

SCOPE FOR IMMUNOMODULATORY EFFECTS OF RASAYANAS IN SICKLE CELL DISEASE: A REVIEW**Dr. Avinash Kande*¹, Dr. Dharmesh Chauhan², Dr. Rakesh Salve³ and Dr. M. R. Pandya⁴**^{1,2}PG Scholar, Dept. of Rasa Shastra Evam Bhaishajya Kalpana, Parul Institute of Ayurved, Vadodara – Gujarat.³Associate Professor, Dept. of Rasa Shastra Evam Bhaishajya Kalpana, Parul Institute of Ayurved, Vadodara – Gujarat.⁴Professor & HOD, Dept. of Rasa Shastra Evam Bhaishajya Kalpana, Parul Institute of Ayurved, Vadodara – Gujarat.***Corresponding Author: Dr. Avinash Kande**

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ABSTRACT

Sickle cell disease (SCD) is a genetic abnormality causing production of abnormal crescent or sickle shaped RBC's. An impaired vyadhi kshamatva is notably observed in SCD that may give way to severe bacterial infections due to Hyposplenism. This article focuses on herbal & herbo-mineral formulations specifically rasayanas with its immunomodulatory effects that could be indicated in Sickle Cell Disease. The literary material was collected from classical Ayurvedic texts and research journals. It was found that several Ayurvedic medicines had preventive as well as therapeutic pharmacological activity towards improving vyadhi kshamatva which is needed in Sickle Cell Disease.

KEYWORDS: Sickle cell disease (SCD), Vyadhi Kshamatva, Rasayana, Immunomodulatory.**INTRODUCTION**

Sickle-cell disease (SCD) a genetic abnormality of autosomal recessive inheritance causing production of sickle shaped RBCs.^[1] It exhibits a group of blood disorders and complications viz. sickle-cell anaemia (SCA), Sickle-cell crisis, splenic sequestration etc. An increased risk of severe infections is observed due to loss of functional splenic tissues (Hyposplenism). Such infections are typically caused by encapsulated organisms such as *Streptococcus pneumoniae* and *Haemophilus influenzae*, *salmonella* spp. In SCD, the haemoglobin carrying capacity of RBC's gets reduced leading to lack of oxygen. The disease in particular is solely inherited to next generation from parents due to an abnormal haemoglobin gene. Sequentially copies are transferred to the child, one per from each parent. Ayurveda emphasizes that prevention is equivalent to cure, to strengthen immune system and improve body resistance against any disease causing pathogens. For this purpose, a dedicated branch of Rasayana & Vajikarana was made under Astang Ayurveda marking its significance it maintaining swaasthya.

Aim of the Study

Since Vyadhi Kshamatva can be achieved in several cumulative ways i.e. swasthavrutta paripalana etc., a literary compilatory attempt has been made specific to Rasayanas mentioned in Ayurveda which have immunomodulatory effects that could be indicated in Sickle Cell Disease.

MATERIALS AND METHODS

All the literary material was collected from relevant classical texts, peer reviewed journals and any other authentic sources of data.

Current Scenario of SCD

SCD has prevalence in India, especially in the central, western regions. In India, the sickle gene is widespread in all the eastern districts of Maharashtra, Punjab, Madhya, Pradesh, Jharkhand, Gujarat, Chhattisgarh and some areas of Kerala. Approximately 20 percent of children with SCD die by the age of two. Aside from Africa and countries bordering the Mediterranean (e.g., Italy, Greece, Spain, and Turkey) that have high incidences of SCA, significant prevalence has been reported especially in Saudi Arabia, Yemen, India, Pakistan, Bangladesh, and China.^[2-6] The occurrence of SCA in the Americas and in Northwest Europe owes of course to the Triangular Slave Trade, shows the generally of sickle cell disorders (SCDs) worldwide. As per 2017 data 3.2 million were affected with SCD.

Etymology

Vyadhi Kshamatva: Acharya Chakrapani has interpreted *Vyadhi bala virodhitva* - i.e. antagonistic to disease virulence & strength and *Vyadhyutpada pratibandhakatva* - restrain and bind cause & factors of disease. The word Rasayana is composed of two words Rasa + Ayan. References such as *Labhopayo hi Sastanam Rasadinam Rasayanam*^[7], *Svasthanasy orjaskaram Yat tad*

vrisyam tad Rasayanam^[8], *Yajjara vyadhinasanam tad rasayanam*^[9] define Rasayan is the measure which prolongs longevity, develops positive health & improves mental faculties and provides resistance against disease or Rasayan is a measure to obtain good quality dhatus or drugs that destroy ageing process (vayasthapan) & disease.

Benefits of Rasayana – key towards improving SCD

Rasayana benefits broadly speaking are seen in factors such as improving longevity, memory, intellect, freedom from disease, enhancing lustre & complexion (rasadi dhatus) etc. Further to this, detailed pharmacological activities and their therapeutic actions of these rasayanans are illustrated below.^[10-17] (See table 1).

Table No. 1

Sr. No	Aushadhi	Pharmacological Action/Therapeutic Efficacy
1	<i>Amalaki Rasayana</i>	Rasayana, Tridoshaghna, Shonitsthapana, free radical scavenging activity, neutralize reactive oxygen species
2	<i>Agastya Haritaki Rasayana</i>	Imunomodulatory, Hydrolysable tannins of T. Chebula – anti mutagenicity in Salmonella typhimurium
3	<i>Triphala</i>	Better alternative than allopathic immunomodulators. Krumi nashan = antimicrobial
4	<i>Chyawanprash Avaleha</i>	Effect on Dendritic cell maturity & functional ability, Enhanced immune response, Cytokine production in immunosuppressant
5	<i>Ratnaprabha Vati</i>	Enriched with Swarna, Abhrak bhasma etc. mentioned as balya & Rasayana, Study showed improved efficacy in endometrial CA
6	<i>Bhringaraj</i> (Eclipta Alba)	Free oxygen radical scavenger mechanism (Wagner H. et al, 1986).
7	<i>Guduchi</i> (Tinospora cordifolia)	Motivate macrophages, enhance phagocytic activity & cell mediated immunity. (Kapil A. Sharma S., 1997).
8	<i>Guduchi +Ashwagandha +Amalaki+Tulasi</i>	Improvement in T-cell memory, Lymphocyte increase, microbial activity of the neutrophils
9	<i>Yastimadhu</i> (Glycirriza glabra)	Accelerates lymphocytic transformation, Increases the Leukocyte count, Activation of Macrophage (Yamamoto M., 1975).
10	<i>Guggulu</i> (Commiphora mukul)	Randomised control trial-increase in total lymphocyte and T-cell count
11	<i>Shilajatu</i> (Black Bitumen)	Cytokine release, Inhibition of cyclophosphamide, activates macrophages
12	<i>Shatavari</i> (Asparagus racemosus)	Aqueous extract suppress single and double, doses of cyclophosphamide, Improved defense mechanism
13	<i>Loha Bhasma</i>	Protective effect against necrosis & cytoprotective
14	<i>Mandur Bhasma</i>	Restored cellular function by inhibiting toxicant induced cell depletion and countered fibrosis
15	<i>Ashwagandha</i> (Withania somnifera)	Immunomodulatory, anti- inflammatory antioxidising agent. prohibited leucopenia induced by cyclophosphamide
16	<i>Bramha Rasayana</i>	Free radical scavenging activity studied in vitro & in vivo models
17	<i>Haridra</i> (Curcuma longa)	Capacity to modulate the antimicrobial peptides, increased survival rate in challenged pathogenic environment, Protective effect of the turmeric against viral infection noted.

RESULT

Vyadhi kshamatva is important for the maintenance of healthy kaya, mana and also to be free from diseases. Dosha, dhatu adi ghatak, nidra, agni in normal condition provide bala to body. If any vitiation occurs to those body entities, it will cause dourbalya in body. This will be the reason for the occurrence of many diseases in future. So by understanding the rasayana vigyan along with dinacharya, rutucharya, pathya ahara vihar, sadvritta and achar rasayana will lead to prevention as well as reducing the factors leading to SCD.

DISCUSSION

Considering that SCD is beej dosha janya vyadhi, it may be categorized under *pratyakhyey* type.^[18] As such prevention plays pivotal role which may be achieved to certain extent with the intake of Rasayanans along with adherence to idle pathya aahar vihar etc. From the above

table it is observed that Rasayana formulations, drugs induce immune stimulation or subject immunomodulatory changes by the virtue of their pharmacological action, thus improving defense mechanism against free radical damage, improve phagocytosis etc. Sickle Cell Disease which displays immune-compromised activity could lead to further complications like bacterial infections. Here a decreased T-cell involvement in defense mechanism could be countered by administration of immunomodulators as seen above. Also rasayanans have multifaceted actions like *shonithsthapana* [action on pliha involvement] *vayasthapan* [free radical scavenging, reducing degenerative changes]. This can be of added advantage in management of SCD and its complications if any.

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