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THE ROLE OF *GANDHKA JARANA* IN THE PREPARATION OF SAMGUNA AND SADAGUNA *RASA SINDURA*

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ABSTRACT: *Rasa sindura, is a famous and prestigious Ayurvedic Preparation, prepared by Kupipakwa method through Baluka Yantra system of healing. It is supposed as a toxic drug due to presence of Mercury. Therefore, it needs experimental proves and such type of experimental study shows that there are no toxic effects in therapeutic doses. Gamdhaka Jarana process reduces the unwanted effects, along with potentiating its diseases curing capacity.*

INTRODUCTION

Crude Parada and Gadhaka are supposed to produce many toxic effects on internal use, because of their toxic nature and impurities[1]. Hence number of processes have been described in Rasa Shastra texts to reduce their toxic effects and impurities to the minimum extend. In this context Sodhana, Astasamaskara and Gandhaka Jarna deserves mention[2].

Literary study reveals that these processes are not only remove the dosas (impurities) on the toxic effects of parade but also potentiate it in many ways. This is true in all the cases but in case of Parada Samskara and Gandhaka Jarana[3] it is more true as many potentiating effects of these Samskaras have been found mentioned in the texts. In the context of Gandhaka Jarana it is mentioned in the text that without daring Sadagunabalijarana[4], the Parada does not become suitable for curing diseases. Thus Gandhaka Jarana is an important process in which sulphure in different proportions is added in the mercury and made to burn in it with the help of fire applied through Baluka Yantra system of heating.

HISTORICAL DEVELOPMENT:

Historically the detailed description of Gandhaka Jarana and its effects has been found mentioned in "Rasendra Chintamani" (12th A.D.). Before this a few references regarding Gandhaka Jarana are found in "Rasarnava", "Rasendra Cudamani" and "Rasa Prakash Sudhakara"[6]. Later on a detailed description with regards to importance necessity and affection is found mentioned.

GANDHAKA JARANA:

According to Ayurveda Prakash, Murchana and Jarana are used as synonyms but this is true only in the context of Gandhaka Jarana otherwise Murchhana is quite different from Jarana. As in Murchhana Parada definitely acquires disease curing capacity and converts into therapeutically effective compound form, which is entirely different

than Bhasma form while is entirely different than Bhasma form while in Jarana mercury returns in its original state without being subjected to galena and patina etc. processes which is not possible. Murchhana is of two types:

1. Sagandha Murchhana – done with Gandhaka and other drugs.
2. Nirgandha Murchhana – done with Visadi and other drugs.

The detailed classification of murchhana as mentioned in the texts is given as follows:

MURCCHANA

- Sagandha
  - On the basis of fumes
    1. Bahirdhuma Rasa Sindura
    2. Antardhuma – Rasa Sindura
    3. Nirdhuma - Kajjali
  - On the basis of drugs and process
    1. Gandhaka Pisti – Kajjali
    2. Gandhaka Baddha – Parpati
    3. Gandhaka Jirna – Rasa Sindura
    4. Dhatu Pisti – Tamra Pisti
- Nirgandha
  Mugdha Rasa, Rasa Karpoora etc.

In Sagandha Murchhana mercury is made Murcchita (compound) by adding sulphur. This is a more common form of murchhana and is highly popular in practice because it is easy to prepare, and safe to use as it don't produce any toxic symptom in the body when used internally in therapeutic doses.

DIFFERENCE BETWEEN JARANA AND MURCCHANA:

	JARANA	**MURCCHANA**
1	After complete Jarana of the Abhrakasatwaand Gold etc., metals, Parada returns to its original form without being subjected to galena and patina processes	After completion of murcchana process parade does not return to its form. It can be used as such for therapeutic purpose.
2	Useful for Dhatuwada and Rasayana purpose	Used only for curing diseases and Rasayana Karma.
3	Agni Samskara is compulsory	Agni Samskara is not compulsory in murcchana.

IMPORTANCE:

The Rasa Shastra texts claim that Parada treated with Gandhaka Jarana process becomes highly potentiated and many pharmacological and therapeutic properties. This potentiation depends on the proportion of Sulphur made burnt during Jarana process. According to textual references Sadagunabalijarita parade is claimed to be much more effective than Samguna or Dwi-guna balijarita parade. Not only this some texts claim that without sadagunabalijarana, parade does not develop a disease curing capacity. Hence from therapeutic point of view it is essential.

The effects of Gandhaka Jarana in different proportions:

Sl. No.	Quantity of Sulphur	Effects produced
1	Samgauna	100 times more potent than Sodhita Parada
2	Dwi-guna	Kusthahara
3	Tri-guna	Sarva Jadya Vinasana
4	Catur-guna	Rasayana
5	Pancaguna	Rajaykshamahara
6	Sadaguna	Sarvarogo hara

Thus Gandhaka Jarana in different proportions is highly important in making mercury potentiated in different ways specially from therapeutic point of view.

METHODS AND APPRATUSES FOR GANDHAKA JARANA:

Various methods and Yantras (Apparatuses) are described in Rasa Texts for Gandhaka Jarana. The Kupi Yantra and Baluka Yantra are the best and commonly used yantras for this purposes, through which Rasa Sindura and Makardhawaja are prepared. Where Samaguna to Sadaguna jarana is made to potentiate these preparations. For preparing these preparation now-a-days Keca-kupi wrapped several times with cloth smeared in mud is used to fill the material (Kajjali) and Baluka yantra system of heat is applied where Kramagni (graded heat) is recommended i.e starting from Mridu (mild) agni (heat) and raising to Madhya agni (moderate heat) and lastly tibragni (strong heat), for burning extra sulphur from the compounds. It may be said here that the heat applied in this manner only make the final product of the desired quality and the property. This affects the yield of final product also.

To explain the Mridu, Madhya and Tibragni we are now using three terms (Meltinf for Mriduagni, Fuming for Madhyagni and flaming for Tibragni). That means the temp. necessary for melting the materials may be taken as the temp. for mridu agni. The temp. necessary for inducing the profuse fumes from the compound and before starting the flames from the bottle may be taken as the temp. of Madhyagni and the temp. required for starting the flames till

their disappearance may be taken as the temp. for Tibragni. And the temp. is sufficient for Gandhaka jarana and also for the preparation of the compound. Then the Kupi should be corcked and sealed to allow the compound to sublime at the neck and for this the same temp. of Tibragni may be continued for maximum one hour more.

Thus the heating time and temp. is very important in the preparation of Kupipakwa rasayana by Balukayantra system of heating.

Quantity of Sulphur:

According to the texts the quantity of Sulphur to added and burnt, varies from equal to thousand times, in addition to this it is also claimed in the texts that the power and potency of mercury and mercurial compounds increases in the proportion of Sulphur added and burnt in mercury.

Pharmaceutical Study:

The Pharmaceutical study was conducted to assess the role of Gandhaka Jarana with reference to Parada preparation and for this Rasa Sindura was selected and prepared by doing Gandhaka Jarana in different proportions. The two samples of Samaguna and Sadguna Rasa Sindura have been prepared by Samanya Sodhita and Astsamskara Parada separately and have been leveled as A,B,C & D. These samples were subjected for short term and long term toxicity study in experimental animals (Albino rats).

In the texts, there are number of methods for Gandhaka Jarana and of these Valuka Yantra method is more common and easy and has been followed in this study. This traditional method for the preparation of Rasa Sindura has many problems viz (1) Maintenance and Control of heat, (ii) Standardisation of temperature range of Mridu, Madhya and Tibragni, (iii) Uniformity of the final product.

Thus to overcome these problems the vertical type of Muffle Furance developed by Dr. D. Joshi has been used in the present study. Through this furnace the total time needed for the preparation of Samaguna Rasa Sindura is 6 hours 30 minutes while 7.30 hrs are needed in the preparation of Sadguna Rasa Sindura due to excess amount of Sulphur added in Sadguna sample. However there was no significant difference either physically or chemically in the final products prepared with Samaguna & Sadguna gandhaka. On chemical examination Mercury and Sulphur in Kajjali and in Samaguna & Sadguna Rasa Sindura prepared with Samanya Sodhita and Astasamskarita Mercury is as follows:

Group	Kajjali Mercury	Sulphur	Rasa Sindura		Free Sulphur
			Mercury	Sulphur	
A	48.66	49.12	84.27	19.9	1.46
B	13.38	84.68	83.74	14.56	1.02
C	48.89	49.18	84.04	13.06	1.88
D	13.46	84.72	83.47	14.12	1.22

This is as per the quantitative estimation of major ingredients present in the samples A,B,C & D.

Toxicological Study:

As per the modern literature the mercury compounds in different doses administered for different durations from different routes reported to produced toxic affects on various tissues like brain, lung, kidney, liver and intestine etc. The toxic effects of mercury were found reduced when used after being treated with Sulphur.

The Samaguna Rasa Sindura was prepared with equal parts of Mercury and Sulphur while in Sadaguna Rasa Sindura the Sulphur was used in six parts but in final products of both the samples – ratio of Mercury & Sulphur was approximately the same. Following the administration of four samples of Rasa Sindura certain toxic changes have been observed in Lung, Liver, Kidney, Pancreas and Intestine in 3,6, and 12 doses. The table showing the toxic effects is as follows:

Conclusions :

On comparison of different groups of animals treated with Samguna and Sadguna Rasa Sindura (prepared with Astasamsakarits Parada) and with Samaguna and Sadguna Rasa Sindura (prepared with Samanya Sodhita parada) it was observed that the animals treated with 3 & 6 mg. doses of all the four samples of Rasa Sindura for short duration (14 days). There was no significant difference in organs, but in the same doses of Sadaguna Rasa Sindura (both) for long duration (40 days) showed less toxic effect than Samguna Rasa Sindura (both) samples. Moreover, the different groups of animals treated with different doses of both Sadguna Rasa Sindura for short & long duration when compared among themselves, Sadguna Rasa Sindura prepared from Astasamskarita Parada showed least toxic effects than the other one which was prepared by Sadguna Rasa Sindura. In higher doses (12 mg) the Sadguna Rasa Sindura showed more toxic effects on Liver, Kidney (Tubles) than Sadguna Rasa Sindura in both short and long duration.

Thus, Histopathological studies indicated / that Rasa Sindura samples in higher doses (12 mg/100) showed certain toxic / effects on Lung, Liver, Kidney, small and large intestine and Pancrease when continued for longer duration (40 days)

HISTOPATHOLOGICAL FINDINGS OF TOXICITY
(14 days)

GROUP	LUNGS		LIVER		KIDNEY		SMALL INTESTINE		LARGE INTESTINE		SPLEEN
	Cong.	L.Hyper	Cong.	Fine / focul F.V	Cong. C.S.	T.E.N	Eosino. Philic Infil.	S.M.H.	E.I	S.M.H	Cong. (mild)
A/a1	(+5/5)	(-)	(+5/5)	(-)	(+2/5)	(-)	(-)	(-)	(-)	(-)	(+)
A/a2	(+)	(-)	(+)	(-)	(+3/5)	(-)	(-)	(-)	(-)	(-)	(+)
A/a3	(+)	(-)	(+)	(+3/5)	(+3/5)	(+1/5)	(-)	(-)	(+1/5)	(-)	(+)
B/a1	(+3/5)	(-)	(+2/5)	(-)	(+2/5)	(-)	(-)	(-)	(-)	(-)	(+)
B/a2	(+)	(-)	(+)	(-)	(+3/5)	(-)	(-)	(-)	(+2/5)	(-)	(+)
B/a3	(+)	(-)	(+)	(-)	(+3/5)	(-)	(-)	(-)	(+2/5)	(-)	(+)
C/a1	(+)	(-)	(+)	(-)	(2/5)	(-)	(-)	(+)	(-)	(-)	(+)
C/a2	(+)	(-)	(+)	(-)	(+3/5)	(-)	(-)	(-)	(+2/4)	(-)	(+)
C/a3	(+)	(-)	(+)	(+3/5)	(+4/5)	(+2/5)	(-)	(-)	(-)	(+2/5)	(+)
Da/a1	(+)	(-)	(+)	(-)	(+3/4)	(-)	(-)	(-)	(-)	(-)	(+)
Da/a2	(+)	(-)	(+)	(-)	(+4/5)	(-)	(-)	(-)	(+2/5)	(-)	(+)
Da/a3	(+)	(-)	(+)	(+3/5)	(+5/5)	(-)	(-)	(-)	(-)	(+2/5)	(+)
Control I	(+)	(-)	(+)	(-)	(+2/5)	(-)	(-)	(-)	(-)	(-)	

(40 days)

GROUP	LUNGS		LIVER		KIDNEY		SMALL INTESTINE		LARGE INTESTINE		SPLEEN
	Cong.	L.Hyper	Cong.	Fine / focul F.V	Cong. C.S.	T.E.N	Eosino. Philic Infil.	S.M.H.	E.I	S.M.H	Cong. (mild)
A/c1	(+)	(-)	(+)	(+2/5)	(+)	(+1/5)	(-)	(-)	(-)	(-)	(+)
A/c2	(+)	(-)	(+)	(+3/5)	(+2/5)	(+2/5)	(-)	(-)	(-)	(-)	(+)
A/c3	(+)	(+3/4)	(+)	(+3/4)	(+3/4)	(+3/4)	(+2/4)	(-)	(-)	(+2/4)	(+)
B/c1	(+)	(-)	(+)	(-)	(+3/5)	(-)	(-)	(-)	(-)	(-)	(+)
B/c2	(+)	(-)	(+)	(+2/4)	(+2/4)	(+2/4)	(+2/4)	(-)	(-)	(-)	(+)
B/c3	(+)	(-)	(+)	(+3/5)	(+3/5)	(+3/5)	(+2/5)	(-)	(-)	(-)	(+)
C/c1	(+)	(-)	(+)	(+3/5)	(+3/5)	(+3/5)	(+2/5)	(-)	(-)	(-)	(+)
C/c2	(+)	(+2/4)	(+)	(+3/4)	(+3/4)	(+3/4)	(-)	(-)	(-)	(+2/4)	(+)
C/c3	(+)	(+3/4)	(+)	(+3/4)	(+4/4)	(+4/4)	(-)	(-)	(-)	(+4/4)	(+)
D/c1	(+)	(-)	(+)	(+2/5)	(+3/5)	(+3/5)	(-)	(-)	(-)	(-)	(+)
D/c2	(+)	(-)	(+)	(+2/4)	(+3/4)	(+3/4)	(+2/4)	(-)	(-)	(-)	(+)
D/c3	(+)	(+2/4)	(+)	(+3/4)	(+4/4)	(+4/4)	(-)	(-)	(-)	(+3/4)	(+)
Control II	(+)	(-)	(+)	(-)	(+)	(-)	(-)	(-)	(-)	(-)	(+)

A = Samaguna Rasa Sindura (by Astasamskarit Parada)

B = Sadaguna Rasa Sindura (by Astasamskarita Parada)

C = Samaguna Rasa Sindura (by Samanya Parada)

D = Samaguna Rasa Sindura (by Samanya Parada)

a = Acute (14 days)

c = Chronic (40 days)

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