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A CLINICAL STUDY TO EVALUATE THE EFFECT OF VIRECHANA IN PREDIABETES

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ABSTRACT

Prediabetes is a condition in which blood sugar level is high, but not high enough to be type 2 diabetes. Since Indians are at higher risk of Prediabetes and developing diabetes a decade earlier than Europeans. Increasing prevalence of type 2 diabetes mellitus has become alarming. Effective management of Prediabetes would definitely slow down the progression of diabetes mellitus. Here I have given Virechana to the Prediabetic patients. Drugs used for Virechana karma are Triphala, Trivrutta, Guduchi, Nimb siddha kashaya, Trikatu churna and Gomutra are taken as prakshepa dravya, taken from Sushrut Samhita. Virechana is one of the Panchkarma therapies mentioned in Ayurvedic Classics. It removes vitiated doshas from strotas and help in strotoshodhana. It helps in removal of doshas at microcellular level.

KEYWORDS: Prediabetes, Diabetes Mellitus, Virechana, Panchkarma.

INTRODUCTION

For more than 6000 years, Ayurveda i.e., ancient science of healing is addressed for prevention of disease and maintenance of health. It places great emphasis on enhancing the quality of life and prevention of ill health through diet & lifestyle. Ayurveda has also mentioneda lot of diseases along with its treatment in detail resembling symptoms of diseases in modern science. Combining and understanding both the sciences can give amazing result.

Today's world is blessed with so many technologies, that it has given immense comfort tothe humans. Thus, lifestyle of people is changed a lot. Due to industrialization, globalization & modern lifestyle which comprise of long sedentary periods, physical inactivity, mental stress, consumption of unhealthy food and beverages leads to various Metabolic Disorders, Diabetes isone of them.

Diabetes is considered as major health problem due to its serious complications, such as atherosclerosis, retinopathy, kidney damage and gangrene of lower extremities. As it is a gradually progressing disease, identifying the disease at earlier stage its progression can be checked. Earlier stage of Diabetes is known as Prediabetes.

Statistics show that, India leads the world with the largest number of diabetic subjects and itis termed as 'Diabetes Capital of the World'. According to WHO, Number of people with diabetes rose from 108 million in 1980 to 422 million in 2014. India ranks among top 3 countries with diabetic population. India had 64.5 million people with Diabetes as per 2015 data. Out of this 36 million people remained undiagnosed. In year 2019, estimated 1.5 million deaths were directly caused by Diabetes. 30% of Indian adults aged 20 years or older have Prediabetes whichis about 78 million.

Recently National Urban Diabetes survey (NUDS) carried out by the Diabetes Epidemiology Study Group in India (DESI) in six major cities of India covering all the regions of the country estimated that the prevalence rate of Diabetes in the adult population is 12.10%, while the prevalence rate of pre-diabetic condition is 14%. Above data suggest that diabetes and prediabetes are rapidly gaining the status of potential epidemic in India.

Prediabetes is abnormal glucose homeostasis, also called as impaired glucose tolerance. It isa condition in which blood sugar levels are higher than normal but not high enough to be classified as full-blown diabetes. According to WHO criteria FPG (fasting plasma glucose) between 110 to 125 mg/dl & PPG (postprandial glucose) between 140 to 199 mg/dl. According to ADA (American diabetic association) FPG (fasting plasma glucose) between 100 to 125 mg/dl& PPG (postprandial glucose) between 140 to 199 mg/dl & Glycosylated haemoglobin level i.e., HbA1C between 5.7 to 6.4% comes under this range.2 Individuals in all three groups are at higher risk of progression to Type 2 DM & have an increased risk of cardiovascular disease.

Progression from prediabetes to DM is 25% over 3 to 5 years & this progression is faster in Asian Indians. Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces (due to resistance to insulin) which leads to hyperglycaemia. Majority of the people around the world arehaving Type 2 DM. WHO estimates that diabetes is major silent killer and it was seventh leadingcause of death in 2016.

Aacharya Sushruta has described shatkriyakala in great detail. In sthanasanshraya avastha i.e., fourth stage, disease shows its picture (purvaroopavastha) and we come across the diagnosisof the disease and treatment can be initiated.3 Thus, same with the Type 2 DM, if treatment is started at the Prediabetic stage we can prevent its progression. In Ayurvedic Classics various diseases are described along with their causes, sign and symptoms, etiopathogenesis under Nidan panchaka. Prameha has been described elaborately in all Ayurvedic classics. It is described as one of the Mahagada i.e., difficult to cure, having cardinal symptom prabhuta avil Mutrata.

Unavailability of the treatment of Prameha may result into Madhumeha. Aacharya Charaka has highlighted the role bahudrava shleshma, and other vital elements like meda, kleda, mamsa andfinally oja in the samprapti of Madhumeha.5

The sign and symptoms, etiopathogenesis of Madhumeha mentioned in Ayurvedic Classics resembles to that of Diabetes Mellitus.

REVIEW OF LITERATURE

For utpatti of prameha vyadhi following body constituents are involved.

Dosha

a) Kapha

Though all three doshas take part in samprapti, kapha predominates in them. Normally, kapha dosha has dominance of prithvi and jala mahabhoota29 having sthira and ghana property which indicates its ghanibhava. Hence it does gaurava and dharana karma in the body. Vitiated or vidagdha kapha is of lavana rasa30 having agni and jala mahabhoota dominancy. In prameha, kapha is in vitiated form i.e. bahu and drava in character. So, saara and sthira guna of kapha are lost, leading to manifestation like dhatu shaitilya in pramehi patient. This dravibhoota kapha causes vitiation of dhatus like meda, mamsa, kleda, rasa, rakta, vasa, lasika etc. and following symptoms like shaithilya, alasya, atinidra, gaurava are produced in patient.

b) Pitta

As prameha is tridoshaja vyadhi, pitta Dosha is also involved in samprapti. In aavaranajanya samprapti vitiation of pitta occurs. Rasa, rakta, sweda and lasika are the seats ofpitta, so when pitta dosha is provoked it causes vitiation of this doshas. Symptoms like pipasa,shosha, daha,

swedatipravrutti and visragandha are produced.

c) Vata

In the pathogenesis of Madhumeha, it is the predominant dosha. In Madhumeha vata gets aggravated either because of avarana caused by kapha, pitta or by its own etiological factors. When dhatukshayajanya. samprapti is there, kapha and pitta dosha are in kshinavastha and vatais aggravated by its own etiological factors. Vaata by its gunas like ruksha, laghu, khara etc. draws vital constituents of the body like vasa, majja and oja towards basti and excretes them through urine, resulting in symptoms like shosha, trushna, suptata and daurbalya.

Dushya

a) Rasa

Its close resemblance with kapha dosha is described by Acharya, Vagbhata as 'Rasoapi shleshmavata'. Rasavriddhi lakshanas are similar to those of kapha dosha vriddhi.31 As kapha ispredominant dosha in samprapti of prameha, rasa also gets vitiated. As rasa dhatu is seat of kapha and pitta dosha. When rasa dhatu gets vitiated in prameha, it shows manifestation like alasya, gaurava and karshya.

b) Rakta

Involvement of rakta dhatu is not much in the precipitation of prameha. It mainly getsvitiated in pittaja prameha. More than initially, at later stage rakta also gets vitiated causing complications like prameha pidaka, vidradhi etc.

c) Mamsa

It is one of the main dushyas described by Acharyas. Especially in kaphaja prakara and santarpanajanya prameha mansadushti is seen. Because of mamsa dushti manifestation like putimamspidaka etc. are seen.

d) Meda

Meda is the main dushya in the pathogenesis of prameha, having almost similar propertiesto the vitiated predominant prameha dosha i.e. kapha. Both gets vitiated by same etiological factors. Acharya Charaka while describing altered state of these dushyas used the term "Bahu" means in excess and "Abaddha" means loss of compactness of the affected dushyas. Normal function of meda is to produce unctuousness in the body along with drudhatva i.e. compactness.

Meda is produced in excess quantity in the pathogenesis of prameha and it is aparipakwa i.e. sama. Along with kapha, it obstructs the path of vata. This provoked vata increases agni and cause patient to eat food in more quantity leading to excessive deposition of apakwa meda. Thisleads to causes severe depletion of other dhatus and produces various symptoms.

e) Majja

Majja dhatu is not vitiated to much extent. But in vataja prameha due to ruksha, laghu, khara guna there is ksharana of vital elements like majja. And it leads to symptoms like bhrama, murchha, netragaurava etc.

f) Shukra

Normal function of shukra dhatu in body is to maintain dehabala. Vitiation of shukra dhatu produce symptoms like daurbalya and kruchhravyavayata. There is depletion of shukradhatu in shukrameha.

g) Oja

In vataja type of prameha, provoked vata due to its ruksha guna alters madhura rasa of ojato kashaya. This provoked vata carries oja towards basti and excretes through urine. Ojakshya symptoms are produced like daurbalya, nidra, tandra etc.

h) Vasa

Acharya Charaka described vasameha as a subtype of vaataja prameha. Vasa is updhatu of mamsa (mamsasyasneha), and it is described as unctuousness present in mamsa dhatu. In Prameha, mamsa is one of the main dushya, so in turns vasa also gets vitiated.

i) Lasika

This is liquid component present just beneath the skin. Lasika also gets vitiated by vata resulting in lasikameha.

j) Kleda

This is one of the components mainly involved in the samprapti of prameha. Its literary meaning is wetness, dumpness or moisture etc. Its normal physiology in body is maintained by mutra and sweda along with meda. sweda holds it and mutra excretes it outside, maintaining equilibrium. 32 Thus, when kleda is involved, it affects above factors and produce symptoms like swedavriddhi, daurgandhya and prabhoota mutrata. Commentator of Ashtanga Hridya, Arundatta commented about kleda, if kleda is not present in the body it

leads to shosha i.e. dryness in the body.33

k) Sweda

\This dushya is separately mentioned by Acharya Vagbhata. It is closely related to meda and kleada in the body. It is produced as malabhaga of meda in sthula-sukshmapachana. Thus, due to vitiation of kleda and meda, swedavaha strotodushti occurs and it leads to symptoms likeswedatipravrutti, daurgandhya, snigdhagaatrata and picchilagaatrata.

PURVAROOPA

During the process of development of disease, prodromal signs and symptoms are produced, which are indicative of the occurring disease, they are termed as purvaroopa. These premonitory symptoms are produced at the stage of sthanasanshraya i.e. fourth stage of shatakriyakala. Vitiated dosha while spreading through the whole body gets accumulated at strotovaigunya i.e. sthana sanshraya occurs and then some symptoms are produced they are termed as purvaroopa according to Madhukoshkar,35

Madhukoshkar classified these purvaroopas into following two types.
1. Saamanya purvaroopa & 2. Vishesha purvaroopa.

Samanya Purvaroopa: By them only occurring disease can be identified but dosha vishes of vyaadhi cannot be identified.

Vishesha Purvaroopa: Here not only vyadhi but also dosha vishesha of the occurring disease can be known.

Importance of Purvaroopa

Purvaroopa are important to diagnose the disease as early as possible, for good prognosis of the disease. Further indulgence of the causative factors can be prevented and treatment can be started at this stage to prevent the disease. It is also important to know the vyadhibala and sadhyasadhyata of the disease. If all the symptoms mentioned in purvaroopa avastha are present then vyadhi is said to be asadhya; It is also important for the differential diagnosis of the disease. eg. while differentiating Raktapitta and Prameha, symptoms mentioned in both the disease are same. Here Prameha can be differentiated by knowing its purvaroopa.

Purvaroopas of Prameh are as follows

Swedatipravrutti, Daurgandhay Predominant dosha and dushya in prameha vyadhi are kapha

(bahudrava swaroopa) and meda dhatu. Due to dhatwagnimandya vikruta meda (atisnigdha, aamsanyukta) is produced and malbhaga of meda i.e. sweda is also produced in excess quantity.Excess production of sweda leads to daurgandhya.

Karapada daha- It is burning sensation of palm and sole. Due to aashayapakarsha gati of pitta, daha may be produced. Sometimes due to pittavriddhikar hetu, ushna and tikshna guna of pitta increases, and kapha is unable to regulate pitta dosha so symptom like karpada daha is produced.

Karpada suptata- Due to aashayapakarsha gati of kapha, kapha is dislocated by force of vriddhavyana vayu, and on reaching to another sites it produces symptoms like suptata.

Netra-jivha-shravana upadeha- Upadeha (upalepa) means feeling of heaviness at indriya due to excessive accumulation of malabhaga. Because of defective metabolism (dhatvagnimandya) production of malabhaga is in excess.

Hridayopadeha- it means feeling of heaviness at hridya. Hridya is mulasthana of rasavaha strotasa, thus due to defective metabolism rasagata mala is also produced in excess leading to feeling of heaviness.

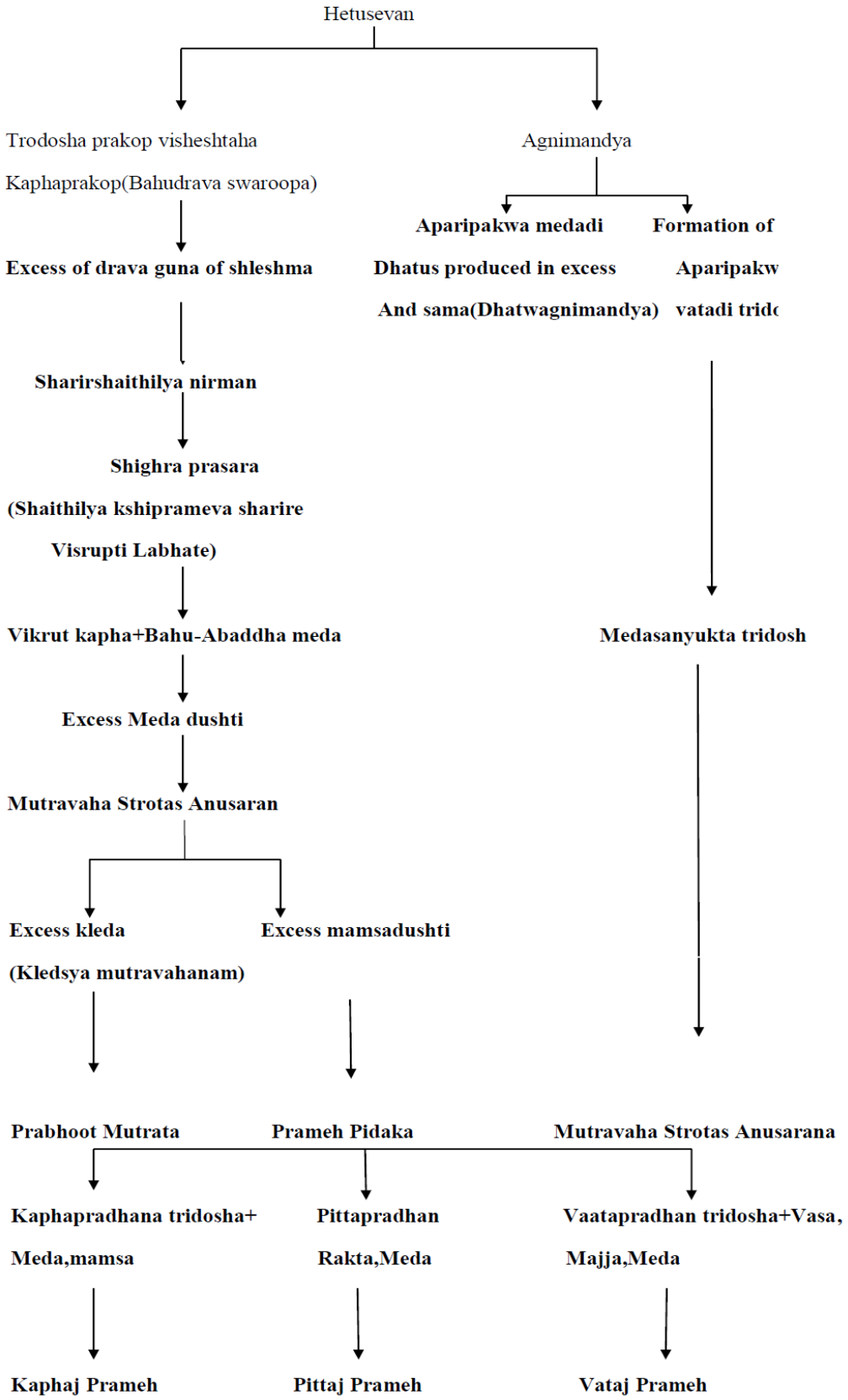
Kesha-nakhativriddhi - Kesha and nakha are termed as asthi dhatu mala. In prameha malotpatti isincreased leading to ativriddhi of kesha and nakha.

Jatilibhavam kesha- Meda is prominent dushya in prameha, and it is also precursor dhatu to asthi. Due to dhatwagnimandya, vikruta and excess meda is produced leading to excess sweda production. Thus, ativriddha kesha and excess sweda leads to jatilibhava of shirastha kesha.

Aasyamadhurya- It is due to kapha prakopa by madhura guna and also due to increased aapyansha in the body.

Mukha-Talu shosha & Pipasa- Ushna, tikshna guna vriddhi of pitta due to pittavriddhikar hetu leads to aapyansha shoshana from dhatus and produces these symptoms. Aashayapakarsha gati of vata also, leads to udaka kshaya from dhatus leading to feeling of dryness and increased thirst.

Samprapti of Prameh.



MATERIAL AND METHODS

Type of study

Prospective Open Clinical Study.

Number of Patients:-30.**Drug**

For virechana snehapaan with goghruta. For virechana karma, Trivrutta, Guduchi, Nimba, Triphala, Trikatu, Gomutra are used.

METHODS OF PREPARATIONS

Virechana KarmaPoorvakarm

Snehapana was given in Sarvadehik Niramavastha with Goghruta for 3-7 days until Snehasiddhi Lakshana occurred.

Abhyanga was done with Tila Taila for 15-30 minutes followed by Nadi Swedana for 3 days after Snehapana.

Pradhana Karma

Virechana karma was done with following Kalpa. Approximate quantity of each drug wasas follows.

Sr. No.	Drug	Quantity
1	Trivrutta bharad	25 gm
2	Triphala bharad	25gm
3	Guduchi bharad	25gm
4	Nimb bharad	25gm
5	Trikatu churna	3gm
6	Gomutra	10 ml

(Final dose was decided accordingly to koshta and agni of patient.)

Method of preparation

Adding the contents, 16 times water and then boil until 1/8th i.e., 200ml. Kwath will be prepared according to classical methods of kwath preparation from Sharangdhar samhita.114 Trikatu churna will be added as prakshepa (quantity will be 3gm). Gomutra will be added in thequantity of 10 ml.

Approximately 200ml of kwath with 3 gm of trikatu churna prakshepa with 10 ml of gomutra will be given. (Final dose will be decided accordingly to koshta and agni of patient.)

Paschata Karma

Samsarjana karma depending on shuddhi prakara for 3-7 days.

Duration: for virechanakarma approximately 15 to 20 days.Diet: Antidiabetic diet advised to the patient.

Follow up: Clinically patient will be screened before and after virechana karma. IFG & IGT andHbA1C & BSL (F & PP) levels will be measured before and after completion of study.

Plan of Study

Patient presenting with prediabetes were selected then investigated for IFG, IGT, HbA1C& BSL (Fasting & Post prandial). Planed for virechana after considering inclusion & exclusion criteria. Virechana karma was given to the patients along with purva karma, pradhan karma and paschat karma procedures for approximately 15 to 20 days. After one month BSL (F & PP) levels were repeated and after 3-month HbA1C, IFG and IGT were done. The result obtained after completion of study was compared and documented in case record form.

CLINICAL EXAMINATION

Complete clinical examination was done to diagnose and assess the condition of patient.

DIAGNOSTIC CRITERIA

1. IFG between 100 to 125mg/dl& IGT between 140 to 199 mg/dl.
2. BSL F 100 to 125 mg/dl & PP 140 to 199mg/dl.3. HbA1C 5.7 to 6.4%.

INVESTIGATIONS

1) Blood- CBC, ESR, Liver Function and Renal Function Tests before treatment as routine and toexclude complications said in 'Exclusion Criteria'.

Inclusion Criteria

1. Males and Females of age group 20 to 70 years Newly diagnosed with prediabetes.
2. Either any of the below will be considered in study, IFG between 100 to 125mg/dl& IGT between 140 to 199 mg/dl BSL F 100 to 125 mg/dl & PP 140 to 199mg/dl.
3. HbA1C 5.7 to 6.4%
4. Subject who are willing to give written informed consent

Exclusion Criteria

1. IGT >200 mg/dl IFG <100 mg/dl
2. HbA1C > 6.5%
3. Prior use of medicine to treat diabetes except gestational diabetes.
4. Significant renal insufficiency.

5. Pregnant & lactating.
6. Having CA or any other major life-threatening disease
7. Those patients who are not ready to comply the trial protocol.
8. HIV, AIDS, Hep-B, Hep-C, or any other immunosuppressive disorder.9.Current diagnosis or H/O of malignancy.

WITHDRAWAL CRITERIA

Patients will be withdrawn from clinical trial with replacement if:

1. Occurrence of serious adverse effect.
2. If patient does not give follow-up on regular basis.
3. If patient is non-cooperative.
4. If subject himself/ herself wants to withdraw from study.
5. Further continuation of study is likely to be detrimental for the health of the patient.

Criteria of Assessment

Assessment Criteria: Assessment was done objectively.

Objective Criteria: BSL, IFG, IGT & HbA1C was estimated before and after the treatment for assessment.

OBSERVATIONS AND RESULTS

Present study with the title "A Clinical Study To Evaluate the Effect of Virechana in Prediabetes" was done with 30 patients. Before starting the study, the selected patients were observed under same criteria. A detailed history was taken according to case record form mentioned in materials and methods. Before starting the treatment, investigations were done and those values were noted as the before treatment values and these patients were screened as per protocol; observations were noted and results were recorded. Following are the observations seenduring the study.

Table no 12: Patients selected for study.

1	Total no. of patients recruitedin the study	33
2	No. of patients who left thestudy	3
3	No. of patients who had takenVirechana karma	30

1) In the study maximum patients were from age group 40-49 yrs(37%) and then of 50-59 yrs(33%).
2) Amongst the total patients 50% were male and 50% were female.

3) Majority of patients were from middle class (83%) and then from lower class (13%).
4) Amongst 30 patients, 16.67% were doing their business, 30% were housewife, 3.33% were driver, 3.33% were in marketing,3.33% were in security,2% were retired,36.67% were in service.
5) It was observed that among 30 patients, 63.33% were graduate, 13.33% were illiterate and23.33% were undergraduate.
6) About 77% patients were taking mixed diet (i.e both veg and non veg) while remaining 23%were vegetarian.
7) In this study, 33.33% patients were having habit of taking Tea and/ or Coffee frequently. 13.33% were found to have alcohol addiction and 3.33% were found to have smoking addiction. 30% were found to have no addiction.3.33% patients were having coffee, alcohol and smoking addiction. 6.67% patients were having smoking and alcohol addiction.6.67% were found to have tea and alcohol addiction. 3.33% were having tobacco and alcohol addiction.
8) In this study, it was seen that 23% patients were of Kapha-Pitta prakriti, 33% were Kapha-Vata, 7% were Pitta-Vata, 13% were Pitta-Kapha and 10% were of VataKapha prakriti.13% were vata- pitta.
9) In this study, it was seen that 47%patients had Manda Agni, 47% patients had Vishama . Agni, 7% had Tikshna Agni and no patient had Samagni.
10) 57% patients were having Madhyama Koashta, 20% having krura Koshtha and 23% patients were having Mrudu Koshtha.
11) 63% patients had dushti of Kapha dosha dominant, 13% had Pitta and 23% hadVata doshadominant.
12) In this study, 87% were from Anupa Desha, 3% were from Jangala Desha and 10% were from Sadharan desh.
13) I this study, 53% patients had family history of diabetes mellitus while 47% did not had family history of diabetes mellitus.

STATISTICAL ANALYSIS

STATISTICAL EVALUATION OF TREATMENT

Clinical data obtained from patients was analysed statistically in terms of Mean score, Percentage of relief, Standard Deviation (S.D.), Standard Error (S.E.) by following tests.

Paired 't' test

For assessment of effect of treatment on haematological parameters (BSL F& PP, HbA1C, IFG & IGT) before and after treatment within Trial Group is a quantitative data, so Paired 't' testwas applied.

1) BSL FASTING

BSL Fasting values were decreased in Trial group to 100.16+10.16. Paired t was 8.15, P value is <0.0001 which was statistically significant.

2) BSL PP

BSL PP values were decreased to 155.03±3.18, in the Trial group. Paired t was 9.4749. P valueis <0.0001; which was statistically significant.

3) HbA1C

HbA1C values were decreased to 5.53 0.14 in Trial group.

Paired t was 13.72; P value is <0.0001; which was statistically significant.

4) IFG

IFG values were decreased to 96.70±4.40 in Trial group..

Paired t was 7.98; P value is <0.0001; which was statistically significant.

5) IGT: IGT values were decreased to 135.54±7.21 in Trial group. Paired t was 16.57; P value is <0.0001; which was statistically significant.

DISCUSSION

Discussion is the foremost substratum of any type of research work. If all the points are discussed with proper results then they help to draw proper conclusion. It is the logical reasoningof observations. Prediabetes is one of the life style disorder. Due to today's lifestyle including faulty food habits (atisnigdha, guru, madhura) minimum physical exercise, sedentary lifestyle and mental stress results into various abnormalities in body composition, one of them is Prediabete. Progression of Prediabetes to Diabetes is rapidly increasing nowadays. Diabetes is widely regarded as a major risk factor for dyslipidaemia, atherosclerotic diseases, coronary heart disease, and nephropathy etc. Its prevalence is increasing day by day. This has encouraged me tocarry this study entitled, "A Clinical Study To Evaluate The Effect Of Virechana In Prediabetes".

The observation and results obtained, are discussed here with as follows.

A) General Discussion

B) Effect on Parameters

C) Total Effect of Therapy:

A) General Discussion

Age wise Distribution:

In this study, maximum patients (37%) were from age group 40-49 Years and then from 50-59 Years (33%) and 23% patients belonged to age group 60-70 Years.

Sex wise Distribution

In this study, amongst total patients 50% patients were Male and 50% were Female.

Occupational Status

Amongst 30 patients 36.67% were doing service, 30% were housewives, 16.67% were doing business. 6,67% patients were retired, 9.99% were from other occupation.

Educational Status

Amongst 30 patients, 13.33% were found to be illiterate, 63.33% were found graduate and 23.33% were undergraduate.

Economic Status

Majority of patients in the trial group were middle class (83%) and 13% were from lower class, 4% were from higher class.

Diet Habits

It was noted that 77% patients were taking mixed food (i.e. both veg and non veg diet) and 23% were having only veg diet.

Addiction wise distribution

In this study, 33.33% patients were having habit of taking tea or coffee frequently. 13.33% were found to have alcohol addiction. 6.67% were having smoking and alcohol addiction, 6.67% werehaving tea and alcohol addiction. 30% were found to have no addiction.

Doshaj Prakruti wise

In this study, it was seen that 33% patients were of kapha-vata prakruti, 23% patients were

kapha-pitta prakruti. 13% patients were of pitta-kapha prakruti, 13% patients were of vata-pittaprakruti. 10% patients were of vata -kapha and 7% were of pitta-vata prakruti.

Desha

In this study, 86.67% were from anup desha, 10% were from sadharana desha and 3.33% patientof jangala desha.

Dominant Dosha

In this study, 63% patients had dushti of kapha dosha dominance, 23 % patients had dushti of vata dosha dominannt and 13% patients had dushti of pitta dominant.

Agni

In this study, it was seen that 47% patients had mandagni, 47% patients had vishamagni. Koshtha.

In this study 57% patients were having madhyhyam koshtha, 23% patients were having mrudukoshta and 20% patients were having krura koshta.

Family History of Diabetes

In this study it was observed that 53% patients were having family history of Diabetes, whereas47% patients had no family history of Diabetes.

Thus, with overall observations; The age group of 40-49 years and 50-59 years suffers more than the age group of 30-39 years and the age group 20-39 years suffers less. The reason behind this could be explained as people belonging to these group live more stressfull, sedentary life anddon't do much of exercise. Equal number of males and females affected. It can be explained as if study done on large population, this gender predisposition may vary. The middle-class group found to have more incidences of Prediabetes. The reason for this can be that the persons visiting hospitals are more middle class in number, so the data and percentage can vary in broad population. Maximum number of the patients were addicted to tea, coffee or alcohol. Many of the patients were habituated to consumption of mixed diet which included veg and nonveg food. As this diet is atisnigdha, atiguru and madhura rasa dominant in nature, causing pathophysiologyof the Prameha.

The persons with kapha-vata and kapha-pitta prakriti with kapha dosha dominant had more incidences of Prediabetes. As main dosha dushti of the disease as per explained in review is kapha dosha. As this study is conducted in our college which is in anup desha. More number

people residing at anupa desha were seen. And as kapha doshanubandha is present at anup desha, persons living in anup desha had more incidences of Prediabetes. There were equal number mandagni and vishamagni patients. Suggesting their irregular eating and bowel habits, it leads to vikruta chayapachaya and aamdosha. Main pathophysiology occurs due to mandagni as explained in review. Prediabetes that is in here as Pramehapurvaroopa, is due to jatharagni and dhatvagnimandya which gets vitiated due to atimadhura, snigdh, picchila, drava, sheeta aahara vihara and avyayama which are basically kaphavruddhikara. The dhatvagni gets poshana from mainly jatharagni; so, it also gets vitiated. Here we have seen that kapha vataanubandhi prakruti people are having more incidence. Also, the dosha dominance in these cases was found to be kapha.

So, the aetiopathogenesis supports the data record and vice-versa. It should be noted that it isa complex process; that is the slow and steady process which requires satatya in hetu sevan.

B) Discussion On Haematological Parameters

Statistical Analysis of the effect of therapy on Haematological parameters Prediabetes by paired't' test.

1) BSL FASTING

   BSL Fasting values were decreased in Trial group to 100.16+10.16. Paired t was 8.15, P valueis <0.0001 which was statistically significant.

2) BSL PP: BSL PP values were decreased to 155.03 3.18, in the Trial group. Paired t was 9.4749. P valueis <0.0001; which was statistically significant.

3) HbA1C HbA1C values were decreased to 5.53±0.14 In Trial group. Paired t was 13.72; P value is <0.0001; which was statistically significant.

4) IFG: IFG values were decreased to 96.70±4.40 in Trial group. Paired t was 7.98; P value is <0.0001; which was statistically significant.

5) IGT: IGT values were decreased to 135.54±7.21 in Trial group. was statistically significant.Paired t was 16.57; P value is <0.0001; which

C) Total Effect Of Therapy:

Probable mode of action of Virechana (Shodhana)

Panchakarma is Ayurveda's primary purification and detoxification treatment. This treatment eliminates toxins from the body. It helps to remove deep rooted illness and balances the doshas and dhatus. Strotoshuddhi i.e. cleansing of the macro and micro channels is

veryimportant to maintain prakrut agni in patient, which maintains cellular metabolism. But in this vyadhi, vitiated sama kapha dosha is located in excessive quantity in strotasa which cause strotorodha which hamper agni of our body i.e. jatharagni and dhatvagni. Aim of my treatment is to remove this sama kapha from strotasa by strotoshodhana .e. by virechana karma. This ultimately increases pachakagni, leading to correct cellular metabolism. Thus, basic principles ofour treatment are strotoshodhana, pachana and deepana.

Virechana is one of the important Panchakarma therapy of Ayurveda. It allows our digestive system to evolve day by day. it is very safe in patients with Hypertension, and IHD. Other treatment included under Panchakarma is contraindicated in IHD patients, because it may lead to complications. Prediabetes here in as Prameha samprapti is mainly caused by jathragni, bhutagni and dhatavagni mandya. It is also featured with strotorodha at cellular level due to samarasa, medadi dhatu and sama kapha, which further disturb metabolic process i.e. chayapachay Kriya. It leads to formation of excess of kleda i.e. waste product of our body. Virechana help to remove this excess kleda and sama kapha from strotasa. It also results into agnisandhukshana at micro-cellular level. Thus, it improves basal metabolic rate, metabolism is corrected through dhatvagnideepan at microcellular level. As Described by Charakacharya, Prameha is aamashaya (pittasthana) samudbhawa vyaadhi. And hence, for treating this pitta sthana, virechana is one of the treatments. It is also effective in the disorders of pitta associated with kapha. Virechana also cleanses sense organs by shodhana karma i.e. improves their function, purifies rasa, raktadidhatus and also helps in improving the efficacy of shamana drugs.

Abhyantara snehapana with goghruta causes molecular splitting (Bhedan) which increases dravaguna in the molecule. Swedan followed by Snehapana helps to release the dosha out of the cell i.e. (dosha vilayana). Due to this bhedana and vilayana karma there is utkleshana of dosha (pramanataha vruddhi of dosha) causing increase in the membrane permeability of cell, making ittense. The Virechaka drugs stimulate the membrane in such a way that the dosha i.e. toxins get transferred from intracellular to extracellular fluid. This process removes the vitiated sama dosha or kleda from cell. And increases the capacity of cell and thus opening the receptors and increasing the cell reuptake. Virechak drugs like triphala, trivritta, guduchi, nimba kwatha, gomutra and trikatu entering amashaya by their ushna, tikshna, sukshma, vyavayee, vikashi after properties and prabhava move to hridaya. From there, through dasha dhamani (vyavayee), reaches to macro and micro- channels of the body (anutva property).

Utkleshita dosha finally help to remove sama kosthagata dosha through adhomarga. Sansarjana karma is given for agni sandukshana. Hampered agni is one of the initiating factor for prameha samprapti. Virechana removes utkleshit pitta kapha, does srotovishodhana and agni sandukshana. Thus, virechana removes the root cause of disease and corrects metabolism at jathargni and dhatvagni level.

Virechana helps in elimination of vikruta doshas from the body and bring them into their physiological state and keep them in their pancha-swa (swasthana, swaguna, swagati, swakarmaand swapramana). Its helps in removal of strotasawarodha and does strotoshodhana (Annawaha, udakwaha and medavaha). This way, it helps in breaking the vyadhi samprapti and aids in treating the patient further with apunarbhava chikitsa.

Mode of action of Virechana Drugs Used

1. Triphala

It is pancharasatmak except lavana. It has laghu ruksha sara guna and virya anushna. Tikta kashaya rasa does kapha pitta shamana. Sara guna helps in dosha and mala anulomana and strotas shodhana. It is deepan, ruchya so helps in agni deepan.

Combined properties of the above drugs are tikta, katu rasa, laghu ruksha ushna sara guna and katu vipaka. It has vayu aakash and tej mahabhuta in dominance. Which are exactly opposite tomadhura rasa,snigana, guru, manda guna and pruthvi, aap mahabhuta. So, helps in decreasing effect of these guna. Tikta katu drugs possess the lekhana, karshana, meda-kleda upashoshana properties. These properties help in dosha pachan at the level of dhatwagni. Kapha is the main dosha of this disease. so, all the drugs having kaphahara properties provided better result in this series.

2. Trivrutta

Trivrutta is tikta, katu rasatmak, katu vipaki and having laghu, ruksha and tikshna guna. Hence, it helps in kapha pitta shodhana when used for virchana. The laxative effect of trivrutta is mainly due to the presence of turpethein.

3. Guduchi

It has tikta, kashaya rasa, katu vipaka and laghu guna. Tikta rasa dominance helps in saamdosha pachana in body. Because of ushna veerya and katu vipaka it does jatharagnideepan. Guduchi issaid to be one of the best drugs for prameha by Aacharyas and it

is tridoshashamaka.

4. Nimba

It has tikta-kashaya rasa, katu vipaka and laghu guna. Because of these properties it is aampachana and helps to pacify kaphapitta.

5. Trikatu

Combined properties of trikatu is katu rasapradhanya, ruksha, tikshna, laghu guna, ushna veerya and katu vipaka. It has tej and vayu mahabhoota dominance. Kapha is the main dosha of this disease; so all the drugs having kaphahara properties provide better result. As trikatu is sukshma strotogami, it specially acts on dhatavgni level and does dhatvagni sandhukshana called sukshma pachana. It also does sama kapha dosha pachana due to their katu rasa and ushna, tikshna property ultimately regularize metabolism at cellular level. Also helps in vatanulomana.

Gomutra

Its properties are laghu, ruksha, tikshna, ushna guna and katu rasa. It has katu vipaka. Gomutrais kaphavatahara, and it also does agnideepan.

So final conclusion is Virechanakarma is effective in the management of Prediabetes.

SUMMARY

The present study entitled "A Clinical Study To Evaluate The Effect of Virechana In Prediabetes". Comprise of the following section First section (introduction) is the preface of dissertation. It enlist the importance of Ayurveda, describes modern as well as ayurvedic aspect of the disease in brief. It also enlists the descriptionabout the treatment regime chosen, and need of the study.

Second section (Research question, Aims & Objectives) clears the view of the study and put forward the target of the study.

Third section deals with the previous work done on the topic.

Fourth section gives detailed review about literature, subdivided into following sections

1. Review regarding the Ayurvedic concepts of the disease, consisting topics like Pramehapurvaroopa, its importance. Followed by detail of the nidanpanchak of the disease,prognosis. and with explaining chikitsa and pathya-apathya in short.

2. Review of literature regarding modern concept of Prediabetes and all the details regarding it.
3. Review of literature about virechana panchakarma.
4. Review of drugs used for virechana.

The Fifth section (Materials and methods) gives a detail about the materials and methods used in this study. This section comprises of an explanation of Inclusion and exclusion criteria, criteria of diagnosis, criteria of assessment, assessment of total effect of therapy.

Sixth section (Observation and Results) deals with the observation and analysis of the data obtained.

Seventh section (Discussion) includes logical reasoning of the observation. Eighth section (Summary) deals with the summary of whole study.

Ninth section (Conclusion) gives conclusion about whole study. Tenth section (Bibliography) is followed by Annexure.

Eleventh section (Annexure) includes Case record form, References, Master charts and Abbreviations for review.

As per inclusion criteria, total 30 patients were screened, suffering from prediabetes irrespective of caste, religion and sex and economic status. All the patients examined as per the proforma mentioned earlier and necessary investigations carried out. After diagnosing the patient with thePrediabetes, were given virechana panchakarma.

Initially BSL (F & PP) and HbA1C done for confirmation of disease. CBC, ESR, LFT, RFT, Lipid Profile, Urine routine and microscopic were done to rule out any other pathology.

Effect of the treatment regime on the basis of haematological parameters was studied. Data collected was subjected to statistical analysis to obtain result and conclusion.

MASTER CHART NO.1

Sr. .No.	Reg. No.	Sex	Age	Occupation	Education	Economic Status	Diet	Addiction
1	12786	F	52	Housewife	Undergraduate	Middle	Mix	Tea/Coffee
2	43892	M	42	Business	Graduate	Middle	Mix	Tobacco, Alcohol
3	45732	F	45	Housewife	Undergraduate	Middle	Mix	Tea/Coffee
4	58473	M	29	Service	Graduate	Middle	Mix	Alcohol
5	49996	F	65	Housewife	Illiterate	Middle	Mix	Tea/Coffee
6	65309	M	53	Service	Graduate	Middle	Mix	Smoking, Alcohol
7	67684	M	59	Retired	Graduate	Middle	Mix	No
8	69308	M	58	Service	Graduate	Middle	Mix	Alcohol
9	72093	F	69	Housewife	Illiterate	Middle	Veg	Tea/Coffee
10	72365	F	54	Housewife	Undergraduate	Middle	Veg	No

11	71848	F	37	Service	Graduate	Middle	Mix	No
12	3206	F	45	Housewife	Illiterate	Lower	Mix	Tea/Coffee
13	4892	F	56	Housewife	Undergraduate	Lower	Mix	No
14	6560	F	58	Housewife	Undergraduate	Middle	Mix	Tea/Coffee
15	25285	M	53	Service	Graduate	Middle	Mix	Alcohol
16	10806	F	48	Service	Graduate	Middle	Veg	No
17	26578	M	45	Driver	Undergraduate	Lower	Mix	Smoking
18	27503	M	49	Service	Graduate	Middle	Mix	Tea, Alcohol
19	2356	F	60	Housewife	Illiterate	Middle	Mix	Tea/Coffee
20	2826	M	61	Business	Graduate	Upper	Mix	Tea/Coffee
21	3251	F	48	Service	Graduate	Middle	Veg	No
22	8099	M	41	Marketing	Graduate	Middle	Mix	Coffee, Alcohol' Smoking
23	5452	F	42	Service	Graduate	Middle	Veg	Tea/Coffee
24	6428	M	45	Security	Undergraduate	Lower	Mix	Tea/Coffee
25	5989	F	46	Service	Graduate	Middle	Mix	No
26	6298	M	50	Service	Graduate	Middle	Mix	Alcohol
27	6550	M	60	Business	Graduate	Middle	Mix	Smoking, Alcohol
28	6927	F	63	Retired	Graduate	Middle	Veg	No
29	7462	M	59	Business	Graduate	Middle	Mix	Tea,Alcohol
30	8440	M	67	Business	Graduate	Middle	Veg	No

MASTERCHART NO.2

Sr. No	Reg.no.	Prakruti	Desha	Dosha	Agni	Koshtha	F/h/o Dm
1	12786	KP	Anup	K	Manda	Mrudu	Yes
2	43892	KV	Anup	K	Manda	Madhyam	Yes
3	45732	KP	Anup	K	Manda	Madhyam	Yes
4	58473	PK	Anup	K	Visham	Mrudu	Yes
5	49996	KV	Anup	V	Visham	Madhyam	Yes
6	65309	PK	Anup	K	Manda	Madhyam	No
7	67684	VK	Anup	V	Visham	Krur	Yes
8	69308	VP	Anup	P	Visham	Madhyam	Yes
9	72093	KV	Anup	K	Manda	Krur	No
10	72365	PV	Anup	P	Visham	Madhyam	No
11	71848	KP	Anup	K	Manda	Mrudu	Yes
12	3206	PV	Anup	K	Visham	Madhyam	Yes
13	4892	KV	Anup	K	Manda	Mrudu	No
14	6560	KP	Sadharan	V	Tikshna	Madhyam	No
15	25285	PV	Anup	K	Manda	Krur	No
16	10806	KV	Anup	V	Visham	Krur	No
17	26578	VK	Anup	K	Manda	Madhyam	No
18	27503	PK	Sadharan	P	Tikshna	Mrudu	No
19	2356	VP	Jangal	V	Visham	Madhyam	No
20	2826	KP	Anup	K	Manda	Mrudu	No
21	3251	KV	Anup	K	Visham	Krur	Yes
22	8099	VP	Anup	V	Visham	Madhyam	Yes
23	5452	KV	Anup	K	Manda	Madhyam	No

24	6428	PK	Anup	K	Visham	Madhyam	No
25	5989	KP	Anup	P	Visham	Mrudu	Yes
26	6298	KV	Anup	K	Manda	Madhyam	Yes
27	6550	KP	Anup	K	Manda	Madhyam	Yes
28	6927	VP	Anup	V	Visham	Madhyam	No
29	7462	VK	Anup	K	Manda	Krur	No
30	8440	KV	Sadharan	K	Visham	Madhyam	No

MASTERCHART NO.3

Sr. .No.	Reg.No.	FastingBsl		Post Prandial Bsl		Hba1c		Ifg		Igt	
		BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
1	12786	125	94	193	150	6.1	5.8	116	106	186	149
2	43892	115	106	197	181	6.3	5.4	108	100	193	136
3	45732	109	100	200	173	6.1	5.3	114	98	194	146
4	58473	102	98	163	154	5.8	5.3	104	94	159	**132**
5	49996	108	80	195	140	5.97	5.58	134	86	158	124
6	65309	109	76	183	149	6.4	5.8	103	84	196	152
7	67684	104	96	194	173	6.0	5.5	108	92	172	128
8	69308	120	105	196	183	6.3	5.6	106	100	186	136
9	72093	104	96	161	119	5.6	5.6	108	92	173	134
10	72365	118	1107	162	149	6.24	5.4	115	100	152	137
11	71848	133	120	187	156	5.8	5.4	110	100	166	147
12	3206	106	98	165	130	6.2	5.6	110	100	148	125
13	4892	118	106	193	176	6.19	5.6	106	100	186	126
14	6560	129	108	174	158	5.8	5.4	116	100	196	138
15	25285	100	94	162	159	6.03	5.7	100	94	160	140
16	10806	109	94	154	136	5.7	5.68	103	98	160	140
17	26578	110	88	140	126	5.5	5.5	105	96	168	140
18	27503	110	94	195	146	5.7	5.4	105	97	168	134
19	2356	120	110	169	143	5.8	5.6	115	96	168	126.4
20	2826	105	85	150	139	6.1	5.4	108	98	176	127
21	3251	120	110	174	158	6.2	5.4	119	92	160	126
22	8099	101	94	176	159	5.8	5.6	102	96	184	130
23	5452	146	120	167	156	6.2	5.6	104	94	172	134
24	6428	104	101	194	152	6.4	5.5	106	100	196	139
25	5989	112	109	200	184	6.4	5.8	114	98	194	142
26	6298	112	109	196	166	6.2	5.7	106	100	184	136
27	6550	111	105	154	139	5.3	5.3	109	98	159	138
28	6927	109	102	187	167	5.5	5.5	109	98	178	135
29	7462	104	96	196	184	5.9	5.6	102	98	184	133
30	8440	110	104	197	146	6.1	5.6	108	96	173	138

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