

A COMPARATIVE STUDY AND PHARMACOLOGICAL INTERPRETATION OF CALCIUM COMPOUNDS VIS-À-VIS SHUKLA VARGA

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ABSTRACT :

Classical texts like Charaka, Sushruta and Vagbhata have used the calcium compounds in many diseases but they didn't classify them in a single group. Rasarnavakar & Rasaratnakar have classified them in *Shukla varga*. After 16th century other Rasa texts also mentioned separate group for Ca-compounds. In Tamilnadu ,it is found that Siddha Vaidya use scalp bone for *Unmada & Apasmar* and Pelvic bone for leucorrhoea proving our principle "*Vruddhi: Samane: Sarvesham*". In Kerala use of *Mrigshring Bhasma* along with *Kaddali Rasayana* for leucorrhoea is quite common. Paper deals with comparative study of Calcium Compounds between Modern pharmacology and Ayurveda pharmacology and proving superiority of Ayurvedic method of preparation.

Key words: Calcium Compounds, *Shukla Varga*, *Rasarnava*, *Rasratnakar*

INTRODUCTION: Calcium is an important constituent of the animal & human body containing about 2% of the calcium by weight. It is present to a considerable amount in all soft tissues & the blood & is essential to most forms of living matter and for the activity of certain ferments. Thus the milk will not curdle nor will the blood coagulate in the absence of calcium (1).

Modern Concept: Calcium is present almost entirely in the plasma and the normal level is 9 - 11.5 mg/dl. Serum calcium level is kept constant and is maintained by

1. Amount and availability of calcium in the food
2. Reaction of the tissues
3. Vitamin D
4. Parathyroid hormone

On the other hand serum calcium level depends on

- a) Amount absorbed from the intestine
- b) Plasma protein concentration and its composition

- a) Plasma inorganic phosphate level &
- d) Parathormone level

Serum Calcium is lowered if –

1. There is any defective absorption from intestine .e.g. Rickets & Steatorrhoea.
2. When calcium intake is very low as during later months of pregnancy.
3. In Hypoparathyroidism & in some cases of renal failure.

Serum Calcium may be raised-

1. In Hyperparathyroidism
2. After intake of large amount of Vit-D
3. In some diseases associated with increased amount of abnormal plasma proteins

Calcium is present in both animal & vegetable foods, although vegetable foods are much richer in calcium than the foods of animal origin. Milk & Yolk of eggs are especially rich in calcium in a readily assimilable form the normal calcium requirement of an adult is about 0.5 to 1 g daily. During the growing period, pregnancy and period of lactation the demand is greater. It is absorbed with difficulty & it has been estimated that only

50% of calcium of the food is absorbed. Therefore 1 g of calcium must be taken daily with food to supply the adequate requirement (2)

Calcium Compounds in Ayurveda

Calcium compounds are included under the category "Shukla varga". Rasarnavakar and Rasaratnakar has included 5 drugs under this category they are

1. "Shuklavarga: Sudha, kurma, shankha, shukti, varatika".
2. "Chunnam Kurmam Shankha Shukti Varatai: Shuklavargaka:"(3)

But nowadays many more drugs can be included under *Shuklavarga* and all these contain mainly calcium as an important compound. Therefore some of these following drugs are most likely to join the *shukla varga* they are-

"Muktaphalam Shankha Shukti Pravalascha Varatika Shambuka: Kurmaprushthascha Ajasthi Mrugshringakam Kukuttandatvacham Chunnam Godanti Badarashma cha Khatika Vanshasambhutam Shukla Vargamidam Smrutam Bhasmantaram Prayoktavyam Khatibanshavihay cha" (Dr.Siddhinandan Mishra)

1. Mukta 2.Praval 3.Shankha 4.Shukti 5.Varatika 6.Shambuka 7.Kurmapristha 8.Ajasthi 9.Mrigshring 10.Kukutandtwak bhasma 11.Chuna 12.Godanti 13.Khatika 14.Vanshalochana etc (4)

In the above lists most of the drugs are of animal origin and possess the similar characteristics to that of *Asthidhatu*, but are unlikely to digest easily because they are very hard like inorganic substances. Therefore they can be used in medicinal form only after refining and processing them in minute or subtle form. Some of the drugs from these can be used directly after refining them through *Agni sanskar* e.g.

Mukta & Chandraputi Pravala are used in fine Pisti form and they are given the Bhavana (trituration) of *shita dravyas*, while shankha, shukti & kapardika are made into subtle form through *Agni Sanskar* and are included under *Bhasma*. The general characteristics of all these drugs are similar but due to their different species they possess independent qualities also. Broadly they are classified under calcium containing compounds, even though each one of them is having different actions on our body.

The benefits of calcium containing compounds over other metal or mineral preparations also make them very handy to use frequently. Unlike other Rasa preparation their *Shodhana* and *Marana* process is not so tedious and also toxic effect of the drug is very rare even if taken in impure form.

Generally all these drugs are made bio available by their *Shodhana* through *Amla dravyas* mainly by Nimbu swarasa and *Marana* is done usually by Kumari swarasa (5).

Calcium compounds are alkaline in nature. Most of the calcium compounds given orally as a source of calcium are soluble in gastric acid but are converted mostly to insoluble CaCO_3 in the duodenum so that only a fraction of the Ca is available for absorption. CaCO_3 especially is dependent greatly upon gastric acid to make some of the Ca-bioavailable. Persons with Achlorhydria, Pyloroplasty or other conditions in which Ca-compound is not in acidic environment long through to liberate or maintain much soluble Ca; usually do not obtain adequate Ca-absorption from the calcium carbonate and certain other Ca-compounds (6).

This may be the main and scientific reason that Ca-compounds are purified by *Amla-dravyas* to increase their absorptions in the Acidic medium of stomach and are

reduced to bhasma by Kumari-swarasa to convert them into a fine state of subdivision and in making them so light as to be highly absorbable and assimilable after oral administration.

History- Classical texts like Charaka, Sushruta and Vagbhata have used the calcium compounds in many diseases but they didn't classify them in a single group. Rasarnavakar & Rasaratnakar has classified them in *Shukla varga*. After 16th century other Rasa texts also mentioned separate group for Ca-compounds. In Tamilnadu, it is found that Siddha Vaidya use scalp bone for *Unmada & Apasmar* and Pelvic bone for leucorrhoea proving our principle "Vruddhi: Samane: Sarvesham". In Kerala use of *Mrigshring Bhasma* along with *Kaddali Rasayana* for leucorrhoea is quite common.

Indications- Calcium compounds in Ayurveda are used as Rasayana, Beauty aids for women, Cardiotonic, Lung guards and in diseases like Raktapitta, Pradar, Kshaya, Hepato-splenomegaly, Unmada, Netraroga, Psychosexual disorders, Peptic Ulcer, Sprue, Colitis, Bronchitis, Pleuritis, UTI, Nephritis, Rickets, Pyorrhoea, Renal Tuberculosis, Migraine, Malarial Fever, Lactose Intolerance in children and so on (7).

Interpretation- Mukta and Pravala are included in *Ratna Varga* due to their shining appearance, high cost and multiple uses both medicinal and non-medicinal. From Mukta we can get superior quality of animal calcium and this calcium absorbs quickly & maximally in the body comparative to other calcium compounds. Pravala & Mukta, besides containing calcium, carbon and oxygen also contain other elements in traces which make them therapeutically more potent than the other drugs of the Calcium carbonate group.

Mukta and Pravala are in readily assimilable form therefore instead of doing their *Bhasma*; their *Pisti* is more commonly preferred. Also being included under *Ratnavarga* the *Pisti* form will enhance their drug action. While other drugs like Shankha, Shukti and Kapardika are used in *Bhasma* form. Therefore Mukta & Pravala are of *sheeta virya* while Shankha & Kaparda are of *ushna virya*.

Also properties of Mukta & Shukti are more similar, but shukti is of comparatively less value & less potent while properties of Shankha & Kapardika are more similar but Shankha is slightly *ushna* while Kapardika is more *ushna*.

Due to all these minute variations all drugs differ variably from each other. Therefore we can observe that action of Mukta is up to *Oja dhatu*. Pravala is penetrating up to *Shukra dhatu* likewise other drugs are having their particular action on a particular dhatu. So it is quite evident, if chemically all these drugs resemble the same formula or same compound their action on the body is different.

CONCLUSION: Calcium compounds due to their easy preparation methods, less toxic effects, their multiple and variable therapeutic uses with different *Anupanas* & with comparatively low cost and their greater bio-availability compared to Allopathic Calcium preparations can be used very frequently and without fear in practice.

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