

Shvasakshatata in Pandu Roga: A Conceptual Review of Ayurvedic Samprapti and Modern Pathophysiology of Anemia-Induced Breathlessness

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Abstract: *Shvasakshatata (shortness of breath) is one of the most distressing and clinically significant symptoms in patients with Pandu Roga and modern Anemia. In Ayurveda, this symptom is described as Shwasa or Shvasakshatata arising from Rasa Kshaya and Rakta Kshaya, leading to Prana Vayu vitiation (disturbance of the life force governing respiration). Modern medicine explains dyspnea in anemia as a compensatory mechanism for tissue hypoxia caused by reduced oxygen-carrying capacity of blood. This conceptual review article critically analyzes the Ayurvedic pathogenesis (Samprapti) of Shvasakshatata in Pandu Roga, correlates it with modern pathophysiological mechanisms (tissue hypoxia, chemoreceptor activation, compensatory tachypnea), and presents a unified theoretical framework that bridges classical Ayurvedic texts (Charaka Samhita, Sushruta Samhita, Ashtanga Hrudaya) with contemporary hematology and respiratory physiology.*

Keywords: Pandu Roga, Shvasakshatata, Anemia, Dyspnea, Ayurvedic Samprapti, Pathophysiology

I. INTRODUCTION

The Dosha, Dhātu and Mala are basis [Moola] of body, which are responsible for all physiological processes in body. Vitiating of Pitta predominant Tridosha initiates pathological processes in body and causes Pandu Roga.¹ In this condition, vitiated Pitta afflicts Dhātus as a result complexion, strength, unctuousness gets too much diminished due to morbidity of Dosha and dushya and as a result blood, fat and Ojas gets exceedingly reduced.² Acharya Charaka has included Pandu Roga in Rasapradoshaj Vikara.³ and Santarpana Janya Vyadhi.⁴ Also Vachaspathya refers Pandu as color of patient resembles with colour of pollen grains of Ketaki flower which is whitish yellow [pale] in appearance.⁵ It is characterized by clinical features such as Panduta [pallor], Daurbalya [general debility], Angsaad [weakness of body], Annadwesha [aversion towards food], Shrama [fatigue], Bhrama [giddiness], Gatrashoola [bodyache], Aruchi [anorexia], Hataanala [poor digestion], Akshikoota Shotha [swelling over peri orbital area].⁶ Pandu is a symptom as well as disease and mostly resembles with anaemia of modern science. Anaemia word is derived from Greek word 'Anaimia'. 'An' means without and 'Haima' means blood.⁷ According to modern science, Anaemia is deficiency of haemoglobin in blood which can be caused by either few red blood cells [RBCs] or too little Haemoglobin in cells.⁸ Nutritional deficiency anaemia is very common in India and Iron deficiency is commonest nutritional deficiency all over world, but its prevalence is higher in developing countries like India. It most commonly affects children and females of reproductive age group. In India, prevalence of anaemia is 52%. WHO estimates that nearly 1/3rd of world's population is suffering from Anaemia.⁹ 10The data of National family health survey-3 shows that Anaemia is particularly high [55.3%] in all women of 15-49 years age group.⁹ Its causes mainly include poor



vegetarian diet, malabsorption of iron, hookworm infections, excessive blood loss, menstruation and childbirth. Its symptoms resembles with Pandu Roga which include fatigue, weakness, dizziness and shortness of breath. Shvasakshatata (shortness of breath) is a symptom in Pandu Roga and Anemia in modern medicine. Patients with moderate-to-severe anemia (Hb <10 g/dL) commonly report dyspnea on exertion, while those with severe anemia (Hb <6 g/dL) may experience dyspnea at rest, palpitations, fatigue, and dizziness.¹¹

II. AIMS AND OBJECTIVES - AIM

To study Ayurvedic pathogenesis (Samprapti) of Shvasakshatata in Pandu Roga, correlates it with modern pathophysiological mechanisms (tissue hypoxia, chemoreceptor activation, compensatory tachypnea), and presents a unified theoretical framework that bridges classical Ayurvedic texts (Charaka Samhita, Sushruta Samhita, Ashtanga Hrudaya) with contemporary hematology and respiratory physiology..

Objective

To Review of Ayurvedic Samprapti of of shvasakshatata in Pandu rog and Modern Pathophysiology of Anemia-Induced Breathlessness

III. MATERIALS AND METHODS

Data has been collected from different classical Ayurvedic texts, research journals and databases like PubMed, Google scholar, Scopus and many more.

IV. REVIEW OF LITERATURE

Ayurvedic Perspective: Pandu Roga and Shwasa (Dyspnea)

1. Vyutpatti -

The word Pandu is derived from the Sanskrit root "Padi Nashane" by adding the "Ku" suffix (Pratyaya), which denotes destruction or loss (Nashana).¹²

2. Nirukti -

According to Shabdarnava Kosha, "Pandustu Peetabhagardha Ketaki Dhulisannibham" means that the colour of Pandu resembles the whitish-yellow pollen grains of the Ketaki flower.¹³

3. Definition -

सर्वं शुचाङ्गेषु ह पाण्डुभावो
यतोऽधिकः स्यात् खलु पाण्डुरोगः ॥ (च.च. १६/४)

because of the predominance of pallor throughout the body, the disease is called Pandu Roga.¹⁴

4. Synonyms -

According to Sushruta Samhita, the synonyms of Pandu are Kamala, Panaki, Lagharaka, Alasa, and Kumbhahwa.¹⁵

V. NIDANA

The etiological factors (Nidana) of Pandu Roga, including Sannipataja and Mridbhakshanajanya Pandu, are broadly classified into three groups in the classical texts.^{16, 17}

A. Aaharaja Nidana

B. Viharaja Nidana

C. Nidanarthakara Roga

A. Aaharaja Nidana -

क्षाराम्ललवणात्युष्णतीक्ष्णान च निषेवेते । त्वरुद्धासात्म्यभोजी च मद्यपश्च नरः सदा ॥ (च.च.१६/८)

Acharya Charaka has described the following dietary causes of Pandu Roga:¹⁶

- Excessive intake of Kshara (alkaline), Amla (sour), Lavana (salty), Ushna (hot), and Tikshna (sharp/pungent) foods.



- Consumption of Viruddha Ahara (incompatible food) and Asatmya Ahara (unwholesome food).
- Excessive intake of Nishpava, Masha, Pinyaka, and Tila Taila.
- Excessive consumption of Madya (alcohol).
- Mridbhakshana (habit of eating clay).
- Excessive intake of Kashaya and Katu Rasa.

B. Viharaja Nidana -

वदग्धेऽत्रे दवास्वप्नो व्यायामो व्यवाय एव च । वेगधारणमत्यथ पाण्डुरोगस्य कारणम् ॥ (च.च. १६/९ - १०)

According to Acharya Charaka, the following lifestyle factors contribute to Pandu Roga:¹⁶

- Diwaswapna, Vyayama, and Vyavaya performed before complete digestion of food (Vidagdhe Anne).
- Improper administration of Panchakarma (Pratikarma Vaishamya).
- Improper observance of seasonal regimen (Ritu Vaishamya).
- Suppression of natural urges (Vega Vidharana).
- Mental factors such as Kama (desire), Bhaya (fear), Chinta (anxiety), Krodha (anger), and Shoka (grief).

VI. PURVARUPA

The symptoms that appear before the manifestation of the disease are known as Purvarupa. According to Acharya Charaka, the following are the premonitory symptoms of Pandu Roga:

हृदयस्पन्दनं रौढयं स्वेदाभावः श्रमस्तथा ॥ (च.च. १६/१२)¹⁹

The Purvarupa of Pandu include Hridayaspandana (palpitations), Raukshya (dryness of the skin), Swedabhava (absence of sweating), and Shrama (fatigue).¹⁹

VII. RUPA / LAKSHANA

Samanya Lakshana

Acharya Charaka has described the general clinical features of Pandu Roga as follows:

सम्भूतेऽस्मिन् भवेत्सर्वः कण्ठवेदी हतानलः । दुर्बलः सदनोऽन्नद्विद्वद् श्रमभ्रमनपीडितः ॥१३॥
गात्रशूलज्वरश्चासगौरवारुचिमात्ररः । मृदतैश्च गात्रैश्च पीडितोन्माथतैश्च ॥१४॥ शूनाक्षकूटो हृदयः शीणलोमा
हतप्रभः ।

कोपनः शिथिलद्वेषी निद्रालुः श्लेष्मणोऽल्पवाक् ॥१५॥

पिण्डकोट्टेष्टकट्यूपादरुक्सदना न च । भवन्त्यारोहणायसौवर्षश्चास्य वदयते ॥१६॥ (च.च. १६/१३ - १६)²⁰

The general manifestations of Pandu include Karnakshweda (tinnitus), Hatanala (poor digestive fire), Daurbalya (general weakness), Annadwesha (loss of appetite), Shrama (fatigue), Bhrama (giddiness), Gatrashoola (body ache), Jwara (fever), Shwasa (dyspnoea), Gaurava (heaviness of the body), Aruchi (anorexia), Akshikuta Shotha (periorbital swelling), Shirnaloma (hair fall), Hataprabha (loss of complexion), Kopana (irritability), Shishira Dweshi (aversion to cold), Nidralu (drowsiness), Shthivana (frequent spitting), Alpavak (speaks less), Pindikodweshtana (calf muscle cramps), Kati-Uru-Pada Ruk/Sadana (pain and weakness in the lower back, thighs and feet), and Arohana Ayasa (breathlessness or fatigue while climbing).²⁰

VIII. SAMPRAPTI

A. Samanya Samprapti -

Acharya Charaka explains the general pathogenesis of Pandu Roga as follows:

दोषाः पृथग्प्रधानास्तु यस्य कुप्यन्ति धातुषु । शैथिल्यं तस्य धातूनां गौरवं चोपजायते ॥४॥ ततो वणर्बलस्रेहा ये
चान्येऽप्योजसो गुणाः । व्रजन्ति क्षयमत्यथ दोषद्वयप्रदूषणात् ॥५॥ सोऽल्परक्तोऽल्पमेदस्को नःसारः शिथिलेन्द्रियः ।
वैवर्ण्यं भजते... (च.च. १६/४ - ६)²¹



Aggravated Pitta-dominant Tridosha vitiate Rakta and other Dhatus, producing Shaithilya (laxity) and Gaurava (heaviness). Consequently, Varna (complexion), Bala (strength), Sneha (unctuousness), and the qualities of Ojas are diminished due to Dosha-Dushya Sammurchana. This ultimately results in depletion of Rakta and Meda, weakness of the sensory organs, and discoloration of the skin, leading to Pandu Roga.²¹

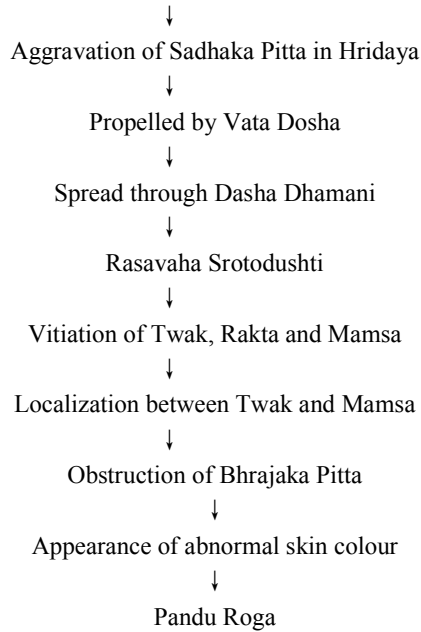
B. Vishesha Samprapti -

समुदकण यदा पित्तं हृदये समविस्थितम् ॥९॥ वायुना बालना क्षिप्तं संप्राप्य धमनीदर्श ॥१०॥ प्रपन्नं केवलं देहं त्वङ्मांसान्तरमाश्रितम् । प्रदूष्य कफवातासृक्त्वङ्मांसान् करोति तत् । पाण्डुरोगो रक्तहरतान् वणान् बहुवधास्त्वचः । स पाण्डुरोग इत्युक्तः ॥ (च.च. १६/९ - ११)²²

When aggravated Pitta, situated in the Hridaya, is propelled by Vata through the Dasha Dhamani, it spreads throughout the body. It localizes between Twak and Mamsa, vitiating Kapha, Vata, Rakta, Twak, and Mamsa. This produces various skin discolorations such as Pandu (pale), Haridra (yellow), and Harita (greenish), which characterize Pandu Roga.

IX. SAMPRAPTI CHAKRA

Tridosha-provoking Ahara and Vihara (Pitta predominant)



X. SAMPRAPTI GHATAKA

- Dosha: Pitta-pradhana Tridosha
- Dushya: Rasa, Rakta, Twak, Mamsa
- Srotasa: Rasavaha, Raktavaha
- Srotodushti: Sanga
- Adhithana: Sarva Sharira Twak
- Ashaya: Amashaya
- Agni: Dhatvagni



- Vyadhi Swabhava: Chirakari
- Sadhyasadhyata: Sadhya/Krichchhra Sadhya

XI. MODERN REVIEW : ANEMIA-INDUCED BREATHLESSNESS -

Modern medicine confirms that anemia causes dyspnea through reduced oxygen-carrying capacity, tissue hypoxia, and compensatory tachypnea.

Modern Pathophysiology of Dyspnea in Anemia

1. Definition and Classification of Anemia -

Anemia is defined by the World Health Organization (WHO) as a hemoglobin concentration of <13 g/dL in adult men and <12 g/dL in non-pregnant adult women. Iron deficiency anemia (IDA) is the most common nutritional deficiency and the leading cause of anemia worldwide.²³

Classification of Anemia²⁴-

Type of Anemia	Hemoglobin Level	MCV	Modern Correlation
Mild	10–12 g/dL	Normal/Microcytic	Early iron deficiency anemia
Moderate	7–10 g/dL	Microcytic	Iron deficiency anemia, anemia of chronic disease
Severe	<7 g/dL	Microcytic/Macrocytic	Severe IDA, hemolytic anemia
Microcytic	MCV <80 fL	Low MCV	Iron deficiency anemia
Macrocytic	MCV >100 fL	High MCV	Vitamin B12/Folate deficiency

2. Mechanism of Dyspnea in Anemia -

Dyspnea is one of the cardinal manifestations of moderate to severe anemia and primarily results from impaired oxygen transport to peripheral tissues.²⁵

Reduced Oxygen-Carrying Capacity

The oxygen content of arterial blood is calculated as:

$$O_2 \text{ Content} = (Hb \times 1.34 \times SaO_2) + (0.003 \times PaO_2)$$

A reduction in hemoglobin concentration significantly decreases oxygen-carrying capacity despite normal arterial oxygen saturation (SpO₂), resulting in diminished tissue oxygen delivery.²⁵

Tissue Hypoxia

Reduced oxygen delivery to vital organs including skeletal muscles, myocardium, lungs and brain leads to tissue hypoxia. Cells subsequently shift from aerobic to anaerobic metabolism, causing lactate accumulation and metabolic acidosis.²⁶

Chemoreceptor Activation

Peripheral chemoreceptors located in the carotid and aortic bodies detect reduced oxygen delivery and stimulate the respiratory center in the medulla oblongata, resulting in an increase in respiratory rate (tachypnea).²⁷

Compensatory Cardiopulmonary Response

To compensate for reduced oxygen delivery, cardiac output increases through tachycardia while respiratory rate rises to enhance oxygen uptake. Consequently, patients experience exertional or resting dyspnea depending on the severity of anemia.²⁸



Severe Anemia

In severe anemia (Hb <6 g/dL), persistent compensatory mechanisms may culminate in high-output cardiac failure, pulmonary congestion, orthopnea and dyspnea even at rest.²⁹

3. Clinical Correlates of Dyspnea in Anemia -

The severity of dyspnea generally correlates with the degree of hemoglobin reduction.³⁰

Clinical Feature	Severity	Hemoglobin Level
Dyspnea on exertion	Mild	10–12 g/dL
Dyspnea on minimal activity	Moderate	7–10 g/dL
Dyspnea at rest	Severe	<7 g/dL
Fatigue and weakness	All grades	Variable
Palpitations and tachycardia	Moderate–Severe	<9 g/dL
Pallor	All grades	Usually <11 g/dL
Dizziness/Syncope	Severe	<6 g/dL

Clinical Thresholds

- Hb <10 g/dL: Mild dyspnea during exertion.
- Hb <8 g/dL: Dyspnea on minimal exertion with tachycardia.
- Hb <6 g/dL: Dyspnea at rest with increased risk of high-output cardiac failure.³⁰

4. Conceptual Correlation between Ayurveda and Modern Medicine -

The Ayurvedic description of Pandu Roga demonstrates remarkable similarities with the modern pathophysiology of anemia. The depletion of Rasa and Rakta Dhatu leads to impaired nourishment of tissues and vitiation of Prana Vayu, which clinically manifests as Shwasa, Klama, and Hridspandana. These changes closely correspond to reduced oxygen-carrying capacity, tissue hypoxia, chemoreceptor stimulation, tachypnea, and compensatory tachycardia described in modern medicine.³¹

Ayurvedic Concept	Modern Correlation	Mechanism
Rasa Kshaya	Reduced plasma volume and nutritional deficiency	Impaired tissue nourishment
Rakta Kshaya	Reduced hemoglobin and RBC count	Decreased oxygen transport
Prana Vayu Vaigunya	Respiratory center stimulation	Chemoreceptor activation and tachypnea
Shwasa	Dyspnea	Subjective breathlessness
Klama	Fatigue	Tissue hypoxia
Hridspandana/Hridveda	Palpitations	Increased cardiac output and tachycardia
Ama	Chronic inflammation	Anemia of chronic disease
Agnimandya	Poor iron absorption	Iron deficiency due to impaired gastrointestinal function
Vataja Pandu	Severe iron deficiency anemia	Severe dyspnea with cardiac decompensation
Pittaja Pandu	Moderate iron deficiency anemia	Exertional dyspnea with systemic manifestations



5. Conceptual Correlation -

The Ayurvedic concept of Prana Vayu closely resembles the physiological regulation of respiration by the medullary respiratory center. In Rasa Kshaya and Rakta Kshaya, diminished oxygen transport results in tissue hypoxia, which activates peripheral chemoreceptors and stimulates the respiratory center, producing tachypnea and dyspnea. Thus, the Ayurvedic description of Prana Vayu Vaigunya leading to Shwasa closely parallels the modern mechanism of dyspnea in anemia.³¹

XII. DISCUSSION

This review establishes a strong conceptual link between Ayurvedic Pandu Roga and modern anemia-induced dyspnea. The Ayurvedic mechanism (Rasa/Rakta Kshaya → Prana Vayu vitiation → Shwasa) is biologically plausible and aligns with modern pathophysiology (low Hb → tissue hypoxia → chemoreceptor activation → dyspnea).

Key Insights:

1. Vataja Pandu = Severe IDA (Hb <6) with critical dyspnea (Maha Shwasa).
2. Pittaaja Pandu = Moderate IDA (Hb 6–9) with exertional dyspnea.
3. Kaphaja Pandu = Mild IDA (Hb 9–11) with mild dyspnea.
4. Prana Vayu is the Ayurvedic equivalent of the medullary respiratory center + chemoreceptors.
5. Ama correlates with inflammation (CRP, IL-6) in anemia of chronic disease.

Clinical Implications:

- **Early diagnosis:** Amla Ichha (sour craving) correlates with iron deficiency; should prompt Hb testing.ijirt
- **Monitoring:** Shwasa severity (light, moderate, grave) correlates with Hb levels and Borg scale.
- **Treatment:** Ayurvedic herbs (Punarnava Mandura, Loha Bhasma) + diet + pranayama are evidence-based interventions for dyspnea in Pandu.

Future Research Directions:

1. Quantitative study: Correlate Vata Dosha score with Borg Scale and Hb levels.
2. Systematic review: Meta-analysis of all Ayurvedic trials for Pandu Roga (2010–2025).
3. Molecular study: Investigate Ama as a biomarker (CRP, cytokines) in anemia of chronic disease.

XIII. CONCLUSION

Shvasakshatata is a cardinal and distressing symptom in Pandu Roga (anemia), arising from Rasa/Rakta Kshaya and Prana Vayu vitiation in Ayurveda, and tissue hypoxia in modern medicine. This review suggests that the Ayurvedic explanation of Shvasakshatata in Pandu closely matches the pathophysiological mechanisms of dyspnea described in modern medicine. Ayurveda and modern medicine are complementary, not contradictory. Integrating Rasa/Rakta Kshaya with Hb/RBC and Prana Vayu with chemoreceptor activation offers a holistic approach to managing dyspnea in anemia.

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