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Comparative study of *Vamana and Virechanakarma* in controlling blood sugar levels in diabetes mellitus

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Abstract

Diabetes mellitus (DM) with its devastating consequences is a global health problem of this era. Presently India is having the largest diabetic population of 50.8 million. The characteristic features of DM have close resemblance with *Prameha* (obstinate urinary disorders including diabetes) in Ayurveda. *Madhumeha* is a *Vatika* subtype of *Prameha* that is most close to DM. One variety of this *Madhumeha* (DM) is *Aavaranjanya* (due to occlusion) in which *Vayu* aggravates due to occlusion by *Pitta* or *Kapha*. This type of *Madhumeha* (DM) can be managed if *Samshodhana* (bio-cleansing) is used in early stages of disease followed by palliative treatment. *Vamana* (emetic therapy) and *Virechana* (purgation therapy) are the *Samsodhana Karma* (bio-cleansing therapies) that are compatible to overcome this *Aavarana* (occlusion). A comparative study was planned to compare their efficacy in controlling blood sugar levels in patients with DM. Although none of them were completely able to control blood sugar in the long-term but the study yields some very interesting results in reducing the blood sugar levels which could be useful in the future studies related to DM.

Key words: Blood sugar control, *Prameha*, *Vamana*, *Virechana*

Introduction

Perhaps never before, the health and wealth have gone in such a contradictory manner when wealth is booming like nothing and health is dooming like anything. Diabetes mellitus (DM) with its devastating consequences is a Global Health Problem of this era. Data from global studies demonstrates that the number of people with diabetes in 2011 has reached a staggering 366 million, 4.6 million deaths are due to diabetes and health care spending on diabetes has reached 465 billion USD.[1] Presently India is having the largest diabetic population with 50.8 million people living with the disease. World Health Organization (WHO) predicts a net loss of 336.6 billion international dollars in national income of India from diabetes between years 2005 and 2015.[2] It is no more the disease of rich but a disease of people leading sedentary life.

As per the WHO, "Diabetes mellitus is a heterogeneous metabolic disorder characterized by common features of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism due to absolute or relative deficiency in insulin secretion and/or action or both".[3] The characteristic features of DM have close resemblance with different varieties of a disease named as *Prameha* in Ayurveda.[4] *Madhumeha* (DM) is a *Vatika* subtype of *Prameha* that is most close to DM. One variety of this *Madhumeha* is *Aavaranajanya* (due to occlusion) in which aggravation of *Vayu* is due to its occlusion.[5] Basic pathological factor for this *Aavarana* is *Bahudravakapha* (excess *Kapha* in liquid form) along with *Bahu-abaddhameda* (excess and loosely bound fat).[6] One of the causative factor for this *Aavaran* is *Asamsodhana* (not getting bio-cleansing therapy at proper time).[7] This type of *Madhumeha* ((DM) can be treated if *Samshodhana* is used in early stages of disease followed by palliative treatment.[8] *Vamana* and *Virechana* are the *Samsodhana Karma* that are compatible to overcome this *Aavarana* so a comparative study was planned to compare their efficacy in controlling blood sugar levels in patients with DM.

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Aims and Objectives

1. To assess the efficacy of *Vamana* in controlling the raised blood sugar level.
2. To assess the efficacy of *Virechana* in controlling the raised blood sugar level.
3. To compare the efficacy of *Vamana* and *Virechana* in controlling the raised blood sugar level.

Materials and Methods

Selection of patients

Inclusion criterion

Known cases of Type-2 DM attending the OPD and IPD of the Govt. Akhandanand Ayurvedic College and Hospital, Ahmedabad, in the age group of 25-60 years having none of the long-term complication of DM were primarily considered for the study. Neither of them was having muscle wasting nor was underweight. Only those patients were selected who had never taken insulin to control his/her blood sugar. Of these, only those patients were finally selected who were found fit for *Vamana* or *Virechana* and who were having fasting blood sugar level in the range of 126-250 mg/dl or postprandial blood sugar level in the range of 200-350 mg/dl or both.

Exclusion criterion

Patients of Type-1 diabetes or the patients of Type-2 diabetes taking insulin or having diabetes in association with other diseases like cardiovascular diseases, renal diseases, carcinoma or any type of endocrinopathies, or patients with genetic syndromes having DM were not selected for the study.

Plan of study

In the study, 20 known cases of DM with a maximum chronicity of 10 years were selected and informed consent was taken in advance. These were subdivided randomly into group 'A' (*Vamana*) and group 'B' (*Virechana*) each comprising of 10 patients to compare the efficacy of both therapies. Any ongoing treatment for DM in all the patients was withheld for 5 days and then they were subjected to blood examination. The blood sugar levels thus achieved were considered as basal level. Thereafter the following management plan was implemented.

Treatment schedule

The treatment schedule in both the group followed the sequence of *Deepana-paachana* (digestive and appetizer medication), *Aabhyantara Snehapana* (internal oleation), *Sarvaanga Abhayanga-Swedana* (whole body massage and fomentation), *Vamana/Virechana*, and *Samsarjanakrama*. In both the groups a follow up study of 15 days was also done to assure the outcome of *Shodhanchikitsa* (bio-cleansing therapy).

Trikatuchurna in a dose of 3-6 g/day in two divided doses was used for 3-5 days for the purpose of *Deepana-paachana*. After proper *Deepana-paachana*, *Aabhyantara Snehapana* was started with *Triphaladi Ghrita* in increasing dose as per the *Koshtha* (Bowel) and *Agni* (digestive power) of the subject for the period of 3-7 days.[9] When the signs of proper *Snehana* (oleation) were achieved, *Sarvaanga Abhayanga* (whole body massage) with *Tilataila* was done followed by whole body *Swedana* (fomentation) by using the *Swedana* box (fomentation chamber). Fomentation was given only in mild form.[10] *Abhaynga–Swedana* (massage–fomentation) was used for two days in group A while in group B these procedures were done for 3 days.

In the patients of group A after the 3rd day of last *Snehapaan*, *Vamana* was given by *Ikshwakubeejachoorna* mixed with honey in a dose of 4-8 g as per requirement of patient while in group B *Virechana* (purgation therapy) was given after 4th day of last *Snehapaan* with *Snuhibhavita Katuki* in a dose of 6-10 g as per the *Kostha* (Bowel), etc., of patient.

After the *Samsodhankarma*, *Samsarjanakrama* was followed for 3-7 days as per *Suddhi* (outcome of bio-cleansing) achieved individually.[11] After completion of *Samsarjanakrama* blood sugar levels were checked. Patients were instructed not to take any antidiabetic medication for the next 15 days but to follow the advised antidiabetic diet and daily regimen. They were advised to report at the earliest in case they face any kind of medical problem during this period. On completion of this follow up period all the subjects were again investigated for their blood sugar levels.

Drugs used in the trial

All the drugs used in the trial were made available by the Govt. Ayurveda Pharmacy, Rajpippala, Gujarat.

Trikatu choorna

This was prepared by mixing equal amounts of *Pippali (Piper longum)* powder, *Sunthi* powder *(Zingiber officinale)*, and *Maricha (Piper nigrum)* powder. This was used for *Deepana-paachana* needed prior to *Snehapana*.

Triphaladi ghrita

Ghrita (ghee) processed with equal amounts of *Haritaki (Terminalia chebula)*, *Bibhitaka (Terminalia belerica)*, *Aamalaki (Emblica officinalis)*, *Aaragvadha (Cassia fistula)*, *Patha (Cissampelos pareira)*, *Saptaparna (Alstonia scholaris)*, *Vatsaka (Holarrhena antidysentrica)*, *Mustaka (Cyprus rotundus)* *Madanphala (Randia dumetorum)*, and *Nimba (Azadirachta indica)* was prepared. Same methodology as mentioned by *Sharangdhara* for *Ghrita Paka* (processing of ghee) was adopted to prepare *Ghrita*.[12] This processed *Ghrita* was named as *Triphaladi Ghrita* and was used for *Aabhyantara Snehapana* in both the groups.

Ikshwaku beej choorna

Seeds from the ripened fruits of *Ikshwaku* (*Lagenaria vulgaris*) were taken out, dried, and were grinded to get the fine powder. This powder along with honey and *Saindhavalavana* (rock salt) was used as *Vamana* drug. Honey and *Saindhava* were used for the purpose of liquefaction and *Chedana* (alleviation) of *Kapha* (mucus).[13]

Madhuyasti Phanta

Phanta (cold infusion) of *Madhuyasti (Glycirhyza glabra)* was used as *Vanmanopaga* (medicine to induce vomiting).

Snuhibhavit Katuki

Katuki Choorna (Picrorhiza kurro) was subjected to the single *Bhavana* (processing) of *Snuhikshira* (*Euphorbia nerifolia)* in stone marbles. Then it was kept in open shadow to dry for one day. This dried powder was used for *Virechana Karma* in the present study.

Criterion for assessment

The overall assessment of therapy was done by comparing the percentage change in fasting and postprandial blood sugar levels before treatment and after treatment (i.e., after *Samsarjana*). Besides that a follow up study of 15 days after *Samsarjanakrama* was also done and the results so found were compared with the blood sugar levels at the start of treatment. Then these two results were compared to assess the actual efficacy of procedures.

To calculate the percentage relief in blood sugar, the normal range of fasting blood sugar (FBS) (i.e., ≤125 mg/dl) and postprandial blood sugar (PPBS) (i.e., ≤200 mg/dl) were considered as base line and so percentage relief was calculated on both the occasions by using the formula:

% Relief in Fasting Blood Sugar = ((BT - AT)/(BT - 125))×100

% Relief in Postprandial Blood sugar = ((BT - AT)/(BT - 200))×100

The outcome of treatment was assessed in the manner as described below [Table 1].

Statistical analysis

The obtained information was analyzed statistically in terms of mean score (x), Standard Deviation (SD) and Standard Error (SE). Paired '*t*' test was carried out at the level of 0.05, 0.02, 0.01, 0.001 of *P* levels. The results were interpreted as,

- $P < 0.05$ and $P < 0.02$ Improvement
- $P < 0.01$ Significant improvement
- $P < 0.001$ Highly significant improvement.

Observation and Result

Study was done on 20 patients who were randomly selected for *Vamana* or *Virechana* group. Each group comprised of 10 patients. Most of the patients (45%) were in the age group of 41-50 years. Majority of patients under study were male (75%), Hindu (75%), and married (75%). Maximum number of patients were Graduate (30%), in service (30%), or running their own business (30%). Majority belonged to middle socio-economic status (60%). Most of the patients under trial had diabetes since less than a year (55%). Of total patients, 75% had positive family history.

Analysis of blood sugar level and relief in group – 'A' (*Vamana*)

In the *Vamana* group 'A', before treatment the mean FBS was 143.9 mg/dl while mean PPBS was 251.9 mg/dl. After *Vamana* (emetic therapy followed by *Samsarjanakrama*) mean FBS became 135.9 mg/dl with a relief of 42.3%, whereas in the follow up study its value further lowered to be 135 mg/dl with a 47% relief. Hence, on both occasions, results were statically significant ($P < 0.01$). In this group the mean PPBS came down to 229 mg/dl after *Samsarjanakrama* with a relief of 44.1%, whereas in the follow up it was found to be 231.9 mg/dl with a relief of 38%. Both of these show a statically significant ($P < 0.01$) reduction in PPBS also [Table 2].

In this group, 50% patients were having their FBS under control on both the occasions, that is, after *Samsarjana* as well as in follow up. Patients with moderate relief were just 10% after *Samsarjana* but during follow up, 20% were having moderate relief. In the same group 60% were having their PPBS under control after *Samsarjana* but in follow up study, PPBS of only 40% was under control leaving the remaining 20% to the range of marked relief [Table 3].

Table 1: Assessment of relief via change in blood sugar

Result	Fasting blood sugar	Postprandial blood sugar
Controlled	FBS within normal limit (i.e. ≤125 mg/dl)	PPBS within normal limit. (i.e. ≤200 mg/dl)
Marked relief	FBS improved by ≥75% than before treatment	PPBS improved by ≥75% than before treatment
Moderate relief	FBS improved by ≥50% than before treatment	PPBS improved by ≥50% than before treatment
Mild relief	FBS improved by ≥25% than before treatment	PPBS improved by ≥25% than before treatment
No relief	FBS not improved or improved by ≤25% than before treatment	PPBS not improved or improved by ≤25% than before treatment

FBS: Fasting blood sugar, PPBS: Postprandial blood sugar

Table 2: Statistical analysis of blood sugar level in group 'A' (*Vamana*)

Blood sugar	Mean blood sugar (mg/dl)			% relief	SD (±)	SE (±)	*'t'*	*P*
	BT	After *Samsarjana* Follow up study						
		A.SJ.	135.9	42.3	1.88	0.59	3.35	<0.01
FBS	143.9	F.U.	135	47	1.83	0.58	4.12	<0.01
		A.SJ.	229	44.1	2.00	0.63	3.63	<0.01
PPBS	251.9	F.U.	231.9	38	1.91	0.60	3.47	<0.01

FBS: Fasting blood sugar, PPBS: Postprandial blood sugar, SD: Standard deviation, SE: Standard error, A.SJ.: After *Samsarjana,* F.U. : Follow up study

Table 3: Assessment of relief in group 'A' (*Vamana*)

Group 'A'	Relief in fasting sugar level				Relief in postprandial sugar level			
	After *Samsarjana*		Follow up study		After *Samsarjana*		Follow up study	
	No. of patients	% of patients	No. of patients	% of patients	No. of patients	% of patients	No. of patients	% of patients
Controlled	5	50	5	50	6	60	4	40
Marked relief	-	-	-	-	-	-	2	20
Moderate relief	1	10	2	20	-	-	-	-
Mild relief	-	-	-	-	-	-	-	-
No relief	4	40	3	30	4	40	4	40

After *Samsarjana* in this group, a total of five patients had both FBS and PPBS under control. In the follow up study, only three were having both FBS and PPBS under control.

Analysis of blood sugar level and relief in group 'B' (*Virechana*)

In group 'B', before treatment the mean FBS was 167.5 mg/dl, whereas mean PPBS was 254.9 mg/dl. After *Virechana* (purgation therapy followed by *Samsarjanakarma*), mean FBS became 145.6 mg/dl with a relief of 51.5%, whereas in the follow up study its value increased to 152.7 mg/dl with a reduced relief of 34.8%. Results were found to be statistically significant ($P < 0.01$) on both the occasions. In this group, the mean PPBS came down to 210.4 mg/dl after *Samsarjanakrama* with a relief of 81.6%, which is statically a highly significant result. In follow up it was found to be 224.1 mg/dl with a relief of 56.1%, which shows a statically significant ($P < 0.01$) reduction in PPBS [Table 4].

After *Samsarjana*, the fasting blood sugar of 40% was found under control, whereas 10% each were having marked and mild relief in FBS. In the follow up study, only 30% patients were found with controlled blood sugar, 10% were with moderate relief, and 20% were in the range of mild relief but 10% achieved a marked relief level. Interestingly at this time the patients with no relief were reduced from 40% to 30%. In this group, after *Samsarjana* the PPBS of 50% patients was totally under control, whereas patient with marked, moderate, and mild relief in PPBS were equal, that is, 10%. In the follow up study, 40% patients were having PPBS under control, 10% patients were having marked relief, whereas 20% were with mild relief [Table 5].

After *Samsarjana* in this group, a total of four patients had both FBS and PPBS under control but after the follow up study, only three were having both FBS and PPBS under control.

Comparison of efficacy of *Vamanaa* and *Virechaan* on FBS and PPBS

After *Samsarjana*, the FBS levels were improved by 42.3%, which further improved by 47% in the follow up study in group 'A'. In group 'B', the relief in FBS was 51.5% just after *Samsarjana* but in the follow up, it declined to 34.8%. In group 'A' the relief in PPBS was significant 44.1%, which lowered to 38% in follow up. In group 'B', the PPBS improved by 81.6% but in the follow up study, the improvement in PPBS was 56.1% [Table 6].

Discussion

Type-2 diabetes occurs due to impaired insulin secretion, peripheral insulin resistance, and excessive hepatic glucose production. Insulin resistance impairs glucose utilization by insulin sensitive tissues and increase hepatic glucose output, both these effects contribute to the hyperglycemia. Increased hepatic glucose output predominantly accounts for increased fasting hyperglycemia, whereas decreased peripheral glucose uptake results rise in postprandial hyperglycemia.[14]

Bahudravasleshma and *Bahuabaddhameda* are the basic

Table 6: Comparison of efficacy of *Vamana* and *Virechan* on FBS and PPBS

Group 'A' (mg/dl)	Relief %		*P*	Group 'B' (mg/dl)	Relief %		*P*
FBS	A.SJ.	42.3	<0.01	FBS	A.SJ.	51.5	<0.01
	F.U.	47	<0.01		F.U.	34.8	<0.01
PPBS	A.SJ.	44.1	<.01	PPBS	A.SJ.	81.6	<.001
	F.U.	38	<.01		F.U.	56.1	<.01

F.U.: Follow up study, FBS: Fasting blood sugar, PPBS: postprandial blood sugar, A. SJ. : After *Samsarjana*

Table 4: Statistical analysis of blood sugar level in group 'B' (*Virechana*)

Blood sugar level	Mean blood sugar (mg/dl)			% relief	SD (±)	SE (±)	't'	*P*
	BT	After *Samsarjana* Follow up study						
		A.S	145.6	51.5	1.94	0.61	3.25	<0.01
FBS	167.5	F.U	152.7	34.8	1.72	0.54	3.47	<0.01
		A.S	210.4	81.6	1.71	0.54	4.8	<0.001
PPBS	254.9	F.U	224.1	56.1	1.82	0.57	3.46	<0.01

BT: Before Treatment, F.U.: Follow up study, FBS: Fasting blood sugar, PPBS: postprandial blood sugar, SD: Standard deviation, A. SJ.: After *Samsarjana*

Table 5: Assessment of relief in group 'B' (*Virechana*)

Group 'B'	Relief in fasting sugar level				Relief in postprandial sugar level			
	After *Samsarjana*		Follow up study		After *Samsarjana*		Follow up study	
	No. of patients	% of patients	No. of patients	% of patients	No. of patients	% of patients	No. of patients	% of patients
Controlled	4	40	3	30	5	50	4	40
Marked relief	1	10	1	10	1	10	0	0
Moderate relief	0	0	1	10	1	10	1	10
Mild relief	1	10	2	20	1	10	2	20
No relief	4	40	3	30	2	20	3	30

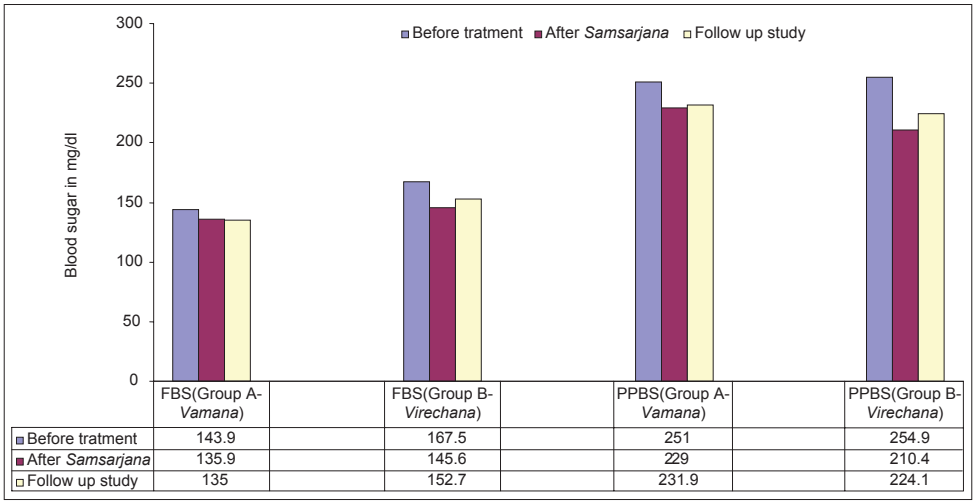
pathological factors for *Prameha* (obstinate urinary disorders including diabetes). *Bahudravasleshma* can be some sort of target tissue defect, whereas *Bahu-abaddhameda* can be correlated with free fatty acids, which are released from intra abdominal central adipose tissues. Free fatty acids may cause insulin resistance.[15]

As far as *Vamana* is concerned it alleviates primarily *Kapha* and to some extent *pitta* also.[16] Here *Vamana* seems to reduce the peripheral insulin resistance in muscles by alleviating *Bahudravasleshma* and so helping to increase the glucose uptake. As *Vamana* also reduces the *Meda*, it must be promoting the function of insulin by reducing the circulating free fatty acids in the body.[17]

As role of *Virechana* is on the site of *Pitta* it can be assumed that by acting primarily on liver and pancreas it may help to reduce hepatic glucose production and overcome the impaired insulin secretion. Both of these can justify its role in reducing both FBS and PPBS considerably in comparison to *Vamana* as was seen in group 'B' [Figure 1].

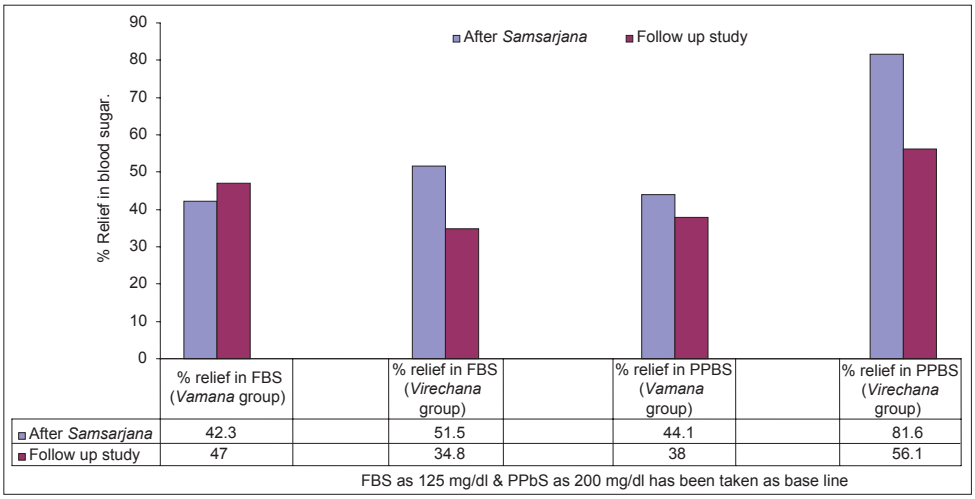
On the basis of results found, it is clear that in both groups the reduction in FBS and PPBS were statically significant ($P < 0.01$ or $P < 0.001$) on all the occasions. As far as group 'A' is concerned, the percentage improvement in FBS and PPBS was comparably in the lower side than in group 'B' at the time of both assessments, that is, after *Samsarjana*, and in follow up. In both groups, the percentage improvement in blood sugar level was tending to decrease during follow up study except the FBS level of group 'A', which showed an increase in percentage relief. [Figure 2] Data clearly suggests the elevation of both FBS and PPBS levels in both groups (except FBS in follow up in Group 'A') but at a slower pace in group 'A'. An interesting observation is that after *Samsarjana* in both groups, percentage of patients with controlled PPBS was more than with controlled FBS.

In group 'A' much sustained results in follow up suggests that *Vamana* acts on the basic pathology of *Bahudravasleshma* and *Bahuabadhameda*. It is clear that both *Vamana* and *Virechana* are reducing the insulin resistance, more aggressive reduction in both FBS and PPBS in group 'B' suggests that *Virechana* must be increasing insulin secretion also. However, this trend could not be maintained in follow up where increase in both FBS and PPBS was noted.



	FBS(Group A-*Vamana*)	FBS(Group B-*Virechana*)	PPBS(Group A-*Vamana*)	PPBS(Group B-*Virechana*)
Before tratment	143.9	167.5	251	254.9
After *Samsarjana*	135.9	145.6	229	210.4
Follow up study	135	152.7	231.9	224.1

Figure 1: Comparative analysis of FBS and PPBS in Group 'A'(*Vamana*) and Group 'B' (*Virechana*)



	% relief in FBS (*Vamana* group)	% relief in FBS (*Virechana* group)	% relief in PPBS (*Vamana* group)	% relief in PPBS (*Virechana* group)
After *Samsarjana*	42.3	51.5	44.1	81.6
Follow up study	47	34.8	38	56.1

FBS as 125 mg/dl & PPbS as 200 mg/dl has been taken as base line

Figure 2: Comparison of percentage change in blood sugar levels in Group 'A' (*Vamana*) and Group 'B'(*Virechana*)

In few cases, sugar level was on an increasing trend suggesting the fact that only *Vamana*a or *Virechana* is not capable enough to maintain the sugar levels. *Prameha* has been mentioned as *Aanushangivyadhi* (disease having relapsing nature), which literally means a relapsing nature.[18] Hence, for better control of blood sugar levels, along with this palliative treatment *Rasayana chikitsa* (rejuvenation therapy) is also needed.[19] There were some patients in both groups who could maintain their FBS and PPBS well in control even after the follow up with the antidiabetic diet regimen and life style changes. This clearly suggests that if patient is in early stage of disease when *Kapha* is dominant than *Shodhana* itself may be enough to control sugar levels. As *Prameha* passes through transitional states it is better to use *Shodhana* in early stage when *Kapha* or *Pitta* is dominant otherwise it becomes incurable.[20]

Probable mode of action

In *Prameha*, the dominant *Dosha* (morbid matter) and *Dushya* (target tissue) are *Kapha* and *Meda* (fat) so here *Trikatuchurna* was selected for *Deepana-paachana* as besides increasing the *Agni* (digestive power) it alleviates *Kapha* and *Meda* also. It is indicated in *Prameha*, hence, probably it helps in breaking the pathogenesis of *Prameha*.[21] *Sampraptivighatana* (alleviation of pathological process) at the cellular level is the ideal treatment to uproot any disease. Hence, it is mandatory to have a carrier that can facilitate the drug or its pharmacological properties to get into the cell. Cell membrane is made up of phospholipids which does not allow the passage of water soluble molecules but it provides free passage to lipids and lipid soluble substances. *Ghrita* (ghee) has been mentioned as best *Sneha* (unctuous substances) in *Ayurveda* because of its specific qualities of *Yogavahitva* (substance which acquires the property of another substance when combined together) and *Samsakaranuvartana* (property to assimilate effectively the properties of other substances). Besides that, it has been told to be *Saatmaya* (congenial) since birth and is easy to consume.[22] Its bioavailability is much more than any other *Sneha* (unctuous substances). Hence, *Ghrita* was chosen for *Abhyantarasnehana* purpose. *Ghrita* was processed with 10 drugs as mentioned for *Santarpan janya vyadhi* (disease caused due to excessive nourishment) in *Charakasamhita*.[23,24] This processed *Ghrita* may help to reduce the insulin resistance at cellular level as well as the circulating free fatty acids in the blood. Paste of *Ikshwaku* seeds is indicated for *Vamana* in *Prameha* and its mode of action is same as other *Vamana* (emetic) drugs.[25,26] Patients with *Madhumeha* (DM) are *Durvirechya* (tough for purgation) so in them *Teekshna Virechan* (strong purgative) is necessary.[27] *Snuhi (Euphorbia nerifolia)* has been mentioned as strongest purgative and is indicated in *Madhumeha* (DM) also.[28,29] *Katuki (Picrorhiza kurro)* is mainly *Pittavirechaka* (chologogue) and processed with *Snuhi (Euphorbia nerifolia)* it can eliminate both *Kapha-Pitta* even in patients of *Madhumeha* (DM). As in DM, there is increased hepatic glucose production, it is a possibility that *Katuki (Picrorhiza kurro)* being *Pittavirechaka* (chologogue) reduces various enzymes responsible for this mechanism and so reduce hepatic glucose production. *Vamana* seems to reduce blood sugar levels chiefly by reducing insulin resistance while *Virechana* probably reduces insulin resistance as well as promotes insulin secretion.

Conclusion

It can be summarized that both *Vamana*a and *Virechana* cause marked reduction in FBS and PPBS levels. In early course of disease *Samshodhana* must be the choice of treatment; as at this stage, patient has dominance of *Kapha* and *Pitta*. It seems that *Vamana* by reducing *Kapha* and *Meda* helps to minimize insulin resistance, whereas *Virechana* by lowering down the hepatic glucose production helps to control blood sugar. As *Prameha* is an *Aanushangivyadhi*, neither *Vamana*a nor *Virechana* alone acts as the complete treatment for it. To get definite output regarding specific role of *Vamana*a and *Virechana* on FBS and PPBS, further study is necessary. The present study was carried on a small sample and for a limited time. As it showed encouraging results, further research must be done at a higher level with a large sample with longer duration so that a definite theory can be promulagated.

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हिन्दी सारांश

डायबिटीस मेलाईटस् में ब्लड शुगर नियन्त्रण हेतु वमन एवम् विरेचन का तुलनात्मक अध्ययन

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अधुना डायबिटीस मेलाईटस् वैश्विक स्तर पर एक अति चिन्तनीय रोग के रूप में व्याप्त हो चुका है । २०११ मे विश्व भर मे इससे पीड़ित रोगियो की संख्या ३६ करोड ६० लाख हो गयी । आयुर्वेद मे वर्णित विभिन्न प्रकार के प्रमेह रोग के लक्षण इस रोग से मिलते है । उनमें से भी मधुमेह को डायबिटीस मेलाईटस के सर्वाधिक समीप माना जाता है । आवरण जन्य मधुमेह मे संशोधन चिकित्सा का महत्वपूर्ण स्थान है । प्रस्तुत परीक्षण मे मधुमेह रोगियों के ब्लड शुगर स्तर पर वमन एवम् विरेचन द्वारा होने वाले प्रभाव का तुलनात्मक अध्ययन किया गया । अध्ययन से ज्ञात हुआ कि वमन तथा विरेचन दोनों ही ब्लड शुगर कम करते है लेकिन विरेचन के द्वारा प्रारम्भिक लाभ अधिक रहता है जबकि वमन के द्वारा प्रभाव लम्बे समय तक स्थायी रहता है ।