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Kanta Loha Tablet as a *Madhumeha* hara drug – A single case study

Case report

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Abstract

Rasa Shastra which explains a compendium of formulations that act as spectacular remedies for numerous diseases. Metals were used for *Deha Vada* (for the cure of ailments) and also for *Rasayana Karma*(Immunity boosting). *Loha Bhasma* had been using in many formulations from ancient time itself. *Kanta Loha,* which is superior among *Loha* can be considered as Magnetite. The Magnetite should contain more than 60% of iron content in it. The incineration process done according to the reference of classical *Rasa Shastra* classics. The controversy term "iron overload lead to diabetes" needs to be rechecked by monitoring the results of tests in diabetic patients after medication in the form of Kanta *Loha Bhasma*. In this article a single case study result showing towards the anti diabetic effect in human subject.

Key Words: *Rasa Shastra, Kanta Loha Bhasma,* Magnetite, Anti-hyperglycaemic effect.

Introduction

Kanta Loha(Lode stone) which is considered to be best among *Trividha Loha* divisions i.e. *Kanta Loha, Teekshna Loha, Munda Loha.* In AFI, *Kanta Loha* can be compared to magnetite iron ore which contains more than 60% of iron content in it. *Rasa Ratna Samuchaya* explains the use of *Kanta Loha Bhasma* in *Madhumeha* (type 2 diabetes mellitus) (1).A prolonged pharmaceutical procedures are needed to make raw magnetite iron ore samples in absorbable form. *Kanta Loha* tablet was prepared after prolonged procedures mentioned in the classics i.e. *Shodhana* (Purification), *Bhanupaka, Sthalipaka, Ghrita Bharjana, Puta paka* and *Amriteekarana.*

Diabetes mellitus is a group of metabolic disease characterised by hyperglycemia resulting from defects in insulin secretion, insulin action or both. On the basis of etiology, factors contributing to hyperglycaemia may include reduced insulin secretion decreased glucose usage and increased glucose production. Type 2 diabetes mellitus characterized by 3 pathophysiological abnormalities: impaired insulin secretion, peripheral insulin resistance and excessive hepatic glucose production. In the early stage of the disease, glucose tolerance remains normal, despite the insulin resistance, because the pancreatic beta cells compensate by increasing the insulin ouput. Gradually insulin resistance and compensatory hyperinsulinemia progress, the pancreatic islets become unable to sustain the hyperinsulinemic state. Post prandial glucose (PPG) levels meaning "Sugar after the meal" give more important information about how the body is able to manage glucose after a meal. Post prandial glucose numbers don't just change based on what you eat. They're also affected by how active you are, your insulin sensitivity. The ADA recommends that people with type 2 diabetes keep their PPG under 180mg/ dL(2). A random plasma glucose concentration 11.1 mmol/L (200 mg/Dl) accompanied by classic symptoms of DM (Polyuria, polydipsia, weight loss) is sufficient for the diagnosis of DM.

Aim

To monitor the efficacy of *Kanta Loha Bhasma* Tablet in the signs and symptoms of type 2 diabetes (*Madhumeha*).

Materials and Methods

Study setting

OPD (Outpatient Department) of Rasa Shastra &Bhaishajya Kalpana department, ITRA, Jamnagar, Gujarat, India. The study was started after obtaining the ethical approval from Institutional Ethics committee, ITRA, Jamnagar and the study was registered in CTRI Ref.No.CTRI/2020/05/025358.

Case Study

A 59-year-old female patient having symptoms of polyuria, turbid urine, polyphagia, polydipsia, numbness in the palms and soles, excessive perspiration, weakness, cramps in calf muscles for 1 year had chosen for the study.

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History of present illness

The patient was apparently normal before one year. She had sudden onset of increased frequency of nocturnal urination and polydipsia since before one year. She did the laboratory investigations to rule out the disease. She found elevated glucose level and took allopathic medication for the same. She approached here in order to stop continuous use of antihyperglycemic medication.

Treatment History

Metformin 1 (OD) at early morning since 6 months.

History of Past illness

The patient had no history of hypertension and any other systemic diseases.

Family History

No any relevant family history of type 2 diabetes found.

Table:1 Personal History During Healthy Days (*VaiyaktikaVrittanta*)

Micturition	Day time 6-8times, At night 3-4 times
Bowel habit	Irregular –1 times/ 2 day
Sleep	Disturbed sleep due to frequent nocturnal urination. At night 2-3 hours Day time-2 hours.
Addiction	No any addiction
Blood Pressure	124/84 mmHg
Pulse rate	74/min
Respiratory rate	18/min

Systemic Examination

No any abnormality detected.

Clinical findings

Ashtavidhapariksha

Ashtavidhapariksha (Eight-fold classifications) has been mentioned in Table 2.

Table 2: *Ashtavidhapariksha*

Nadi	*Dosha -KaphaVataja,*Regular.
Mutra	Day time 8-9 times, At night 3-4 times
Mala	1time in 2 day/*Katina.*
Jihva	*Nirama*
Shabda	*Spashta*
Sparsha	*Ruksha*
Drik	*Vikruta*
Akriti	*Madhyama*

Diagnostic focus and Assessment:

Assessment Criteria:

Subjective Parameters

- *Prabhuta Mutrata* (Polyuria)
- *Avila Mutrata* (Turbid urine)
- *Kshudhadhikya*(Polyphagia)
- *Trishnadhikya* (Polydipsia)
- *Kara-Pada-Tala Daha* (Burning sensation in palms & soles)
- *Swedadhikya* (Excessive perspiration)
- *Daurbalya* (Weakness)
- *Pindiko-udveshtana* (Cramps in calf muscles).

Assessment criteria of chief complaints

Table :3 Assessment criteria of chief complaints

Symptoms	Grading
***Prabhuta Mutrata* (Polyuria)**	
3 – 5 times per day, rarely at night	0
6 – 8 times per day, 1 – 2 times per night	1
9 – 11 times per day, 3 – 4 times per night	2
More than 11 times per day, more than 4 times per night	3
***Avila Mutrata* (Turbid urine)**	
Crystal clear fluid	0
Faintly cloudy or smoky (turbidity barely visible)	1
Turbidity clearly present but newsprint easily read through test tube	2
Newsprint not easily read through test tube	3
Newsprint cannot be seen through test tube	4
***Kshudhadhikya* (Polyphagia)**	
As usual	0
Slightly increased (1 – 2 meals)	1
Moderately increased (3 – 4 meals)	2
***Trishnadhikya* (Polydipsia)**	
Feeling of thirst 7 – 9 times/24 hours, either/or Intake of water 5 – 7 times/24 hours with quantity 1.5 – 2.0 liter/24 hours	0
Feeling of thirst 9 - 11 times/24 hours, either/or Intake of water 7 - 9 times/24 hours with quantity 2.0 - 2.50 liter/24 hours	1
Feeling of thirst 11 – 13 times/24 hours, either/or Intake of water 9 – 11 times/24 hours with quantity 2.50 -3.00 liter/24 hours	2
Feeling of thirst >13 times/24 hours, either/or Intake of water >11 times/24 hours with quantity >3.00 liter/24 hours	3
***Kara-Pada-Tala Daha* (Burning sensation in palms & soles)**	
No *Daha*	0
Hasta -Pada-Tala *Daha* found occasionally,mild, bearable	1
Hasta -Pada-Tala *Daha* continuous but bearable & not severe	2
Hasta -Pada-Tala-*Daha* continuous and severe &unbearable	3
***Swedadhikya* (Excessive perspiration)**	
Sweating after heavy work and fast movement or in hot weather	0

Profuse sweating after moderate work and movement	1
Sweating after little work and movement (stepping ladder etc.)	2
Profuse sweating after little work and movement	3
Sweating even at rest or in cold weather	4
***Daurbalya* (Weakness)**	
No fatigue	0
Noticeable fatigue, not affecting daily routine	1
Noticeable fatigue, moderately affecting daily routine	2
Noticeable fatigue, markedly affecting daily routine	3
***Pindiko-udveshtan* (Cramps in calf muscles)**	
No cramps	0
Cramps after walking more than 1 km.	1
Cramps after walking ¾ km	2
Cramps after walking ½ km	3
Inability in walking even ½ km	4

Objective Parameters

Laboratory Investigations

- Hematological- Hb (gm %) RBC, TLC, DLC, Platelet, ESR, PCV
- Bio-chemical-
  - Diabetic profile
  - Lipid Profile
  - Hepatic profile
  - Renal Profile
- Urine routine examination

Therapeutic intervention

Treatments given to the patient have been enlisted in Table 4.

Follow up

After completion of treatment, the patient was followed up for 7days. Patient showed marked relief in the signs and symptoms and no any new complaints were reported during the 7th day of follow up.

Results

After 14th day of assessments, variations in results were found on each symptom associated with *Madhumeha* (Type 2 Diabetes mellitus). Results of the treatment were tabulated and analyzed. Patient got relief in signs and symptoms with gradual improvement. Assessment on each considering symptom of *Madhumeha* (Type 2 Diabetes mellitus)has been presented in Table 5 and 6.

Outcome

It was observed that after 5 days of treatment, all the signs and symptoms were markedly relieved .

Table 4 : Posology of treatment protocol

Sr.No	Drug	Dose	Mode of Administration	Duration
1	*Kantaloha*Tablet	315mg [250 mg Kanta Loha Bhasma + 65 mg *Triphala ghana*] (1 tab twice daily before food)	Oral	15 Days

Table 5: Assessment on considering symptoms of *Madhumeha* (Type 2 Diabetis melitus)

Sr.No	Signs and Symptoms	1st Day (Before Treatment)	After treatment 15th day
1	*Prabhuta Mutrata* (Polyuria)	2	0
2	*Avila Mutrata* (Turbid urine)	2	0
3	*Kshudhadhikya*(Polyphagia)	1	0
4	*Trishnadhikya* (Polydipsia)	2	1
5	*Kara-Pada-Tala Daha* (Burning sensation in palms & soles)	2	1
6	*Swedadhikya* (Excessive perspiration)	2	0
7	*Daurbalya*(Weakness)	2	0
8	*Pindiko-udveshtana* (Cramps in calf muscles).	1	0

Table 6: Laboratory Investigations

Parameter			BT	AT	Follow up (7 days)
Hematological	Hb (gm %)		14.4	13.5	14
	RBC		4.82	4.58	4.52
	TLC		7300	8090	8090
	DLC	Neutrophil	57	53	54
		Lymphocytes	32	34	32
		Eosinophils	6	8	5
		Monocyte	5	5	5
		Basophils	0	0	0
	Platelet	292000	28300	28300	
	ESR	28	18	12	
	PCV	44.4	40.6	40.6	
	Diabetic profile	FBS	149	147	138

Bio-chemical		PPBS	261	152	150
	Lipid Profile	Sr Total Cholesterol	261	278	270
		Sr Triglyceride	134	130	130
		HDL	64.3	64	64
		VLDL	26.8	27.4	27
		LDL	169.9	165	159
	Hepatic profile	Sr. Bilirubin (T)	0.26	0.42	0.40
		Sr. Bilirubin (D)	0.18	0.15	0.15
		SGOT	14	16	14
		SGPT	19	17	17
		Alkaline Phosphatase	85	71	70
		Total Proteins	7.15	7.65	7.45
		Albumin	3.97	3.85	3.80
		Globulin	3.18	3.15	3.12
	Renal Profile	Sr. Creatinine	0.98	0.92	0.90
		Sr. Uric acid	3.52	4.17	4.10
		Blood Urea	20	20	20
Urine	Physical	Colour	Whitish	Pale yellow	Pale yellow
		Appearance	Turbid	Clear	Clear
		Reaction	Acidic	Acidic	Acidic
		Sp. Gr.	QI	QI	QI
	Chemical	Albumin	Present	Absent	Absent
		Sugar	Present	Absent	Absent
	Microscopic	Pus cells	4-5	Absent	Absent
		RBC	Absent	Absent	Absent
		Epi cells	6-8	1-2	1-2
		Casts	Absent	Absent	Absent
		Crystals	Absent	Absent	Absent

Table 7: *Rasa Panchaka* of *Kantaloha* Tablet(3),(4),(5),(6)

No	Drug	Botanical names	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Karma*
1	***Kantaloha***	Magnetite iron ore	*Tikta,MadhuraKashaya*	*Sheeta, Guru, Snigdha*	*Sheeta*	*Madhura*	*Tridosha Shamaka*
2	***Hareetaki***	*Terminalia chebula* Retz.	*Pancha rasa (Kashaya pradhana and Lavanavarjita)*	*Laghu, Ruksha*	*Ushna*	*Madhura*	*Tridoshaghna Chakshushya Rasayana Lekhana*
3	***Amalaki***	*Embilica officinalis* Gaertn	*Pancha rasa (Amla pradhana and Lavanavarjita)*	*Laghu, Ruksha*	*Shita*	*Madhura*	*Kapha pitta hara Chakshushya Rasayana Bhedana*
4	***Bibhitaka***	*Terminalia bellerica* Roxb.	*Kashaya*	*Laghu, Ruksha*	*Ushna*	*Madhura*	*Kapha pitta hara Chakshushya Rasayana Bhedana*

Observation

It was observed that the patient got marked relief from *Madhumeha* (Type 2 Diabetes mellitus) in 15 days. She was asked to come for follow-upafter7 days; Patient was not on any medication at that time.

Discussion

•Effect of treatment on *Prabhuta Mutrata* (Polyuria)

The patient had complained of frequent urination, 8–9 times per day, 3–4 times per night disturbing daily routine at first day of treatment, gradually it has been decreased to 3–5 times per day, rarely at night.

•Effect of treatment on *Avila Mutrata* (Turbid Urine)

Turbidity clearly present but newsprint easily read through test tube before the treatment. On 15th day the urine appears clear.

•Effect of treatment on *Kshudhadhikya* (Polyphagia)

Before the treatment patient had complaints of slightly increased polyphagia. After 15 day of treatment the symptom became normal.

•Effect of treatment on *Trishnadhikya* (Polydipsia)

The patient had grade 2 polydipsia. After the medication the grade 1 polydipsia present.

•Effect of treatment on *Kara-Pada-Tala Daha* (Burning sensation in palms & soles)

Before medication, *Hasta -Pada-Tala Daha* was continuous but bearable & not severe. After clinical trial patient had mild burning sensation only that is also not continuous.

•Effect of treatment on *Swedadhikya* (Excessive perspiration)

Before the intervention the patent had sweating after little work and movement (stepping ladder etc.).After the intervention the patient felt relief.

•Effect of treatment on *Daurbalya* (Weakness)

The patient had weakness before the treatment. Noticeable relief in symptoms observed.

•Effect of treatment on *Pindiko-udveshtana* (Cramps in calf muscles).

Patient had mild cramp before the treatment. Muscle cramp were not noted after the treatment.

•Changes in the glucose values

The patient had fasting blood sugar value of 149 before the medication. Slight decrease i.e., 138 noted in FBS after the treatment. Drastic changes in the Post prandial glucose value were noted. Before the medication the value was 261, after the follow up PPBS is 150.

Mode of Action of *Kanta Loha* Tablet

Kanta Loha (Magnetite) is indicated in the *Madhumeha* According to Rasa Vaghbhata. *Kanta Loha Bhasma* may act as targeted drug delivery because of its *Yogavahi* property. *Triphala* as a whole is expected to be more effective due to the combined activity of the individual components. Anti-oxidant property of *Triphala* arises from polyphenols, which reduces the oxidative stress by converting the reactive oxygen free radicals to non-reactive products (7).Triphala also the drugs said to act as *Naimittika Rasayana* which is beneficial in *Madhumeha*(8).

Kanta Loha Bhasma consists of super paramagnetic iron oxide nanoparticles. SPIONs are powerful glucose lowering factor that play important role in diabetic treatment. Triphala also contains bio active compounds such as Quercetin(9).It has been shown that QC treatment can enhance cognitive impairement in the diabetic rats, which may have the potential for treating neuropathy in the diabetic patients(10).Histological analysis showed that the treatment with QC-Fe_3O_4 restored the shape of beta islands and increased the number of islets and their area in diabetic rats (11). *Kanta Loha Bhasma* along with the Triphala extract having the same effect in human samples also.

Conclusion

In the current case study there is drastic reduction in the PPBS value indicates the anti hyperglycemic action of *Kanta Loha* Tablet. The synergic action of *Triphala* and *Kanta Loha* may be acted as synergetic action of Qurcetin conjugated SPIONs. The human subject showed marked change in the glucose value with the 15 days of treatment. This finding may help the medical scholars to utilize this ancient herbo mineral formulation in type 2 diabetes.

Scope for Further Study

The study should be conducted in large samples as well as prolonged duration in order to monitor the anti hyperglycemic effect more clearly.

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