

Pandu Roga Chikitsa acc. to Charaka Samhita w.s.r. to anaemia

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Abstract

Pandu Roga, commonly referred to as anemia in modern medicine, is a condition characterized by pallor and weakness due to decreased red blood cells or hemoglobin levels. The ancient Ayurvedic text **Charaka Samhita** provides a comprehensive understanding of Pandu Roga, including its etiology, pathogenesis, classification, clinical features, prognosis, and therapeutic approaches. This article explores Pandu Roga Chikitsa (treatment of anemia) as outlined by Acharya Charaka, correlating it with modern medical knowledge. By integrating traditional Ayurvedic insights with contemporary science, we aim to enhance the understanding of anemia and promote holistic management strategies.

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Introduction

Anemia is a widespread health concern affecting individuals across all age groups globally. It is characterized by a decrease in the number of red blood cells (RBCs) or hemoglobin concentration, leading to reduced oxygen-carrying capacity of the blood. Common symptoms include fatigue, weakness, shortness of breath, and pallor.

In Ayurveda, anemia is known as **Pandu Roga**, derived from the Sanskrit word “Pandu,” meaning pale or whitish-yellow. The **Charaka Samhita**, a foundational text of Ayurveda attributed to Acharya Charaka, dedicates a chapter to Pandu Roga, offering detailed insights into its causation, types, clinical manifestations, and treatments.

This article delves into the Ayurvedic understanding of Pandu Roga as presented in the Charaka Samhita, correlating it with modern medical perspectives on anemia. By exploring the classical descriptions and comparing them with contemporary knowledge, we aim to highlight the relevance of Ayurvedic principles in today’s medical landscape and promote integrative approaches to managing anemia.

Understanding Pandu Roga in Ayurveda

Definition

Pandu Roga is a pathological condition characterized by pallor of the skin and mucous membranes, weakness, and diminished bodily functions due to impaired production and quality of blood (Rakta Dhatu). It is considered a systemic disorder resulting from the vitiation of Doshas (Vata, Pitta, Kapha), leading to decreased Ojas (vital essence) and overall debility.

Types of Pandu Roga

According to Acharya Charaka, Pandu Roga is classified into five types:

1. **Vataja Pandu:** Predominantly caused by Vata Dosha.
2. **Pittaja Pandu:** Predominantly caused by Pitta Dosha.
3. **Kaphaja Pandu:** Predominantly caused by Kapha Dosha.
4. **Sannipataja Pandu:** Caused by the vitiation of all three Doshas (Tridosha).
5. **Mridbhakshana Janya Pandu (Anemia due to ingestion of soil):** Caused by the consumption of non-nutritive substances like soil or clay.

Sanskrit Reference:

- “Pāṇḍurōgāḥ smṛtāḥ pañca vātapittakaphais trayah, caturthaḥ sannipātena pañcamo bhakṣaṇān mṛdaḥ.”
(Verse 3)

Etiology (Nidana) of Pandu Roga

Ayurvedic Perspective

Pandu Roga arises due to various dietary, lifestyle, and psychological factors that lead to the vitiation of Doshas, especially Pitta Dosha.

Dietary Factors:

- **Excessive Intake of Certain Tastes:**
 - Sour (*Amla*), salty (*Lavana*), pungent (*Katu*), and alkaline substances.
- **Consumption of Incompatible Foods (*Viruddhahara*):**
 - Eating foods that are incompatible in combination or nature.
- **Overconsumption of Specific Food Items:**
 - Legumes like *Nishpava* (kidney beans), *Masha* (black gram), *Tila* (sesame seeds), and heavy oils.
- **Eating Stale or Unwholesome Foods:**
 - Consuming spoiled, contaminated, or unwholesome food.

Lifestyle Factors:

- **Day Sleep (*Divaswapna*):**
 - Sleeping during the day disrupts metabolism and Dosha balance.

- **Excessive Physical Activities:**
 - Overexertion leading to depletion of body tissues.
- **Excessive Sexual Activity:**
 - Depletes vital fluids and Ojas.
- **Suppression of Natural Urges (*Vegadharana*):**
 - Holding back natural urges like defecation and urination.

Psychological Factors:

- **Emotional Disturbances:**
 - Excessive anger (*Krodha*), grief (*Shoka*), fear (*Bhaya*), and worry (*Chinta*).

Other Causes:

- **Seasonal and Environmental Factors:**
 - Imbalance in seasonal routines affecting Dosha equilibrium.
- **Exposure to Toxins:**
 - Ingestion or exposure to toxic substances.

Sanskrit References:

- “*Kṣārāmla-lavaṇātyuṣṇa-viruddhāsātmyabhojanāt...*” (Verse 7)
- “*Kāmachintābhayakrodha-shokopahata-chetasaḥ...*” (Verse 9)

Modern Correlation

Modern medicine identifies several causes of anemia that align with Ayurvedic etiological factors:

Dietary Causes:

- **Nutritional Deficiencies:**
 - Iron, vitamin B12, and folic acid deficiencies due to poor dietary intake or malabsorption.
- **Consumption of Toxins:**
 - Lead poisoning from environmental exposure.
- **Pica (Eating Non-food Substances):**
 - Ingestion of soil or clay leading to iron deficiency.

Lifestyle Factors:

- **Chronic Blood Loss:**
 - Due to heavy menstruation, gastrointestinal bleeding.
- **Chronic Diseases:**
 - Conditions like chronic kidney disease affecting erythropoietin production.
- **Excessive Physical Strain:**
 - Overexertion leading to increased destruction of RBCs.

Psychological Factors:

- **Stress:**

- Chronic stress affecting hormonal balance and nutritional status.

Pathogenesis (Samprapti) of Pandu Roga

Ayurvedic Perspective

The development of Pandu Roga involves the vitiation of Doshas and subsequent impairment of Dhatus (body tissues), especially Rakta Dhatu (blood tissue).

1. Vitiating of Doshas:

- **Pitta Dosha:** Primary Dosha involved, leading to excessive heat and destruction of blood.
- **Vata and Kapha Doshas:** May be involved, causing different variants of Pandu Roga.

2. Impact on Dhatus:

- **Rakta Dhatu Kshaya (Decrease in Blood Tissue):** Due to Pitta-induced destruction.
- **Ojas Depletion:** Loss of vital essence leading to weakness and pallor.
- **Dhatu Shaithilya (Weakness of Tissues):** Impaired nourishment causing laxity and debility.

3. Systemic Manifestations:

- **Pallor:** Due to reduced blood volume and quality.
- **Weakness and Fatigue:** Resulting from decreased oxygen-carrying capacity.
- **Altered Skin Coloration:** Yellowish or pale complexion.

Sanskrit References:

- “Doṣāḥ pittapradhānāstu yasya kupyanti dhātuṣu, śaithilyaṁ tasya dhātūnām gauravaṁ copajāyate.” (Verse 4)
- “Tatō varṇa-bala-snēhā yē cānyē’pyōjasō guṇāḥ, vrajanti kṣayam atyarthaṁ doṣa-dūṣya-pradūṣaṇāt.” (Verse 5)

Modern Correlation

1. Pathophysiology of Anemia:

- **Decreased RBC Production:**
 - Due to nutritional deficiencies (iron, B12, folate).
 - Bone marrow suppression from chronic diseases.
- **Increased RBC Destruction:**
 - Hemolytic anemias due to autoimmune conditions or toxins.
- **Blood Loss:**
 - Acute or chronic bleeding leading to decreased blood volume.

2. Impact on Body Functions:

- **Hypoxia:**
 - Reduced oxygen delivery to tissues causing fatigue and weakness.
- **Compensatory Mechanisms:**
 - Tachycardia, increased cardiac output to meet oxygen demands.

3. Clinical Manifestations:

- **Pallor:**
 - Visible on skin and mucous membranes due to decreased hemoglobin.
- **Jaundice:**
 - In hemolytic anemias, increased bilirubin levels causing yellowish discoloration.

Clinical Features (Lakshana) of Pandu Roga

Ayurvedic Perspective

The symptoms of Pandu Roga vary based on the predominant Dosha involved.

Common Symptoms:

- **Pallor (Vaivarnya):**
 - Pale or yellowish discoloration of skin, eyes, nails.
- **Weakness (Daurbalya):**
 - General debility and lack of energy.
- **Fatigue (Shrama):**
 - Easily exhausted with minimal exertion.
- **Loss of Appetite (Aruchi):**
 - Disinterest in food, leading to further weakness.
- **Shortness of Breath (Shwasa):**
 - Difficulty breathing due to decreased oxygenation.
- **Palpitations (Hridaya Spandana):**
 - Awareness of heartbeat or irregular heartbeat.

Vataja Pandu Symptoms:

- **Dryness (Raukshya):**
 - Dry skin and mucous membranes.
- **Body Aches (Angamarda):**
 - Generalized body pain.
- **Constipation (Vibandha):**
 - Difficulty in bowel movements.
- **Dark Discoloration:**
 - Skin appears dark or greyish.

Sanskrit Reference:

- “Janayet kṛṣṇapāṇḍutvaṁ tathā rūkṣāruṇāṅgatām.” (Verse 17)

Pittaja Pandu Symptoms:

- **Yellowish Discoloration:**
 - Skin and eyes appear yellow.
- **Burning Sensation (Daha):**

- Feeling of heat in the body.
- **Fever (Jvara):**
 - Low-grade fever.
- **Excessive Thirst (Trishna):**
 - Constant desire to drink water.
- **Sour Belching (Amla Udgara):**
 - Acidic burps indicating hyperacidity.

Sanskrit Reference:

- “*Sa pīto haritābho vā jvara-dāha-samanvitaḥ, tṛṣṇā-mūrcchā-pipāsārtaḥ pīta-mūtra-śakṛn naraḥ.*” (Verse 20)

Kaphaja Pandu Symptoms:

- **Pale Skin (Shweta Varna):**
 - Skin appears whitish.
- **Heaviness (Gaurava):**
 - Feeling of heaviness in the body.
- **Swelling (Shotha):**
 - Edema in various parts of the body.
- **Nausea (Hrillasa):**
 - Feeling of nausea or urge to vomit.
- **Excessive Salivation (Praseka):**
 - Increased saliva production.

Sanskrit Reference:

- “*Karoti gauravaṁ tandrā chardim śvetāvabhāsatām.*” (Verse 23)

Sannipataja Pandu Symptoms:

- **Mixed Features:**
 - Combination of symptoms from all three Doshas.
- **Severe Condition:**
 - More serious and difficult to treat.

Sanskrit Reference:

- “*Sarvānnasevinaḥ sarve duṣṭā doṣās tridoṣajam, tridoṣaliṅgam kurvanti pāṇḍurogam suduḥsaham.*” (Verse 26)

Mridbhakshana Janya Pandu Symptoms:

- **Ingestion of Soil (Mridbhakshana):**
 - Habit of eating soil or clay.
- **Blockage (Srotorodha):**
 - Obstruction of channels due to soil accumulation.
- **Swelling (Shotha):**
 - Edema due to impaired circulation.

Sanskrit Reference:

- “Kupyatyanyatamo malaḥ... pūrayatyavipakvaiva srotāṁsi nirunaddhi ca.” (Verses 27-28)

Modern Correlation

Symptoms of anemia vary based on the underlying cause and severity.

Common Symptoms:

- **Pallor:**
 - Pale skin and mucous membranes.
- **Fatigue and Weakness:**
 - Due to decreased oxygen delivery.
- **Shortness of Breath:**
 - Exertional dyspnea from hypoxia.
- **Palpitations:**
 - Tachycardia as a compensatory mechanism.
- **Headaches and Dizziness:**
 - Due to cerebral hypoxia.

Iron Deficiency Anemia Symptoms:

- **Craving for Non-food Substances (Pica):**
 - Desire to eat soil, ice, or clay.
- **Brittle Nails and Hair:**
 - Koilonychia (spoon-shaped nails).
- **Glossitis:**
 - Inflammation of the tongue.

Hemolytic Anemia Symptoms:

- **Jaundice:**
 - Yellowing of skin and eyes due to bilirubin accumulation.
- **Dark Urine:**
 - Due to excretion of hemoglobin breakdown products.
- **Splenomegaly:**
 - Enlargement of the spleen.

Megaloblastic Anemia Symptoms:

- **Neurological Symptoms:**
 - Numbness, tingling due to vitamin B12 deficiency.
- **Glossitis and Diarrhea:**
 - Gastrointestinal disturbances.

Diagnosis

Ayurvedic Methods

- 1. Clinical Examination (Rogi Pareeksha):**
 - **Inspection (Darshana):**
 - Observing skin color, eyes, nails, and overall appearance.
 - **Palpation (Sparshana):**
 - Checking for swelling, pulse examination.
 - **Questioning (Prashna):**
 - Inquiring about dietary habits, lifestyle, and psychological factors.
- 2. Dosha Assessment:**
 - Determining the predominant Dosha involved based on symptoms.
- 3. Examination of Stool (Mala Pariksha):**
 - Observing stool for color, consistency, presence of undigested food.

Modern Diagnostic Methods

- 1. Complete Blood Count (CBC):**
 - **Hemoglobin Levels:**
 - Assessing severity of anemia.
 - **Red Blood Cell Indices:**
 - Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH).
- 2. Peripheral Blood Smear:**
 - **Morphology of RBCs:**
 - Microcytic, macrocytic, or normocytic anemia.
- 3. Biochemical Tests:**
 - **Iron Studies:**
 - Serum ferritin, iron, total iron-binding capacity (TIBC).
 - **Vitamin B12 and Folate Levels:**
 - To detect deficiencies.
- 4. Bone Marrow Examination:**
 - In cases of suspected marrow suppression or leukemia.
- 5. Stool Occult Blood Test:**
 - To detect gastrointestinal bleeding.
- 6. Additional Tests:**
 - **Renal Function Tests:**
 - To assess kidney-related anemia.
 - **Liver Function Tests:**
 - In cases of hemolytic anemia.

Prognosis (Sadhya-Asadhya) of Pandu Roga

Ayurvedic Perspective

- **Curable (Sadhya):**
 - Recent onset, mild cases with manageable Dosha imbalance.
- **Difficult to Cure (Krichra Sadhya):**
 - Chronic cases with significant tissue depletion.
- **Incurable (Asadhya):**
 - Advanced cases with complications like Kumbha Kamala (ascites in severe jaundice).

Sanskrit Reference:

- “Pāṇḍurogaś cirōtpannaḥ kharībhūto na sidhyati, kālaprakāṛṣāc chūno na yaś ca pītāni paśyati.” (Verse 31)

Modern Correlation

- **Good Prognosis:**
 - Nutritional anemia responding well to supplementation.
- **Guarded Prognosis:**
 - Anemia due to chronic diseases requiring ongoing management.
- **Poor Prognosis:**
 - Anemia associated with malignancies or severe marrow suppression.

Treatment (Chikitsa) of Pandu Roga

Ayurvedic Principles

1. **Purification Therapies (Shodhana):**
 - **Virechana (Purgation):**
 - For Pitta-dominant Pandu Roga to eliminate excess Pitta.
 - **Vamana (Emesis):**
 - In Kapha-dominant cases to remove Kapha.
2. **Palliative Therapies (Shamana):**
 - **Use of Herbal Formulations:**
 - To balance Doshas and enhance Dhatu production.
 - **Rejuvenation (Rasayana):**
 - Strengthening therapies to restore Ojas and vitality.
3. **Dietary Management (Ahara):**
 - **Consumption of Nutritious Foods:**
 - Easily digestible, nourishing foods to build blood.
 - **Avoidance of Causative Factors:**
 - Eliminating incompatible and aggravating foods.
4. **Lifestyle Modifications (Vihara):**
 - **Adequate Rest:**
 - Ensuring sufficient sleep and avoiding overexertion.
 - **Stress Management:**
 - Practicing yoga and meditation to balance mind and body.

Specific Treatments Based on Dosha Predominance

Vataja Pandu Chikitsa:

- **Snehana (Oleation):**
 - Internal and external use of oils like sesame oil.
- **Basti (Enema Therapy):**
 - Oil enemas to pacify Vata Dosha.
- **Herbal Formulations:**
 - **Dashamoola preparations** to strengthen and nourish.

Pittaja Pandu Chikitsa:

- **Virechana (Purgation):**
 - Using mild laxatives to eliminate Pitta.
- **Cooling Herbs:**
 - Use of **Guduchi, Amalaki, Neem.**
- **Medicated Ghee (Ghrita):**
 - **Mahatikta Ghrita** for detoxification.

Kaphaja Pandu Chikitsa:

- **Vamana (Emesis):**
 - To remove excess Kapha.
- **Drying Therapies:**
 - Use of pungent, bitter herbs.
- **Herbal Formulations:**
 - **Trikatu Churna** to enhance digestion.

Mridbhakshana Janya Pandu Chikitsa:

- **Elimination of Ingested Soil:**
 - Using strong purgatives to expel ingested earth.
- **Counseling:**
 - Addressing psychological aspects to prevent pica.
- **Herbal Remedies:**
 - **Pippali, Haritaki, and Ayurvedic iron preparations.**

Ayurvedic Formulations

1. Dhatri Avaleha:

- **Ingredients:** Amalaki (*Embllica officinalis*), Pippali (long pepper), honey, sugar.
- **Benefits:** Enhances hemoglobin, boosts immunity, rejuvenates.

Sanskrit Reference:

- “*Dhātrīphalarasa drōṇe cūrṇitam lēhavat pacēt...*” (Verses 100-101)

2. Navayasa Churna:

- **Ingredients:** Iron ash (Lauha Bhasma), Triphala, Trikatu, Musta, Vidanga, Chitraka.
- **Benefits:** Improves digestion, stimulates blood formation.

Sanskrit Reference:

- *“Tryūṣaṇa triphalā musta viḍaṅga citrakāḥ samāḥ... taccūrṇaṁ kṣaudra sarpiṣā...”* (Verses 70-71)

3. Mandura Vatika:

- **Ingredients:** Purified iron oxide (Mandura), Triphala, Trikatu, Vidanga, honey.
- **Benefits:** Effective in anemia, hepatosplenomegaly, edema.

Sanskrit Reference:

- *“Mandūravatākā hy ete prāṇadāḥ pāṇḍu-rogiṇām...”* (Verses 76-77)

4. Punarnava Mandura:

- **Ingredients:** Punarnava (Boerhavia diffusa), Mandura, Trikatu, Triphala.
- **Benefits:** Reduces edema, improves hemoglobin, acts as diuretic.

Sanskrit Reference:

- *“Punarnavā trivṛḍ vyōṣa viḍaṅgaṁ dāru citrakam...”* (Verses 93-96)

5. Draksha Ghrita:

- **Ingredients:** Ghee processed with raisins (Draksha), herbs like Haritaki, Amalaki.
- **Benefits:** Nourishes blood, alleviates weakness.

Sanskrit Reference:

- *“Purāṇa sarpiṣaḥ prasthaḥ drākṣārdha prastha sādhitāḥ...”* (Verse 52)

Dietary Recommendations

1. Recommended Foods:

- **Easily Digestible Grains:**
 - Rice, wheat, barley.
- **Legumes:**
 - Green gram (Mudga), lentils.
- **Vegetables:**
 - Leafy greens rich in iron.
- **Fruits:**
 - Pomegranate, grapes, amla.
- **Dairy Products:**
 - Milk, ghee for nourishment.

2. Foods to Avoid:

- **Heavy, Oily Foods:**
 - Excessive intake of fried items.
- **Sour and Salty Foods:**
 - Overconsumption aggravates Pitta.
- **Incompatible Foods:**
 - Avoiding combinations like milk and fish.

Lifestyle Modifications

1. Adequate Rest:

- Ensuring proper sleep and avoiding overexertion.
- 2. **Stress Management:**
 - Practicing yoga, meditation to balance mind and body.
- 3. **Avoiding Day Sleep:**
 - Unless prescribed, to prevent Kapha aggravation.
- 4. **Regular Physical Activity:**
 - Gentle exercises to improve circulation.

Modern Correlation and Management

1. **Nutritional Supplementation:**
 - **Iron Supplements:**
 - Ferrous sulfate, gluconate for iron deficiency.
 - **Vitamin B12 and Folate:**
 - Oral or injectable forms for deficiencies.
2. **Dietary Modifications:**
 - **Iron-rich Foods:**
 - Red meat, leafy greens, legumes.
 - **Vitamin C Intake:**
 - Enhances iron absorption (citrus fruits).
3. **Treating Underlying Causes:**
 - **Addressing Chronic Diseases:**
 - Managing renal failure, chronic infections.
 - **Blood Transfusions:**
 - In severe anemia or acute blood loss.
4. **Medications:**
 - **Erythropoiesis-Stimulating Agents:**
 - For anemia due to chronic kidney disease.
 - **Chelation Therapy:**
 - In cases of iron overload.
5. **Lifestyle Modifications:**
 - **Avoiding Toxins:**
 - Reducing exposure to lead, chemicals.
 - **Counseling for Pica:**
 - Behavioral therapy to prevent soil ingestion.

Discussion

The Ayurvedic concept of Pandu Roga encompasses various types of anemia recognized in modern medicine. The detailed descriptions of etiology, pathogenesis, and clinical features provided in the Charaka Samhita align with contemporary understanding.

- **Dietary Causes:**
 - Both systems acknowledge the role of nutritional deficiencies.

- **Psychological Factors:**

- Ayurveda emphasizes the impact of emotions on physical health, correlating with stress-induced anemia.

- **Clinical Features:**

- Symptoms like pallor, weakness, and fatigue are common to both.

Ayurveda offers a holistic approach, addressing not just the symptoms but also the root causes, including dietary habits, lifestyle, and mental health. The use of herbal formulations aims to correct the underlying Dosha imbalance and rejuvenate the body's systems.

Modern medicine focuses on identifying the specific type of anemia and addressing it through targeted therapies, such as supplementation or treating underlying conditions.

Integrating both approaches can enhance patient care by combining the strengths of each system. For example, Ayurvedic herbs like **Punarnava** and **Mandura** can complement iron supplements, potentially reducing side effects and improving efficacy.

Conclusion

Pandu Roga Chikitsa as outlined by Charaka provides valuable insights into managing anemia holistically. The emphasis on restoring Dosha balance, enhancing Dhatu nourishment, and rejuvenating Ojas aligns with the modern goal of treating the underlying cause and improving overall health.

Correlating Ayurvedic principles with modern medical understanding reveals significant overlaps and opportunities for integrative treatment strategies. Embracing both traditional wisdom and contemporary science can lead to more comprehensive and effective management of anemia.

References

1. **Charaka Samhita**, Chikitsa Sthana, Chapter 16: Pandu Roga Chikitsa.
2. Sharma, P. V. (1981). *Charaka Samhita: Text with English Translation*. Chaukhambha Orientalia.
3. Lad, V. (2002). *Textbook of Ayurveda*. Ayurvedic Press.
4. Tripathi, B. (1995). *Charaka Samhita (Hindi Commentary)*. Chaukhambha Surbharati Prakashan.
5. World Health Organization (WHO). (2021). **Global Database on Anemia**.
6. National Heart, Lung, and Blood Institute (NHLBI). (2020). **Anemia**.
7. Hoffbrand, A. V., & Moss, P. A. H. (2016). *Essential Haematology*. Wiley-Blackwell.
8. Ross, A. C., et al. (2014). *Modern Nutrition in Health and Disease*. Lippincott Williams & Wilkins.
9. Sembulingam, K., & Sembulingam, P. (2012). *Essentials of Medical Physiology*. Jaypee Brothers Medical Publishers.
10. Tietz, N. W. (2014). *Fundamentals of Clinical Chemistry and Molecular Diagnostics*. Elsevier Health Sciences.