

DIABETES AND ITS COMPLICATIONS COMPLICATIONS (GENERAL)

Is Hyperinsulinaemia a central characteristic of a chronic cardiovascular risk factor clustering syndrome: mixed findings in Asin Indian, Creole and Chinese Mauritians

Zimmet PZ, Collins VR, Dowse GK, Alberti KGMM, Toumilehto J, Knight LT, Gareeboo H, Chitson P, Fareed D. *Diabetic Medicine* 1994; 11 : 388-90.

The aim of the study was to investigate whether the constellation of cardiovascular disease risk factors, described as Insulin Resistance Syndrome, exists in the multi-ethnic population of Mauritius and to assess whether hyperinsulinaemia is the key feature of this syndrome. A sample of 5080 Mauritian subjects (aged 25 - 74 years) was examined in a non communicable disease survey in 1987. Survey procedure included an oral glucose tolerance test and anthropometric, blood pressure, plasma lipids and serum insulin measurements. Abnormal glucose tolerance (diabetes and impaired glucose tolerance), general obesity, upper body obesity, hypertension, low HDL-cholesterol and hypertriglyceridaemia were defined as risk factor conditions. Mean values for a series of risk factor variables were compared between reference subjects (no risk factors) and those with a risk factor condition (either one condition only or in combination with one or more others). Prevalence estimates for each risk factor condition in combination with three or more other conditions were three to four times greater than expected by chance and levels of risk factors for subjects with more than one risk factor condition were further away from the reference levels than for those with just one condition. Fasting and 2-hour serum insulin levels were elevated for each condition when in combination with others or to a lesser extent when isolated. However, this was not the case for isolated hypertension where insulin levels were not elevated. When adjusted for age, sex and body mass index, insulin levels were only significantly elevated in subjects with upper body obesity if in association with general obesity. A clustering of cardiovascular risk factors was therefore found in Mauritius. However, insulin levels although high for most conditions, were not high in hypertension.

The use of a point based protocol for evaluating risk for the development of foot problems: A four year prospective study

Sadikot SM, Sathe SR, Bhakta VP. *Journal of Diabetic Association of India* 1993; 33 : 27-31.

We utilised a point based protocol devised by one of us (Sadikot SM) to judge the propensity of diabetic patients to get foot problems. The protocol allows categorisation of patients into five categories (A to E) with rising risk for foot disorders. All patients received the basic foot care education, but patients with a relatively high risk (C,D,E) received a more intensive foot care regimen and frequent follow-ups with special emphasis on prevention and early diagnosis and intensive management. 64 patients have been followed up regularly for four years. The percentage of patients in each risk category who developed a foot problem during this time is : A: 1/10 (10%); B: 2/14 (14.2%); C: 3/13 (23%); D: 5/16 (31.3%) and E 4/11 (36.3%). Thirty seven initial patients lost to the rigid follow-ups were seen at intervals varying from 1-4 years from the first evaluation. Their original category and the percentage of patients in each category who had developed foot problems in the interim were: A: 1/7 (14.3%); B: 3/9 (33.3%); C: 2/6

(33.3%); D: 4/9 (44.4%); E: 3/6 (50%). The morbidity and sequelae in the affected patients in the first group was considerably lower than in the second group. Although the number of patients is still small, we feel that our point based protocol can be of help in pinpointing high risk patients thereby reducing the incidence as well as the morbidity and sequelae associated with diabetic foot problems.

Complications of patterns of fibro-calculeous pancreatic diabetes (FCPD) vis-a-vis those of other diabetic subsets

Kunda PK, Mukhopadhyay J. *Journal of Diabetic Association of India* 1994; 34: 24-6.

Fibrocalculeous pancreatic diabetes (FCPD) though reported elsewhere was not documented in West Bengal till our reports. Detailed studies on complication patterns of FCPD vis-a-vis other diabetic subtypes are scanty creating incentive for the present work. Prevalence of complications in FCPD was previously considered to be low as in other secondary forms of diabetes, but now this prevalence is considered to be comparable to the primary forms. However, complication patterns of the primary forms vary in that microvascular complications are more common in Type 1 while macrovascular ones are more common in Type 2. In this present study, we tried to compare the complication patterns of FCPD to those of Type 1 and Type 2 diabetes. Clinical assessment was supplemented with detailed investigations to detect early subclinical complications.

Metabolic and Clinical characteristics of South Asians and Europeans in Coventry

Simmons D, Powell MJ. *Diabetic Medicine* 1993; 10: 751-8.

A house to house survey in Foleshill, Coventry, compared risk factors for Type 2 diabetes and ischaemic heart disease (IHD) among adult United Kingdom Europeans (n=5508, 64% screened) and South Asians (n=4395, 84% screened). Those with a high glucose and a randomized 10% of others had a glucose tolerance test while those with previously diagnosed diabetes (104 Europeans, 223 South Asians) were re-interviewed in more detail. By the age of 29 years, South Asians had higher 2-hour glucose (5.4 ± 1.0 vs 4.84 ± 1.2 mmol l⁻¹, $P < 0.005$) and insulin (45.6 vs 23.8 mU l⁻¹, $P < 0.001$) concentrations and in males, a higher cholesterol concentration (5.1 ± 0.9 vs 4.6 ± 1.2 mmol l⁻¹, $P < 0.05$). South Asians with known Type 2 diabetes had an earlier age at diagnosis (48 ± 11 vs 57 ± 14 years $P < 0.001$), lower body mass index in the past (29.0 ± 4.8 vs 32.1 ± 6.9 kg m⁻², $P < 0.001$) and currently (27.1 ± 3.7 vs 29.1 ± 6.4 kg m⁻², $P < 0.001$), were more likely to present with acute symptoms were less likely to attend the hospital clinic (14% vs 31% $P < 0.001$) and were less likely to be treated with diet alone (14% vs 21%) or with insulin (9% vs 16%) than Europeans. Glycaemic control was similar in the two ethnic groups. These findings suggest an earlier onset of the disease processes involved in diabetes in South Asians. Important ethnic differences in patterns of care exist that make clinical comparisons difficult.

Ethnic differences in risk markers for heart disease in Bradford and Implications for preventive strategies

Knight T, Smith Z, Lockton JA, Bedford A, Toop M, Kemohan E, Baker MR. *Journal of Epidemiology of Community Health* 1993; 47 : 89-5.

To assess and compare the prevalence of established risk mark

* *Complication of abstracts of original articles on complications in diabetes in Indians, in India or abroad. Only articles after 1990 are included. This compilation has been done by Dr. V. Mohan.*

ers for ischaemic heart disease in a sample of Asian and non Asian men and to relate these observations to preventive strategies.

Setting: Two factories in the textile industry in Bradford, West Yorkshire, UK.

Subjects: 288 male manual workers aged 20 to 65 years.

Design: Cross sectional study within one occupational/social class stratum.

Measurements and main results: Age, body mass index, plasma lipids, fibrinogen and serum insulin values, blood pressure, smoking habits, alcohol consumption and exercise routines were recorded. Plasma total cholesterol concentrations were significantly lower in Asian than non-Asian men (5.3 mmol/L vs 5.8 mmol/L respectively, $P < 0.0001$), as were low density lipoprotein cholesterol concentrations (3.4 mmol/L vs 3.7 mmol/L, $P = 0.0150$) and high density lipoprotein (HDL) cholesterol (1.1 mmol/L vs 1.3 mmol/L, $P < 0.0001$). Hypercholesterolaemia (concentration > 6.5 mM) was present in nearly one quarter of non-Asians but less than one eighth of Asian men. Triglyceride values were not significantly higher in Asians. Smoking rates were high in non-Asians (43.8%) and only slightly lower in Asians (39.1%). Asian smokers smoked fewer cigarettes per day on average (0.3 vs 16.1 $P = 0.0001$). Almost a quarter of non-Asian men (23.1%) and 26.6% of Asian men had raised blood pressure. Systolic pressures were higher in non-Asian men (138.3 mm Hg vs 133.0 mm Hg, $P = 0.0070$), but diastolic pressures showed no ethnic differences. Diabetes was more prevalent in Asian men (10.9% vs 4.4% $P < 0.05$), who also showed higher insulin concentrations after glucose loading (22.3 mU/L vs 10.2 mU/L $P < 0.0001$). Plasma fibrinogen values were higher in non-Asian men (2.9 g/L vs 2.6 g/L, $P < 0.0001$) and these were associated with smoking. Nearly all non-Asians (92.5%) consumed alcohol at some time whereas 62.5% of Asians habitually abstained from alcohol consumption. Among the drinkers, non-Asian men consumed on average, 23.9 units per week and Asian men 18.4 units per week ($P = 0.083$). The mean body mass index for Asian men was 24.5 kg/m². The frequency of exercise in leisure time was low in both groups with 44.4% of non-Asian and 21.1% of Asian men taking moderate exercise weekly, and even fewer, regular strenuous exercise (16.3% and 8.6% respectively).

NEUROPATHY

Detection of autonomic nervous dysfunction by SL Manouvere

Ali G, Kamili MA, Rashid S, Shah MY, Jan I, Allaqaband GQ. *Journal of Association of Physicians of India* 1993; 41 : 567-8.

We have evaluated the immediate heart rate response to standing and lying in 100 diabetic subjects aged 43 + 10 years who underwent five other cardiovascular autonomic tests. Using a specially devised scoring system the patients were divided into three groups: a) Fifty-eight subjects without autonomic neuropathy b) 15 borderline c) 27 with autonomic neuropathy. The results were compared with 50 sex and age matched controls. We studied SL1 = ratio between R-R mean before lying and R-R maximum between the 20th to 25th beat and R-R minimum over the first 5 beats after lying. In controls SL was 1.35 + 0.18 and SL2 was 1.52

+ 0.23. In diabetic subjects without autonomic neuropathy SL1 was 1.04 + 0.002 ($P < 0.0001$) and SL2 was 1.20 + 0.09 ($P < 0.0001$). We propose that the lowest normal and highest abnormal limits of SL1 are 1.12 and 1.08 respectively and that normal and highest abnormal limits of SL2 are 1.23 and 1.18 respectively. We suggest the use of SL1 as a pure parasympathetic test and SL2 as a mixed but predominantly sympathetic test in the diagnosis of autonomic neuropathy.

Autonomic and peripheral neuropathy in insulin dependent diabetics

Nijhawan S, Mathur A, Singh V, Bhandari VM. *Journal of Association of Physicians of India* 1993; 41 : 565-6.

Twenty five diabetics (all Insulfn-dependent) and 20 age end sex matched controls were studied to assess peripheral nerve tunc tions and autonomic (cardiovascular and urinary bladder) nerve functlons. Impotence was the commonest symptom followed by postural dizziness, atonic bladder, shooting pains in the limbs and gustatory sweating. Cardiac autonomic neuropathy was found In 60% of the diabetics while 68% of them had diabetic cystopathy. Peripheral nerve dysfunction was present in 80%0l the patients. Forty percent of the diabetics had all the three forms of neuropathies (cardiac, urinary bladder and peripheral), while another 40% of the patients had at least two forms of neuropathy.

Cardiac autonomic neuropathy and their relation with other angiopathies in non-insulin-dependent diabetes mellitus

Tankhiwale SR, Pazare AR, Kudrimoti NB. *Journal of Diabetic Association of India* 1991; 31 : 71-3.

In the present study incidence of cardiac autonomic neuropathy in non-insulin-dependent mellitus was studied which was 30% with more involvement of parasympathetic nervous system (22.9% to 44.3%).

Incidence of cardiac autonomic neuropathy amongst other angiopathies were 40.9 to 75% with maximum percentage in nephropathy (75%) in the present study.

Thus incidence of cardiac autonomic neuropathy in non-insulin dependent diabetes mellitus was more (40.9 to 75%) in microangiopathies as compared to angiopathies involving larger vessels.

A study of relationship between glycaemic control and nerve conduction velocity in diabetes.

Mehrotra TN, Sood K, Singh V, Sharma R, Jain S. *Journal of Diabetic Association of India* 1993; 33 : 2-4.

Diabetic patients were subdivided according to the age, sex duration of diabetes, types of diabetes and mode of therapy and effect of short term glycaemic control was investigated in 30 diabetic patients. Our results show that nerve conduction studies can discriminate significantly between diabetic patients and healthy controls. Sex, age, type of diabetes or mode of therapy did not influence significantly the results of conduction studies in different groups of diabetics. Furthermore short term glycaemic control in same patients did not influence significantly the results of nerve conduction studies.

Electrocardiographic evidence of autonomic dysfunction in non-insulin dependent diabetes mellitus.

Zargar AH, Koul S, Masoodi SR, Laway BA, Shah NA. *Journal of Diabetic Association of India* 1993; 33 : 54-7.

Tests of diagnosis of Diabetic Autonomic Neuropathy are simple to perform but are perhaps not widely known in the general medical community. Measurement of variations in the electrocardiographic R-R intervals is one of several tests advocated as the simplest and most reliable means of testing autonomic dysfunction. Twenty-five patients of NIDDM and twenty-five age matched control were studied and following parameters were calculated. Blood pressure response to standing and to static exercise; basal heart rate; heart rate variation during valsalva maneuver, during respiration and during standing. Out of 25 patients of NIDDM, 10 had evidence of peripheral neuropathy (PNP). Blood pressure response to static exercise was abnormal in 56% of all diabetics and (90%) of diabetics with PNP. Valsalva ratio (VR) was significantly abnormal (1.06 ± 0.13) in diabetics with $P < 0.001$. Heart rate variation during respiration revealed no significant difference in E:1 ratio of controls and diabetics but there was a significant abnormality in E:1 ratio of diabetics with PNP ($P < 0.01$). Immediate heart rate response to standing revealed an abnormal 30:15 ratio. Based on these observations, it is suggested that diabetics with PNP have a high incidence of autonomic dysfunction and simple non-invasive electro-cardiographic studies can be used to document it.

ISCHAEMIC HEART DISEASE

Comparison of cardiovascular risk factors in Type 2 (non-insulin dependent) diabetics with and without coronary heart disease

John L, Nayyar V, Shyla PM, Kanagasabapathy AS. *Journal of Association of Physicians of India* 1993; 41 : 84-7.

Cardiovascular risk factors in NIDDM were studied by comparing 175 subjects with coronary heart disease (CHD) to 173 subjects without CHD; both groups were matched with regard to male to female ratio, age at diagnosis of diabetes and body mass index. The risk factors included were hypertension, poor metabolic control, smoking and lipid abnormalities. Since the mean known duration of diabetes in subjects with CHD was longer compared to those without CHD (12.93 ± 7.23 and 6.25 ± 5.66) and sub sample of subjects from both groups with duration of diabetes with 15 years or less were also analysed for comparison. Even after adjustment of duration the clustering of vascular complication in the subjects with CHD was striking. Presence of low HDL cholesterol was significant in both men and women diabetics with CHD ($P < 0.01$); while hypertension and poor metabolic control showed a strong positive correlation to CHD in both low cholesterol and elevated serum triglycerides showed strong association to CHD in both sexes; while in women in addition hypertension and insulin therapy also had a positive correlation to CHD ($P < 0.01$). Furthermore the influence of known duration of diabetes was not observed to be a significant contributor to the cardiovascular risk factors, since the above mentioned risk factors remained statistically significant in the subsample of patients with duration of diabetes less than 15 years.

Coronary risk factors in people from the Indian subcontinent living in West London and their siblings in India.

Bhatnagar D, Anand IS, Durrington PN, Patel DJ, Wander CS, Mackness MI, Creed F, Tomenson B, Chandrashekar Y, Winterbotham M, Britt RP, Keil JE, Sutton GC. *Lancet* 1995; 345 105-9.

Several reports have shown that migrants from southeast Asia tend to have an increased risk of coronary heart disease when settled in their new country. We compared coronary risk factors in a randomly selected group of 247 migrants from the Indian subcontinent of Punjabi origin living in West London and 117 of their siblings living in Punjab in India.

The West London cohort had a greater body mass index ($P < 0.001$), systolic blood pressure ($P = 0.0087$), serum cholesterol ($P < 0.001$), apolipoprotein B ($P < 0.001$), lower high-density lipoprotein cholesterol ($P < 0.05$) and higher fasting blood glucose ($P < 0.05$) than their siblings in the Punjab. Insulin sensitivity derived from the homeostatic assessment mathematical model, was lower in men in West London than in their counter-parts in India ($P < 0.05$). Indians in West London had lower beta cell function than those in the Punjab ($P < 0.001$). Serum lipoprotein 'a' concentrations were similar in both the West London and Punjab population, but were significantly higher ($P = 0.01$) than those of white European populations in the UK.

Increase in serum cholesterol after migration from India lead to increased coronary risk conferred by high serum lipoprotein 'a' concentrations and greater insulin resistance. Such between country comparisons are an important means of establishing the importance of coronary risk factors.

Study of cardiovascular complications and mortality in diabetic and non-diabetic patients sustaining acute myocardial infarctions

Chakraborty J, Roy RU, Banerjee N, Mookerjee GC. *Journal of Diabetic Association of India*. 1991; 31 : 94-8.

Sixty eight patients, admitted in the intensive coronary care unit of the Ramakrishna Mission Seva Pratisthan with acute myocardial infarction in the year 1986, was included in the study of which fifteen (15) patients were diabetic and rest, fifty three (53) were non-diabetic. Increased rate of fatality was observed in diabetic patients (53.3% in comparison with non-diabetics 32.0%). This increased rate of mortality in diabetics is possibly not due to larger infarct size or poor control of blood glucose, as evidenced from serum SGOT and LDH levels and blood glucose levels. One possible explanation is that high mortality rate could be due to association of another risk factor-systemic hypertension, which was found closely related to the fatality of the diabetic patients and statistical evaluation also confirmed this observation.

Diastolic dysfunction and its correlation with glycometabolic derangement in insulin-dependent diabetics.

Mukhopadhyay S, Chowdhury S, Bhattacharya TD, Sen Gupta BR. *Journal of Diabetic Association of India* 1991; 32 : 51-9.

Left ventricular function was studied in 22 insulin-dependent diabetics (IDDM) without clinical evidence of micro or macroangiopathy and the results compared with 20 matched controls. Indices of systolic function like ejection fraction (EF%) and left ventricular ejection time (LVET) suggested a

mild hypercontractile state. The isovolumetric relaxation period (IVRP), however was significantly prolonged in IDDM, reflecting impaired diastolic relaxation. While IVRP prolongation was positively correlated with glycated haemoglobin (HBA₁) and fasting plasma triglyceride (TG) values, no significant correlation was found with age or sex of the patient or the duration of diabetes. We postulate that myocardial glycosylation and TG deposition may cause diastolic dysfunction in uncontrolled IDDM, initially the systolic remaining unimpaired.

Correlative study between coronary artery disease and other angiopathies in diabetes mellitus

Tankhiwale SR, Pazare AT, Patil RS. Journal of Diabetic Association of India 1991; 31 : 35-7.

Various angiopathies in diabetes mellitus and their interrelations were studied in this study. Incidence of coronary artery disease were 19% in the patients of diabetic neuropathy, 20% in patients of diabetic retinopathy, 100% in patients of cerebrovascular disease and peripheral vascular disease respectively in present study. In the present study incidence of other diabetic angiopathies were 63.6% in 11 patients of diabetic coronary angiopathy. Hence probable correlation was made that incidence of coronary artery disease was high with angiopathies involving large vessels than small vessels. Incidence of other angiopathies was more common in patients with coronary angiopathies.

Study of cardiac complications in diabetes mellitus.

Goswami MK, Goswami BM. Journal of Diabetic Association of India 1994; 34 : 27-9.

Diabetes Mellitus is a disease which may involve all the vital organs of the body irrespective of its type. The cardiovascular system is one of the systems commonly affected. The above statement has been corroborated by various authors in course of their studies conducted all over the world. In India, studies were conducted by Nanda et al, Rangaraj et al, in this regard. Since no such study has ever been conducted in the remote North Eastern part of the country, it was decided to initiate the study with following aims and objectives.

- (1) Study of the prevalence of diabetes mellitus and its types.
- (2) Study of the extent of cardiac involvement among the diabetics.
- (3) Identification of the epidemiological predictors, if any.
- (4) Assessment of the incidence of these factors.
- (5) Estimation of therapeutic efficacy of cardiac drugs in diabetics.

Cardiac autonomic function in fibrocalculous pancreatic diabetes.

Govindan R, Das AK. Acta Diabetologica Latina 1993; 1 : 36-8.

Cardiac autonomic function was evaluated in 23 patients with fibro-calculous pancreatic diabetes (FCPD). Though none of the patients had any symptoms referable to autonomic dysfunction, 5 had abnormal heart rate responses. The variability in heart rate in response to deep breathing was the earliest abnormality found in these patients. Four of the five patients had clinical evidence of neuropathy while all 5 had retinopathy and overt nephropathy. It is therefore concluded that autonomic nervous system can be involved in

patients with FCPD even as early as 2 years after the onset of the disease and thus that evaluation of the autonomic nervous system should be part of the routine evaluation of all patients with FCPD.

Insulin resistance, diabetes and risk markers for ischaemic heart disease in Asian men and non-insulin dependent diabetic men in Bradford.

Knight TM, Smith Z, Whittles A, Sahota P, Lockton JA, Hogg G, Bedford A, Toop M, Kernohan EEM, Baker MR. British Heart Journal 1992; 67: 343-50.

A cross sectional study was carried out to examine the hypothesis, in a community not studied before, that insulin resistance associated with centralized adiposity is the mechanism underlying the predisposition of Asian immigrant communities to both ischaemic heart disease and diabetes mellitus. Subjects comprised of male manual workers of Asian (n = 110) and non-Asian origin (n = 156), aged 20-65 years recruited from two factories in the textile sector of Bradford, West Yorkshire. Diabetes was found to be almost three times more prevalent in the Asian group. Two hours after an oral glucose load, Asian men had double the serum insulin concentrations of non-Asian men ($P < 0.0001$). Asian men also had significantly lower concentrations of plasma total cholesterol ($P < 0.03$), HDL-cholesterol (HDL2, $P < 0.001$; HDL3, $P < 0.001$) and apolipoprotein AI ($P < 0.0001$). Fasting plasma triglyceride concentrations were slightly higher ($P = 0.072$) in the Asian men; thus the ratio of triglyceride cholesterol was higher ($P = 0.006$). The interrelation between serum insulin and plasma lipid concentrations indicated metabolic differences between the ethnic groups. Insulin concentrations were associated with cholesterol concentrations in the Asian men only and there was a lack of association between triglyceride, LDL-cholesterol and HDL-cholesterol in this group. The risk marker profile in the Asian men was therefore quite different to that of their non-Asian counterparts and was associated with a greater tendency to centralized adiposity. These data support the insulin resistance hypothesis and thus have important implications for strategies for the prevention of heart disease in Asian communities in the UK.

NEPHROPATHY

Prevalence or microalbuminuria in diabetic subjects

Sheth J, Trivedi B, Shah L, Sheth VS. Journal of Association of Physicians of India 1993; 41 : 562-4.

A total of 193 diabetic patients were investigated to assess the prevalence of microalbuminuria. Urinary albumin excretion rate (UAER) was measured by radioimmunoassay (RIA) on 3-hour urine samples. The prevalence of microalbuminuria (UAER $> 15\mu\text{g}/\text{min}$) was 41%. Microalbuminuria was commonly observed in patients having diabetes (or more than 5 years. A significant correlation was found between duration of diabetes and microalbuminuria ($P < 0.01$). Glycaemic control (fasting and postprandial blood sugar did not show any correlation with UAER, whereas blood urea ($r.39$, $P < 0.01$), creatinine ($r.26$, $P < 0.05$) and chloride ($r.24$, $P < 0.05$) were positively correlated. Significant correlation was found between raised blood pressure and UAER ($P < 0.01$).

Higher levels of microproteinuria in Asian compared with European patients with diabetes mellitus and their relationship to dietary protein intake and diabetic complications.

Tindall H, Martin, D. Nagi, S. Pinnock, M. Stickland, J.A. Davies. Diabetic Medicine 1994; 11 : 37-41.

Asian patients with diabetes have a higher prevalence of renal disease than their European counterparts. The aim of the study was to investigate the pattern of the renal excretion of proteins in 70 Asian and 70 European patients with diabetes and to relate it to dietary intake of protein and prevalence of diabetic complications. Compared with matched Europeans, Asian patients had an increased urinary excretion of albumin and transferrin ($P < 0.02$) with 14 Asians and 6 Europeans having significant microalbuminuria ($> 30 \text{ Hg min}^{-1}$). In 12 Asians and all 6 Europeans this was associated with complications from diabetes, particularly vascular. Asian patients had significantly more ischaemic heart disease ($P < .0001$) but less neuropathy ($P < 0.0001$) and retinopathy ($P < 0.05$) than their matched European counterparts. Asian diets were lower in protein (median range) Asian vs European: 12.5% (6-29%) vs 19% (11-27%); $P < 0.01$ and carbohydrate and higher in fat than European diets. There was no correlation between dietary protein intake and excretion of any of the urinary proteins measured. However, a significant correlation was found in Asians between protein intake and length of residence in the UK ($P < 0.005$). Unless ways to reduce complications can be found then future allocation of resources will need to take this into consideration in areas with large Asian communities.

Microalbuminuria in NIDDM patients in South India.

Viswanathan M, Snehalatha C, Bhattacharya PK, Mohan V, Ramachandran A. Indian Journal of Medical Research 1991; 125-9.

Urinary albumin excretion (UAE) was estimated by radioimmunoassay in 316 non-insulin-dependent diabetic patients (NIDDM) with diabetes for 10 or more years and proteinuria $< 150 \text{ mg/24 h}$. Albuminuria was determined in 24 hr collection of urine in 259 patients but in the other 57, a random sample was used. The mean UAE was 23 ± 45.3 (SD) Ug/mg creatinine in the patients against 4.4 ± 2.7 Ug/mg in the controls [30]. Ninety patients (28.5%) had microalbuminuria i.e., the UAE exceeded, 20 Ug/mg creatinine . A higher percentage (31.7%) of men had microalbuminuria than women (23.6%). The presence of microalbuminuria was similar in the insulin treated and in oral drug treated patients (29.6% and 26.5% respectively). Stepwise multiple regression analysis using albumin/creatinine ratio as the dependent variable showed that factors such as blood pressure, blood glucose, HbA1c, body mass index, sex, age, duration of diabetes and the association of vascular complications of diabetes did not have significant correlation to microalbuminuria. Creatinine clearance showed a significant inverse correlation to the albumin/creatinine ratio. Although the prevalence of microalbuminuria in NIDDM in this study is not significantly different from those reported from other countries, the morbidity index due to kidney disease could be high due to the large absolute number involved in our country. This underscores the need for early detection of the

disease and institution of preventive measures to arrest its progression.

Microalbuminuria estimation by a new dip stick method - comparison with radioimmunoassay.

Snehalatha C, Mohan V, Bhattacharyya PK, Ramachandran A, Viswanathan M. Journal of Diabetic Association of India 1992; 32-34.

The usefulness of a dip stick method for estimation of microalbuminuria (MA), the Micral test (Boehringer Mannheim, West Germany) was evaluated by comparing the results with those obtained by a radioimmunoassay (RIA). The sensitivity of Micral test was 89% and its specificity was 99%. The test is performed in about 6 minutes and the test principle is immunochemical in nature. It is a reliable and rapid procedure for semiquantitative estimation of microalbuminuria.

Increased incidence of end-stage renal failure secondary to diabetes mellitus in Asian ethnic groups in the UK.

Burden AC, McNally PG, Feehally J, Walls J. Diabetic Medicine 1992; 7 : 641-5.

Diabetic renal disease is more common in patients of Asian ethnic origin than white Caucasians in the UK. This study determines whether a disparity in the incidence of end-stage renal failure secondary to diabetes mellitus exists between these ethnic groups. The incidence of treated end-stage renal failure was estimated using the person time at risk incidence rate for patients receiving renal replacement therapy secondary to diabetes mellitus in the county of Leicestershire from 1979-1988. The incidence rate of end-stage renal failure expressed for the estimated population of patients with diabetes mellitus, of Asian ethnic origin was 486.6 (95% CI 185.1-788.1) cases per million person-years per year, compared with 35.6 (17 - 54.2) in white Caucasians. All patients of Asian ethnic origin developing end-stage renal failure had NIDDM. The high incidence of end-stage renal failure secondary to diabetes mellitus in patients of Asian ethnic origin in the UK imparts significant public health implications for resource planning and allocation and the need to initiate strategies to renal disease in this ethnic group.

Rate of progression of albuminuria in Type 2 diabetes.

Lilly John, Sundar Rao PSS, Kanagasabapathy AS. Diabetes Care 1994; 17: 888-90.

A cohort of 481 Type 2 diabetic patients were followed prospectively for 5 years. Blood glucose (BG) and blood pressure (BP) were checked at 2 monthly intervals and urinary albumin excretion (UAE) was checked at yearly intervals. Progression of albuminuria was recognized by the development of microalbuminuria and macroalbuminuria and a significant increase in albuminuria within the microalbuminuric range. UAE was normal in 349 patients, 93 patients were microalbuminuric and the rest (39) were macroalbuminuric. Sixty-two patients with normal UAE developed microalbuminuria. Ten patients with normoalbuminuria and 23 with microalbuminuria developed macroalbuminuria during the 5 year observation period with overall incidence of 46.9/1,000 person-years for normoalbuminuria and 58.7/1,000-years for microalbuminuria.

Baseline UAE was significantly higher in those patients who progressed compared with those patients who did not (normoalbuminuria: 8.5 ± 6 vs. 5.3 ± 4 $\mu\text{g}/\text{min}$, $P < 0.001$; microalbuminuria: 68.5 ± 57 vs. 47.4 ± 34 $\mu\text{g}/\text{min}$, $P < 0.01$). Multiple regression analysis revealed initial UAE and diabetes duration to be predictors of albuminuria progression. Initial UAE is a strong predictor of albuminuria progression in Type 2 diabetic patients.

Prevalence of diabetic nephropathy in non-insulin-dependent diabetics.

Lily John, Sundar Rao PSS, Kanagasabapathy AS. Ind J Med Res 1991; 94 : 24-9.

Renal involvement was studied in 538 consecutive NIDDM subjects (271 males and 267 females). The mean (SD) age of males was 55.4 (11.0) and of females 51.0 (10.5). Diabetic nephropathy was present in 8.9% of the patients (urinary albumin excretion > 200 $\mu\text{g}/\text{min}$) and another 19.7% had microalbuminuria (20 - 200 $\mu\text{g}/\text{min}$). Male predominance was striking in the macroalbuminuric group ($P < 0.001$). The age of the patients and duration of diabetes in patients with micro and macroalbuminuria were significantly higher as compared to those in the normoalbuminuric group ($P < 0.001$). Patients with micro and macroalbuminuria had significantly elevated blood sugars and blood pressures ($P < 0.01$). The prevalence of vascular complications were found to be higher in the macroalbuminuric group ($P < 0.01$). Male sex, older age, longer duration of diabetes, poor glycaemic control and raised blood pressure were significant risk factors in the development of diabetic nephropathy.

Captopril on proteinuria in non-insulin-dependent diabetes.

Lilly John, Poonnoose E, Sundar Rao PSS, Kanagasabapathy AS. Hypertension 1994; 8 : 81-8.

A double blind controlled study for a period of 12 weeks and a long term prospective study for 4.5 years was undertaken to assess the influence of angiotensin converting enzyme inhibitor, Captopril, to reduce proteinuria in diabetic nephropathy (Proteinuria > 500 $\text{mg}/24$ hrs). Patients in short term study (17 Captopril, 16 Placebo) were comparable in terms of clinical and laboratory variables. There was a steady decline in proteinuria (mean reduction of 37%) in the Captopril group whereas there was no change in proteinuria in the placebo group. The mean age of the patients in long term study was 53.4 ± 6.6 years with a mean duration of proteinuria of 14.4 ± 5.8 months. At the end of follow-up, proteinuria decreased significantly in 8 patients (group A-mean reduction of 71.9 ± 14.4), in 6 patients (group B) there was no change while a significant increase (mean increase of 209 ± 201.1) was observed in 7 patients (group C). Patients in group C had significantly high mean systolic and diastolic blood pressure and higher mean HbA_{1c} compared to that of patients in group A ($P < 0.05$). We conclude from this study that Captopril treatment for 12 weeks resulted in reduction of proteinuria in a significant number of patients with diabetic nephropathy. Moreover longterm Captopril treatment was found beneficial in the group of proteinuric patients when optimal blood sugar and blood pressure could be initiated and maintained during the course of the disease.

Glomerular filtration rate in Indian non-insulin-dependent diabetics at various stages of albuminuria.

Lilly John, Mathews P, Oommen R. Diabetes Research and Clinical Practice 1994; 23: 121-25.

Sixty-seven non-insulin-dependent diabetic subjects were selected to estimate the glomerular filtrations rate (GFR). All patients had satisfactory glycaemic control ($\text{HbA}_{1c} < 9.5\%$). GFR was determined using Technetium 99m DTPA by the method devised by Gates. Thirty-eight subjects had normal albumin excretion ($\text{UAE} < 20$ $\mu\text{g}/\text{min}$), 15 had UAE in the microalbuminuric range (20 - 100 $\mu\text{g}/\text{min}$) and the rest were macroalbuminuric (> 200 $\mu\text{g}/\text{min}$). GFR was lower in the normoalbuminuric patients as compared to the controls, but the decrease was not significant 71.5 (21.4) vs. 98.3 (16.1) ml/min per 1.73m^2 . GFR was significantly decreased in both micro and macroalbuminuric groups 64.0 (24.5) and 53.8 (27.3) ml/min 1.73m^2 respectively ($P < 0.05$). No appreciable change in GFR was observed in normoalbuminuric patients with increasing duration of diabetes, however, there was a steady decline in GFR with time in both micro and macroalbuminuric patients. Hypertension was present in 79%, 47% and 16% of macro, micro and normoalbuminuric patients respectively. GFR was significantly lower in hypertensive diabetic patients compared to normotensives (52.3 vs. 76.1 ml/min per 1.73m^2) ($P < 0.01$), while this difference was not significant in the micro and macroalbuminuric groups. We conclude from our study that the stage of hyperfiltration could not be detected in non-insulin-dependent diabetes and that hypertension had a significant influence on the rate of decline of GFR.

RETINOPATHY

Metabolic factors in the development of retinopathy of juvenile-onset Type 1 diabetes mellitus

Khosla PK, Sharma K, Tewari HK, Bajaj JS, Vaidya MC. Indian Journal of Ophthalmology 1994; 42 : 23-5.

Thirty-five patients of insulin-dependent-diabetes mellitus (IDDM) were investigated for the effect of various metabolic factors on retinopathy. The severity of retinopathy increased with duration and age of onset of IDDM. Degree of glycaemia (fasting blood sugar (FBS)) was similar in patients with or without retinopathy. All IDDM patients as a group showed severe carbohydrate intolerance with lower basal and post glucose serum immunoreactive insulin (IRI) levels and serum C-peptide radioimmunoactivity (CPR) as compared to controls. The insulin secretory response was similar in no retinopathy, mild retinopathy and severe retinopathy groups. Patients with retinopathy had higher incidence of hyperlipidaemia but mean serum levels of cholesterol and triglycerides were similar. This study does not suggest a direct relationship between the various metabolic factors studied and retinopathy due to IDDM.

Experimental inhibition of proliferative vitreoretinopathy in retinal detachment using daunorubicin.

Kumar A, Tewari HK, Bathwal DP, Khosla PK. Indian Journal of Ophthalmology 1994; 42: 31-5.

Proliferative vitreoretinopathy (PVR) remains the most common cause of failure in retinal detachment surgery. Surgical procedures for its repair entails complex and extensive instrumentation besides technical skill. The success rate varies widely with high incidence of redetachment. Keeping this in view, we evaluated the role of intravitreal

daunorubicin as an anti-mitotic agent in the inhibition of PVR. Our study concluded that 5 Ug of intravitreal daunorubicin effectively inhibited PVR in the rabbit eye and the dosage was safe and non-toxic. The half-life of the drug was determined to be about 140 minutes, suggesting a prolonged intravitreal concentration sufficient to prevent fibroblast proliferation.

Diabetic iris vasculopathy

Ratnakar KS, Agarwal H. Journal of Diabetic Association of India 1991; 31 : 40-1.

Diabetic iris changes hitherto described include pigmentary epithelial vacuolation, rubeosis, iriditis etc. However, precise stromal vascular alterations are not clear. Using morphometric analysis, iris in different forms of diabetic retinopathy has been shown to exhibit alterations that may permit us to describe it a characteristic and term it as Diabetic Iris Vasculopathy. This may be of importance in assessing the retinopathy in the future

A genetic study of retinopathy in South Indian Type 2 (non insulin-dependent) diabetic patients

Hawrami K, Mohan R, Mohan V, Hitman GA. Diabetologia 1995 34 : 441-4.

Genetic marked studies in diabetic retinopathy are controversial and frequently complicated by possible independent association of Type 1 (insulin dependent) diabetes mellitus with the marker so far analysed. We have looked for associations of candidate genes with retinopathy in South Indian Type 2 (non-insulin dependent) diabetic patients; patients were subdivided into those with exudative maculopathy (n = 53), proliferative retinopathy (n = 40) and patients free from diabetic retinopathy with a minimum disease duration of 15 years (n = 45). DNA was extracted from blood samples and studied by Southern blot hybridisation techniques and the following probe enzyme combinations: HLA-DQB1; Taq 1, HLA-DQA1; TaqI, HLA-DRA; Bgl II, insulin gene hypervariable region; Pvu II and

the switch region of the immunoglobulin IgM heavy chain gene (Su); Sac 1. Difference in genotype distributions between the study groups were only detected with the Su probe which detects polymorphism of both Su S alpha 1 (the switch region of IgA). Two alleles of S alpha were detected sized 7.4 kilobase and 6.9 kilobase. The frequency of 6.9 kilobase homozygotes was lower in proliferative retinopathy (19%) compared to patients free from diabetic retinopathy (54% P = 0.005) and exudative maculopathy (46%, P = 0.03). The data suggests that there is a genetic predisposition to proliferative retinopathy in Type 2 (non-insulin-dependent) diabetes of South Indian origin and that this is determined by polymorphism of the heavy chain immunoglobulin genes located on chromosome 14.

Does oxidant stress play a role in diabetic retinopathy?

Rema M, Mohan V, Anusha B, Radha Shanmugasundaram K Indian Journal of Ophthalmology 1995; 43 : 17-21.

The role of oxidant stress in the causation of chronic tissue damage is being increasingly recognized. Oxidant stress is usually countered by abundant supply of antioxidants. If concomitant anti-oxidant deficiency occurs, oxidant stress may produce tissue damage. We took up a study on anti-oxidant status in non insulin-dependent diabetes mellitus (NIDDM) patients with and without retinopathy and compared them with a control non-diabetic group.

The levels of superoxide dismutase (SOD) were significantly reduced in all diabetic patients, i.e., those with and without retinopathy. However, the lowest levels were found in the diabetic patients with retinopathy. Vitamin E and Vitamin C levels were also markedly lower in the diabetic patients. There was a paradoxical rise in the catalase and glutathione peroxidase (GPR) in the diabetic patients with retinopathy. This may be a compensatory mechanism by the body to prevent tissue damage by increasing the levels of the two alternative anti-oxidant enzymes.