

LETTER TO THE EDITOR

CAN PHYSICAL EXERCISE, YOGA, DIET CONTROL AND NATUROPATHIC TREATMENT PREVENT PROGRESSION OF DIABETES MELLITUS?

Sir,

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This is to bring to light an interesting observation made in our institute during a case study. A diabetic patient was brought under control for his blood sugar and cardiovascular parameters after two years sincere practice of physical exercise and yoga, intake of diabetic diet and naturopathic treatment.

A male patient, aged 43 years, diagnosed earlier for type-2 diabetes mellitus was admitted to hospital of U. P. Rural Institute of Medical Sciences & Research, Saifai, Etawah, with retention of urine. After ultrasonography, it was diagnosed that the patient was suffering from prostatic abscess. He was treated with broad-spectrum antibiotics and perineal catheter drainage. The patient had normal renal and hepatic functions. He was given insulin thrice in a day just before meals during the time of operation. After operation, he was given oral dose of hypoglycemic tablets (metformin) thrice in a day.

After the initial recovery, all his biochemical parameters were recorded and the subject was motivated to practice exercise, yoga and strictly follow prescribed diet and naturopathy treatment instead of taking medicines for treatment of his diabetes. Patient was found be very cooperative and determined for the study. Institute ethics committee approval and

written informed consent were obtained from the subject prior to commencement of the study.

The physical exercise included running and jogging for a period of thirty minutes each in the morning and evening every day, yoga practice was given in the form of anulom-bilom pranayama for 15 min in the evening, diet therapy included diabetic diet as per doctor's advice and naturotherapy treatment was given in the form whole body bath in lukewarm water twice in a day (morning and evening). The recording of and biochemical and cardiovascular parameters were done almost every month. It was found that there was a significant improvement in all these parameters in six-month's time (Table I & II). The biochemical parameters estimated were blood sugar, glycosylated haemoglobin (HbA1c), body weight and cardiovascular parameters included heart rate (HR), blood pressures (systolic, diastolic and pulse), Ankle Brachial Index (ABI), Arterial Stiffness Index (ASI) and Pulse Wave Velocity (PWV). The subject was found be absolutely healthy and under control for his all biochemical and cardio-vascular parameters. Statistical analysis of the data was done by paired t-test and one-way ANOVA. For each parameter, minimum six estimations (indicated as n in the tables) were obtained. $P < 0.05$ was considered as statistically significant.

TABLE I : Comparison of biochemical parameters, body weight and cardiovascular parameters before and after treatment. (results are mean±SEM)

	Glycosy-lated Hb(HbA1c) %	Blood glucose mg/dL		Body weight (kg)	HR (Beats per min)	BP (mmHg)		
		Prepost Prandial	Prandial			Systolic	diastolic	pulse
Pretreatment n =6 (Control)	7.2 ±.01	359±12.02	400±13.03	64 ±03.02	80.2±02.02	139±04.15	86±04.02	53±02.01
Post treatment (after 6 months) n = 14	6.9±.01	111±08.02*	163±06.03*	66±0.502	70.2±04.02	110±06.01*	75±03.02	35±01.08
Post treatment (after 12 months) n=14	7.1±.01	129±08.05*	153±10.01*	68±01.02	51.2±03.02 *	106±03.15*	74±03.02	31±01.01
Post treatment (after 18 months) n=14	6.8±.01*	121±08.02*	142±09.03*	70±03.2	58.5±02.5*	124±08.05*	76±03.02	48±02.101
Post treatment (after 24 months) n=14	6.6±.01*	112±06.02*	132±05.03*	71±02.2 *	61.4±02.12 *	121±04.01*	80±03.02	41±01.01

*Significantly different (P<0.05) when compared to control. The n indicates number of recordings from the same patient.

TABLE II: Comparison of cardiovascular parameters before and after treatment. (results are mean ± SEM)

	Pulse wave velocity (PWV)			Stiffness Index (ASI)		Stiffness Index (ASI)		Ankle Brachial Index (ABI)	
	Right ba	Left ba	C-F PWV	R Bra	L Bra	R Ank	L Ank	Right	Left
	cm/s	cm/s	cm/s	mmHg	mmHg	mmHg	mmHg		
Pretreatment, n=7, (Control)	1359 ± 26.03	1361 ±21.07	884.2 ±14.07	41.3 ± 1.2	39.0 ±2.1	59.3 ± 1.2	65.2 ± 2.1	1.15 ±.01	1.25 ±.02
Post treatment (after 16 months) n=8	1308 ± 21.04	1299 ±20.09	853.7 ±12.04	40.6 ± 1.1	39.8 ±2.5	42.4 ± 1.1	49.6 ± 2.2	1.11 ±.03	1.15 ±.05
Post treatment (after 12 months) n=8	1274 ± 23.09	1231 ±19.06	850.1 ±11.02	34.4 ± 2.2	33.1 ±2.1	45.1 ± 3.5	51.2 ± 2.1	1.05 ±.01	1.11 ±.06
Post treatment (after 18 months) n=8	1008* ± 21.03	1002* ±15.04	651.6* ±10.03	28.6* ± 1.2	27.8* ±2.1	38.5* ± 1.2	40.4* ± 2.8	1.08 ±.01	1.12 ±.02
Post treatment (after 18 months) n=8	1087* ± 16.09	1078* ±23.09	597* ±11.07	26.3* ± 1.7	24.0* ±2.7	39.2* ± 3.2	41.2* ± 2.0	1.02 ±.01	1.09 ±.03

*Significantly different (P<0.05) when compared to control.

There are two main goals of treatment of diabetes mellitus: 1) reduction of mortality and concomitant morbidity (from assorted diabetic complications) and 2) preservation of quality of life. The first goal can be achieved through close glycemic control (i.e., to near 'normal' blood glucose levels); reduction in severity of complications. Type 2 diabetes is initially treated by adjustments in diet, exercise and weight loss therapy, especially in obese patients (3). The degree of weight loss that improves the clinical profile is sometimes modest (2-5 kg or 4.4-11 lb). A major benefit of exercise is its effects on cardiovascular improvements. Research work has shown that short-term aerobic exercise improves the sensitivity of muscles to insulin. It also improves blood cholesterol levels and ensures normal blood pressure control. In our study, patient with type 2 diabetes after a 24-months exercise protocol attained reduction in his glucose levels by 70%, HbA1c by 20%, and normalization blood pressure and other cardiovascular parameters.

Aortic PWV is an independent predictor of mortality in both diabetes and GTT impaired

population samples. In displacing SBP as a prognostic factor, aortic PWV is probably further along the causal pathway for arterial disease and may represent a useful integrated index of vascular status and hence cardiovascular risk. It was reported earlier that the C-F PWV increases when there is increased sympathetic tone and high blood pressure. In our study, PWV at three regions (Right ba, Left ba, C-F PWV) were reduced significantly after 12 months of treatment indicating a lower sympathetic function. The level of HbA1c was also reduced significantly after 18 months of post treatment signifying non-diabetic status of the body. The similar type of finding already reported where HbA1c level was reduced significantly in Type 2 DM that followed yogasanas and pranayama for forty days (4).

In an earlier observation, it was reported that short-term aerobic exercise significantly decreases arterial stiffness in both common carotid and femoral arteries, and the reduction of stiffness was associated with improvement of insulin resistance in type-2 diabetes (4). We have also in the present case found significant decrease on all arterial functions. It may be concluded that physical exercise, yoga, diet and naturopathic techniques for a minimum period of six to twelve months could ensure efficient

diabetic control and prevent the progression of type 2 diabetes mellitus.

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