WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 6.041
Volume 5, Issue 4, XXX-XXX Review Article ISSN 2278 – 4357

MEDICAL NUTRITIONAL THERAPY (SHILAJIT) AND EXCESISE FOR PREVENTION AND TREATMENT of MICRO AND MACRO VASCULAR COMPLICATION OF TYPE-II DM

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Article Received on
16 Feb. 2016,
Revised on 07 March 2016,
Accepted on 27 March 2016
DOI: 10.20959/wjpps20164-6586

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ABSTRACTS

With the development, now various associations including ADA are working for the treatment of DM type-II. We are successful in management of DM with the help of newer hypoglycemic drug and insulin analogues. This will manage hyperglycemia. But strict sugar control can't be achieved. This uncontrolled blood sugar will further develop micro and macro vascular complication including Retinopathy, CAD, Nephropathy and Neuropathy. These complication will provoked various life dangerous diseases as like Retinal damage, Acute MI, Renal failure and Diabetic foot. Now we have to think for strict sugar control with prevention of micro and macrovascular complication. This can be achieved by proper diet and nutrient as per our daily requirement with regular exercise. Even after thatwe have to take some rejuvenating drug which work multidirectional by correcting micro and macro vascular damage and prevent diurnal blood sugar fluctuation. Ayurveda has explained a wonderful drug name as Shilajit. Charak said that "No any disease in the world, which can't be treated by Shilajit". Means that, Shilajit works multidirectional in various system of our body. By this it correct multisystem complication of DM.

KEYWORD- ADA, hypoglycemic drug, micro and macro vascular complication, Retinopathy, CAD, Nephropathy, Neuropathy, rejuvenating drug, Shilajit.

INTRODUCTION

DM is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.[1]

Diagnostic Criteria for Diabetes (ADA)[1,2]

	Glucose concentration in (mg/dl)		
	Whole Blood		Venous plasma
	Venous	Capillary	
Diabetes Mellitus Symptoms of DM + Fasting or 2 hr PP glucose load or both	 ≥110 ≥180	 ≥110 ≥200	 ≥126 ≥200
Impaired glucose tolerance Fasting And 2 hr postglucose load	 <110 ≥120 &<180	 <110 ≥140 &<200	 <126 ≥140 &<200
Impaired fasting glucose Fasting 2 hour	 ≥100 &<110 <120	 ≥100 &<110 <140	 ≥110 &<126 <140

Rationale for the new criteria[3]

(1) The value of FPG to diagnose diabetes was lowered from 140 to 126 mg/dl. This is because, as a solitary tool, using FPG cut off 140 mg/dl will miss 25% of subjects with a PP value of >200 mg/dl.

(2) Epidemiological studies (Pima Indian subjects, Egypt, 3rd National Health and Nutrition Examination Survey in USA) showed microvascular complication of retinopathy starts occurring at values close to 126 mg/dl.(10).

(3) FPG cut off should be made more accurate for screening and diagnosis.

Implications of new criteria

New categories of hyperglycemia

3 new categories have been created

- Normal fasting glucose: FPG <110 mg/dl
- Impaired fasting glucose: 110 < FPG <126 mg/dl
- Impaired glucose tolerance: FPG <126, 2 hr PP between 140 & 200.

Such individuals are at more risk of microvascular complications and diabetes in future. In addition a value of 110 mg/dl approximates the value at which the 1st phase insulin secretion is lost.

Screening for undiagnosed diabetes in asymptomatic individuals[4]

1. Measure fasting plasma glucose in all persons age 45 years or older: if normal, repeat at 3 year interval.
2. Measure fasting plasma glucose in persons less than 45 years old with high risk characteristics.

(a) Obesity, i.e. 120% of desirable body weight, or BMI >27 kg/m^2
(b) 1st degree relatives with diabetes
(c) High risk racial or ethnic populations
(d) Hypertension
(e) Dyslipedemia HDL <35, TG >250 mg/dl
(f) Prior gestational diabetes mellitus or baby weighing >9 lb
(g) Prior impaired fasting glucose or impaired glucose tolerance

HbA_1C: Another important glycemic control indicator widely accepted as the best single indicator of risk for microvascular disease and macrovascular risks.

HbA_1C	**Type 2 diabetes (UKPDS) 8% → 7%**
Retinopathy	17-21%
Nephropathy	24-33%
Neuropathy	-
Cardiovascular disease	16%

Medical Nutrition Therapy[5]

MNT is integral to total diabetes care and management.

Goals of MNT (ADA)

1. Maintenance of near normal blood glucose levels by balancing food intake with insulin or oral hypoglycemic agents and physical activity level
2. Achievement of optimal serum lipid level.
3. Provision of adequate calories for maintaining or attaining reasonable weight for adults, normal growth and development rates in children and adolescents increased metabolic needs during pregnancy and lactation or illness.

4. Prevention and treatment of acute complication of e.g. hypoglycemia, exercise related problems, short term illness and of long term complication of diabetes e.g. renal, ocular, cardiovascular complications.
5. Improvement of overall health through optimal nutrition.

Recommended Daily Allowances in Diabetes

Calories

- Obese/very inactive adults – 20 Kcal/kg
- Adult > 55 years, active women, sedentary man – 28 Kcal/kg
- Active man/ very active women – 30 Kcal/kg
- Thin/Very active man – 40 kcal/kg

Proteins

- 10-20% of daily caloric intake should be from protein
- With the result of overt nephropathy, protein restricted to 0.8 gm/kg/day (ADA) i.e. (10% of daily calories)
- If GFR begins to fall, restriction upto 0.6 g/kg/d may prove helpful.

Total fat: National cholesterol education Program (NCEP) recommendations.

- Fat intake to be limited to <30% of total calories
- Saturated fats <10%, poly unsaturated fat < 10% of calories and mono unsaturated fat in the range of 10-15%
- If LDL cholesterol raised –reduce saturated fats to < 7% and dietary cholesterol to < 200 mg/d)
- If Triglyceride or VLDL cholesterol is raised, increase monounsaturated fats and carbohydrate while reducing saturated fats.
- If triglyceride ≥100 mg/dl – reduce fat intake to < 10% of total calorie intake with pharmacological treatment.

Sugars: For most of this century the notion had been that simple sugars-should be avoided and replaced by starches, believing that sugars are more rapidly digested and absorbed than starches, thereby aggravating hyperglycemia to a greater degree. In fact the researches conducted in past decades have shown that starches have higher glycemic index than that of fruits, milk and sucrose. Sucrose is metabolized into glucose and fructose. Fructose is stored

in liver as glycogen and does not enter the circulation. Hence sucrose and sucrose containing foods must have their place in the meal plant. The priority should be given to the total amount carbohydrate rather than the source.

Sweetners: Non nutritive sweetners (aspartame, saccharin) are safe and helpful in controlling total carbohydrate intake.

Nutritive sweeteners (fructose, fruit juice concentrate, sorbitol) are unlikely to have significant advantage over sucrose in decreasing caloric intake.

Fibers: May help in prevention of constipation, provide satiety value, prevention of colon cancer and have lipid lowering effect.

Micronutrients

If dietary intake is adequate no need of additional supplementation.

– Chromium supplementation is needed only in patients with prolonged parenteral nutrition.

– Magnesium supplementation in patient with decreased Mg levels helps in preventing insulin resistance and hypertension.

Exercise Management[6]

Guidelines for safe exercises in Type 2 DM

1. Start with mild exercise, e.g. walking, swimming, riding a stationary bike and gradually increase durations.
2. To improve insulin sensitivity and glycemic control, exercise should be done at least 4 day/week or every other day.
3. Exercise should not result in shortness of breath.
4. Fitness can be achieved by exercising 4-7 days/weeks at 50% to 70% maximal heart rate for a minimum of 20 min. (maximal HR = 220-age)
5. Warm up and cool down exercise are important to prevent injuries.
6. Muscle strengthening exercise may also lead to improved glycemic control.

Risk of exercise in patients with complications

Coronary Artery disease

- May exhibit ischemic changes in ECG.
- Arrhythmias

Retinopathy

In patients with proliferative retinopathy, strenuous exercise may precipitate vitreous hemorrhage or retinal detachment. They should avoid straining, jarring, valsalva maneuvers, anaerobic exercises.

Nephropathy

High intensity exercise to be avoided.

Peripheral Neuropathy

- Weight bearing or prolonged walking/ jogging to be avoided to prevent ulceration.
- Swimming cycling, non weight bearing exercise to be advised.

Effects of Exercises

- Glycemic control- improves insulin sensitivity.
- Prevention of cardiovascular disease: exercise induced insulin sensitivity helps in prevention of hypertension, hyperinsulinemia, central obesity.
- Control of dyslipidemia: VLDL levels reduced, though levels of LDL and HDL are not much effected
- Fibrinolysis: Studies have demonstrated reduction in plasminogen activator inhibition -1 and thus improving fibrinolysis.
- Prevention of type 2 DM
- Weight reduction
- Improved quality of life.

Recent treatment for Tertiary Prevention (treatment of established complication)

- **Retinopathy** -Intensive glycemic, Intensive BP, Laser photocoagulation
- **Nephropathy** -Intensive glycemic, Antihypertensive (ACE inhibitor), Protein restricted diet
- **Neuropathy** - Intensive glycemic, Other medication - Gabapentin, Amitryptiline and fluxetine
- **CVD** -Intensive glycemic, Treatment of dyslipidemia, Intensive BP

SHILAJIT- Shilajit is an exudation from rock during hot sunny days. Though it may be occurring in many parts of the world but India was the first to highlight its tremendous

therapeutic value for many centuries (era of Charaka & Sushruta). Ayurveda mentions it as wonderful medicine.

Sanskrit	:	Shilajit
English Name	:	Mineral Pitch
Hindi	:	Shilajit

Test[7]

The tests mentioned in Ayurvedic texts are only of a crude type. Genuinely of any drug is justified by the testing it as per the specification.

1. Shilajit is put on fire it erects perpendicularly and burn with out smoke.
2. If pure Shilajit is put in water through the tip of a thin erect glass it will come down slowly after spreading like fire.
3. The pure Shilajit should contain the smell of cow urine.

Pharmaceutical Properties[8]

Organic Constituents

	Crude Shilajit (%)	Purified Shilajit (%)
Moisture	12.54	29.03
Benzoic acid	6.82	8.58-320mg
Hippuric acid	5.53	6.13-240mg
Fatty acids	2.01	1.36-500mg
Resin and waxy matter	3.28	2.44-100mg
Gums	15.59	17.32-680mg
Albuminoids	19.61	16.12-640mg
Vegetable matter, sand, etc.	28.52	2.15

Mineral Constituents

	Crude Shilajit (%)	Purified Shilajit (%)
Moisture	12.54	29.03
Loss on ignition	64.58	52.63
Ash	22.88	18.34
Silica (residue insoluble in HCl)	4.60	2.69
Iron ($Fe_2 O_3$)	0.51	0.64-240mg
Alumina ($Al_2 O_3$)	2.26	2.61-100mg
Lime (CaO)	6.83	4.82-200mg
Magnesia (MgO)	1.29	1.20-48mg
Potash ($K_2 O$)	4.60	3.81-150mg
Sulphuric Acid (SO_3)	0.64	0.97-4mg
Chloride acid (NaCl)	0.26	0.57-2mg
Phosphoric acid ($P_2 O_5$)	0.28	0.24-1mg
Nitrogen	3.64	3.36-120mg

Pharmacological Properties[9]

Locally antiseptic, anodyne, parasiticide and antiphlogistic. Internally use act as tonic, slightly laxative, cholagogue, respiratory stimulant, disinfectant and expectorant, intestinal antiseptic, diuretic and lithotriptic.

Uses[7,10,11]

Charaka says "There is hardly any curable disease which can't be controlled or cured with the aid of Shilajit". It is used by Kavirajas and Hakims in a great variety of disease. It is specially employed in genito-urinary diseases and in diabetes; in gall stones, jaundice, enlarged spleen, fermentative dyspepsia, worms, digestive troubles, piles, adiposity, anasarca, renal stone, renal and bladder calculi, anuria etc., hysteria, neurasthenia, epilepsy and insanity, nervous diseases; amenorrhoea, dysmenrrhoea and menorrhagia; scrofula, tuberculosis, phthisis and leprosy; eczema, elephantiasis, anaemia, anorexia, biliary congestion, chronic bronchitis, asthma, fracture of bones etc., in diabetes in which it reduced the quantity of sugar and urine. But it increases the quantity of urea; therefore, it should never be given in uric acid calculus. It diminishes phospaturia and is useful in phosphatic concretions. It is also useful in ascites, ureamia, cholaemia and the like. It is valuable in cases of diabetic albuminuria, where both casts and albumin diminish; it is said to be a cure for diabetic amaurosis. "Under the influence of Shilajit, thirst, polyuria, burning sensation and exhaustion disappear quickly. It markedly helps the assimilation of sugar.

Specific Action of Shilajit

It has following specific actions which are given below

Chedana karma, Vrisya, Balya, Lekhana, Yogavahi, Rasayana.

Therapeutic uses explained by researches

It is powerful tonic and alternative useful in a variety of diseases. In sexual weakness it is generally administered with Asvagandha Dr. H.C. Sen concludes that Shilajit should be tried extensively in Obesity, Diabetes, Dyspepsia, Anasarca, Enlargements of liver and spleen, Bleeding piles, Asthma etc. Many Ayurvedic and modern literature are available regarding Shilajit.

Dose[10,11,12]

According to different Ayurvedic Scholar-

Charak - 12gm, 25gm, 50gm

Susruta - 10Tula(50kg)

Rasa Tarangani - 2Ratti

Common Practice - 2R-8R(250mg-1gm)

CONCLUSION

This work is explaining multi systemic effect of shilajit. Shilajit will rejuvenate our system by correcting micro and macro vascular damage. It will decrease insulin resistant by its lekhana property. It act as yogavahi means potentiate hypoglycemic effect of ant diabetic drugs. It increases general strength of body due to Balya effect.

In this way it has been proved that Shilajit is a best adjutant drug for managing DM type II and its complication.

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