Clinical evaluation of *Tinospora Cordifolia* (wild) Miers (Guduci) in the management of Diabetic Foot Ulcer

**ABSTRACT**

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Key note : Diabetic foot ulcer and Ayurvedic management.

**Aim :**
To evaluate hypoglycaemic effect of Guduchi (*Tinospora Cordifolia*) and it's healing efficacy in Diabetic foot ulcer along with Guduchyadi kwath for regular dressing.

**Objective :**
To understand genesis of Diabetic foot ulcer with special reference to ancient Ayurvedic concept and to carryout study on herbal drugs in it's management.

To provide a cost effective treatment aiming to save the affected foot as amputation doesnot appear to be practical solution.

**Setting :**
The clinical study was carried out on patients suffering from uncontrolled NIDDM with diabetic foot ulcer. The 60 (sixty) cases selected from O.P.D at Govt. Ayurvedic College Hospital, Jalukbari, Guwahati of Department of Swastha Rakshan with collaboration of Department of Shalya, during the period of July 2007 to Dec. 2011.

**Introduction :**
Madhumeha which is regarded as end stage of Prameha i.e. Diabetes Mellitus was known to Ayurvedic physicians some 3000 years back. The
association of polyuria with sweet tasting substance in the urine was reported in Sanskrit literature dating from 5th to 6th century A.D by two notable Indian physicians Sushruta and Charak. The urine of polyuric patients was described as tasting like honey, being sticky to touch and strongly attracting ants.

In the last few years there have been revolutionary changes in the therapy of Diabetes Mellitus. Drug like insulin, Biguanides (Metformin), insulin Secretagogues (Sulphonylureas), insulin sensitizers (Thiazolidinediones), Alphaglucosidase inhibitors, Non sulphonylureas (D-phenylolanine, Meglitinide), diet/exercise and behavior modification has definitely helped in controlling the blood sugar level and improving the quality of life. Hb A1C itself is such a glycosylated blood protein that gives valuable information on the level of glycemic control over the past 120 days, which is the average life span of a RBC. This process of non enzymatic glycosylation leads to a genre of proteins called collectively as AGE products or Advanced Glycosylation End products. Their importance lies in the fact that these proteins, both structural and functional have reduced turnover altered physical properties and in general lesser functionality in the body. But none of the therapy have been unequivocally successful in maintaining euglycaemia and in avoiding late stage complication of diabetes.

Even today, to understand metabolism and treatment of Diabetes Mellitus and requires a demanding and spectrum of knowledge about chemical, immunologic vascular and endocrine factors in human.

Madhumeha has been a matter of discussion and research since ancient era. It is a complicated disease involving almost all system and foot ulcer (Pidaka/Vrana/Dustavrana/Vidradhi) said to be one of the serious sequence needs special care and management which may be otherwise life threatening.

So, considering its gravity different approaches have been made regarding its causes, pathogenesis and treatment with reference to the most advanced scientific approach.

It is very interesting to describe here that ancient Indian physicians as well as surgeon were aware of so called Diabetic foot ulcer like disease. Sushruta has clearly mentioned formation of Pidoka in the lower limbs of Madhumehi with
a scientific explanation giving its pathogenesis. In the Chikitsa Sthana of Sushruta (12:8) has explained why the lower limb (dependent part) of the body of Madhumehi is prone for the occurrence of foot ulcer. In his view the Rasa carrying channels of patients suffering from Madhumeha become weakened, so Doshas fail to come back to the upper part of the body (angiopathy – microvascular and macrovascular changes), hence they cause much problem in the lower half of the body and ultimately given rise to Pidaka/ Vrana/ Vidradhi/ ulcer.

Acharya charak described Mamsa, Marma and Sandhisthana as the sites of promeha pidakas, but did not give much importance to the treatment. While Sushruta, the great surgeon has given due importance which are formed by opening of Pidakas, vidhradi or by direct injury specially in the patient of Madhumeha lies under krichhasadhya vyadhi.

Pidaka is the term literally meaning to create pida (pain).

Pidakas are considered as major complications of Prameha which originate due to Dusta vasa and Meda dhatu. Pidaka may also be found in persons who are not suffering from prameha but having Dusta Medadhatu.

The diabetic foot is characterized by a classical triad of neuropathy, ischaemia (vasculopathy) and infection i.e. immune compromised meaning altered host response because of chronic hyperglycaemia along with important risk factors leading to ulceration.

Diabetic polyneuropathy consisting of Sensory neuropathy, Motor neuropathy and Autonomic neuropathy.

*Paripheral vascular disease (PVD)* :
PVD is consisting of

(a) Macroangiopathy
(b) Microangiopathy

**Infection**: Impaired sensation (insensate foot), foot deformity, vasculopathy, cracks, fissures, persistent mechanical injury, immune deficiency due to change of polymorph nuclear function (like intracellular bacterial activity, chemotaxis and phagocytosis) and foot ulcers act as portal of entry of microorganisms. In non-diabetic infection leads to increased blood flow. In the diabetic, however infection frequently leads to microthrombi formation in the small arterioles, which further impair circulation. When this occurs in small arterioles of toes, the vessel becomes end arteries, resulting in formation of gangrene. Vascular disease also impairs delivery of antibiotics and oxygen to the affected areas.

In the light of the above, there is a need for easily available, efficacious and safe drug for the treatment of Diabetes Mellitus and its complications such as foot ulcer.

The present study has therefore planned with a view to understand genesis of diabetic foot with special reference to ancient Ayurvedic concept and to carry out study on herbal drugs in its management which is cost effective aiming to save the affected foot and provide the patient a functional walkable foot, as amputation does not appear to practical solution for management of Diabetic foot in a country like India where good prosthetic facilities are either not available or not affordable.

**Methodology**:

**Criteria for selection of cases**:

Male and female both sex of all age group mostly in between 30-70 years.

**Exclusion Criteria**:

Patients having severe IHD, CKD, pregnancy, koch’s and foot with entire gangrene were discarded from the study.

**Trial Group**:
6 (six) cases of uncontrolled NIDDM on aqueous extract of Guruchi stem (orally) and foot ulcer dressing regularly with Guduchyadi kwath (decoction).

**Controlled Group:**

54 (fifty four) case Uncontrolled NIDDM on aqueous extract of Guruchi stem (orally) with Modern and Ayurvedic oral Hypoglycaemic drugs if needed on insulin with regular dressing with Guduchyadi kwath (decoction).

The patients were given freshly prepared 30 ml of aqueous extract of stem of Guduchi (soaked overnight) twice daily in empty stomach i.e. before breakfast and dinner along with antidiabetic drugs like oral hypoglycemic drugs or combination of Ayurvedic and Modern hypoglycemic drugs if needed insulin was given.

Subsequently the foot ulcer was regularly dressed with Guduchyadi kwath made of Guduchi, Manjistha, Haridra, Neem, Vidanga, Yavatikta, thereafter pulp of Ghrita kumari applied on the ulcer and bandaged. Repeated exploration and debridement was usually required to set up adequate vascularity helping those infected ulcers into healing ulcers. Sometimes corn excision was carried out to reduce planter pressure assuring satisfactory healing with good function of the foot could be achieved.

Patients were examined and investigated as per protocol before starting the therapy and at the interval of fifteen days attempting strictly to control blood sugar level.

**Healing of diabetic foot ulcer and trial drug:**

Regarding healing of ulcer by trial drug it show that the patients coming with ulcer infected with multiple organism, having no/mild vascular abnormalities takes two to three month duration to be healed up.

The aqueous extract of stem of Guduci (Tinospora cordifolia) soaked over night also helps in bringing blood sugar level down along with other oral hypoglycaemic drugs.
On the other hand a deep root infection with variable blood sugar involving the bone tissue needs more than three months time.

In 80% cases good healing without amputation have been achieved. But those patients coming with established vascular changes with gangrenous toes (20%) needed a minor amputation of toes. In these cases also after surgery, the ulcer was healed up very quickly with the same therapy.

No antibiotic was given either orally or locally.

The drug Guduchi (Tinospora cordifolia) in Katu, tikta and Kashaya (pungent, bitter and astringent) in taste but vipaka (effect after digestion) is swadu (sweet). Effectwise it is ushna (hot) and laghu (easy to digest) by virtue.

Being tikta, katu and kashaya in rasa and ushna in virjya, the Guduchi pacifies both kapha and medadusti (dyslipidaemia) which is the underlying cause of angiopathy and neuropathy. Working at the level of dhatwagni it helps in the utilisation of glucose by insulin into tissues and thus acting as hypoglycaemic (pramehegha) or pittasamak. By the action of Rassayana i.e. increases nutrient value of plasma, digestion and metabolism and improves microcirculation and tissue perfusion leading to improvement of nourishment and quality of tissues and thus act as to enhance longevity, immunity and mental competance (general health index). So it corrects tissue loss (ketosis) which is accompanied by vataja prameha and its end stage is Madhumeha (diabetes mellitus).

Now, as scientific studies based on the principles of physical science gradually substantiate the therapeutic claim of Ayurveda, the acceptability of Guduchi as potential drugs with remarkable immunomodulatory, antioxidant, antianxiety and natural adaptogenic properties improving agent.

Also indirectly it is acting as antimicrobial (krimighna) and corrects skin diseases such as ulcers (antiseptic) which is termed as kusthaghna.

Regarding other drugs used for dressing in the form of kwatha (decoction) and lepa (poultice) such as Mangistha Haridra, Neem, Vidanga
Yavatikta and Ghritakumari all are having antimicrobial activity against common bacteria (clinically signs of inflammation are pacified by the drugs).

Again the drugs together showed increased in cross linking collagen fibres and absence of monocytes, neovascularisation, indicating wound healing effect. The ulcer clinically and histopathologically resulting in healing and functional improvement in the disease noted.

So considering Dosha-dushya involvement (etiopathogenesis) we needed the drugs having properties like vranarapaka, Raktasodhak or Krimighna (antiseptic or antimicrobial), Kapha-pitta-vata samak (correcting neuropathy), Twak doshahara or srotosodhak (correcting angiopathy), Sothahara (antinflammatory), promehaghna (hypoglycaemic), Rasayana (rejuvanative/antioxidant) and Balya (immunomedulator).

Therefore considering all such properties Guduchi swaras along with other hypoglycemic drugs including insulin and regular dressing with Guduchyadi kwath have been jointly used for their clinical evaluation.
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AN ABSTRACT SUBMITTED TO THE UNIVERSITY OF GAUHATI FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (MEDICINE)

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