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# AN AYURVEDIC PERSPECTIVE OF SICKLE CELL ANAEMIA WITH SPECIAL REFERENCE TO PANDU VYADHI – A CASE STUDY

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**ABSTRACT** Sickle cell anaemia (SCA) is a genetic disease that results from abnormal haemoglobin known as haemoglobin-S(Hb-S). It is transmitted as an autosomal recessive disorder. Sickle cell crisis is an acute complication of sickle cell anaemia characterised by episodic vasoocclusion due to sickled red blood cells, resulting in severe pain, tissue ischaemia and potential organ dysfunction. SCA is one of the most commonly inherited haemoglobin disorder in India, particularly affecting tribal population with Maharashtra being one of the high burden states. According to Ayurveda, SCA can be compared with Pandu Vyadhi. Genetic basis of SCA is well established. So Beeja Dushtijanya Pandu/Kulaja Pandu/Anuvanshika Pandu can be corelated with SCA. In present context, the Doshika status of the disease can be analyzed as Vata-Pitta provocation along with depletion of Kapha. This present case is effectiveness of Ayurvedic treatment along with allopathy treatment in management of sickle cell crisis. A 24 yrs old male patient, diagnosed to be suffering with sickle cell anaemia presented with complaints of dyspnoea, body ache, chest pain, backpain, melaena and yellowish discoloration of eyes in OPD, Department of Kayachikitsa, Sane Guruji Arogya Kendra, Hadapsar, Pune. His mother and father are sickle cell trait (Hb-AS). They are resident of Nandurbar district in the Northwestern region of Maharashtra, India. He used to suffer from such crisis episodes 3-4 times in a year. He was treated with Ayurvedic medications along with allopathy medication, after which he had not experienced any pain crisis. This case study is intended to study the pathophysiology and management of sickle cell crisis from Ayurvedic perspective and to explore the probable mode of action of Ayurvedic medications. SCA – Sickle cell anaemia

**KEYWORDS :** Sickle Cell Anaemia, Sickle Cell Crisis, Pandu Vyadhi, Beeja Dushtijanya Pandu

## 1. INTRODUCTION

The sickle cell syndromes are caused by a mutation in the beta-globin gene that changes the sixth amino acid from glutamic acid to valine.[1] HbS($\alpha_2\beta_2^{6glu\text{-}val}$) polymerizes reversibly when deoxygenated to form a gelatinous network of fibrous polymers that stiffen the RBC membrane, increase viscosity and cause dehydration due to potassium leakage and calcium influx.[2] These changes also produce sickle shape. Sickled cells loose the pliability needed to transverse small capillaries. These possess altered sticky membranes that are abnormally adherent to the endothelium of small venules.[3] These abnormalities provoke unpredictable episodes of microvascular vasoocclusion and premature RBC destruction(Haemolytic Anaemia) in liver and spleen.[4] The rigid adherent cells also clog small capillaries and venules, causing tissue ischemia, acute pain and gradual end organ damage.[5] Prominent manifestations include episodes of ischaemic pain ( i.e painful crisis) and ischemic malfunction or frank infarction in the spleen, central nervous system, bones, joints, liver, kidney and lungs.[6]

Maharashtra bears a high burden of sickle cell disease, particularly among tribal populations of Vidarbha, Satpura, and Marathwada, where sickle cell carrier prevalence ranges from 0–35%, reaching 20–35% in some communities.[7]

Management of acute sickle cell crisis includes adequate hydration, prompt treatment of underlying causes, aggressive pain control, blood transfusion when indicated, and supportive medications such as hydroxyurea, sodium bicarbonate, and folic acid. Hematopoietic stem cell transplantation is the only curative therapy available for selected patients.[8]

Although sickle cell disease is not explicitly described in Ayurveda, its clinical presentation closely resembles Pandu Vyadhi. Both conditions share common features such as Raktalpata (anaemia), Shithilendriya and Klama (fatigue), Aruchi (anorexia), Hatanala (diminished digestive fire), Shwasa (dyspnoea), Arohana-Ayasa (exertional fatigue), Pindika-Dweshtana (calf muscle stiffness), Jwara (fever), and Parvabheda (joint pain).[9]

From an Ayurvedic perspective, the pathogenesis may be attributed to the aggravation of Vata and Pitta Doshas, with depletion of Kapha. Vata initiates pathological changes, Pitta contributes to transformation of Dhatus, and diminished Kapha leads to loss of tissue integrity (Dhatu Vaiparitya), resulting in the manifestation of various clinical disorders.[10]

SCD may be attributed due to abnormality in Beeja (sperm, ovum and zygote), Beejabhaga (chromosomes) and Beejabhagavayava (Gene locus: Promoter region, Exons, Introns). During embryonic development abnormality is seen in that body part component, which Beeja or Beejabhaga are affected by vitiated Dosha.[11]

This case study assesses the clinical outcomes of Ayurvedic management in a 24-year-old male patient with homozygous sickle cell anemia, aiming to improve quality of life and long-term health outcomes.

## 2. Patient Information and Clinical Findings

A 24 years old male patient reported to Sane Guruji Aarogya Kendra's OPD 1, in conscious and oriented state with complaining of dyspnoea, body ache, chest pain, backpain, melaena and yellowish discoloration of eyes. He is a diagnosed case of sickle cell anaemia since age of 13 yrs. He developed sudden pain crisis and investigated for the same and came to know about the disease (HB SS). Mother and father were also screened at that time and both were found to be sickle Cell trait (Hb AS). He was admitted in Sane Guruji Aarogya Kendra's ward for further management and investigation.

General examination revealed he was thin built and was not well nourished. He had history of PCV transfusion 7 yrs ago. He didn't had any surgical history, any addiction or any food/drug allergy.

### 2.1 Physical Examination

**O/E-** Afebrile, Icterus present
**Pulse –** 84/min
**BP –** 110/80 mm of hg
**R/S-** B/L clear
**CVS-** S1S2 N
**CNS-** conscious and oriented
**P/A-** mild tenderness of right hypochondriac and lumbar region. Spleenomegaly present.

### 2.2 Ashtavidha Pariksha

**Nadi (Pulse) –** Vata-Pittaj
**Mala (Stool) –** Krushnavarni (Melaena)

**Mutra (Urine) –** Samyak Mutrapravrutti (Normal in frequency)
**Jivha (Tongue) -** Saam (Coated)
**Shabda (Speech)-** Spastha (Normal)
**Sparsha (Touch)-** Samshitoshna (afebrile)
**Drika (Eyes)-** Prakrut, Upnetram nasti (Normal with pallor conjunctiva with mild icterus on sclera)
**Akruti (Appearance) –**Krusha (Thin)

### 2.3 Investigations

Hb -7.8 gm%
RBC – 3.1 * $10^6$/ul
WBC – 6,100/ul
PLT – 2,46,000/ul
MCV -75.8
HCT-14.1%
HIV I & II – Negative
CXR - Normal
ECG – S/O normal sinus rhythm
USG – S/O mild spleenomegly

Urine R - N
BUL - 50
Sr. Creat - 0.6
Total bilirubin – 3.4
Direct bilirubin – 1.0
Indirect bilirubin– 2.4
SGOT – 51
SGPT – 31
Alk. Phosphatase - 47.8

### 2.4 Therapeutic Intervention

**Ayurvedic Management**

**Table No 1- Internal Medications**

| DRUGS | DOSE | ROUTE | ANUPANA |
|---|---|---|---|
| Mahavatavidhwansa Rasa | 500mg-2 TDS | Oral | Lukewarm water |
| Tab SC3 | 500mg-2 BD | Oral | Water |
| Dashamularishta | 20 ml BD | Oral | Lukewarm water |

**Panchakarma (For 5 days)**

A) Snehan with Murivenna Taila
B) Swedan with Nadi Sweda
C) Basti (Anuvasana) with Sahachar Tail + Panchatikta Ghruta (60ml)

**Modern Management**

1. Inj. Paracetamol 1gm IV TDS
2. Inj. Dynapar AQ 75 MG IN 100 ML NS IV BD
3. IV fluids according to haemodynamics
4. Cap Hydroxyurea 500mg P/O OD
5. Tab Sobisis forte P/O 2 BD
6. Tab Folvite 5 mg P/O 1 OD

### 3. Outcome and Follow up

The patient was followed up regularly for six months. Tab SC3, Cap Hydroxyurea, Sobisis Forte, and Folvite were continued as long-term maintenance therapy, whereas Mahavatavidhwansa Rasa and Dashamoolarishta were prescribed for a defined duration. During the follow-up period, the patient remained clinically stable and did not experience any episodes of sickle cell crisis or require hospitalization. Overall, the patient's quality of life and functional status improved significantly.

### 4. DISCUSSION

From an Ayurvedic perspective, sickle cell crisis may be understood as a condition of aggravated Vata associated with Rakta Dushti and Dhatu Kshaya, producing severe Shoola and manifestations akin to Pandu Roga. Management focuses on Vata Shamana, Rakta Prasadana, Rasayana therapy and Vedanasthapana measures.

Mahavatavidhwansa Rasa [12] comprises Shuddha Parada (purified mercury), Shuddha Gandhaka(sulphur), metallic Bhasmas (Loha, Abhraka, Naga, Vanga, and Tamra), Trikatu, Shuddha Tankan (purified borax), and purified Vatsanabha (Aconitum ferox), processed with various herbal media. It exerts Vatahara, Vedanasthapana, Deepana, Pachana, and Rasayana actions, which may alleviate pain, enhance digestion and bioavailability, improve hematopoietic function, and support strength in vaso-occlusive episodes associated with sickle cell disease.

Tab $SC_3$ [13] formulation containing Bilwa (Aegle marmelos), Guduchi (Tinospora cordifolia), Kumari (Aloe vera), and Bhavana Dravyas such as Bhumyamalaki (Phyllanthus amarus), Sharpunkha (Tephrosia purpurea), and Bhringaraja (Eclipta alba) appears to act through multiple mechanisms relevant to sickle cell disease. Bilwa, owing to its Agnideepana, Pachana, Shothahara, and Vedanasthapana properties, may alleviate pain and inflammation while improving Raktadhatvagni. Guduchi, a potent Rasayana and Balya drug, possesses immunomodulatory and antioxidant activities that may help counter oxidative stress associated with chronic hemolysis. Kumari contributes to tissue nourishment and supports digestion. Bhumyamalaki and Sharpunkha exert hepatosplenic protective effects, which may be beneficial in conditions associated with hemolysis and splenic dysfunction. Bhringaraja, with its Panduhara, Rasayana, and Shothahara properties, may improve strength and reduce inflammation. Collectively, these actions may contribute to pain relief, enhanced hematopoietic function, improved tissue nourishment, and better overall quality of life in patients with vaso-occlusive crises.

Dashamoolarishta [14] contains Dashamoola along with Chitraka (Plumbago zeylanica), Pushkaramoola (Inula racemosa), Lodhra (Symplocos racemosa), Guduchi (Tinospora cordifolia), Triphala (Terminalia chebula, Terminalia bellirica, Emblica officinalis) Punarnava (Boerhaavia diffusa), Manjistha (Rubia cordifolia), and Yashtimadhu (Glycyrrhiza glabra). Owing to its Vedanasthapana, Shothahara, Vatahara, Balya, and Rasayana properties, it may serve as an adjuvant in sickle cell disease by alleviating painful vaso-occlusive episodes, reducing fatigue, combating oxidative stress, and promoting Rakta Dhatu formation.

Role of Panchakarma-Snehana was administered to pacify aggravated Vata, alleviate pain, and provide nourishment to the tissues, thereby improving mobility and overall strength. Swedana was employed following Snehana to relieve pain and stiffness and to facilitate Vata Anulomana by promoting unobstructed movement within the channels. Basti therapy was administered as the principal modality for Vata Shamana. By regulating Vata Dosha and nourishing the body tissues, Basti contributed to pain relief, improvement in strength, and reduction in the frequency of vaso-occlusive episodes.

Hydroxyurea does not provide immediate relief during an acute sickle cell crisis but serves as a disease-modifying therapy. By increasing fetal hemoglobin (HbF) levels, it inhibits erythrocyte sickling, thereby reducing the frequency of vaso-occlusive crises, acute chest syndrome, transfusion requirements, and hospitalizations, ultimately improving quality of life and survival.[15]

Sodium bicarbonate was administered to correct metabolic acidosis and maintain acid-base homeostasis during the vaso-occlusive crisis. Correction of acidosis may reduce hemoglobin S polymerization and erythrocyte sickling, thereby contributing to improved tissue perfusion.[16]

### 5. CONCLUSION

From an Ayurvedic perspective, sickle cell disease arises from Bijadushti, leading to Agnimandya, Dhatukshaya, Tridosha Prakopa, and Ama formation. The present case manifested as a vaso-occlusive crisis. Integrative management with Ayurvedic interventions resulted in significant clinical improvement, with no recurrence of painful crises requiring hospitalization during six months of follow-up. Improvement in appetite, body weight, physical activity, and quality of life was observed. Long-term follow-up and larger studies are needed to further evaluate the efficacy of Ayurvedic interventions in sickle cell disease.

### 6. Informed Consent

The informed consent regarding documentation and publication of the case was obtained from the patient.

### 7. Patient Perspectives

The patient was satisfied and pleased with the care which was provided in the hospital. He is now able to perform her routine activities without discomfort.

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### 9. Disclosure of Conflict of Interest

The authors declare that there was no conflict of interest regarding the publication of manuscript

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