly detected cases of diabetes mellitus or those with high blood sugar levels within the last 3 months exclusive of patients with secondary causes (steroids, pregnancy, Cushing's). Clinical evaluation for neuropathy, ophthalmology evaluation, FBS / PPBS/Gly Hb/FLP / chest X-ray / ECG body mass index, waist hip ratio and skin fold thickness.

Study Period : October 2002 - December 2003

Preliminary Study : 30 Patients

Mean age diagnosis	: 51.27 yrs.
Obesity	: 20% (6)
Neuropathy	: 10% (3)
Retinopathy	: 10% (3)
Male / Femal Ratio	: 18:12
Family history	: 26.7% (8)
Nephropathy	: 40% (12)
Other Complications	
Tuberculosis	: 0.67% (2)
Ketosis	: 0.67% (2)

**Results :** Our study reveals, a significant percentage of patients at diagnosis are already suffering from complications related to diabetes. 80% of the patients were admitted for complaints other than diabetes

and were incidentally detected.

Most of the patients were lean diabetics and family history of diabetes mellitus was present in 26.7% of the patients.

## 57 Tuberculin Skin Reactivity (Mantoux Test) in Diabetes Mellitus

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**Objective :** This study was conducted to screen the tuberculin skin reactivity (Mantoux test) in diabetic patients.

**Methods :** This prospective study was conducted in patients of diabetes in Department of Medicine (Endocrinology and Metabolic Clinic and Medical Unit-III). This study included total of 100 patients and 100 healthy controls. Skin reactivity in these patients was compared with that seen in normal controls. Skin reactivity was tested with 0.1 ml (5TU) PPD-S from August 2002 to January 2003.

**Results :** There were 65 females and 35 males in each group. Mean age of the cases and controls was 43.50±12.54 years and 43.50±12.54 years respectively. Mean fasting blood sugar was 164.96±58.14 in cases and 98.13±10.989 in controls (p=0.000). Mean value of skin reactivity (induration) was 7.24±4.95 mm in cases as compared to 5.11 ±4.43 mm in controls (p=0.000). Prevalence of tuberculin positivity (Mx <sup>3</sup>10 mm) in diabetics was 41 % as compared to 29% in controls (p=0.051). If cut off value was taken as 5 mm in diabetics then the percentage increased to 67% (p<0.001). The prevalence of tuberculin positivity increased with duration of disease (16% in < 5 yrs, 80% in >10 yrs, p=0.000). Tuberculin positivity increased with increase in value of HbA correlation coefficient being 0.609 (p=0.000). No correlation of blood sugar fasting / postprandial with the tuberculin reactivity was seen. Prevalence of tuberculin positivity increased with age (<40 yrs - 37.5%, <sup>3</sup>61 yrs -83.3%). however it was statistically not significant. There was no relationship of skin reactivity (induration) with sex of the patient.

**Conclusion :** There is increased prevalence of tuberculin positivity in diabetics as compared to healthy controls. This increases further when the cut off is taken as 5 mm in diabetics. It increases with duration of disease and HbA. There is no relationship between blood glucose value (fasting/postprandial) and rise in Mantoux.

## 58 Prospective Analysis of Thyroid Abnormalities in Cases of Type-II Diabetes Mellitus

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Type-I Diabetes Mellitus is well known to be associated with diseases of thyroid. The association between thyroid disorders and type-II Diabetes Mellitus (DM-II) has not been assessed clearly. We studied 184 cases of DM-II without known clinical thyroid disease for assessing the thyroid dysfunction and tried to correlate it with complications of DM-II. Out of 184 cases of DM-II, covered in a span of two and half years, 98 (53.26%) were males and 86 (46.74%) were females with a mean age of 58 years with range of 44-90 years. The duration of disease was more than 6 years in 134 (72.8%) cases. One hundred twelve cases of DM-II were having target organ damage of variable degree in form of hypertension (24.4%), coronary artery disease (28.8%), peripheral neuropathy (36.8%), nephropathy (20.6%), retinopathy (38.7%), autonomic neuropathy (14.4%). All patients were investigated for lipid profile, T<sub>3</sub>, T<sub>4</sub>, TSH, thyroid microsomal antibodies, thyroglobin antigens, ultrasound thyroid, ECG and urine for microalbuminuria. The fundus examination was done by an experienced ophthalmologist. If TSH value was found to be abnormal, then thyroid disease (TD) was labelled but if, antigen/antibody titres were disturbed without any thyroid nodule in

ultrasound, then label of autoimmune thyroiditis (AT) was given. TD was found to be present in 78 (40.4%) cases (50 males, 28 females), but AT was present in 32 (17.4%) cases (8 males, 24 females). There was positive correlation with age of patient in TD group but no correlation was found with complication of diabetes. There was no correlation of age, severity or complications in autoimmune thyroiditis group but this finding was significantly more in female cases.

## 59 Early Use of Insulin in Combination with OHA in Type 2 Diabetes

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A metanalysis of randomized control trial has shown that combining sulphonylurea and insulin therapy can improve metabolic control with significantly smaller daily doses of insulin alone and without significant change in body weight. The addition of a basal insulin supplement when sulphonylurea monotherapy fails is well established but the introduction of insulin at the much earlier stage of sulphonylurea inadequacy has not been evaluated in a long term study.

In this study 150 patients were selected, patients were divided into 3 groups. First group was put on diet + Sulphonylurea, Second group received Sulphonylurea + Bedtime insulin, Third group received insulin only. Patients were given glimepiride in morning and ultralente human insulin at bed time glycemic control, hypoglycemia and body weight were monitored at regular intervals over a period of 3 years. Better glycemic control with low fasting plasma glucose, HbA<sub>1c</sub> levels and minimal episodes of hypoglycemia were observed in patients who were on combination of sulphonylurea and human insulin. Regarding body weight, patients allocated to sulphonylurea + insulin combination or insulin alone, gained weight initially but weight was controlled later on with improvement in glycemic control.

## 60 Foot Amputation Prevention Initiative in India

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**Aim:** To determine whether intensive treatment strategies for Type 2 diabetic patients with high risk foot will help in preventing foot amputations.

**Subjects and Methods:** A total of 3000 patients with high risk foot according to Joseph Reed classification were enrolled in this project since September 2001. Among them 1026 subjects had a history of foot ulceration. Neuropathy was diagnosed as a VPT > 25 V by biothesiometer. Peripheral vascular disease (PVD) was diagnosed as ABI < 0.8. All the subjects were given intensive education regarding footcare and were examined every 3 months. Patients and families were instructed to visit the center if any sign of lesion appeared. New ulceration was defined as any ulceration at the same or different site of a previous ulcer.

**Results:** At the end of 2 years, 665 (65%) patients had come for a followup. Among them 421 (63%) patients followed the advice given while 244 (37%) patients did not follow the same. A significantly ( $\chi^2=149$ ,  $p<0.0001$ ) higher percentage (87%) of patients among those, who followed the advice exhibited healing of ulceration when compared with those who didn't follow the advice (41%). The mean duration required for achieving healing of foot ulcers was also significantly lesser for patients who followed the advice (43 days vs 90 days among those who didn't follow the advice). The number of new surgeries (29%) and new problems (12%) were significantly higher ( $p<0.0001$ ) in subjects who did not follow the advice given for proper foot care when compared with those who followed the advice (new surgery 3% and new problems

6%).

**Conclusion:** The study showed that faster healing of ulcers, lesser development of new ulcers and lesser need for new surgeries were noted in patients who followed the advice given. This goal was achieved by providing intensive instructions and education to our patients and their families. This was a preliminary report and the effect of intensive treatment on prevention of foot complications needs to be ascertained.

## 61 Insulin Resistance and Pancreatic Beta Cell Function in New Onset Type 2 Diabetes Patients

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Type 2 diabetes is a heterogeneous disorder with a combination of insulin resistance and beta cell dysfunction. It has been reported in literature of differences between insulin resistance and beta cell dysfunction in different ethnic population subgroups. The degree of these abnormalities determines the response to therapy. We investigated 34 consecutive patients of recent onset type 2 diabetes to estimate the degree of insulin resistance and beta cell function in our patients. These patients were not on any anti-diabetic treatment. The diagnosis of diabetes was confirmed by the WHO criteria. The patients were clinically evaluated. The body mass index and waist hip ratio of the patients were recorded. The secondary causes of diabetes were excluded. The patients were subjected to an oral glucose tolerance test (OGTT) with 75 gm glucose, after an overnight fast. The blood glucose plasma insulin samples were determined at fasting, 30 minutes, 60 minutes and 120 minutes. The blood glucose was determined with glucose oxidase method and plasma insulin by radioimmunoassay. The glycosylated hemoglobin was determined by high performance liquid chromatography (HPLC Biorad Diastat). The lipid profile was also done. The results were statistically analysed. The mean age of the patients was  $42.4 \pm 6.1$  years the mean duration of symptoms prior to diagnosis was 3 months. There were 26 males and 8 females. The body mass index was  $24.7 \pm 2.9$  kg/m<sup>2</sup> and the mean waist hip ratio was  $0.93 \pm 0.04$ . The initial fasting plasma glucose was  $169.1 \pm 39.4$  mg/dl and 2 hours post 75 gm glucose was  $266 \pm 85.8$  mg/dl. The fasting plasma insulin was  $11.9 \pm 7.8$   $\mu$ . The mean glycosylated hemoglobin was  $9.3 \pm 1.3$  % at diagnosis. The mean total cholesterol was  $217.12 \pm 33.8$  mg/dl, LDL beings  $147.94 \pm 25.2$  mg/dl, HDL of  $39.9 \pm 4.7$  mg/dl and triglycerides of  $178.5 \pm 53.1$  mg/dl. The insulin resistance was studied by the homeostasis model assessment (HOMA-beta and HOMA-resistance). The insulin resistance by HOMA was  $4.9 \pm 3.6$  and HOMA beta cell function was  $25.6 \pm 17.8$ . It is seen that the type 2 diabetes occurs at a lower age and our patients have much lower body mass index and A combination of insulin resistance and loss of beta cell function presents in our type 2 diabetes patients.

## 62 A Study of Prevalence of Complications in Newly Detected Diabetic Patients

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**Aim:** To study prevalence of long term complications of diabetes mellitus at the time of detection of the disease. The influence of variables like WHR, obesity, BMI, severity of hyperglycaemia on these complications will also be evaluated

**Material and Method:** One hundred and eighty six patients with type-2 diabetes detected within 6 months were recruited into this study. All subjects underwent detailed clinical evaluation, and laboratory investigations, which included screening for micro and macrovascular complication. Microalbuminuria was estimated by micral strips (Micral II BM strips). Plasma insulin was estimated by radioimmunoassay and beta

cell function and insulin resistance was calculated using the homeostasis model assessment (HOMA). All statistical analysis was done by SPSS (version 10.0) statistical analysis system.

**Results:** The mean age of the study group was  $55.98 \pm 11.15$  years {M:  $50.68 \pm 11.15$  years; F:  $48.42 \pm 8.57$  years}. Of all the complications the highest prevalence was of neuropathy (473%). The prevalence of microalbuminuria was 34.4%, being higher in males than females ( $p < 0.05$ ). The overt proteinuria was present in 12.8 % of the males and 14.5% females (the difference was statistically significant). Retinopathy was present in 28% of the patients being significantly higher in males (32.5%) than in females (20.3%). Coronary artery disease and peripheral vascular disease (PVD) were present in 14 % and 17 % of subjects respectively being more common in males. Mostly subjects with micro and macrovascular complications were in high risk group ( $\geq 45$  years for males and  $\geq 55$  years for females). A positive family history was present in 36.21% of female and 47.86% of males. The prevalence of CAD, retinopathy and neuropathy was higher in subjects with higher WHR. The subjects with CAD and PVD had a higher BMI. Systolic pressure was more in subjects with CAD, retinopathy and neuropathy. The mean fasting blood sugar was found to have a significant positive influence on retinopathy and PVD only. The mean serum cholesterol was  $175.20 \pm 44.62$  mg/dl but statistically higher in subjects with nephropathy. The prevalence of different complications were more in subjects with triglyceride levels above 150 mg/dl, although the significant difference was found only in subjects having nephropathy ( $p < 0.05$ ). The mean serum HDL was  $37.00 \pm 8.18$  mg/dl (range 12-63 mg/dl). The prevalence of CAD and PVD was significantly higher in group having serum HDL of less than 35 mg/dl ( $p < 0.05$ ). The mean HbA<sub>1c</sub> of the study group was  $8.64 \pm 1.19\%$  (range 4.1-13.5%). Those who had HbA<sub>1c</sub> levels of more than 7.1% had higher complications. HOMA-R and HOMA-B did not show any statistical difference in male and female subjects with different micro and macrovascular complications. In subjects having neuropathy both insulin resistance and b cell dysfunction was found to be statistically significant as compared to subjects without neuropathy. The subjects with retinopathy had more of b cell dysfunction than subjects with normal fundus and this was statistically significant ( $p < 0.05$ ). The subjects having CAD had more of insulin resistance which was significant ( $p < 0.05$ ).

**Conclusion:** In conclusion, this study shows that increasing age predisposes the person to develop diabetes and different micro and macrovascular complication are prevalent at the time of diagnosis itself, of which neuropathy was the commonest. These complications are influenced by many factors such as age, waist circumference, WHR, BMI, systolic blood pressure, fasting blood sugar, high serum triglycerides and low HDL and HbA<sub>1c</sub>. The subjects having these complications had moderate insulin resistance, insulin secretory abnormality or both.

## Emergency Medicine

### 63 Study of Clinical Profile of Selected Cases of Neuroleptic Malignant Syndrome in Summers of Western Rajasthan

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In the hot arid deserts of Western Rajasthan, we studied four cases of neuroleptic malignant syndrome (NMS) which is a rare life threatening complication of antipsychotic, antidepressant and mood stabilizer drugs. All these were taking drug, like olanzapine, lithium, clozapine, risperidone, amitriptyline, ziprasidone orphenadrine, in single or in combinations. In all cases symptoms evolve from few hours to 24 hours, common clinical features were hyperthermia, generalized muscular rigidity, tremors,

altered sensorium, respiratory distress, profuse diaphoresis, tachycardia, tachypnea, incontinency.

CBC, LFT, RBS, Bl, Urea, S. creatinine, Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>+</sup>, CPK (Nac), urine, complete, CSF, X-ray chest, PA, ECG, CT scan head was done in all patients. Cerebral Malaria, meningitis, ICSOL were excluded from the study. Leucocytosis, elevated SGOT, SGPT and CPK (Nac) in all cases were observed. CPK (Nac) levels range from 1500 to 9500 at the onset of disease which gradually normalize in 2 to 3 weeks. CSF and CT scan was normal in all patients.

All patients were initially treated in ICU where airway breathing and circulation was supported, IV fluids were given to correct volume depletion and hypotension. All antipsychotics, lithium and anticholinergics were immediately withdrawn. Hyperthermia was corrected by antipyretics and artificial cooling measures. Levodopa, bromocriptine and benzodiazepines were used in combinations in all patients. In one patient IV dantrolene (1mg/kg) followed by oral Dantrolene 50mg 8 hourly was given. Empirical antibiotics and subcutaneous LMW Heparin was given to decrease the risk of venous thrombosis. Complications observed were acute renal failure, chest infections, aspiration pneumonia, seizures and chronic cerebellar syndrome. Three out of four patients survived and improved after two weeks of treatment. One patient do not improved much and left hospital against medical advise after one week and was lost to follow-up. We observed increased incidence of NMS in hot summers of Western Rajasthan which need to be evaluated.

## Endocrine

### 64 Lipoprotein Abnormalities in Type-II Diabetes with Albuminuria

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**Introduction :** Mortality from cardiovascular disease is increased nine fold in NIDDM with micro-albuminuria, compared to non-diabetic population. NIDDM patients with increased albumin excretion suffer from dyslipidaemia and cardiovascular disease.

**Aim :** In the present study we have to findout serum lipid pattern in patients of type-II diabetes with and with albuminuria and their relationship with glycemic control and cardiovascular morbidity.

**Patients and Methods :** Sixty-five patients of type-II diabetes were subjected to investigations like- FPG, 2hrPGPG, HbA<sub>1c</sub>, total cholesterol, HDL-C, LDL-C, VLDL-C, TG, ECG, Micral test, urinary albumin ECG and echocardiography. The patients were divided into Gr-I (normoalbuminuric), Gr-II (microalbuminuric) and Gr-III (macroalbuminuric).

#### Results

(mg%)	Total chol,	LDL-C,	HDL-C,	VLDL-C,	TG
Gr-I	183±10	106±11	45±4	31±4	155±16
Gr-II	192±10	113±13	40±4	39±3	194±9
Gr-III	202±13	123±13	37±4	42±3	212±13

All lipid values except HDL-C are lower in group-I as compared to Gr-II and III but HDL-C was significantly higher in this group. Gr-II and III had higher incidence of ischaemia.

**Conclusion :** Dyslipidaemia was more frequent in albuminuric type-II diabetics predisposing to higher incidence of coronary artery disease.