

Mercury Notions and Facts: Need for Ayurveda Community

Rohit A.Gokarna, Supriya Gokarn, Shilendra Mishra, Anup Pande



Abstract:

Drug design in Ayurvedic pharmaceuticals has always been unique and time tested. Most of the times, literature has led us to consolidated evidence. It is acceptable fact that these medicaments have always been questioned constantly due to presence of heavy metals. Mercury being a major threat among the heavy metals, is being banned from the world. At this juncture its need of the hour to look and generate evidence for its benefits and facts. There are number of studies conducted by various research scholars, which are needed to be reviewed to have a better knowledge and to get confidence in practitioners. A review on mercurial preparations like *Kajjali*, *Parpati* and *Rasasindura* has been done in present study. It was found that ample numbers of studies were taken up regarding their safety, efficacy in experimental models and clinical trials in humans. Mercurial preparations taken up in present study had attained a stable organo-metallic compound form and was found safe for medicinal use in their respective therapeutic dose. Efficacy of these drugs was also established with relevant clinical trials.

Key words: *Kajjali*, *Parpati*, *Rasasindura*, Safety, Mercury

Introduction:

Ayurvedic pharmaceuticals has constantly been targeted due to various reasons like lack of standardization, safety data and evidence based studies. Especially mercurial preparations have always been questioned for their benefits and risk factor. Reports of alarming quantity of heavy metals in Ayurvedic medicaments published by Saper et.al. in 2004 and 2008 is well known and referred by most of the scholars[1,2]. In recent past there is cry to ban trade of Mercury and its gradual phase out by Year 2020[3]. This has lead to concerns among Ayurveda community as ban on trade of Mercury will have a devastating effect on Ayurveda.

Mercurial formulations like *Kajjali*, *Parpati*, *Rasasindura* are commonly used by practitioners on the basis of classical claims and experiences but convincing scientific community regarding their safety has always been apprehension. There has been considerable reduction in prescription and production of mercurial preparations due to notion of heavy metal toxicity. There is urgent need of creating awareness and educating practitioners regarding facts and notions of mercurial preparations. Hence the present study is planned to review research works done on major mercurial preparations to elicit the facts.

Materials and Methods:

A review of Research works and Publications was done to find out notions and facts regarding mercurial preparations.

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Observations and Results:

Kajjali, a mercurial preparation and integral part several compound formulations and till 2005, 10 different researches have been conducted. The studies were determined on pharmaceutical standardization, analytical evaluation, Clinical study (*Tamaka Shwasa*, *Kushta*, Migrane etc.). [Table 1] Available research articles focused on characterization of *Kajjali* which depicted HgS (Meta-cinnabar) form with particle size of 25nm on its surface [4,5]. Acute and Sub-acute toxicity study in Wistar stain albino rats showed *Kajjali* powder suspension has no acute and subacute toxicity[6]. No incidences of genotoxicity, in terms of micronuclei induction or DNA damage was recorded in animals treated with *Kajjali Bhasma*, which re-emphasizes its safety for human consumption despite its trace mercury content[7].

Parpati is a thin flake like mercurial preparation and 14 different researches have been conducted in various institutes till 2005. [Table 2] Pharmaceutical standardization and analytical studies have been explored in these studies. *Parpati* mainly utilized in *Grahani* (sprue syndrome) and several

studies have been conducted to establish the classical claim. However there are very few research articles on *Parpati*, highlights being pharmaceutical standardization with *Trividha Paka* (three different stages of drug processing)[8]. A comprehensive review of *Parpati Kalpas* is a good study to understand basics of preparation[9]. Toxicity study of *Rasparpati* in albino rats ensures the safety of *Rasaparpati*, if it is prepared as per classical methods and administered in prescribed dose [10].

Rasasindura is a sublimated mercurial preparation with wide range of application in clinics. 24 Thesis works have been taken-up by the scholars of *Rasashastra* till 2005. [Table 3] Pharmaceutical standardization, Analytical profiles, evaluating safety and toxicity data, and clinical efficacies in *Tamaka Shwasa*, *Vrana*, *Shwitra*, *Kshudra Kushta*, Hypertension, Male sexual problems were attempted in these studies [11]. Published research articles on RS include Conventional methods having added advantages like better maintenance of temperature, saving of energy, cost effectiveness, less human effort over classical method[12]. RS has reported to be

Table 1. Researches conducted on *Kajjali* in various institutes.

| Table 1. Researches conducted on <i>Kajjali</i> in various institutes. | | | | |
|--|----------------|--------------------------------|--|--------------------|
| 1. | <i>Kajjali</i> | Experimental | Bioassay of <i>Kajjali</i> | Sawant P.P. |
| 2. | <i>Kajjali</i> | Clinical | Pharmaco-clinical study of <i>Kajjali</i> and <i>Rasa parpati</i> . | Ravindra K. |
| 3. | <i>Kajjali</i> | Comparative Pharmaceutical | Role of mercury in the form of <i>Kajjali</i> and <i>Parpati</i> . | Bhattacharya P.C. |
| 4. | <i>Kajjali</i> | Comparative Pharmaceutical | <i>Kajjali</i> and <i>Parpati</i> : Comparative study. | Zala K.K. |
| 5. | <i>Kajjali</i> | Clinical/ <i>Shwasa</i> | Comparative study of <i>Arka-dala churna</i> alone & along with <i>Kajjali</i> & <i>Rasa-sindoor</i> on <i>Shvasa</i> | Khaire G.D. |
| 6. | <i>Kajjali</i> | Clinical/Migrane | To compare clinical efficacy of <i>Shirah-Shooladi-Vajra Rasa</i> herbal and without classical <i>Kajjali</i> in patients of <i>Ardhava bhedaka</i> w.s.r. to migrane. | Bajaj Harshita |
| 7. | <i>Kajjali</i> | Clinical/ <i>Kushta</i> | <i>Ardha-Sama va Dvi-Guna-Gandhaka-Yukta Kajjali va Navaneeta Mishrita Malahara cha Vicharchika Kushthavar Tulanatmaka Adhyayana.</i> | Swarn Pragya |
| 8. | <i>Kajjali</i> | Pharmaceutical | <i>Sama guna tatha Shadaguna Kajjali evam Manakeekarana.</i> | Sabhaga Chandani |
| 9. | <i>Kajjali</i> | Clinical/ <i>Tamaka Swasa</i> | <i>Dhatoora-Moola-Twak Swarasa Bhavita Kajjali on Tamaka Swasa Roga.</i> | Patel K.K. |
| 10. | <i>Kajjali</i> | Clinical/ <i>Tamaka Shwasa</i> | A comparative study of three 'claimed' <i>Swashara Yogas (Tamra bhasma, Dhatura moola twak swarasa bhavita Kajjali and malla sindoor)</i> . | Valdoria Rashik N. |

Mercury sulfide (crystals ranging from 25-50nm) associated with several organic macro molecules and trace elements in different amounts[13]. Toxicity studies with *Samaguna* and *Shadguna* RS prepared with *Astasamsakarita* and *Samanya Shodhita Parada* reported no significant degenerative changes. Samples with *Astasanskarita Parada* proved to be less toxic than the other samples[14]. RS feeding to *Drosophila melanogaster* did not show any heavy metal toxicity[15].

Discussion:

Classical claims may differ from actual practice in clinics. To accept or reject any hypothesis, one relies on the research findings and facts. On other hand methodical compilation of clinical experiences in classics has made us to believe and practice the same. Classics of Ayurveda have also elaborated the hazards of drugs, which are not properly manufactured. Specific processing techniques (like *Shodhana* and

Marana etc.), have been explained to remove the hazardous effects from these drugs. We even find detailed description of testing methods of end product (like *Bhasma Pariksha*), which will ensure safety of drug. How can one deny the science which explains each and every aspect of a drug like indications, dose, to whom to give and to whom not to give, what should be the vehicle, what are the diseases, where they are not recommended and even anti-dotes in case of adverse drug reaction.

Reviewed studies has shown the drugs *Kajjali*, *Parpati* and *Rasasindura* were found to be safe in various studies and also exhibited encouraging results in several clinical manifestations. It is very important to understand the basic concept of Ayurveda before imposing blame. Hazardous effect of these blames includes losing confidence in these medicaments by practitioners. It is also important to convey the facts to the community with sufficient

Table 2. Researches conducted on *Parpati* in various institutes

| 1. | <i>Parpati</i> | Pharmaceutical | <i>Parpati Vigyaneeyam.</i> | Sharma S.K. |
|-----|----------------|--------------------------|---|-------------------|
| 2. | <i>Parpati</i> | Pharmaceutical | Role of mercury in the form of <i>Kajjali</i> and <i>Parpati</i> . | Bhattacharya P.C. |
| 3. | <i>Parpati</i> | Pharmaceutical | <i>Kajjali and Parpati: Comparative study.</i> | Zala K.K. |
| 4. | <i>Parpati</i> | Clinical/ <i>Grahani</i> | A study on <i>Parpati Kalpa</i> in the management of <i>Grahani Roga</i> . | Gupta R.K. |
| 5. | <i>Parpati</i> | Pharmaceutical | Study on <i>Parpati Kalpanas</i> w.s.r. to <i>Rasa Parpati</i> . | Paul M.C. |
| 6. | <i>Parpati</i> | Clinical/ <i>Grahani</i> | Concept of <i>krimija Grahani</i> and evaluation of the role of fortified <i>Panchamrita Parpati</i> and <i>Mustakarishita</i> in its management. | Tewari C.M. |
| 7. | <i>Parpati</i> | Clinical/ <i>Grahani</i> | A study on pharmaco-analytical and therapeutic efficacy of <i>Rasa parpati</i> w.s.r. to <i>Samanya</i> and <i>Vardhamana Prayoga in Grahani Roga</i> . | Reddy V.B. |
| 8. | <i>Parpati</i> | Pharmaceutical | Studies on Mercurial preparation- <i>Rasa parpati</i> w.s.r. to <i>Trividha Paaka</i> . | Shrivaastava U.K. |
| 9. | <i>Parpati</i> | Clinical | Pharmaco-clinical study of <i>Kajjali</i> and <i>Rasa parpati</i> . | Ravindra K. |
| 10. | <i>Parpati</i> | Pharmaceutical | A study on <i>Rasa Parpati & Trividha paka</i> prepared by <i>Hingulottha Parada</i> . | Yadav L.D. |
| 11. | <i>Parpati</i> | Clinical | A comparative pharmaco-clinical study of <i>Rasa Parpati</i> prepared from <i>Anuvasita, Ashta sanskarita and samanya-sodhita</i> . | Mashru Mona S. |
| 12. | <i>Parpati</i> | Experimental | Pharmaceutical and physico-chemical studies of <i>Rasa Parpati and Prayogika Adhyayana</i> . | Shrivastava K.K. |
| 13. | <i>Parpati</i> | Clinical/ <i>Grahani</i> | Preparation of <i>Rasa Parpati</i> and assessment of its anti-microbial activity in the patients of <i>Grahani</i> in vitro. | Gokhale S.S. |
| 14. | <i>Parpati</i> | Clinical/ <i>Grahani</i> | <i>Rasa Parpati ka Grahani Roga par Prabhava: Ek Adhyayana</i> . | Pathak T. |

| Table 3. Researches conducted on <i>Rasasindura</i> in various institutes | | | | |
|---|----------------------|---------------------------------|---|--------------------|
| S.N. | Drug | Type of study | Title | Author |
| 1. | <i>Rasa-sindoorā</i> | Clinical/ <i>Takmaka Shwasa</i> | Preparation and physico-chemical analysis of <i>Shadaguna-Balijarita Rasa-sindoorā</i> and its clinical efficacy on <i>Tamaka shvasa</i> with three different adjuvant. | Sasi Bhushan V. |
| 2. | <i>Rasa-sindoorā</i> | Toxicity & Hypoglycemic | A comparative study of <i>Hingula</i> and <i>Rasa-sindoorā</i> w.s.r. to their chemical & toxicity study and hypoglycemic effect. | Rama Sagar |
| 3. | <i>Rasa-sindoorā</i> | Clinical | Therapeutic standardization study on <i>Rasa-sindoorā</i> . | Sanjay Kumar |
| 4. | <i>Rasa-sindoorā</i> | Pharmaceutical | Study on the role of <i>Gandhaka-Jarana</i> in relation to mercury and its preparation. <i>Rasa-sindoorā</i> . | Singh A.K. |
| 5. | <i>Rasa-sindoorā</i> | Clinical/ <i>Takmaka Shwasa</i> | <i>Arkapatriswarasa bhavita Rasa-sindoorā in Tamaka Shvasa</i> . | Somanandan G. |
| 6. | <i>Rasa-sindoorā</i> | Clinical/ <i>Takmaka Shwasa</i> | Comparative study of <i>Arka-dala churna</i> alone & along with <i>Kajjali</i> & <i>Rasa-sindoorā</i> on <i>Shvasa</i> | Khaire G.D. |
| 7. | <i>Rasa-sindoorā</i> | Pharmaceutical | A study of <i>Rasa-sindoorā</i> with varying proportion of sulphur. | Badhe H. Jaishree |
| 8. | <i>Rasa-sindoorā</i> | Clinical/Male fertility | ' <i>Sukra shatani cha soote</i> ' ke pariprekshya mein <i>samaguna Rasa-sindoorā</i> evam <i>Atmaguta-Beeja churna</i> ka tulanatmaka adhyayana. | Bhatt Sudha |
| 9. | <i>Rasa-sindoorā</i> | Clinical/ <i>Kshudra kushta</i> | A comparative study of <i>Rasa-sindoorā</i> w.s.r. to its preparation time and its clinical efficacy in <i>kshudra kushtha</i> . | Swayam Prakash |
| 10. | <i>Rasa-sindoorā</i> | Clinical/ rejuvenation | <i>Supatha-Pakva Shadguna Balijarita Rasa-sindoorā ka vishaya prabhava</i> . | Vaghasia Dhiraj |
| 11. | <i>Rasa-sindoorā</i> | Clinical/ male sexual problems | The augmenting effect of <i>Rasa-sindoorā (Ahtasanskarita)</i> w.s.r. to <i>Vrishya yoga</i> on male sexual problems. | Sharma Pavankumar |
| 12. | <i>Rasa-sindoorā</i> | Clinical/ <i>Shvitra</i> | The augmenting effect of <i>Rasa-sindoorā</i> w.s.r. to <i>Shvitraghna yoga</i> . | Agrawal Umeshkumar |
| 13. | <i>Rasa-sindoorā</i> | Clinical/ Hypertension | A comparative study of hypotensive formula alone & along with <i>Rasa-sindoorā</i> . | Gandhi D.B. |
| 14. | <i>Rasa-sindoorā</i> | Clinical/ Contraceptive | An experimental and clinical study of oral contraceptive w.s.r. to augmenting property of <i>Rasa-sindoorā</i> . | Wavare Ramesh |
| 15. | <i>Rasa-sindoorā</i> | Toxicity | A comparative pharmaco-chemical study of <i>Rasa-sindoorā (Samaguna & Shadaguna Balijarita)</i> w.s.r. to its toxicity. | Dasondi M. |
| 16. | <i>Rasa-sindoorā</i> | Pharmaceutical | Standardization of <i>Rasa-sindoorā</i> in relation to <i>Paka-kala</i> and <i>Agni</i> . | Sharma H.S. |
| 17. | <i>Rasa-sindoorā</i> | Clinical/ <i>Nadi Daurbalya</i> | <i>Vividha-vidhi Vinirmita Rasa-sindoorā ka Nirmanatmaka va Tulanatmaka evam Nadi-Daurbalya par Prabhavatmaka adhyayana</i> . | Pramanik T.K. |
| 18. | <i>Rasa-sindoorā</i> | Clinical/ <i>Tamaka Shwasa</i> | <i>Rasa-sindoorā Nirmana evam Tamaka shvasa par Aturalayein Adhyayana</i> . | Hattimare Kishore |
| 19. | <i>Rasa-sindoorā</i> | Pharmaceutical | <i>Rasa-sindoorā Nirmana evam Adhyayana</i> . | Mandgil S. |
| 20. | <i>Rasa-sindoorā</i> | Clinical/ <i>Tamaka Shwasa</i> | <i>Shuddha-Ashta-Sanskarita Parada se Rasa-sindoorā Nirmana evam Tamaka shvasa par Adhyayana</i> . | Sujeeven Kumar |
| 21. | <i>Rasa-sindoorā</i> | Clinical/ <i>Dushta vrana</i> | Clinical study in the management of <i>Dushta-Vrana</i> with <i>Rasa-sindoorā</i> internally and <i>Rasa-Karpoora di Dhoopana</i> externally. | Sanjeev Kumar L.B. |
| 22. | <i>Rasa-sindoorā</i> | Pharmaceutical | <i>Ashta-sanskarita evam Hingulotha Parada Dvara Rasa-sindoorā nirmana evam tulanatmaka adhyayana</i> . | Sharma S.K. |
| 23. | <i>Rasa-sindoorā</i> | Experimental | Chemical and bacteriologic studies on <i>Rasa-sindoorā</i> | Kuldeep K. |
| 24. | <i>Rasa-sindoorā</i> | Clinical/ <i>Madhumeha</i> | A comparative study of <i>Madhumehahara yoga</i> , along and alone, with mercurial preparation <i>Rasa-sindoorā</i> . | Sharma Namdhar |

evidence. The drug like *Kajjali* and *Parpati* were found to be in HgS(meta cinnabar) form with organic encapsulation. Both the drugs were found to be safe at therapeutic dose in experimental studies. *Rasasindura* was in HgS(Cinnabar) organo-metallic compound form and found to be safe in experimental models. These were also found to be efficacious in various clinical conditions.

By observing the results of above studies we can infer that, all the *Shodhana* and *Marana* procedure are very useful and unique process in bringing the metals or minerals in to bioavailable form. These procedures are mainly intended to convert the inorganic form of drug to organic form. The herbal catalyst used as media incorporates their biomedical qualities in to the Metal or Mineral which is subjected to them. Because of this we can confidently claim that the medicine prepared by following authentic *Rasa* procedures is not hazardous. Studies in recent past have shown that these procedures will bring about organic encapsulation in final product [16].

In recent developments government has set up AYUSH ministry to promote Ayurveda and alternative therapies. This will definitely ensure mainstreaming Ayurveda and help to acquire status of primary health care system. This will also make sure that there are enough scientific evidences gathered by conducting researches on herbo-metallic preparations.

Conclusion:

It is evident from above studies that mercurial preparations (followed Ayurveda Pharmaceutical Methods)) taken up in present study attained a stable organo-metallic compound form and are safe for medicinal use in their respective therapeutic dose as there were no significant toxicity observed in various studies. Efficacy of these drugs also has been established with relevant clinical trials. Rigorous efforts to gather safety and efficacy of organo-metallic formulation will curtail the misconception among practitioners.

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