

Mercury toxicity and its earlier footprints in Siddha system of medicine– Analogous to Pharmacovigilance

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ABSTRACT

Background: According to Siddhars, Mercury is the chief of all elements and ubiquitous. Due to the life-threatening toxicity of mercury, it is considered by WHO as one of the top 10 chemicals of major public health concern [1]. Siddhars believe and prove that Mercury can cure most of the incurable diseases, protect the body from the disease, gives good health and facilitate to attain eight folds of Siddhi (Attama Siddhigal)[2]. Siddhars practiced Pharmacovigilance successfully in all the areas of drug profile such as collection and selection of raw drugs, purification, SOP's of formulations, medicinal dosage, duration of the treatment, vehicle, and precaution. Because, the occurrence of ADR is mostly due to error in the above steps. The symptoms and the treatment of ADR caused by mercury and its toxicity is well explained in Siddha literature. In mercury, the collection is made by the removal of impurities from the mercurial ore itself, the literature describes impurities and its toxicity (Thodam & Sattai) [2]. The purification (ore dressing) of mercury is the process to detoxify the toxin by chelation and increase the efficacy. The science behind the detoxification of mercury needs to be explored for the betterment of health. Insisting upon the ban on mercury, monitoring, and reporting of the adverse reaction and adverse event for the mercurial product should be registered and documented for the successive current Pharmacovigilance practice. Implementation of Pharmacovigilance practice will throw the renaissance to the Siddha system of medicine.

Keywords: Siddha, Pharmacovigilance, Ore dressing, Detoxification, Mercury toxicity, ADR.

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INTRODUCTION

Pharmacovigilance, also known as Drug safety, is the Pharmacological science related to collection, detection, assessment, monitoring and prevention of adverse effects with pharmaceutical products.⁴ Adverse Drug Reaction[ADR] are defined as any response to a drug which is noxious and unintended occurs at normal doses.⁴ Although the technical term Pharmacovigilance does not present in the Siddha Literature, the concept of Pharmacovigilance is present lively. Ultimate goal of Pharmacovigilance is Drug safety, it is successfully carried by Siddhars. The *Nanju Murivu Nool*, which is a classic text book of Siddha, describes about the adverse reactions to medicines and also food when they are prepared or used inappropriate manner.³

Siddhars gave more attention towards the factors like collection and selection of raw drugs[*Thervu & segarippu*], purification[*suththi*], SOP's of formulations[*Seimurai*], medicinal dosage[*Alavu*], duration of the treatment[*Naal alavu*], vehicle[*anubanam*], and

precaution[*Pathiyam*] in order minimise the adverse effect, they also select medicine according to some factors such as body constitution[*Udal Iyal*], age[*vayadhu*], Disease condition [Noiyin thanmai]. There is misconception that Siddha medicines are devoid of adverse reactions. Most of the Siddha text Clearly mention that if a drug is used without Knowledge of its proper action, It would certainly act as a Poiso ([Eg: *Vangam kettal pangam*]²) But in the other hand Poisonous drug like Mercury, Arsenic are used widely to prepare a miraculous medicine for various diseases.

Mercury –In Siddha

The term *Pancha sootham* refers to Five types of Mercury compounds used to do medicine.² Mercury compared to the Lord Bhrama, Vishnu, and Sivan because of its 3 power such as creative power, Protective power, and Destructive power respectively. Action: Vitalizer, Tonic, Laxative, Diuretic, Neutralizing *Pitham*, Silagogue, Anti inflammatory, Medicine for venereal disease.²

Properties:

It purifies blood, improves blood and sperms, stimulate appetite, kills micro-organisms and cures the ulcers, improves facial complexion, Improves memory power, strengthens nerve plexus, prevents senility and increases the life span. In Siddha system of medicine, Taste [Suvai], potency [Veeriyam] and Post digestive transformation [Vibagham] of the drug are more important to treat illness. Mercury has Six taste, dominated by sweet and its has both hot and cold potency. Because of its unique nature of taste and potency, it is useful in the treatment of most disease.²

METHODS**COLLECTION OF THE DRUGS**

Impurities of Mercury is considered as *Thodam* and *Sattai*. Disease caused by *Thodam* and method of removing it are explained below:²

S. N	Thodam	Symptom s/Disease	Method of removing Thodam
1	Naagam	Anorectal diseases	Mercury (1), Brickstone Powder (16) and Turmeric powder (16) are added one by one separately and triturated with Lemon Juice for one day and washed with vinegar.
2	Vangam	Leprosy	Kadamba bark [<i>Anthocephalus kadamba</i>] and Alangium root [<i>Alangium salvifolium</i>] is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.
3	Malam	Syncope	Root of jujube [<i>Zyzyphus jujuba</i>] is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.
4	Vanni	Thirst	Root of Ceylon lead wort [<i>Plumbago zylanica</i>] is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.
5	Saanchal yam	Spermator rhoea	Root of Black thorn apple [<i>Datura metel</i>] is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.
6	Vidam	Death	<i>Thiripala chooranam</i> is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.
7	Giri	Scabies	<i>Thirikadugu chooranam</i> is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.
8	Asakyaakini	Gonorrhoea	<i>Tribulus terrestris chooranam</i> is added to Hg and triturated with lime juice for one day and then washed with fermented rice water.

PURIFICATION AND DETOXIFICATION:

Mercury purified by the filtration, oxidation and reduction method. As per the siddha literature Usage of Impured Hg is consider to be the biggest Sin like Heinous sin [*Panchama Pathagam*], those who use the impured Hg they will not be treated as human.²

Various method Practices to purify Hg and few simple methods are explained below:²

1.-Required quantity of Hg is placed in a thick cloth and squeezed for 1000 times. Then it is placed in an earthen pot. Fresh water is

poured in the Earthen pot up to the level of 1 "above the Hg level. The pot is heated with low intensity fire. The water level is maintained by adding water. When the water turns into black colour, the Hg is separated and washed with vinegar for 4 to 5 times to get the purified and detoxified Hg.²

2.-Hg [35 gm] is triturated with, Brick powder [r.s], Turmeric powder [r.s], for one hour respectively and washed with water. Then the Hg is boiled with juice of *Acalypha indica* until it detoxified.²

RESULTS**TOXICITY OF CAUSED BY IMPURE MERCURIAL PREPARATION:**Signs and symptoms

Siddhar Theraiyar describes mercurial toxicity ,they are Increased *pitham*, psychiatric disorder like irritability, excitability, insane behaviour, increase body temperature leading to boils, increased *Megam* [Polyuria], poor memory, anaemia, dysentery, malena, thirst due to gastric irritation, bloating, increased sweating, slurred speech, hallucination, pain present in the limb, hearing impairment ,speech impairment, pallor of the body, increased tear secretion, acute pain, skin lesions, liver disease ,fever with thirst, peripheral neuritis, hemiparesis, fatigue, headache, shivering, hiccups, vomiting, vision impairment.²

Treatment for the Mercurial toxicity

1. Powder of *Caesalpinia sappan* [Log wood] bark and jaggery mixture given to the cramping pain in gluteal region.²
2. Juice of *Coccinia grandis* [Ivy plant] stem given to the Toothache.²
3. Tuber of *Cyperus rotandus* or cow milk or goat milk or anyone of these given to the following symptoms such as peripheral neuritis, burning sensation of the body and syncope.²
4. *Azima tetracantha* leaf juice or *coccinia grandis* leaf juice -80 ml twice a day for 3 days.³
5. *Indigofera tinctoria* root bark grind with hot water-1 gm twice a day for 3 days.³
6. Ash of dry fruit of *Lagenaria siceraria* [4gm] with buttermilk [80 ml] twice a day upto nullification of Hg.³
7. cow's curd [80 ml] with jaggery [12gm] mixture for 7 days. It is given to painful dysentery.³
8. *Ocimum sanctum* root bark [10gm], dry *Zingiber officinale* 10 gm [ginger], salt of *Potassium nitrate* [5gm] make it as decoction. Medicine given for 10,20,30, or 40 days.³
9. *Acacia nilotica* bark, *Calotropis gigantia* root bark, *Ocimum sanctum* root bark, *Acacia leucopholea* root bark take each equal quantity added with water and make it as decoction, Gargle for oral disease.³

Precautions for Mercurial medicine

Fish, salt, too hot items, too cold items, oily foods, alcohol, avoid bitter, sour, spicy taste foods, avoid sexual activities.²

Siddhar's steps In Adverse Reaction and its treatment of Mercury medicineRasa parpam

After Purification, Hg treated with sulphuric acid in Masher [*Kalvam*] and placed in sunlight for a while, this *parpam* is given to all types of non healed ulcers.²

Adverse effects: Oral ulcer and gastric irritation.

Treatment for ADR:

Oral Ulcer: *Kalipakku* [*Areca catechu*], *Kadukkai thool* [*Termenalia chebula*], *Karuvelampattai* [bark of *Acacia nilotica*], *Nellivattrai* [*Phyllanthus emblica*], *Navarpattai* [bark of *Syzygium cumini*] equal quantity of each part, add water prepare as decoction,

gargle for twice a day.² Gastric Irritation: Decoction of *Cyperus rotandus* and Pepper with butter.²

Rasa Mezhugu:

ValaiRasam [Hg purified from cinnabar], *Parangi pattai* *Chooranam*, *Thippili chooranam*, *Lavanga chooranam*, and jaggery grind well. Ready to use after 1 month to prevent adverse effects.²

ADR: Oral ulcer

CONCLUSION

Known documented ADR in classics Pharmacovigilance is the integral part of pharmacology and is essential for every System of medicine. Even though the concept of the Pharmacovigilance exist in Siddha System, occurrence of ADR still continue. No medicine are safe for all the time, for all the people, It may due to some factors like Climatic change, pollution[Air, water, soil], Impurities in Raw drugs, lack of classical methods of medicine preparation, intake of different system of medicine at same time, self- medication. Siddhars having the in depth knowledge on drug, its usage, signs and symptoms, dosage, indications and importantly toxic effects and its remedies. The science behind the detoxification of mercury needs to be explored for the betterment of health. Insisting upon the ban on mercury, monitoring, and reporting of the adverse reaction and adverse event for the mercurial product should be registered and documented for the successive current Pharmacovigilance practice. Implementation of Pharmacovigilance practice will throw the renaissance to the Siddha system.

REFERENCES

1. World Health Organisation ,International Program on Chemical safety, https://www.who.int/ipcs/assessment/public_health/chemicals_phc/en/ [Accessed on 26 Sep.2019].
2. Dr.R.Thiyagarajan. Gunapadam,Thathu-seva vaguppu-2009,2nd Edition, P. No:225-267
3. Pandit.K.S.Murugesu mudhaliyar, Nanju murivu nool-2006,4th Edition, P.No:22-24
4. G.Jeetu, G.Anusha, Pharmacovigilance –A worldwide master key for Drugsafety, [https:// www.ncbi.nlm.nih.gov/pmc/ articles/ PMC2964775/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2964775/), J Young Pharm. 2010 Jul-Sep; 2(3): 315–320.doi: 10.4103/0975- 1483.66802 PMCID: PMC2964775/ PMID: 21042493 [Pub Med] (Accessed on 26 Sep.2019).

