

CONSTITUTION AND DIABETES

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ABSTRACT: *This study discusses maturity onset diabetics and the role of body constitution in the progression of the disease in detail.*

Variation in the progression of maturity onset Diabetes according to body constitution

In the Ayurvedic System of Medicine body constitution is said to play a vital role in the progression of the disease Premeha (Diabetes Mellitus). Broadly seven types of body constitutions have been described, depending on the ratio of humors (Doshas) in it, i.e. Vataja, Pittaja, Kaphaja, Vata-pittaja, Pitta-kaphaja, Vata-kaphaja and Samdosha. A person having Vataja (V) constitution is supposed to be lean and thin, but alert and sensitive as compared to others. On the contrary, a person having a Kaphaja (K) constitution puts on more body weight because of good muscular built and adiposity, whereas he is comparatively dull and less reactive. In Pittaja (P) constitution the body built is medium though the digestion of the subject is better and the metabolic rate is high. The mental functions in this case are also of high order. In the subjects having mixed type constitution there is a mixture of the physical and psychic attributes which is in proportion to the quantum of humors in his body.

According to Ayurveda the process of wear and tear due to diabetes mellitus in the patients of K constitution is supposed to be slow and the management of the disease is

comparatively easier. On the other hand in the patients of P and V constitutions the progression of diseases is likely to be more rapid.

The progression of diabetes mellitus may be estimated by the level of glucose intolerance which is the basic clinicopathological manifestation of this disease. However, this phenomenon is mostly governed by the availability of free insulin in the plasma.

In the present study a series of maturity onset diabetics has been selected. Subsequently their body constitution was decided. The fasting and post-prandial blood glucose and plasma insulin were estimated the rate of progression was inferred on the basis of the duration of illness, and the state of glucose intolerance and plasma insulin level in different types of body constitutions.

Materials and Methods

A series of 40 glucose tolerance test proved patients of maturity onset diabetes ranging between 40 to 60 years of age, were selected, from the outpatients department

and their body constitution was decided. A number of studies have been conducted in the past to decide the body constitution of the subject¹. The criteria has been the description of different body constitutions as contained in the Ayurvedic classics which contained in the Ayurvedic classics which take into account the anthroposcopic, physiological, psychological and socioeconomic characteristics of the subjects². In addition, certain other anthropometric measures such as Biacromial Standing Height Index (BSHI), Tibial Standing Height Index (TSHI), Poderal Index ($\text{Height} / 3 \sqrt{\text{wt}}$) and body surface area have also been incorporated in our study. Furthermore, certain biochemical parameters such as acetylcholine, catecholamine, histamine and plasma cortisol have also been taken into account as an index of body constitution³. In order to decide the type of body constitution different parameters have been given different scores on the basis of

their stability, i.e. anthroposcopic 5, physiological 3 and psychosocial 1. Thus the body-constitution has been labeled in this study on the basis of the highest score of the concerned Dosha (humor).

Then these patients were subjected to analysis of fasting the postprandial blood sugar (by Asatoor and Kings Method) with a load of 100 gm oral glucose. Simultaneously their plasma insulin was also estimated by radioimmuno assay technique in their fasting blood samples. The glucose intolerance and plasma insulin deficiency have been compared with the duration of illness of persons having different types of body constitution to find out the effect of the body constitution in the progression of disease.

Observation and Results

TABLE NO. I – IV

TABLE – I

Physical status and pattern of neurohumors in different constitutions of the diabetics (Mean ± S. D.)

Types of constitution	Scoring of Doshas			Body wt. (kg)	Height (cm.)	Ponderal Index	TSHI	BSHI	Body surface area (Sq. m.)	ACh µg/ml	TCA ng/ml	Plasma cortisol µg%	Histamine µg / ml	
	Vata	Pitta	Kapha											
Vataja	61.07 ± 10.28	32.33 ± 8.97	18.6 ± 10.15	44.6 ± 8.85	161.2 ± 4.96	45.13 ± 3.28	22.75 ± 1.69	23.82 ± 2.2	1.46 ± 0.15	1.1 ± 0.54	10.15 ± 3.80	28.02 ± 8.21	0.13 ± 0.06	
Pittaja	16.94 ± 9.68	64.50 ± 15.45	30.56 ± 15.18	56.25 ± 5.74	161.75 ± 6.96	42.30 ± 2.15	22.44 ± 0.85	24.7 ± 1.76	1.59 ± 0.09	0.97 ± 0.41	16.39 ± 8.55	36.15 ± 21.98	0.15 ± 0.06	
Kaphaja	13.11 ± 11.40	33.77 ± 10.18	65.11 ± 12.52	66.55 ± 5.87	158.55 ± 8.74	41.64 ± 5.43	23.02 ± 1.36	25.61 ± 2.27	1.625 ± 0.119	0.94 ± 0.38	12.044 ± 3.73	37.69 ± 23.22	0.160 ± 0.041	
<i>Statistical Comparison :</i>				Ponderal Index										
			V vs P	t = 2.82 P < 0.01						2.95 ± 0.01	0.76 ± 0.5	2.66 ± 0.02	1.38 ± 0.2	0.93 ± 0.4
			P vs K	t = 0.35 P > 0.05						0.78 ± 0.5	0.18 ± 0.05	1.76 ± 0.1	0.16 ± 0.05	0.5 ± 0.05
V vs K	t = 1.75 P < 0.1						3.02 ± 0.01	0.86 ± 0.4	1.2 ± 0.3	1.2 ± 0.3	1.5 ± 0.2			

TABLE – II

Blood sugar level (mg%) in maturity onset diabetics of different body constitutions (Mean \pm S. D.)

Body Constitution	Duration of illness				Age in years			
	\leq 5 years		7 5 years		40 to 50		50 to 60	
	F. B. S	P. P. Sugar	F. B. S	P.P. Sugar	F. B. S	P.P. Sugar	F. B. S	P.P. Sugar
Vataja	245.89 \pm 121.28	377.5 \pm 161.06	272.05 \pm 145.33	414.72 \pm 206.83	336.17 \pm 131.47	518.33 \pm 156.76	203.14 \pm 97.23	299.8 \pm 127.4
Pittaja	171.95 \pm 85.71	296.56 \pm 106.59	226.8 \pm 111.95	323.0 \pm 162.25	218.64 \pm 89.38	335.17 \pm 124.75	166.11 \pm 96.91	281.22 \pm 120.67
Kaphaja	159.5 \pm 51.26	267.4 \pm 101.65	202.33 \pm 101.65	352.67 \pm 153.26	172.5 \pm 36.64	287.67 \pm 25.11	174.8 \pm 91.42	306.4 \pm 135.73
<i>Statistical Comparison</i>								
V vs P	t = 1.54 P \geq 0.05	1.24 7 0.05	0.58 7 0.05	0.82 7 0.05	1.85 \leq 0.1	2.3 \leq 0.05	0.81 7 0.05	0.31 7 0.05
P vs K	t = 0.37 P \geq 0.05	0.69 7 0.05	0.32 7 0.05	0.26 7 0.05	1.2 7 0.05	0.96 7 0.05	0.17 7 0.05	0.35 7 0.05
V vs K	t = 1.9 P \leq 0.1	1.74 7 0.05	0.84 7 0.05	0.51 7 0.05	2.89 \leq 0.05	3.51 \leq 0.01	0.54 7 0.05	0.09 7 0.05

TABLE –III
Plasma insulin level ($\mu\text{u/ml}$) in maturity onset diabetics of different body constitution
(Mean \pm S. D)

Constitution	Duration of illness		Age in years	
	≤ 5 years insulin $\mu\text{u/ml}$	7 5 years insulin $\mu\text{u/ml}$	40 to 50 Insulin $\mu\text{u/ml}$	50 to 60 Insulin $\mu\text{u/ml}$
Vataja	11.9 \pm 4.19	2.78 \pm 2.24	7.93 \pm 6.9	8.47 \pm 5.31
Pittaja	10.94 \pm 5.44	5.22 \pm 0.25	11.9 \pm 6.74	7.01 \pm 2.31
Kaphaja	18.32 \pm 10.38	18.7 \pm 13.74	15.5 \pm 4.04	20.8 \pm 14.19
<i>Statistical Comparison</i>				
V vs P	t = 0.45 P \geq 0.05	2.65 \leq 0.05	1.04 \geq 0.05	0.76 \geq 0.05
P vs K	t = 1.62 P \geq 0.05	1.7 \geq 0.05	1.11 \geq 0.05	2.16 \leq 0.1
V vs K	t = 1.44 P \geq 0.05	1.99 \leq 0.1	2.18 \leq 0.1	1.87 \leq 0.1

TABLE – IV
Body weight (kg) in maturity onset diabetics of different body constitution (Mean \pm S.D.)

Constitution	Duration of illness		Age in years	
	≤ 5 years Body weight	7 5 years Body weight	40 to 50 Body weight	50 to 60 Body weight
Vataja	46.2 \pm 8.0	42.17 \pm 10.26	45.83 \pm 12.29	43.78 \pm 6.4
Pittaja	56.27 \pm 6.72	56.2 \pm 3.27	55.14 \pm 3.63	57.11 \pm 7.08
Kaphaja	69.33 \pm 3.88	61.0 \pm 5.57	69.5 \pm 1.00	64.2 \pm 7.26
<i>Statistical Comparison</i>				
V vs P	t = 3.0 P \leq 0.01	3.16 \leq 0.05	1.79 \geq 0.05	4.19 \leq 0.001
P vs K	t = 5.08 P \leq 0.001	1.36 \geq 0.05	9.84 \leq 0.001	1.77 \geq 0.05
V vs K	t = 7.45 P \leq 0.001	3.57 \leq 0.01	4.69 \leq 0.01	5.26 \leq 0.001

Discussion

The patients having glucose intolerance were obviously diagnosed as patients of diabetes mellitus. In due course two major groups, namely growth onset and maturity onset, were identified having altogether different etiopathogenesis, line of management and prognosis. Of late a third group designated as borderline group has also been pointed out on the basis of variation in therapeutic response. Several evidences of therapeutic variations are being pooled and suggestions are coming that it may be correlated with constitution. Further constitution studies have also shown that these may be related with the genetic changes making them susceptible to diabetes^{4,5}; Obviously our body of knowledge with respect to diabetic syndrome is still limited.

In this observation the formation of three distinct groups of body constitutions in the series of forty patients is meaningful. This series had 15 patients of V, 16 P and 9 patients of K constitution. The approach followed in Ayurveda for identifying the body constitution is unique and has its own originality. According to Ayurveda body constitution is genetic in origin and is almost irreversible⁶. Its study incorporates anatomical, physiological, psychic and socioeconomic attributes which forms the basis for deciding the body constitution.

In this study scores have been given to different parameters. Anthroscopic 5, Physiologic 3 and Psychosocial 1. Hence the body constitution has been decided on the basis of score. Vatika score was maximum in V constitution (61.07 ± 10.28), Paittika score in P (64.5 ± 15.45) and Shleshmika score in K constitution (65.11 ± 12.52). In this study physical as well as biochemical parameters have been adopted

to confirm / support the above three groups of constitution. It was observed that Ponderal Index was maximum in V constitution (45.13 ± 3.28) and minimum in K (41.64 ± 5.43). On the other hand, body surface area was found to be maximum in K constitution (1.625 ± 0.119) and minimum in V (1.46 ± 0.15 Sq. metre). In P constitution both ponderal index and body surface area were recorded to be medium.

Likewise on biochemical examination acetylcholine has been found to be maximum in the patients having V constitution (1.1 ± 0.54 $\mu\text{g/ml}$) and minimum in the K (0.94 ± 0.38 $\mu\text{g/ml}$). On the other hand catecholamines have been found to be maximum in P constitution (16.39 ± 8.55 ng/ml). and minimum in V (10.15 ± 3.8 ng/ml). Furthermore the blood histamine is observed to be maximum in K (0.160 ± 0.041 $\mu\text{g/ml}$) and minimum in the V constitution (0.13 ± 0.06 $\mu\text{g/ml}$). Thus there is a positive evidence which shows that the classification of constitution suggested in Ayurveda is not only subjective but also has an objective basis. These findings are in conformity with the previous studies on constitution in healthy subjects³.

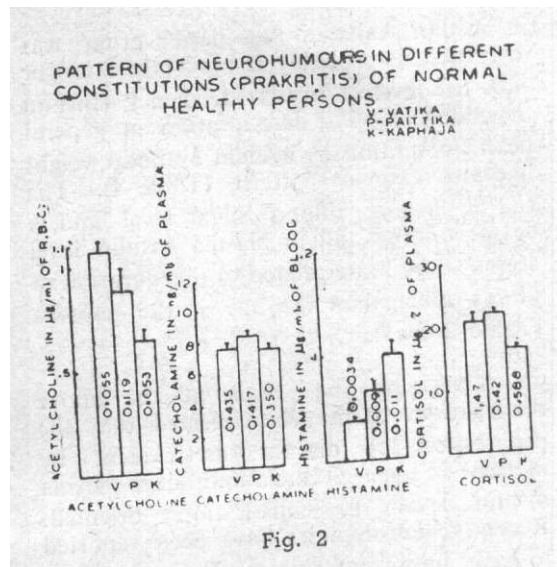
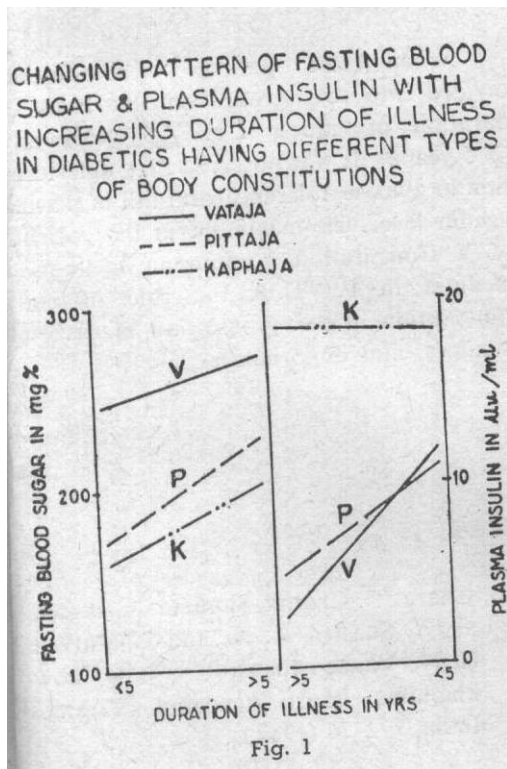
The average fasting and postprandial blood sugar levels in these three groups investigated, were also observed to fall in three distinct range. Fasting blood sugar level in K constitution was 173.77 ± 68.43 mg\% , in P 189.09 ± 94.49 mg\% and in V constitution it was reported to be 256.35 ± 126.99 mg\% . Likewise postprandial blood sugar had also an identical pattern; K; 299.37 ± 103.92 mg\% , P : 304.83 ± 121.47 mg\% and V: 393.45 ± 175.46 mg\% . Obviously the blood sugar level was observed to be highest in V and lowest in K groups. Further the average plasma insulin

level was found to be $8.25 \pm 5.76 \mu\text{u/ml}$ in V, $9.15 \pm 5.22 \mu\text{u/ml}$ in P and $18.44 \pm 10.70 \mu\text{u/ml}$ in K constitutions of the diabetic patients.

To clinch the effect of body constitution in the progression of diabetes mellitus the blood sugar and plasma insulin levels have been studied in relation to duration of illness, which showed interesting results. Patients of each constitution were divided in two groups: (a) having duration of < 5 years and (b) having duration of > 5 years. It was found that the increase in blood sugar with duration of illness was maximum in V and minimum in K constitutions. Correspondingly there was fall in plasma insulin which was recorded to be maximum in V followed by P whereas in K group it was more or less same (Fig. 1). No difference in insulin value in the latter group was discerned as probably it may take a longer time to develop insulin deficiency (Insulin dependence). The deterioration in

general health conditions as evident by body weight had also a similar pattern (Table – 4). The rise in fasting blood sugar level and a corresponding fall in plasma insulin level seem to be more related to the duration of illness rather than the age of the patients (Table 2 & 3).

Thus, on the basis of the above observations it may be inferred that the progression of disease as evident by increase in hyperglycemia and fall in plasma insulin level is constitution oriented. Recently neurohumors have been reported to have important role in the etiopathogenesis of diabetes mellitus^{7,8}, which are also a guiding factor of body constitution³. The deterioration is much faster in Vataja constitution as compared to Pittaja and Kaphaja and it is slowest in case of patients having Kaphaja constitution. This observation also supports the original contention of Ayurvedic classics.



Conclusion:

A series of forty patients of maturity onset diabetes was selected. Their body constitution was decided as Vataja (V), Pittaja (P) and Kaphaja (K) on the basis of physical, psychic and socioeconomic features as described in Ayurvedic classics. These groups were also supported by objective findings i.e Anthropometric and Biochemical. In V ponderal index was found to be maximum (45.13 ± 3.28) with minimum body surface area (1.46 ± 0.15 sq. metre) along with acetylcholine level (1.1 ± 0.54 ug/ml) in blood. On the contrary in K body surface area was maximum (1.625 ± 0.119 sq. metre) with minimum ponderal index (41.64 ± 5.43). Acetylcholine was lower (0.94 ± 0.38 ug/ml) and blood histamine was highest (0.160 ± 0.041 ug/ml) in this group. In P plasma catecholamines were observed to be highest (16.39 ± 8.55 ug/ml) and the physical findings were

medium. Respectively in diabetics of V, P, K constitution the hyperglycemia was observed to be severe (256.35 ± 126.99 mg%), moderate ($189.09 \pm 94.49\%$ mg%) and mild (173.77 ± 68.43 mg%). Correspondingly, plasma insulin was found to be lowest in V (8.25 ± 5.76 Uu/ml), a little high than this in P (9.15 ± 5.22 Uu/ml) but was highest in K (18.44 ± 10.70 Uu/ml).

When these patients were further divided into two groups on the basis of duration of illness i.e ≤ 5 years and > 5 years. It was observed that deterioration in glucose tolerance and fall in plasma insulin level was maximum in the patients of V Constitution, minimum in K and medium in P. Thus the role of body constitution in the progression of diabetes assumes vital importance.

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