# Platform Abstracts of Diamond APICON 2005

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# Diabetes

### 338. Post Prandial Hypertriglyceridemia, Carotid Intima Media Thickness in Type II Diabetics in Upper Assam

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Measurement of post prandial hypertriglyceridemia in diabetes is important in association with carotid intima media thickness which is a coronary risk factor. Hundred (100) patients of upper Assam were studied between 2003-2004. Age of the cases were more than 15 years with or without complications of diabetes mellitus on or off treatment. Sugar was estimated by glucose oxidase and peroxidase method and serum lipid by enzymatic colorimetric method. Carotid intima media thickness was estimated by colour ultrasonography.

Hypertriglyceridemia was found in 30% diabetic patients out of these 20% showed post prandial hypertriglyceridemia, 8% showed fasting hypertriglyceridemia and 2% showed both. Post prandial hypertriglyceridemic patients showed increased carolid intima thickness (> 0.08 mm) in 40% cases. Only 25% showed increased thickness in fasting hypertriglyceridemic patients.

This study shows that post prandial hypertriglyceridemia is associated with increased carotid intima media thickness in diabetic patients as observed in upper Assam.

### 340. Effects of Lycopene (Beta-Carotene) on Lipid Peroxidation and Glycemic Control in Normotensive Type 2 Diabetes Mellitus Patients

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Material and Methods : 20 patients of type 2 diabetes mellitus were included into the study to receive Lycopene (2000 ug twice a day) for 6 months ad 20 age/sex matched type 2 diabetes mellitus patients were included as controls. All the patients of both groups (study and control groups) were on metformin, 3 months prior to inclusion into the study and 6 months during the study. The baseline investigations including Serum TBARS, Fasting blood sugar, $HbA_1c$ and Lipid profile were done at the start of the therapy with lycopene. The above investigations were repeated after six months of the therapy.

Results : After the completion of the study we found that the serum TBARS decreased from $3.85 \pm 0.48$ µmol/L (pretreatment) to $1.24 \pm 0.61$ µmol/l (post-treatment) (p < 0.001) in lycopene treated patients (study group) and from $4.05 \pm 0.44$ µmol/L (pretreatment) to $3.24 \pm 0.61$ µmol/L (post-treatment) in the control group. The blood sugar (fasting) decreased from $130 \pm 10$ mg/dl (pretreatment) to $104 \pm 8$ mg/dl (post-treatment) (p < 0.001) in study group and from $132 \pm 9$ mg/dl to $121 \pm 8.5$ mg/dl (post-treatment) in control group. The $HbA_1c$ decreased in both the Groups, from $8.2 \pm 0.78\%$ (pretreatment) to $6.7 \pm 0.5\%$ (post-treatment) in study group (p < 0.001) and from $8.5 \pm 0.9\%$ (pretreatment) to $8.0 \pm 0.82\%$ (post-treatment) in control group. LDL levels in study group decreased from $122.73 \pm 10.70$ mg/dl (pretreatment) to $92.4 \pm 10.2$ mg/dl (post-treatment) (p < 0.001)

and in control group the LDL levels decreased from $126.2 \pm 10.56$ mg/dl (pretreatment) to $118.42 \pm 9.0$ mg/dl (post-treatment).

Conclusion : The lipid peroxidation decreased and the glycemic control was superior in lycopene treated, normotensive type 2 diabetes mellitus patients as compared to the control group.

### 343. Lycopene Supplementation in Losartan Treated Elderly Type 2 Diabetes Mellitus Patients with Microalbuminuria and It's Effect on Endothelial Function Markers

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Objective : Endothelial dysfunction has been identified, as the key determinant of development of micro and macrovascular complications in type 2 DM. Lycopene is the most powerful naturally occurring antioxidant. It has been demonstrated that diabetics have low serum lycopene levels that correlated inversely with Coronary Artery Disease risk. 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 microadlbuminuria already receiving losartan.

Methods : 50 normotensive type 2 diabetes mellitus patients who were of age > 65 years with microalbuminuria were divided into 2 age and sex matched groups of 25 each. One received placebo while the other received lycopene (2000 i.u/day). The change in the parameters for endothelial function - serum CRP (ELISA) and serum Nitrate + Nitrite by Griess reaction were observed over a three-month period and analysed statistically.

Results : There was significant improvement in serum lycopene levels (before supplementation $42.62 \pm 25.55$ ng/mL, after supplementation $108.29 \pm 57.22$ ng/mL, p < 0.0001). There was significant reduction in the serum CRP levels ($8.42 \pm 5.45$ to $1.83 \pm 1.33$ mg/L (p < 0.01) in Grl and $9.82 \pm 3.9$ mg/L to $2.07 \pm 1.75$ mg/L (p < 0.0) in Gr 2). 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 Grl and $45.2 \pm 12.37$ to $72.56 \pm 16.31$ micromoles/L (p < 0.01) in Gr2. 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 that 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.

**344.** Effects of Atorvastatin and Beta-Carotene (Lycopene) on Endothelial Function and Lipid Peroxidation in Normotensive Type 2 Diabetes Mellitus Patients with Microalbuminuria

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Material and Methods : 30 patients of type 2 diabetes mellitus were randomised to receive either Atorvastatin (a total of 15 patients) comprising Group A or Atorvastatin and Lycopene as a combination in Group B (a total of 15 patients). The lipid peroxidation was measured with the help of estimating Serum TBARS (thiobarbituric acid reactive substances) and the endothelial functions were measured by Flow Mediated Dilation (FMD) and vWF (von Willebrand Factor). The baseline parameters were done at the start of study and were repeated after 3 months of treatment in both the groups.

Results : After the completion of the study we found that the levels of Serum TBARS decreased from 3.18 ±0.79 µmol/L (pretreatment) to 2.69 ± 0.71 µmol/L (post-treatment) (p < 0.001) in Group A and from 3.60 ± 1.01 µmol/L to 1.53 ± 0.44 µmol/L (post-treatment) (p < 0.001) in Group B. The FMD increased in both the Groups, from 4.98 4.06% to 8.82 ± 3.21% increase over baseline diameter in Group A (p < 0.001) and from 3.42 ± 2.30% to 12.08 ± 4.27% increase over baseline diameter in Group B (p < 0.001). The levels of vWF (von Willebrand Factor) decreased from 163.93 ± 15.25% to 150.13 ± 14.37 (p < 0.001) in Group A and from 162.13 ± 11.38% to 138 ± 10.77% (p < 0.001) in Group B.

Conclusion : Atorvastatin decreases the lipid peroxidation and improves the endothelial functions in type 2 diabetes mellitus patients and the addition of Lycopene has an added effect in decreasing the lipid peroxidation and also in improving the endothelial functions.

**352.** Prevalence of Gestational Diabetes Mellitus (GDM) and Impaired Glucose Tolerance (IGT) in Pregnant Women with High Risk Factors for GDM

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Gastational diabetes mellitus is defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy.

Objective : 1. To study the prevalence of GDM and IGT in pregnant women with high risk factors for GDM in our antenatal clinic. 2. To analyze the various risk factors and to investigate a possible association with GAM or IGT.

Methodology : 94 pregnant women with one or more risk factors for GDM, but not known diabetics; above 16 weeks of pregnancy were included in the study after an informed consent. A detailed history and examination was done to look for all known risk factors for GDM as per a standard proforma. GDM and IGT were diagnosed as per the Carpenter and Coustan's modification of O'sullivan and Mahan's cretieria using the 100 gm 3 hours oral glucose tolerance test (OGTT).

Results : The prevalence of abnormal glucose tolerance was 18%. (7.4% GDM and 10.6% IGT) amongst the high-risk pregnant women i.e. 7 GDM and 10 IGT patients were identified. Family history of diabetes in first degree relatives was the commonest risk factor (42%) followed by obesity (BMI > 27 kg/m²) in 11.7% past bad obstetric history (9.6%) and pre-maturity (9.6%). Past history of macrosomia (8.5%), still birth (8.5%) elderly (≥ 35 years) multiparous pregnancies (8.5%) unexplained neonatal deaths (7.5%) congenital anomalies (4.3%) and past history of GDM, pregnancy induced hypertension and polyhydramnios (21.%

women each) were the other risk factors identified. On analyzing the risk factors past history of GDM was found to be the most predictive of abnormal glucose tolerance (2/2 women) followed by obesity (3/11 women), past history of macrosomia (2/8), family history of DM in first degree relatives (9/39), bad obstetric history (2/8) and prematurity (2/9) in earlier pregnancies. Out of the 94 women studied 83 had only one risk factor, 8 had two risk factors and three women had three risk factors for GDM. Glucose tolerance was abnormal in 14.5% of women with a single risk factor, 50% of women with 2 risk factors and 33.3% of women with 3 risk factors for GDM.

Conclusions : The prevalence of GDM and IGT is quite high in women with some risk factor for GDM. Family history of DM is the most common risk factor in our setting and past history of GDM is the risk factor most predictive of the occurrence of GDM or IGT. Women with multiple risk factors (> 1) are more likely to have abnormal glucose tolerance than those with a single risk factor.

**\*356.** Study of Efficacy of Ramipril and Ramipril - Losartan Combination on Microalbuminuria and Blood Pressure in Type II Diabetes Mellitus Patients

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Objective : To study the efficacy of ramipril and ramipril-losartan combination in the control of microalbuminuria and blood pressure in hypertensive type II diabetes mellitus patients with microalbuminuria.

Method : Fifty-six patients of type II diabetes mellitus with hypertension and microalbuminuria were taken and they were randomly divided into two groups with 30 patients in ramipril group and 26 patients in ramipril - losartan group. Baseline investigations and clinical profile was compared with that at the end of study duration.

Result : In our study the group 1 patients showed a fall in systolic blood pressure from 168.33 ± 12.21 to 136.47 ± 9.43 mmHg (18.91%), where as in group 2 patients showed a fall in systolic blood pressure from 169.53 ± 13.08 to 128.38 ± 9.92 mmHg (24.27%). In the group 1 patients a fall in diastolic blood pressure from 98.27 ± 6.90 to 86.47 ± 3.59 mmHg (12.00%), where as in group 2 patients showed a fall in diastolic blood pressure from 97.38 ± 6.60 to 82.00 ± 6.09 mmHg (15.79%). The patients in study group 1 showed a fall in albumin excretion from 167.97 ± 53.62 to 114.83 ± 44.87 mg/d (31.63%). The patients in study group 2 showed a fall in albumin excretion from 177.54 ± 58.28 to 105.31 ± 40.51 mg/d (40.68%). No serious side effects were seen in any of the study groups with no dropout of cases due to adverse reactions. The most common side effect reported was of dyspepsia. The other adverse effects noted were - cough, musculoskeletal pain, dyspepsia and anxiety. There was no significant change in other laboratory parameters assessed in the study.

Conclusion : We can conclude from our study that both ramipril and ramipril losartan combination are efficacious in control of elevated blood pressure and microalbuminuria but the combination has definitely higher efficacy in comparison with ramipril alone.

### 368. CRP and Its Correlation with Insulin Resistance in Healthy Adults

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Background : Inflammation has been suggested as risk factor for the development of atherosclerotic diseases. Role of various inflammatory markers (IL-6, CRP, TNF-$\alpha$, etc.) has been associated with components of Insulin Resistance Syndrome (IRS).

Objective : To assess the association of circulating levels of C-reactive protein (CRP) with insulin resistance in Healthy adults.

Methods and Results : 100 healthy adults in age group of 20-55 yrs (50 males and 50 females) underwent fasting and postprandial (2 hrs post 75 g glucose load) glucose and insulin measurements. CRP levels were measured by quantitative immunoturbidimetric method. Insulin resistance was estimated by HOMA method HOMA$_{IR}$[1]). Mean CRP level was 5.57 mg/L (SD ± 3.00, range : 0.8 - 15.4 mg/L). In this study CRP was positively correlated with fasting glucose (r = 0.241, p < 0.0001), postprandial glucose (r = 0.237, p < 0.0001), fasting insulin (r = 0.348, p < 0.0001), postprandial insulin (r = 0.429, p < 0.0001) and HOMAIR (r=0.343, p < 0.0001). Therefore CRP was significantly correlated with insulin resistance.

Conclusion : CRP is a measure of subclinical inflammation in healthy population. CRP strongly correlated with insulin resistance as measured by HOMAIR even in healthy subjects.

Reference : Matthews DR, Hosker JP, Rudenski AS, Naylor BA, Treacher DF, turner RC. Homeostatic model assessment. *Diabetologia* 1985;28:412-19.

### 378. C-Reactive Protein Levels and Their Correlation with Carotid Atherosclerosis and Lipid Profile in Type 2 Diabetic Subjects

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Introduction : Type 2 diabetes is commonly associated with accelerated atherosclerosis and dyslipidaemia. Evidence is accumulating that atherosclerosis is an inflammatory process and raised levels of CRP (an acute phase reactant) are associated with increased cardiovascular risk. In the present study correlation was sought between CRP, lipid Profile and carotid atherosclerosis, a marker of panatherosclerosis.

Methods : In this case control study, serum CRP levels were measured by latex agglutination method in 50 diabetic subjects (31 M, 19 F; mean age 55.84 ± 8.46 yrs) and 50 non-diabetic healthy controls (31M, 19F; mean age 56.16 ± 8.7). Lipid profile was done in diabetic and control subjects. Carotid Doppler studies were done using a high resolution Aloka Prosound 4000 ultrasound machine in diabetics and control subjects.

Results : Significantly raised CRP levels were seen in diabetic subjects 0.762 mgm/dl ± 0.712 mgm/dl vs 0.504 mgm/dl ± 0.019 mgm/dl. Mean lipid profile levels in diabetics vs control subject were Total Cholesterol (211.32 ± 46.6 mgm/dl) vs (186.32 ± 41.3 mgm/dl) (P = 0.0028). Serum triglycerides (159.12 ± 56.10 mgm/dl) vs (135.26 ± 15.09 mgm/dl) (P = 0.002), LDL Cholesterol (107.44 ± 24.8 mgm/dl) vs (96.94 ± 17.5 mgm/dl) (p = 0.008), HDL Cholesterol (44.06 ± 7.33 mgm/dl) vs (51.2 ± 7.04 mgm/dl) (P=1). Evidence of carotid atherosclerosis in the form of increased IMT and plaques (fibrofatty and calcified) were seen in 46% of diabetic subjects and 12% of control subjects (p HS). On multivariate analysis, significant correlation of CRP with carotid atherosclerosis and serum triglyceride levels was found.

Conclusion : The study concludes that significantly raised CRP levels are found in diabetic subjects as compared to healthy non-diabetic controls. CRP an independent risk factor may contribute in accelerated atherosclerotic disease, in diabetic subjects.

### *382. Type 2 Diabetes Mellitus in Children, Adolescents and Young Adults (CAYA-T2DM) : A Multicenter Collaborative Case-Control Study from North India

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Background and Aim : The determinants of type 2 diabetes mellitus (T2DM) in young individuals are not known in Asian Indians. We aimed to study the clinical, anthropometric and biochemical characteristics of patients with early-onset of T2DM (< 30 y) and compare them with age-matched healthy controls.

Methodology : A multicenter collaborative, case-control design. Patients with T2DM (n=52; 42 males, 10 females, age range 10-42 y) and 69 age-matched healthy controls (46 males and 23 females) were included in the study. Anthropometric measurements (body mass index (BMI)), waist circumference (WC)), waist-hip ratio (W-HR), skinfold thickness at various sites), percentage body fat (% BF) were recorded and biochemical analysis performed.

Results : The mean (SD) age of onset of T2DM was 21.4 (6.1) yrs. History of T2DM in first-degree relatives was observed to be significantly higher in cases as compared to controls (80.4% vs. 23.6%, p < 0.001). The mean values and the prevalence of abnormal values of measures of generalized obesity (BMI and %BF) and abdominal obesity (WC and W-HR) were significantly higher in cases as compared to controls. Independent predictors (OR [95%Cl]) of T2DM were hypertriglyceridemia (5.2 [1.3-20.3]), positive family history of T2DM (6.6 [2.1-20.3]) and high W-HR (7.1 [2.3-22.4]). The odds of T2DM in the presence of combination of risk factors were 10.8 times with hypertriglyceridemia and high W-HR, 36 times with hypertriglyceridemia and family history of T2DM, and 68.4 times with high W-HR and family history of T2DM. In the presence of all the three risk factors together, the odds of T2DM increased to 93.6.

Conclusion : Simple clinical, anthropometric and biochemical parameters strongly predict early - onset T2DM in Asian Indians. These would be helpful for institution of appropriate preventive measures at a young age to prevent T2DM.

### 388. Insulin Resistance / Hyperinsulinemia as An Independent Risk factor for Common Carotid Artery (CCA) Intima Media Thickness (IMT) in Essential Hypertension

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Background and Aims : The association of hyperinsulinemia and essential hypertension has been documented in several studies and furthermore there is aggregation of risk factors such as hypertension, dyslipidemia, and glucose intolerance together with insulin resistance predisposing to greater risk of coronary artery disease (CAD). However controversy exists whether hyperinsulinemia/insulin resistance per se is an independent risk factor for CCA-IMT (a surrogate marker of atherosclerosis) or it is the accompanying risk factors characteristic of insulin resistance syndrome (IRS) which contribute to atherosclerosis. So, the present study was undertaken to resolve the above issue with following aims : To examine whether hyperinsulinemia/insulin resistance

is an independent risk factor in comparison to other risk factors (hypertension, dysplipidemia, hyperglycemia) for CCA-IMT in essential hypertension.

Material and Methods : The present study was conducted in a cross sectional manner on 75 non-diabetic asymptomatic subjects with stage I and II essential hypertension (acc to JNC VI), aged 30-60 years, with BMI < 30 KG/M², with absence of history of smoking or exposure to any drug known to interfere with the IMT and thirty nonsmoker, normal healthy controls aged 30-60 years. Both study cases and normal healthy controls were evaluated for S. lipids (S.CHO, S.TG, LDL, HDL), glycaemic status (BL, Sugar F and 2 hr post 75 gm glucose, HbA1c), BMI, fasting insulin levels, 2 hour post 75 gm glucose insulin levels (by IRMA method) and other baseline biochemical investigations. In addition CCA-IMT was assessed bilaterally by using high resolution B-mode ultrasonography (by ATLHDI 500 2D ultrasound machine) and average of six readings was taken into account. Insulin resistance was assessed by HOMA IR method. The hyperinsulinemia and insulin resistance (by HOMA IR) was defined as values > mean ± 2 SD of the values derived from normal healthy controls.

Results : The mean age group of the hypertensive and study group was $46.15 \pm 8.49$ yrs and $45.33 \pm 10.09$ yrs respectively. The dysplipidemias (acc to NCEP III) and IGT state was found in 35 (49%) and 20 (26.7%) of hypertensive cases respectively. The FASTING HYPERINSULINEMIA (S. fasting insulin levels > 19.38 uIU/ML), 2 hour post 75 gm glucose hyperinsulinemia (insulin levels > 68.75 µIU/ML), and Insulin Resistance (HOMA IR values > 4.13) was found in 22.7%, 21.3% and 36% of cases respectively in subjects with essential hypertension. The mean CCA-IMT in hypertensive group and normal healthy controls was $0.58 \pm 0.08$ mm and $0.72 \pm 0.08$ mm respectively being significantly higher in hypertensive group (p = 0.000). On Univariate analysis to assess the risk correlation of conventional atherosclerotic risk factors, insulin levels (Fasting insulin, 2 hour PP insulin) and insulin resistance (by HOMA IR) with mean CCA-IMT, it showed statistically significant positive correlation of age, BMI, fasting plasma glucose 2h pp plasma glucose, HbA$_1$c, fasting insulin level, and HOMA IR an indicator of insulin resistance. However by multivariate regression analysis only three risk factors namely AGE (p = 0.000), HOMA IR indicator of insulin resistance (p = 0.010), and 2 HOUR POST 75 GM GLUCOSE PLASMA SUGAR (p = 0.040) were found to be independent and continuous risk factors for CCA-IMT.

Conclusions : In conclusion it was demonstrated that INSULIN RESISTANCE is an independent and continuous risk factor for CCA-IMT - a surrogate marker of early atherosclerosis - in subjects with essential hypertension. Thus it raises the issue of therapeutic intervention for treating insulin resistance besides treating hypertension in order to minimize the risk for atherosclerosis.

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### 393.    Clinical Profile of Diabetic Foot

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Objective : To study the clinical profile of patients with foot disease in type 2 diabetes mellitus.

60 patients of type 2 diabetes mellitus with complications were included in the study after getting their consent. Diabetics with foot complication were analyzed for any evidence of sensory neuropathy and motor neuropathy. Detailed neurological examination was done by using Semmes Weinstein 10 gm monofilament and vibratory tuning fork test. Peripheral pulses of foot were analyzed and ankle branchial index was measured for any macrovascular disease. Color Doppler of lower limb vessels was also done to confirm vascular involvement. Foot ulcers were classified according to Wegner's staging. Radiographs of foot was done for detecting osteomyelitis with ulcer greater than Grade-1.

Result : 45 (75%) patients have uncontrolled diabetes with glycosylated Hb more than 10%. 40 (66.3%) patients had evidence of neuropathy (Neuropathic ulcer) and 10 (16.6%) had vascular involvement. ABI was < 1 in 8 (13.3%) patients, color Doppler study revealed evidence of macrovascular disease in 15 (25%) patients.

10 (16.6%) patients had neuroischemic ulcer with both evidence of neuropathy and macrovascular disease.

30 (50%) patients had evidence of Grade 2-3 foot ulcer, 12 (20%) had grade-4 ulcer with abscess formation / bone involvement. 10 (16%) patients had localized gangrene (Grade-5) and 8 (13.3%) had diffuse gangrene (Grade-6).

8 (13.5%) patients underwent amputation and 20 (33%) had would debridement. 2 patients had undergone skin grafting.

Commonest microorganism isolated from ulcer was *Staph. aureus* in 10 (16.6%) patients. *E. coli* and *Pseudomonas* were isolated from 8 (13.3%) and 6 (10%) patients respectively. Gas gangrene was noted in 2 (3.3%) patients.

Septicemia was seen in 4 (6.6%) patients. 2 (3.3%) patients had evidence of osteomyelits.

Conclusions : From the result of our study it is concluded that diabetic foot is mostly due to peripheral neuropathy. Meticulous diabetic control, foot care, diabetic foot education is helpful in preventing foot complication and non-traumatic amputation.

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### 395.    Profile of Cardiac Abnormalities in Type 2 Diabetes Mellitus : Relation with Albuminuria and Hypertension

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Objectives : Study the temporal profile of cardiac (CVS) abnormalities by simple non-invasive methods in cases of Type 2 Diabetes Mellitus (T2DM) with and without hypertension (HT) and its relations with albuminunia.

Methods : A total of 100 patients were selected and divided into 2 groups (1) non-hypertensive -NHT, (2) hypertensive (HTR), and each were segregated by duration into three subgroups - A < 5 yrs, B 5-15 yrs, C > 15 yrs. Parameters studied include (1) 24 hrs urinary albumin excretion rate (UAER), (2) ECG for ischemic heart disease (IHD), left ventricular hypertrophy (LVH) and fixed R-R interval (FR), (3) echocardiography (echo) for diastolic dysfunction (DD), ejection fraction (EF) and LVH. Hypertension was defined as a resting blood pressure of > 159/89, together or singly.

Results : For NHT group-IHD, LVH and FR were significantly present in C only. Echo showed DD significantly in both B and C, LVH was absent and EF was within normal range though A > B. In HTR group, all parameters have early expression but progression with duration occurs in LVH and IHD only but it does not differ with NHT. All parameters predominate in subgroup C. FR, though expressed early in HTR, did not differ between the two groups. UAER decreases between A and B and not C, similar subgroups do not differ for the groups. EF decreases between A and B only for both groups, but nearly always stays in normal range. Echo LVH is significantly present only in B and C of HTR.

| n=100 Parameters ↓ | Subgroups ⬚→ | NHT n=49 A n=16 | B n=24 | C n=9 | HTR n=51 A n=15 | B n=17 | C n=19 |
|---|---|---|---|---|---|---|---|
| ECG | IHD% | 0 | 16.7 | 77.8 | 6.7 | 35.3 | 89.4 |
| | LVH% | 0 | 08.3 | 33.3 | 26.7 | 41.2 | 84.2 |
| | FR% | 0 | 0 | 44.4 | 0 | 23.5 | 26.3 |
| | DD% | 0 | 58.3 | 88.9 | 66.7 | 64.7 | 94.7 |
| ECHO | EF mean | 73.9 ± 1.05 | 71.4 ± 3.2 | 70.4 ± 3.4 | 72.7 ± 1.4 | 66.5 ± 10.4 | 63.3 ± 9.9 |
| | LVH% | 0 | 0 | 0 | 13.3 | 35.2 | 84.2 |
| ALBUMI-NURIA | UAER gm/day | 0.12 ± 0.09 | 0.74 ± 0.84 | 1.0 ± 1.1 | 0.14 ± 0.12 | 1.1 ± 0.77 | 1.42 ± 1.5 |

Conclusion : Initial albuminuria is not reflected in any CVS parameters. Associated HT leads to early inception of markers but progression is variable, albuminuria is unaffected. Probably we are dealing with 2 populations of patients - (1) short duration, few markers and high risk; (2) longer duration, abundant markers but low risk (subgroup C).

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## 396. Lipid Abnormalities in Insulin Resistant Type 2 Diabetes Mellitus and It's Implications

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Background and Aims : Insulin resistance (IR) is a feature of Type 2 Diabetes Mellitus (T2DM) which leads to beta cell failure. This study compares the lipid changes in IR and non IR (NIR) groups of T2DM.

Methods : A total of 50 cases of T2DM at initial detection were studied by clinical and laboratory methods. The HOMA model derived formula was used for determining IR (= [Fasting Serum Insulin (μ IU/ml) x Fasting Plasma Glucose (mmol/l)] + 22.5). A value above 1 was indicative of IR. Serum lipids studied were - total cholesterol (TC), LDL-C, HDL-C and triglyceride (TGL). ECG was done for detecting ischaemic heart disease (IHD) and left ventricular hypertrophy (LVH).

Results : There was no difference between the mean fasting and post prandial glucose, HbA$_1$C and TC between the two groups. Prevalence of IR is very high (90%). The table shows that TGL, LDL-C were significantly more while HDL-C was less in the IR group. Fasting insulin was significantly higher in the IR group. Intra group analysis indicated worsening of hyperinsulinemia with increasing dyslipidemia.

Conclusion : Dyslipidemia of the specific nature of high TGL and LDL-C, low HDL-C and raised insulin were significantly clustered in the IR group. The IR group also showed increased prevalence of IHD and LVH though they were not significant. This specific nature of dyslipidemia can be a surrogate marker for IR, and a guide for starting therapy with insulin sensitizers like metformin or glitazones from the very beginning as routine estimation of fasting serum insulin is not always feasible.

| Parameter | IR (n=45) | NIR (n=5) | P < 0.05 |
|---|---|---|---|
| TGL mg/dl | 168.5 ± 76.6 | 85.8 ± 42.3 | Yes |
| LDL-C mg/dl | 120.1 ± 28.4 | 90.6 ± 23.6 | Yes |
| HDL-C mg/dl | 44.3 ± 10.8 | 47 ± 14.4 | Yes |
| ECG-IHD | 17.7% | 0% | No |
| ECG-LVH | 8.8% | 0% | No |
| Fasting Insulin | 7.68 IU/ml | 1.76 IU/ml | Yes |

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## *400. Viral Correlation in Type I Diabetes Mellitus

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Viral infection in the causation of Type I diabetes mellitus is the one of the most interesting issue of research in recent time. Therefore the present study was undertaken to look for correlation of antiviral antibodies in patients with type I diabetes mellitus.

Methods : The study was conducted in 44 patients of Type I Diabetes mellitus and 24 age and sex matched healthy controls. Viral antibodies were estimated by Enzyme Linked Immune Sorbent Assay against Coxsackie B virus type 1 to 6, Mumps and Rubella. The patients on drugs altering blood sugar level, immunocompromised or those on immuno suppressive therapy were excluded from the study. All the demographic profile including complete haematological and biochemical parameters was studied. Pearson coefficient was used to find out the correlation between the variables.

Results : The sex distribution in the study was 18 males vs 26 females (40.1 : 59.9). The study found 17 patient (38.63%) positive for neutralizing antibodies against Coxsackie group of viruses compared to 12.5% in control. Coxsackie B2 had a positivity rate of 34.1%, while Coxsackie B4 had positivity of 4.5%. In younger age group 0-19 years commonest virus isolated was Coxsackie B2 and B4 (12.5% and 33.3% respectively). The patients diagnosed within 2 months - 1 year had higher positivity for viral antibodies upto 80%. However only Coxsackie B2 had statistically significant rate of infection with p < 0.05. In our study Rubella IgG antibody titre were positive in 41 patients and all controls, we found 2 patients to be positive for Mumps antibodies with overall positivity of 4.54%.

Conclusion : This study shows that Coxsackie B virus may have an important role in the etiopathogenesis of type I diabetes mellitus.

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## 401. To Study The Role of Bone Scintigraphy for Early Detection of Osteomyelitis in Patients with Diabetic Foot

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Background : Diabetic foot is one of the most debilitating and sometimes devastating sequelae of DM and amputation is the most dreaded outcome. In diabetic foot patients, osteomyelitis is often associated and if diagnosis is delayed then it leads to amputation. Triphasic bone scan is an important diagnostic modality to detect early osteomyelitis.

Aims : Early detection of osteomyelitis by using bone scintigraphy in diabetic foot patients.

Methods : Twenty-four patients having diabetic foot were included and malignant ulcers, fracture, orthopedic surgery in past two months, and necrosis and x-ray evidence of osteomyelitis excluded from the study. Triphasic bone scan was done to diagnose osteomyelitis.

Results : Mean age of the patients in this study was 49.83 ± 9.29 years. Mean duration of ulcer was 39.09 days ± 44.80 days. Major risk factor in this study were poor metabolic control (83.3%) with mean Hb$_1$c level 9.62 ± 1.40, smoking (33.3%), neuropathy (100%), peripheral vascular disease (83.3%), hypertension (79.2%), and nephropathy (62.8%), Out of 24 patients, 66.7% patients had grade II ulcer, 25% grade III and 8.3% grade I ulcer (according to Wagner's classification). Bone scan was positive in twenty patients (83.3%), negative in three patients (12.7%). In one patient

bone scan could not able to visualize the lower limb because patient had congestive heart failure.

Conclusions : In diabetic foot patients, for early diagnoses of osteomyelitis triphasic bone scan is an important modality particularly in those patients who are lacking x-ray evidence of osteomyelitis.

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### 406. Estimation of Fasting Serum Insulin Levels and Insulin Resistance Index in Hypertensive Subjects

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Introduction : Up to 50% patients of systemic hypertension are estimated to have insulin resistance in various studies. Insulin resistance is an impaired response to our own body's insulin so that active muscle cells cannot take up glucose as easily as they should, leading to chronically higher blood insulin levels. Increased serum insulin levels are also associated with dyslipidaemias, obesity, glucose intolerance, hyperuricemia, and increased risk of cardiovascular morbidity in these individuals (Syndrome X). This study was undertaken to estimate the level of insulin resistance in Indian hypertensive subjects attending the hypertension clinic.

Methods : In this case control study, fasting serum insulin levels were estimated by fully automated radio immunoassay system in 50 hypertensive subjects (27M, 18F; mean age 28.26 ± 9.29 yrs) and 24 non-hypertensive - healthy controls (14 M, 11F; mean age 37.76 7.67). Insulin resistance Index (IRI) a marker of insulin resistance was calculated using the HOMA IR (Homeostasis Model Assessment), where IRI = Fasting glucose x fasting insulin / 22.5.

Results : The mean duration of hypertension was 3.7 ± 2.4 years in the study subjects. Mean fasting blood sugar level in hypertensive subject was 82.76 ± 12.45 vs 72.68 ± 10.64 mgm% in control subjects (p=0.23). Mean serum insulin levels in hypertensive subjects was 17.29 ± 8.95 µIU/ml (range .2 µIU/ml - 41.95 µIU/ml) vs 9.68 ± 5.1 µIU/ml (range 2 µIU/ml - 26.2 µIU/ml) in controls (p = .016). 16 (32%) of hypertensive subjects showed serum insulin above the normal range (mean ± 2SD). Mean IRI in hypertensive subjects was 4.51 vs 1.70 in controls (p = 0.06). 26 (52%) of hypertensive subjects showed insulin Resistance Index above the normal range (mean ± 2SD).

Conclusion : The study concludes that significant number of hypertensive subjects demonstrate insulin resistance, which may account for higher cardiovascular morbidity and mortality in these subjects.

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### 415. Evaluation of Postprandial Hypertriglyceridemia with Carotid Intima Media Thickness in Type 2 Diabetes Mellitus

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Aims and Objectives of the Study : 1. Estimation of fasting and postprandial triglyceride levels in patients with type 2 diabetic mellitus. 2. Estimation of carotid intima media thickness by Doppler ultrasonography. 3. To correlate postprandial triglyceride levels and carotid intima media thickness with other risk factors in these subjects.

Material and Methods : This is a comparative study which comprises of 50 patients of age between 35-75 years with type 2 diabetes mellitus of more than one year duration without evidence of ischaemic heart disease (IHD), cerebrovascular disease (CVD) and peripheral vascular disease (PVD). The patients of NIDDM > 1 year duration were included in the study. Carotid artery Doppler was done by B-mode ultrasound. Patients with duration

of diabetes less than 1 year and patients with IHD, cerebrovascular disease and PVD were excluded from the study.

Results : There is a significant association between the duration of diabetes, carotid IMT and postprandial triglyceride level. As the duration of diabetes increases there is also a significant rise in carotid IMT and postprandial triglycerides. For duration < 5 yrs the mean CIMT was 1.084 ± 0.52 mm and for duration > 10 yrs the mean CIMT was 1.66 ± 0.71 mm, (P < 0.01) and for duration < 5 yrs the mean pPTG was 174.12 ± 62.82 and for duration > 10 yrs the mean pPTG was 275.57 ± 0.83 (p < 0.05).

There is no significant association between body mass index, hypertension, smoking, total cholesterol, HDL and LDL cholesterol with carotid IMT and postprandial triglyceride level. In conclusion our chief observation in the present study was that elevated fasting triglyceride level was significantly correlated with carotid IMT (P < 0.01) but even much more higher correlation was found in this study between elevated postprandial triglyceride level and carotid IMT (P < 0.001).

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### 418. Serum Triglycerides as a Marker of Insulin Resistance in Non-Diabetic Urban Indians

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Aim : The purpose of the study was to identify a proxy measure for insulin resistance, from the routinely measured components of the metabolic syndrome.

Methods : A cohort of normoglycaemic subjects (NGT) from a diabetic survey who had measurements of anthropometry, fasting lipid parameters and plasma insulin were selected. Fasting and 2h plasma glucose, fasting serum total cholesterol (TC). HDL-Cholesterol (HDL-C), Triglycerides (TG) and plasma insulin were estimated. HOMA insulin resistance (IR) was calculated.

Results : Insulin resistance (HOMA-IR ≥ 4.1) was present in 37 (20.7%). The group with insulin resistance had significantly higher values for total cholesterol and TG and higher waist circumference. IR showed significant correlation with BMI (r = 0.18, p = 0.009), waist (r=0.163, p = 0.015), TC (r=0.18, p=0.008) and TG (r=0.18, p = 0.007). Only TG showed a significant independent association with HOMA-IR (β=0.004, SEβ = 0.0017, p = 0.015). Using the ROC procedure, a TG concentration of ≥ 150 mg/dl had 62.2% sensitivity and 66.2% specificity to diagnose IR.

Conclusions : In view of the fact that hypertriglyceridaemia and IR are common and are often associated in Asian Indians, it is concluded that fasting TG concentration may be considered as a proxy measure of IR.

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### 419. Evaluation of Anthropometric, Hypertensive, Glycemic Lipid and Insulin Profiles with Special Reference to Intima Media Thickness in Elderly 1st Degree Relatives of Type 2 Diabetes Mellitus in Indian Subjects

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Objective : To assess the anthropometric, glycemic, lipid and insulin profiles with special reference to intima media thickness in elderly 1st degree relatives of type 2 diabetes mellitus; To correlate CCA-IMT with all the above parameters.

Material and Methods : The present study was a cross sectional study comprising 60 elderly 1st degree relatives of type 2 diabetes and 40 normal healthy controls without family history of diabetes mellitus with equal number of males and females in each group.

For the study group inclusion criteria were; Age > 55 years of both sex; 1st degree, relative of type 2 diabetes mellitus and exclusion criteria were; known diabetes mellitus and smokers; Morbid and severe obesity (BMI > 35 kg/m²); Subject on drugs such as hormonal replacement therapy, steroids or antilipid agents; Both groups were clinically evaluated and subjected to routine biochemical investigations including fasting blood sugar and 2 hour post 75 gm glucose blood sugar. And a repeat glucose challenge test was done in asymptomatic subjects with deranged values. In addition fasting and 2 hour post 75 mg glucose blood insulin levels by immunoradiometric assay and lipid profile (total cholesterol, LDL, HDL and triglycerides) were done using kits supplied by Redox. CCA-IMT of both sides was determined by high resolution B-mode ultrasonography (ATL-HDL 5000) and average of 6 reading was taken.

Results : The mean age and gender break up of study and control groups were similar, (study 62.95 ± 6.72 years; control 63.15 ± 6.60) years with equal number of male to female ratio in both groups. The following findings were observed in 60 study subjects: obesity - 12 (23%); hypertension - 27 (45%) including isolated systolic hypertension - 16 (27%); dyslipidemia - 50 (69%); type 2 diabetes mellitus - 34 (57%) including isolated post challenge hyperglycemia (fasting < 126 mg/dl and post prandial

≥ 200 mg/dl) 8 (13%), fasting hyperinsulinemia (> 2SD of mean of NHC i.e. 34.38 µu/ml) - 23 (38.5%); postprandial hyperinsulinemia (> 2 SD of mean of NHC i.e. 79.10 µu/ml) - 18 (23.5%); metabolic syndrome 15 (25%); mean IMT in study 0.8033 mm and in control of 0.7055 mm. There was no statistically significant gender difference in the risk factor profile including the IMT. Pearson's correlation of these factors to IMT showed positive co-relation with age (P = .007), systolic BP (P = .027), Fasting plasma glucose (P = .014), postprandial glucose (P = < .001), $HbA_1c$ (P = .002), HDL (P = 005), insulin postprandial (P = < .0001), and on further stepwise multivariate analysis only three parameters; age (P = .008); PP plasma glucose (P < .0001) and PP insulin (P = < .0001) showed independent association with CCA-IMT and these parameters when analysed with respect to quintiles of CCA-IMT showed a continuous relationship.

Conclusion : The present study clearly demonstrate that a significant proportion of 1st degree elderly relative of types 2 Diabetes exhibit an atherogenic risk profile including the presence of hyperinsulemia/metabolic syndrome and increased IMT, with absence of any gender based difference. Amongst the various risk factors contributing to increased IMT; age 2-hour post glucose blood sugar and 2 hour post glucose insulin emerged as independent and continuous variables.

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