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Review Article

POTTALI KALPANA: A CONCISE AND POTENT PHARMACEUTICAL DOSAGE FORM OF INDIAN SYSTEMS OF MEDICINE

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Abstract

Indian system of medicine is a treasure of spectacular and peculiar pharmaceutical dosage forms. Ayurvedic herbo-mineral drugs contain several types of formulations with vivid varieties. Maximum potency with minimum dosage is the philosophy of these drugs. Pottali kalpana is one of such, highly potent, concise and embossed dosage form in Ayurveda. The main ingredients of it, is the amalgam of mercury and sulphur, which is treated with different plant materials and ultimately given a compact form by the application of natural binder. This short review describe about the history, necessity, preparation and mode of application of the Pottali kalpana, an unique Ayurvedic pharmaceutical dosage form.

Keywords: Pottali kalpana, Ayurveda, Dosage form

INTRODUCTION

Rasashastra deals with Indian Alchemy. The nucleus of Rasashastra is mercury. Sulphur is used for pacifying the toxic effects of mercury and also to enhance the therapeutic effect of mercury.

The basic property of mercurial drugs is beautifully described in the following Sanskrit verse¹.

Alpamatropayogitvad aruchedaprasangatah
kshipramarogyadyitvad ausadhebyo adhiko rasah
na doshanam na roginam samyageva pareekshanam
na deshasyasa kalasya kriyam rasa cikitsite

Above verse describe that the mercurial drugs have lesser dosage form and quickness in combating disease pathology. For advising rasa drugs there is no need of examining in detail, the vitiated humor, time, location and season and simply by assessing symptoms and logic they can be administered.

Broadly mercurial formulation is divided into four categories:

Kharaliya form: Formulations which are needed to be grinded and prepared in a mortar and pestle. Kharal is a Sanskrit term of mortar. Kajjali (black colored amalgam of mercury and sulphur) is an excellent example of Kharaliya preparation.

Parpati form: Kajjali thus prepared in kharaliya form is melted at the temperature of 119⁰C (melting point of sulfur), then melted Kajjali is distributed over leaves of *Musa acuminata*, *Butea monosperma*, i.e. big leaves, covered square or rectangular shaped slabs made of cow dung cakes. After pouring the melted Kajjali, it is pressed by another slab made up of similar materials, and after self cooling, the crunchy black layers of Parpati is collected and powdered and stored in the bottle.

Kupipakwa form: Sindoor group of ayurvedic drugs are prepared by Kupipakwa method. They are so named because their colour is of deep red just like red coloured sindoor. It is prepared when Kajjali is made and then poured in a glass bottle covered with seven layers of mud smeared cloth, without the cork and heated in a muffled furnace or Valuka yantra (placed within the heap of sand and heated) at a series of temperature range.

1. 250⁰C: Melting of sulphur
2. 250⁰C-450⁰C: chemical transformation
3. 450⁰C-650⁰C: vaporization of the product and subsequent condensation.

Cork is placed in the bottle at appropriate time when,

- The bottom of the bottle becomes red hot.
- A coin placed over the bottle opening will turn white due to deposition of mercury particles.
- No fumes appeared when a cool iron stick is put into the bottle.

After sealing, self cooling is performed and Sindoor is scraped out from the neck portion of the bottle.

Pottali form: Among all the four mercurial preparation. Pottali is considered as an effective form of mercurial formulations. Minimization of the dose and also maximization of effect are the chief qualities of Pottali². Word Pottali means to minimize the shape of a drug into a more compact and potent form. As these medicaments are in very compact and portable form, they were meant to carry by roaming hermits and saints from different places and used them in exchange of foods and drinks from the patient's house.

In Iatrochemical classic, Paradvigyaniam it is stated in Sanskrit that,

Vistaritasya vastuno alpbhavanm pottam
pottam lati grihayti iti pottali

It can be defined as to collect scattered materials into compact and comprehensive size or otherwise the drug which gives compactness to scattered materials is known as Pottali. There are about 75-80 formulations mentioned in various books by various names with slight variation. Prof. Vasudev Mulashankar Dvivedi & Prof. Harishankar Sharma of Jamanagar have made an attempt to prepare cost effective Pottali formulation with minimum ingredients & named it as Rasagarvha pottali³.

Occurrence of Pottali kalpana in History

The Pottali Kalpana was first described by Nityanatha Siddha of 13th cent. A.D, in his book Rasaratnakar. Ratnagarvha pottali and Sankhagarvha pottali are worth mentioning in this classic. Sharangdhar also developed some formulations of these Pottali preparations in his classic, Sharangdhar Samhita. Yashodhara, the author of Ras Prakash Sudhakar(13th century), had also mentioned about Vajra Parpati in which he adopted the process of Pottali Kalpana. It should be remember that it is Yasodhar, who is also the pioneer in the preparation of Kupipakwa mercurial preparation. Bhiksu Mayuru pada, the author of Yog Ratnakara mentioned Hemgarbha Pottali which is done by boiling the medicament in sulphur. Krishnaram Bhatt the author of Sidhyabhaishjya Manimala has also used these technique. The maximum details about Pottali kalpana is mentioned in Rasayansar of Shyam Sundar acharya. It should be remembered that the birth of Pottali kalpana and Kupipakwa preparation was in 12th century to 13th century.

Necessicity of Pottali Kalpana

The importance of pottali kalpana is mainly based on the drawback of other mercurial formulations, which can be elucidated by the following Sanskrit verse, taken from the classic Rasayansar, Chikitsa prakaran, 113,

Kupi sangrahane dukham, dukhen bharatdawye param,
Dukhenah bhagat dalikah, oushad kshayam mahat

The above verse describes about the unavailability or scarcity of glass (kupi) bottles in 13th century A.D. Hence it was problematic in the formulation of Kupipakwa mercurial formulation, due to scarcity of glass bottles.

Mud pots are heavy to carry and cause havoc in transportation. As in medieval India, medicaments were used to carry by pedestrian physicians, who roam in different places, for delivering the medicines. Hence mud pots create problems for the physicians to carry the medicines, because if the quantity of medicines is large the container must be large to carry them efficiently. Pottali kalpana are the drugs of high potency with compact size, hence they were easy to carry by the travelling physicians.

There was always a risk of breakage of mud pots by the roaming physicians, if it happened; it causes a great loss of medicaments.

Method of Preparation

Requisite amount of mercury and Sulphur are grounded to Kajjali consistency. If metals like gold or silver are used as

medicines, then at first amalgam of mercury with those of metals are prepared and then it is triturated with sulphur. If plants extracts are used it is then added. It is finally triturated with the juice of *Aloe vera*, *Acacia arabica* or any natural binder, made into a small betel-nut, conch or penis shape and dried in shade to avoid cracking on the surface. This is firmly wrapped in a silk cloth with four layers and tied with a thread made up of inert metal. The other end of the thread is fastened to a stick and the Pottali is inserted into Sulphur powder in an enamel or earthen bowl. The bowl is then placed over sand (Valuka yantra) which is indirectly heated by a heating arrangement (Putra). Pottali is mainly prepared in Valuka Yantra or Lavana yantra, for uniform heating. Apart from the usual process of Pottali Kalpana preparation it is also prepared by heating the drugs inside a closed Samputa(enclosed container) and subjecting it to Putra(Heating arrangement) like in the case of Vaiswanara Pottali ras etc.

Levigation alone is done for the preparation of certain types of Pottali preparation like Netrapottali, etc. The poultice should be hanging in the Sulphur containing bowl, without touching the bottom of bowl because it may cause charring of the silk cloth. When the heating is started from the temperature range of 110°C to 140°C, sulphur gets melted at 119°C. The boiling is continued till the melted sulphur turns to blue color. This stage is achieved in 8 hours. Pottali should be constantly exposed to heat with a gradual rise in temperature. Later the Pottali is removed when the molten sulphur temperature attains a temperature range of 110°C to 111°C and after svangasheeta (self-cooling), the silk cloth is removed carefully and excess Gandhak is scraped out with knife. Thus the obtained Pottali(Figure:1) attains a metallic luster and produces metallic sound when struck with a metal object.

Mode of Application

After polishing the Pottali, the name of the medicine or the name of the disease is engraved over the Pottali, for easy identification of the drug during administration. A single pottali preparation has high potency and can be use in several types of diseases. Hence the dose is an important criterion for the proper treatment regimen. According to the disease, the Pottali is taken and by the help of it 'lines' are drawn over a stone slab of granite (just like drawing a line in blackboard with a chalk pencil), then the amount of medicines that is present in the particular lines over the stone slab, is scrapped out and administered internally to the patient.

DISCUSSION

Debossing is the tablet identification, formed as a groove or indentation into the tablets face. Debossing creates a two-dimensional appearance whereas in embossing the tablet identification protrudes above the tablet face or punch cup. Embossing creates a three-dimensional appearance⁴. Tablets and capsules are modern day's compact and unit dosage form, with certain advantages. Tablets may be embossed or debossed for quick identification, whereas capsules have identification characters, printed over the capsule cover. Tablets and capsules cause huge savings in transportation costs in comparison to medicaments within glass bottles. The idea of compact dosage form and their benefits was prevalent in medieval India in the form of Pottali kalpana. Pottali kalpana has compact form, with high potency, they were easy to carry and were embossed just like modern day tablets with

the name of the medicine or the type of disease it can cure. Thus we see the scientific aptitude and observation of the luminaries of Indian system of medicines was highly developed and advanced.

CONCLUSION

Though Pottali Kalpana is a concise and potent medicament in Indian system of medicines, but commercial availability of this type of medicines are negligible. Recently a reputed Ayurvedic company named, Shri Dhootapapeshwara from India had announced the availability of six types of Pottali kalpanas in the eve of World Ayurved Congress, Bhopal, December, 2012. The six types of Pottali Kalpanas are Hemagarbha pottali, Tara garbha pottali, Abhra garbha pottali, Tamra garbha pottali, Rasa garbha pottali and Tridhatu garbha pottali. All these weigh one gram and shaped in such a way that the patient can administer correct dose by himself. More companies should be encouraged in the manufacturing of Pottali Kalpanas and proper drug standardization and quality control parameters are also needed in the case of Pottali Kalpanas.



Figure 1: Various types of Pottali

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