



DECIPHERING THE PANDU OF AYURVEDA

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ABSTRACT

Pandu Roga is one such entity that finds great description throughout the *Ayurvedic* texts. In total, around 2430 formulations and 135 drugs were described either for the prevention or for the management of *Pandu Roga* [1]. In spite of widespread explanation of this disease, there is still ambiguity in its clear understanding. *Pandu* signifies a lot more like Anemia. However, when inspected deeply it encompasses a wide variety of metabolic diseases originating from various causes. Thus, co-relations of *Pandu* just with Anemia seem inappropriate and incomplete. Thereby, here is an attempt to decipher *Pandu Roga* with its corresponding counterpart in contemporary medical science. The standard reference literature of *Ayurveda i.e., Brihatrayis* and modern science were taken into consideration for the present study.

Keywords: *Pandu*, anemia, hypothyroidism, liver diseases, nutritional deficiency.

INTRODUCTION

The word *Pandu* is formed from the root *Padi Nasane* with *Kru* as *Pratyaya* and elaboration through *Ni*. [2] The *Nasane* word here refers to the destruction of natural skin colour. *Charak Samhita* has described the

word *Vaivarnaya* which also means abnormal colour. [3] *Pandu* also refers to the white-yellowish colour. [[Amarkosa, Pu. Kha-5/13]. Thus, *Pandu Roga* is a group of diseases whose cardinal sign is a change

in skin colour chiefly, white-yellowish. On a whole-some, *Pandu* manifests as loss of *Varna*, *Bala*, and *Agni* of body. [3, Chapter 16/29] *Pandu Roga* and *Kustha* are similar in their main characteristic feature of *Vaivarnayata* (discolouration).[3][4] However, these two are different conditions and are treated differently.

Pandu is explained after *Grahani roga* in *Charaka Samhita*. The explanation for this chronology is given in the commentary of *Chakrapani* [3, Chapter 16/1-2], where he explains, due to treatment (excessive) of *Grahani Roga* by drugs of *Teekshana* gun (etc.), there is the production of *Pitta* (excessive) leading to *Pandu Roga*. It is to be noted that, *Grahani Dosha* is due to *Agni Mandya* [3, Chapter 15/51-52] whereas *Pandu* is not. These two are separate conditions and are treated differently.

Pandu is characterized by the main loss of *Rakta Dhatu*. Contrarily, however, it is given in *Rasa Pra-*

doshaj Vikara. This is due to the fact that the *Poorva-roopa* and *Saamanya Lakshana* of *Pandu* matches significantly with *Rasa Kshaya Lakshanas* and *Rasa Pradoshaja Vikaras*. (Table 2 & 5)

CAUSATIVE FACTORS (NIDANAS): [3, Chapter 16/7-9]

Samanya Nidanas of *Pandu Roga* (Table 1) are *Nidanans* for *Tridosha Prakopa* with *Pitta* dominance. *Nidanarthkara Roga for Pandu Roga* (Table 1) indicates that *Rakta Kshaya* is the major pathological event for the manifestation of *Pandu*. According to *Charaka Samhita*, *Mrittika is Visheshha Nidana*, for *Mridabhakshanajanya Pandu*. Other specific type of *Pandu Roga* is due to excessive intake of that particular *Dosha* provoking diet. In case of *Pittaja Pandu*, having *Pitta prakriti* is also a risk factor.

Table 1: *Nidanans of Pandu Roga* [3, Chapter 16/7-9]

<i>Aharaaja Nidana</i>			<i>Viharaaja Nidana</i>	<i>Mansika Nidana</i>
<i>Dravya</i>	<i>Rasa Pradhana</i>	<i>Aahara Vidhi</i>		
<i>Masha</i>	<i>Kshara</i>	<i>Virudha</i>	<i>Ativyayama</i>	<i>Kama</i>
<i>Nishpava</i>	<i>Lavana</i>	<i>Asatmya</i>	<i>Divaswapna</i>	<i>Chinta</i>
<i>Pinyaka</i>	<i>Amla</i>		<i>Rituvaismaya</i>	<i>Bhaya</i>
<i>Til Taila</i>			<i>Vegadharana</i>	<i>Krodha</i>
<i>Vidahi Anna</i>			<i>Panchakarma vyapata</i>	<i>Shoka</i>
<i>Nidanarthkara Rogas of Pandu (Nija Karana)</i>				
<i>Raktarbuda</i> [8]			<i>Yakritdalyadar</i> [8, Chapter 7/16]	
<i>Antarlohita</i> [9]			<i>Pittaja Pratishyaya</i> [13]	
<i>Rakta Pradara</i> [10]			<i>Vyavayja Shosha</i> [13, Chapter 41/22]	
<i>Raktakshaya</i> [3, Chapter 16/33]			<i>Pittaja Kasa</i> [13, Chapter 52/9]	
<i>Punaravartaka Jvara</i> [3, Chapter 3/337]			<i>Shukra Kshaya</i> [5, Chapter 17/69]	
<i>Grahani</i> [3, Chapter 16/1(Comm.)]			<i>Paittika Prameha Updrava</i> [7, Chapter 6/13]	
<i>Pureeshaja Krimi</i> [12]			<i>Kaphaja Shopha</i> [11, Chapter 13/35]	
<i>Arsha Purva Rupa</i> [3, Chapter 14/22]			<i>Rasa Pradoshaja vikara</i> [5]	
<i>Rakta Pitta</i> [11]			<i>Beejopaghata klaibya</i> [3, Chapter 30/61]	
<i>Asrigdara</i> [9, Chapter 2/19]			<i>Mootra ashmari</i> [8, Chapter 3/15]	
<i>Nidanarthkara Rogas of Pandu (Agantuja Karana)</i>				
<i>Katika Tarun Marma Vedha</i> [10, Chapter 6/27]			<i>Mansa Marma Abhighata</i> [6, Chapter 25/40]	
<i>Raktavaha Dhamni Vedha</i> [10, Chapter 9/12]			<i>Antarmrita Shishu</i> [8, Chapter 8/12]	

PATHOGENESIS (SAMPRAPTI):[3, Chapter 16/4-6]

The chief *Prakupita Dosh* in *Pandu* is *Pitta*, along with the other two. This *Prakupita Pitta* is probably increased mainly in its *Teekshana* and *Ushna Guna*. It further leads to *Kopan/Pradooshan* of all the *Dhatus*. The *Kupita Dhatu* becomes *Shithil* and *Guru*. *Gauravta* of *Dhatu's* means, loss in their physiological functions. [3, Chapter 16/4-6(Comm.)]

The *Pitta Prakopa* in *Pandu Roga* is not a quantitative increase, which otherwise should lead to an increase in *Rakta Dhatu* (as in *Raktipitta*). Rather increase in *Pitta* (*Teekshan* and *Ushna Guna* increase mainly) in *Pandu Roga*, leading to *Kshapana* (destruction) of *Rakta Dhatu* (chiefly). [3, Chapter 16/4-6(Comm.)] This results in *Rakta Kshaya* in *Pandu*. The natural skin color is maintained by *Bharajak Pitta*, hence *Vikriti* in it leads to *Vikrit Varna* or *Vaivarnyata*.

The above-explained pathogenesis of *Pandu* can be interpreted as follows. The factors, like over-treatment

of *Grahani* by *Teekshana Ushana* drugs or over-consumption of *Pitta* increasing *Aahara* and *Vihara* leads to *Pitta Pradhan Tridosha Prakopa*. This deranged *Pitta* spreads from the heart through *Dash Dhamni* to all over the body with the help of *Vaata*. It is accumulated between *Twacha* and *Maans* imparting *Pandu*, *Haridra*, *Harita*, and different other colors to the skin. Increased *Pitta* destroys all *Dhatu Saar Bhaag* resulting in disruption of physiological functions. The chief feature of *Pandu* i.e., *Vaivarnyata* is due to *Vikrita Bharajaka Pitta* imparting *Vikrita Varna* to the body.

Thus, it can be inferred that *Vitiated Pitta* is leading to *Dhatu Shaithilyata* and *Dhatu Gauravta*, it is a functional loss of *Dhatu's*. Also, due to *Teekshana* and *Ushna Guna* of *Pitta*, *Sarva Dhatu Kshapana* (physical loss of all dhatu) is also taking place. In general, *Pandu* can be understood as a disturbed metabolic condition of the body leading to loss of vitality.

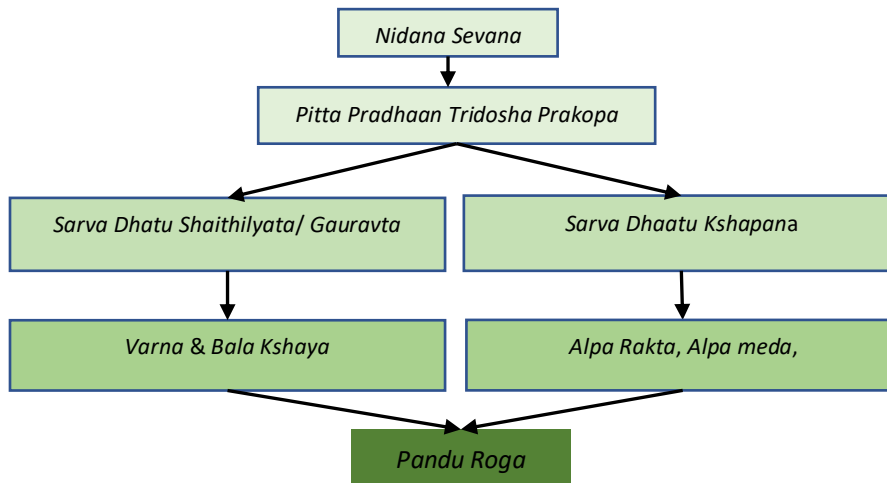


Figure 1. Saamanya Samprapti of Pandu Roga

PRODROMAL SYMPTOMS (POORVAROOPA):

The premonitory symptoms explained by *Charaka Samhita* are - *Hridya Spandana* (palpitation), *Rookshyam* (dryness), *Swedabhaav* (hypohidrosis), and *Shram* (fatigue). [3, Chapter 16/12] These are manifested due to increased *Pitta*, which spreads from the heart to all over the body through *Dash Dhamanis* (aorta and its branches). This *Sanchay*, *Prakopa*, and

Prasara are responsible for *Poorvaroopa Awastha* of *Pandu*. *Swedaabhaav* is due to disturbance caused by *Pitta* in between *Twacha* and *Maans Dhatu*. These *Poorvaroopas* matches with symptoms like fatigue and palpitation of Iron deficiency anemia. Iron deficiency anemia is the most common type of anemia.

Table 2: Resemblance of *Pandu Poorvroopa* with *Rasa Kshaya Lakshanas*

<i>Pandu Poorvroopa</i> [3, Chapter 16/12]	<i>Rasa Kshaya Lakshana</i>
<i>Hridya Spandan</i>	<i>Hridya Kampa</i> [6]
<i>Rookshyam</i>	<i>Rookshyam</i> [7]
<i>Shram</i>	<i>Shram</i> [7]

CLINICAL MANIFESTATIONS (LAKSHANAS): [3, Chapter 16/13-16]

Chief feature (*Panduta*) of *Pandu Roga* is due to *Pitta Prakopa*. Primarily *Rakta & Meda Kshaya* takes place in it. However, generally, there is *Tridosha Prakopa*

and *Sarva Dhatu Kshaya*. Therefore, the features of *Pandu Roga* are represented as a mixture of all *Dosha* and *Dhatu* derangements. These features are compiled in table 3.

Table 3: *Pandu Samanya lakshanas* with their *dosha dushya* and *srotas* involvement

<i>Samanya Lakshanas</i>	<i>Dosha</i>	<i>Dushyas</i>	<i>Srotas</i>
<i>Karna Kshveda</i>	<i>Vata</i>	<i>Rakta Dhatu</i>	<i>Raktavaha</i>
<i>Alpa vaaka</i>	<i>Vata</i>	<i>Rakta Dhatu</i>	<i>Raktavaha</i>
<i>Gatra Marda</i>	<i>Vata</i>	<i>Rakta & Mamsa Dhatu</i>	<i>Rasa & Mamsavaha</i>
<i>Kati-uru-pada ruka</i>	<i>Vata</i>	<i>Rasa Rakta Mansa Dhatu</i>	<i>Rasa-Rakta-Mansavaha</i>
<i>Pindikio Dweshanam</i>	<i>Vata</i>	<i>Rakta & Mamsa Dhatu</i>	<i>Rasa & Mamsavaha</i>
<i>Shishira Dwesha</i>	<i>Vata</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Shrama</i>	<i>Vata</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Dhatu Shithilya</i>	<i>Pitta</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Hatprabhatva</i>	<i>Pitta</i>	<i>Rakta Dhatu</i>	<i>Raktavaha</i>
<i>Jwara</i>	<i>Pitta</i>	<i>Rasa Dhatu</i>	<i>Rasavaha Swedavaha</i>
<i>Kopana</i>	<i>Pitta</i>	<i>Rakta Dhatu</i>	<i>Raktavaha</i>
<i>Panduta</i>	<i>Pitta</i>	<i>Rasa, Rakta & Mamsa Dhatu</i>	<i>Rasa-Rakta-Mansavaha</i>
<i>Rakta Alpata</i>	<i>Pitta</i>	<i>Rasa & Rakta Dhatu</i>	<i>Rasa & Raktavaha</i>
<i>Akshikoota Shotha</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Aruchi</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Anna Dwit/Dweshya</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Dhatu Gaurava</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Gaurava</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Nidraluta</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Shthivan Adhikya</i>	<i>Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Arohane Ayasa</i>	<i>Vata-Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Swasha</i>	<i>Vata-Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasa & Pranavaha</i>
<i>Hatanala</i>	<i>Vata-Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Sadana</i>	<i>Vata-Kapha</i>	<i>Rasa Dhatu</i>	<i>Rasavaha</i>
<i>Nisarata</i>	<i>Tridosha</i>	<i>Sapta Dhatu</i>	<i>Rasaraktadivaha</i>
<i>Shithilendriya</i>	<i>Tridosha</i>	<i>Sapta Dhatu</i>	<i>Rasa & Raktavaha</i>

In contradiction to these, features like *Shishir Dwesha* & *Hatanala/Agni-Naasha* are also given. *Rakt Kshaya* generally leads to *Shishir Preeti*. [7, Chapter 11/17]

However, in spite of *Rakta Kshaya* in *Pandu Roga*, it features *Shishir Dwesha*. *Chakrapani Teeka* explains this ambiguity as *Prabhaav* (effect) of *Pandu Roga*.

[3, Chapter 16/4-6 (Comm.)] The cause of *Agni-Naasha* in *Pandu* is probably due to *Dhatu Saithilya*. It should be noted, the *Samprapti* of *Pandu* does not include *Agni-Naasha*. Thus, it can be concluded *Hat-*

anala is the effect of *Pandu* and not the cause. This *Agni Naasha* will again lead to *Dhatu kshaya* by *Dhatu Poshak Saar Bhaag* anutpadanat i.e., non-production of *Dhatu*s.

Table 4: Contradictory features of *Pandu Saamanya Lakshanas*

Contradictory feature	Explanation
<i>Shishir Dwesha</i>	<i>Prabhaav</i> (effect) of <i>Pandu Roga</i>
<i>Hatanala/Agni-Naasha</i>	Probably due to <i>Dhatu Saithilya</i>

Though objective loss in *Pandu* is more of *Rakta* and *Meda Dhatu*. *Saamanya Roopa* of *Pandu* significantly aligns with *Rasa Pradoshaj Vikara*'s (Table5). Since treatment is a balanced plan of relieving symp-

toms as well as pathogenesis. Thus, taking subjective features into consideration, classifying *Pandu* in *Rasa Pradoshaj Vikara*'s (inspite of *Rakta Kshaya* being its prime pathogenesis) is effectual.

Table 5: Resemblance of *Pandu Saamanya Lakshana* with *Rasa Pradoshaj Vikaras*

<i>Pandu Saamanya lakshana</i> [3, Chapter 16/13-16]	<i>Rasa Pradoshaja Vikaras</i> [5]
<i>Aruchi</i>	<i>Aruchi</i>
<i>Agni Naasha</i>	<i>Agni Naasha</i>
<i>Saad</i>	<i>Saad</i>
<i>Gaurav</i>	<i>Gaurav</i>
<i>Jwar</i>	<i>Jwar</i>
<i>Gaatra shool</i>	<i>Angmard</i>
<i>Sheerna loma</i>	<i>Ayatha kalam palitaani</i>

Pandu in general is an umbrella term covering a distinct variety of diseases characteristic of *Pandutva* in them. Analyzing *Pandu Roga*, it may be inferred that pallor and icterus-producing diseases, in general, can be easily kept in it. However, deeper studies of it, suggest that Nutritional deficiencies, Anemias, Liver diseases, Hypothyroidism, and various genetic defects leading to metabolic defects can be understood and treated as per *Pandu Roga*.

PANDU & ANEMIA: -

Moderate Anemia (Hemoglobin 10-13 g/dL) produces no symptoms compared to significant symptoms of severe Anemia (Hemoglobin 7-8 g/dL) irrespective of its cause. Common signs and symptoms of Anemia match greatly with the *Saamanya lakshanas* and *Poorvroopas* of *Pandu*. The usual features of Anemia - fatigue, Pallor, and reduced exercise capacity match exactly as explained in *Pandu*. [14] Patients appear

pale due to a deficiency of red-colored Hemoglobin which is better appreciated in the conjunctiva, mucous membrane of the tongue, and nail beds. Pallor associated with icterus is suggestive of hemolytic anemia. Dyspnea on mild exertion, palpitation, tachycardia and cardiac murmur occurs due to cardiac compensatory mechanisms. In iron deficiency anemia, atrophy of papillae gives a red, smooth, waxy appearance to the tongue surface. Fissures and ulcerations at the angles of the mouth (angular stomatitis) may develop. Atrophic changes in the Gastric mucosa led to Chronic Atrophic Gastritis with Hypochlorhydria. These changes may lead to *Aruchi* and *Agni Naasha* as explained in *Saamanya Lakshana* of *Pandu*. Patients with chronic severe anaemia often retain salt and water leading to oedema. [15] This explains *Akshikoota Shotha* of *Pandu*.

Table 6: Resemblance of *Pandu Saamanya lakshana* with Anemia

<i>Pandu Saamanya lakshana</i>	Anemia features
<i>Panduta</i>	Pallor
<i>Shrama</i>	Fatigue
<i>Aarohan Aayas</i>	Reduced exercise capacity
<i>Swasha</i>	Breathlessness [16]
<i>Balakshaya</i>	Loss of stamina [16]
<i>Hridya Spandan</i>	Tachycardia [16]
<i>Karna kshveda</i>	Tinnitus [17]
<i>Aruchi</i>	Anorexia [17]
<i>Agni Naasha</i>	Dyspepsia [17]
<i>Bhrama</i>	Dizziness [18]
<i>Durbalyata</i>	Weakness [18]
<i>Nidraluta</i>	Sleepiness [19]
<i>Kopana</i>	Irritability [19]
<i>Sheeerna Loma</i>	Hair loss [20]
<i>Pindiko Dweshtanam</i>	Intermittent claudication of the legs [21]

PANDU & LIVER DISEASES

Liver diseases, in general, can be included in *Saamanya Pandu*. Jaundice is the hallmark and fatigue is the most common and characteristic

symptom of liver disease like viral hepatitis, alcoholic liver diseases' etc. [22] This match with characteristic features of *Pandu* being *Vikrita Varna (Vivarna)* and *Bala Kshaya*.

Table 7: Resemblance of *Pandu Saamanya lakshana* with Liver diseases

<i>Pandu Saamanya lakshana</i>	Liver disease features [22]
<i>Panduta/Peetata/ Vivarna</i>	Jaundice
<i>Shrama/Bala Kshaya</i>	Fatigue
<i>Aarohan Aayas</i>	Afternoon fatigue
<i>Balakshaya</i>	Lack of stamina
<i>Anna Dwit / Aruchi</i>	Poor appetite

Kamala is generally correlated well with liver diseases. It is again classified as *Swatantra* and *Partantra Kamala*. [4, Chapter 13/17] The latter originates after *Pandu* is considered as *Awastha* (stage) of it. According to *Charaka Samhita Kamala* arises due to *Pandu Rogi* indulging in excessive *Pitta Vardhaka Aahara Vihar*. Thus, it can be inferred *Pandu* is *Pitta Pradhan Tridosha Prakopa* disease whereas *Kamala* is *Pitta Prakopa* disease. Thereby treatment principles differ in both conditions, as the use of *Katu Rasa Aushadhi* in *Pandu* whereas in *Kamala*, *Tikta Rasa Aushadhi* is preferred. *Sushruta Samhita* explains *Kamala* as a synonym of *Pandu*. Many other features of *Sushrutokt*

Pittaja Pandu, like *Peeta Akshi*, *Peeta Mootra* matches directly with icterus and darkening of urine, found in liver diseases. Thus, the author is of the opinion that *Kamala* in general should be treated as an advanced stage of *Pandu (Vivridha Pittaja Pandu)*, and accordingly, *Tikta Rasa Aushadhi* dominating treatment protocols should be applied for it.

PANDU & HYPOTHYROIDISM: -

Pandu is considered a disease group having *Dhatu Shaithilya*. Thus, pathogenesis takes place in the metabolism of bodily tissues. Hypothyroidism is a common disease resulting from low production of thyroid hormones affecting large arrays of tissue and

cellular process, a decrease in the metabolic rate and thermogenesis can be observed. Additionally, other hormones are also influenced by their inadequate

production. The *Samanya Lakshanas* and *Poorva-roopas* explained in *Pandu* match extensively to that of Hypothyroidism.

Table 8: Resemblance of *Pandu Saamanya lakshana* with Hypothyroidism

<i>Pandu Saamanya lakshana</i>	Hypothyroidism features [23]
<i>Panduta</i>	Skin pallor with a yellow tinge
<i>Shishira Dwesha</i>	Cold intolerance
<i>Akshikoota Shotha</i>	<i>Periorbital oedema/ eyelid oedema</i>
<i>Sheerna Loma</i>	<i>Hair loss/ Brittle hair</i>
<i>Shrama</i>	<i>Fatigue/tiredness</i>
<i>Swedabhaav</i>	<i>Decreased sweating</i>
<i>Hat Prabha/ Rookshyam</i>	<i>Dry skin</i>
<i>Alpa Vaaka</i>	<i>Depression</i>
<i>Pindiko Dweshanam</i>	<i>Myalgia</i>
<i>Kati-Uru-Pada Ruka</i>	<i>Arthralgia</i>
<i>Durbalya</i>	<i>Weakness</i>

CLASSIFICATION OF PANDU ROGA (BHEDA):

Charaka Samhita classified five varieties of *Pandu* Roga: -

1. *Vataja Pandu Roga*
2. *Pittaja Pandu Roga*
3. *Kaphaja Pandu Roga*
4. *Tridoshaja Pandu Roga*
5. *Mridbhakasha Janya Pandu Roga*

ushruta Samhita opines that *Mridabhakashanjanya Pandu* should not be treated as a fifth type rather it should be included under *Vatajadi Pandu* since *Mridbhaksha Janya Pandu Roga* comes into manifestation through the vitiation of

Vatajadi Doshas. The classification given by *Charaka* is more rational and acceptable for its therapeutic approach.

1. **VATAJA PANDU ROGA:**

Vataja Pandu manifests due to consumption of a *Vata*-provoking diet and activity. Usually, *Pandu* is kept under *Santarpan Janya Vikaras*. [5, Chapter23/5] However, *Vataja Pandu* can be considered as *Aptarpana Janya*, and corresponding treatment protocols also differ from that of *Samanya Pandu*. The *Lakshanas* of *Vataja Pandu* from *Brihatrayis* is summarized in table 8.

Table 9: *Vataja Pandu lakshanas*

<i>Krishnapanduta</i>	<i>Varchshosha</i>
<i>Rukshangata</i>	<i>Asayavairasya</i>
<i>Angamarda</i>	<i>Kampa</i>
<i>Angaruka</i>	<i>Anaha</i>
<i>Angatoda</i>	<i>Shofa</i>
<i>Balakshaya</i>	<i>Arunangata</i>
<i>Krishna Netratavam</i>	<i>Krishna Siravnadhatava</i>
<i>Krishna Nakha, Vina, Mootra, Anana</i>	

For good health, we require energy-providing nutrients (protein, fat, and carbohydrate), vitamins, minerals, and water. Requirements for organic nutrients

include 9 essential amino acids, several fatty acids, glucose, 4 fat-soluble vitamins, 10 water-soluble vitamins, dietary fiber, and choline. Several inorganic

substances, including 4 minerals, 7 trace minerals, 3 electrolytes, and the ultratrace elements must also be supplied by diet³¹. These help to maintain the required metabolism of the body. Their deficiencies due to under nutrition or increased requirements such as infections, trauma, surgeries, alcoholism, etc., lead to disturbed metabolism of the body. Major deficiency diseases like protein-calorie malnutrition, iron-deficiency anemia, goiter (due to iodine deficiency), rickets and osteomalacia (vitamin D deficiency) and xerophthalmia (vitamin A deficiency), megaloblastic anemia (vitamin B₁₂ or folic acid deficiency), scurvy (vitamin C/ascorbic acid deficiency), beriberi (thiamine deficiency) and pellagra (niacin and tryptophan deficiency), etc. and conditions that produce cachexia such as cancer and chronic cardio-pulmonary diseases, surgeries, chronic infections, etc., could be taken into consideration for the manifestation of *Vataja Pandu*. Thus, malnutrition and/or pre-existing diseases lead to *Dhatu Saithilya* and *Dhatu Alpata* manifests as *Vataja Pandu*.

blastic anemia (vitamin B₁₂ or folic acid deficiency), scurvy (vitamin C/ascorbic acid deficiency), beriberi (thiamine deficiency) and pellagra (niacin and tryptophan deficiency), etc. and conditions that produce cachexia such as cancer and chronic cardio-pulmonary diseases, surgeries, chronic infections, etc., could be taken into consideration for the manifestation of *Vataja Pandu*. Thus, malnutrition and/or pre-existing diseases lead to *Dhatu Saithilya* and *Dhatu Alpata* manifests as *Vataja Pandu*.

Table 10: Resemblance of Deficiency diseases with *Vataja Pandu*

Deficiency disease features [24]	<i>Pandu features</i>
Melasma/Skin Hyperpigmentation-Niacin/iron/B ₁₂ deficiency	<i>Krishan Panduta</i>
Pallor in IDA	<i>Panduta</i>
Edema in Kawashiorkar	<i>Shopha</i>
Easy hair pluckability in Kawashiorkar	<i>Sheerna loma</i>
Skin breaks down in Kawashiorkar	<i>Rooksha Angata</i>
Vit.D Induced muscle pain and tetany	<i>Pindiko Dweshtan</i>
Neuropathic pain due to vit. B deficiency (in legs)	<i>Pindiko Dweshtan</i>
Muscle weakness in Thiamine deficiency	<i>Angmarda</i>
Magenta/Bright red tongue in riboflavin & niacin deficiency	<i>Arun Angata</i>
Disorientation & confusion in Niacin & thiamine deficiency	<i>Bhrama</i>
Fatigue in Vit. C deficiency	<i>Shrama</i>
Irritability in thiamine deficiency	<i>Kopana</i>
Tachycardia in Wet Beri Beri due to thiamine deficiency	<i>Hridya Spandan</i>
Pain in Beri Beri due to thiamine deficiency	<i>Ruja</i>
Ophthalmoplegia, drowsiness, peripheral neuropathy-vit.B deficiency	<i>Shithil Indriya</i>
Constipation in cobalamin and folic acid def.	<i>Varcha Shosha</i>

2. PITTAJA PANDU ROGA: -

Pittaja Pandu manifests due to consumption of *Pitta* provoking diet and activity by *Pitta Prakriti* person.

The various features given in *Brihatrayis* are given in table 10.

Table 11: *Pittaja Pandu Lakshanas*

<i>Peetata</i>	<i>Murcha</i>
<i>Haritabhata</i>	<i>Sweda</i>
<i>Jwara</i>	<i>Sheeta Kamita</i>
<i>Daha</i>	<i>Anna Na Abhinandana</i>
<i>Trishna</i>	<i>Katuka Asayata</i>
<i>Chardi</i>	<i>Ushna Na Upashayata</i>
<i>Peeta Mutrala</i>	<i>Amla Na Upashyata</i>
<i>Peeta Vitakta</i>	<i>Vidaha</i>

<i>Bhinna Varchasatva</i>	<i>Amlodgara</i>
<i>Peeta Akshi</i>	<i>Daurgandhya</i>
<i>Peeta Anana</i>	<i>Daurbalya</i>
<i>Peeta Siravnadhatava</i>	<i>Tama</i>

Pittaja Pandu's description matches that of liver diseases. *Peetata / Peeta Akshi* parallels icterus along with other matching features mentioned in table 12. Jaundice is the hallmark of liver diseases and is the main feature of hemolytic anemias.[22][25] Primarily liver diseases such as viral hepatitis and alcoholic hepatitis, and hemolytic anemias like thalassemia,

sickle cell anemia, autoimmune hemolytic anemias, spherocytosis, elliptocytosis, pyruvate kinase deficiency, G6PD deficiency, and other acquired hemolytic anemias invariably present jaundice correlating with *Pittaja Pandu*.

In conclusion, *Pittaja Pandu* is a collective term used to describe liver diseases and hemolytic anemias.

Table 12: Resemblance of liver diseases with *Pittaja Pandu*

Liver disease features	<i>Pittaja Pandu</i> features
Hemolytic jaundice	<i>Peetata</i>
Obstructive jaundice	<i>Haritabhata</i>
Fever in viral and alcoholic hepatitis	<i>Jwara</i>
Dark urine in hepatitis	<i>Peeta Mutrata</i>
Vomiting in viral hepatitis	<i>Chardi</i>
Scleral icterus in hepatitis	<i>Peeta Akshi</i>
Poor appetite/ Nausea	<i>Anna Na Abhinandana</i>
Indigestion	<i>Vidaha/ Amlodgara</i>
Malaise/ lethargy/fatigue	<i>Daurbalya</i>

3. KAPHAJA PANDU ROGA:

Due to *Kapha* promoting *Ahara Vihara*, an increase in *Kapha* causes *Kaphaja Pandu*. *Madhava*, *Bhavaprakasha*, and *Vagbhatta* have described the same symptoms of *Kaphaja Pandu* as *Charaka* and

Sushruta. In the place of *Madhurasya Vagbhatta* has mentioned the symptom, *Lavana Vaktra*. [4, Chapter 13/12] *Kaphaja Pandu Lakshanas* from *Brihatrayis* are given in table 13.

Table 13: *Kaphaja Pandu lakshanas*

<i>Shveta Avabhasta</i>	<i>Shukla Mutrata/Varchas/Akshi</i>
<i>Klama</i>	<i>Kasa</i>
<i>Gaurava</i>	<i>Alasya</i>
<i>Shavyathu</i>	<i>Aruchi</i>
<i>Shwash</i>	<i>Vaak Swar Graha</i>
<i>Tandra</i>	<i>Katu Rooksha Ushna Kamita</i>
<i>Chhardi</i>	<i>Madhurasyata</i>
<i>Praseka</i>	<i>Murcha</i>
<i>Lomaharsha</i>	<i>Bhrama</i>
<i>Saada</i>	

As explained earlier, *Pandu* overall matches with signs and symptoms of hypothyroidism. *Kaphaja*

Pandu also has additional features resembling hypothyroidism (Table 14).

Table 14: Resemblance of Hypothyroidism with *Kaphaja Pandu*

Hypothyroidism features [23]	<i>Kaphaja Pandu</i> features
Hoarse voice	<i>Swara Graha</i>
Oedema/myxedema	<i>Shavyathu</i>
Cold intolerance	<i>Ushna Kamita</i>
Serous cavity effusions	<i>Swash/ Kaas</i>
Lethargy	<i>Alasya</i>
Poor appetite	<i>Aruchi</i>

4. **TRIDOSHAJA PANDU ROGA:** -

If a person indulges in all types of unwholesome food, then all three *Doshas* are vitiated to cause *Tridoshaja Pandu Roga*. The sign and symptoms of this condition are similar to *Doshaja Pandu* as mentioned above. Known as *kricch Sadhya* (diseases curable with efforts), however, diseases that are incurable but manageable are also included under this category. Hence, advanced stages of Anemia, liver diseases, autoim-

mune hemolytic anemia, genetic defects such as thalassemia, sickle cell anemia, enzyme deficiencies, etc. can also be included in this category and be treated accordingly.

5. **MRIDBHAKASHA JANYA PANDU ROGA:**

In this type of *Pandu Roga*, *Mrida Bhakshana* is the major etiological factor. Depending upon the type of *Mrittika* the *Dosha* provocation takes place.

Table 15: *Mridbhaksha Janya Pandu Roga Lakshanas* [3, Chapter17/27-30]

<i>Akshi Koota Bhru Shotha</i>	<i>Atisara</i>
<i>Asya Shotha</i>	<i>Purishaja Krimi</i>
<i>Bala Kshaya</i>	<i>Indriya Nasha</i>
<i>Ganda Shotha</i>	<i>Jatharagni Nasha</i>
<i>Krimi koshta</i>	<i>Varna Nasha</i>
<i>Mehana Shotha</i>	<i>Asya Shotha</i>
<i>Nabhi Shotha</i>	<i>Padashotha</i>
<i>Sa Asrik Kapha Purisha</i>	

Mridbhaksha Janya Pandu can be correlated to Pica. Pica is the persistent eating of non-nutrient substances such as plasters, charcoal, and soil for at least one month. The persistence of pica beyond infancy is abnormal, estimated to be present in 50 % of toddlers and 10 % of children older than 12 years. It is inappropriate for the child's developmental level. Children with pica are at risk for - GIT problems, recur-

rent abdominal pain, diarrhea, worm infestation; Chronic lead poisoning, and Iron deficiency anemia.

COMPLICATIONS (UPADRAVA) & PROGNOSIS (SADHYASADHYATA):

Various complications and bad prognostic features of *Pandu Roga* available in *Ayurvedic* text are given in Tables 16 & 17.

Table 16: *Updrava of Pandu Roga* [26]

<i>Aruchi</i>	<i>Swarabheda</i>
<i>Pipasa</i>	<i>Klama</i>
<i>Jwara</i>	<i>Hridya Awapidana</i>
<i>Murdharuja</i>	<i>Kasa</i>
<i>Agnisada</i>	<i>Atisara</i>

<i>Shoph</i>	<i>Daha</i>
<i>Chhardi</i>	<i>Avipaka</i>
<i>Abalatwa</i>	<i>Shotha</i>
<i>Murchha</i>	<i>Shwash</i>

Table 17: *Asadhya Lakshanas of Pandu* [26, Chapter 44/43-44] [3, Chapter 16/31-33]

<i>Anteshu Shuna Parihina Madhyam</i>	<i>Arochaka</i>
<i>Mlana</i>	<i>Hrillasa</i>
<i>Madhyam Shoona Anteshu Parihina</i>	<i>Klama</i>
<i>Guda Shopha</i>	<i>Ksheena</i>
<i>Mushka Shopha</i>	<i>Hatendriya</i>
<i>Pratamya (Moorcha)</i>	<i>Pandu Danta, Nakha, Netra</i>
<i>Jwara Peedita</i>	<i>Pandu Sanghata Darshi</i>
<i>Chirothpanna Pandu</i>	<i>Alpa Vit</i>
<i>Kharibhootha Pandu</i>	<i>Sakapha Harit Atisaryate</i>
<i>Kala Prakarshat Shoona</i>	<i>Deena</i>
<i>Peeta Darshan</i>	<i>Shwet-atidigdhangta</i>
<i>Bhadda Vit</i>	<i>Chhardi</i>
<i>Swethatha due to Adhika Rakta Kshaya</i>	<i>Trit</i>

Various features in connection to *Pandu Roga* are summarized in Table 18, which when present during the course of the disease, denotes a bad prognosis.

Table 18: Complications matching *Updrava/Sadhyasadhyata* of *Pandu Rog*

<i>Chirothpanna Pandu</i>	Chronicity
<i>Shotha</i>	Oedema
<i>Shwash</i>	Dyspnea
<i>Hridya Awapidana</i>	Cardiac complications
<i>Jwara</i>	Immunocompromised states
<i>Swethatha due to Adhika Rakta kshaya</i>	Severe pallor
<i>Murchha</i>	Coma/hypovolemic shock
<i>Madhya Shoona Anteshu Parihina</i>	Ascites
<i>Chhardi, Trit, Murchha</i>	Hypovolemic shock

Out of the various complications and prognoses described above, many are found in the general symptomatology of *Pandu* and others in specific classifications of *Pandu*. The advanced stages of severe anemia/nutritional deficiencies, chronic liver diseases, severe hypothyroidism, etc., if not corrected lead to life-threatening complications.

TREATMENT (CHIKITSA): -

Pandu Roga is invariably dealt with both *Samshodhana* and *Samshamana* protocols.

Samshodhana is performed by drugs of *Snigdha* and *Teekshan Guna* followed by *Samshamana* mainly with *Tikta Rasa* drugs. The general treatment protocol is summarized in figure 2.

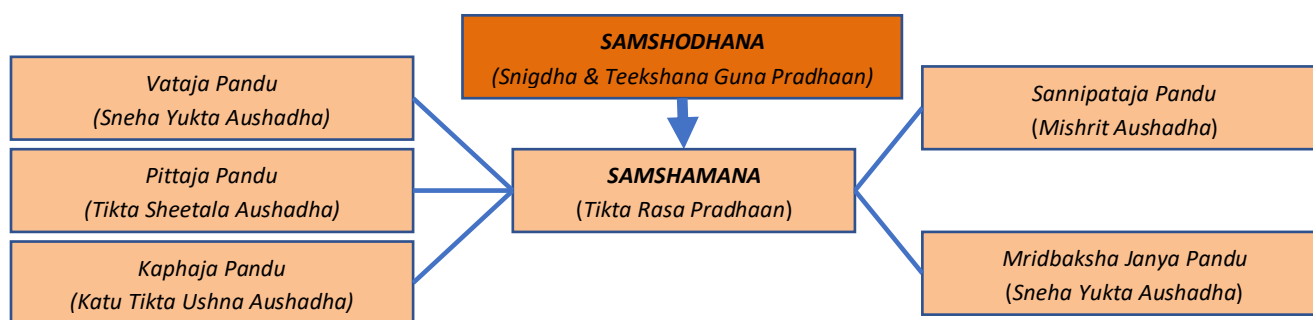


Figure 2. General treatment protocol for Pandu Roga

SAMSHODHANA IN PANDU ROGA

One of the chief features of *Pandu Roga* is *Bala Naasha*. Thus, *Samshodhana* is to be carried out carefully after thoroughly analyzing *Rog-Rogi Bala*. According to *Sushruta Samhita*, it has to be repeatedly carried out in small quantities for the complete expulsion of vitiated *Doshas* from *Dhatus* and *Srotases*. [26, Chapter 44/20] Due to excessive *Bala Kshaya* in *Kaamla*, *Charaka Samhita* advises *Mridu Samshodhana*. *Samshodhana* in *Pandu Roga* includes *Vamana* and *Virechana*. This *Samshodhana* is of *Teekshana* quality.

A. Poorva Karma

Pandu Roga is *Pitta* dominant disorder so before *Shodhana Karma*, *Ghrita* processed with *Pit-*

tashamka Dravyas are given as *Abhyantra Snehan*. In *Vataja Pandu- Kalyanaka Ghrita*, *Pittaja – Maha Tikta Ghrita* and *Kaphaja- Panchgavya Ghrita* are preferred. Invariably all types of *Pandu* have *Pitta Prakopa*, hence *tailas* use for *Pandu* is generally prohibited. Also, the dosage for internal oleation is kept minimal.[27]

B. Pradhana Karma

Vamana and *Virechana* are prescribed in *Pandu Roga*. Since *Pandu Roga* is *Pitta* Dominating condition, *Virechana* is preferred over *Vamana Karma*. Also, in general, *Vamana* is prohibited in *Pandu Roga*. However, if the *Kapha* association is present in *Pandu* then after a thorough analysis of *Kaala*, *Desha*, and *Prakriti*, it may be advised.

Table 19: Pradhan Karma in Samshodhana

Vamana	Virechana [3, Chapter 16/55]	Virechana for Pittaja Pandu	Virechana for Kaphaja Pandu
<i>Krutavedhana</i> [28]	Cow milk/Cow milk added with cow’s urine	Half pala of the powder of <i>Trivrita</i> mixed with one pala of sugar. [3, Chapter 16/57]	<i>Haritaki</i> impregnated with cow’s urine [3, Chapter 16/58]
	Infusion of <i>Danti</i> with one <i>Anjali Gambhari</i>		<i>Snuhi Kshira</i> [28, Chapter 10/5]
	Infusion of <i>Danti</i> with one <i>Anjali Draksha</i>		

C. Paschata Karma

After *Pradhana Karma*, *Samsarjana* is advised. *Pandu Rogi* should be given wholesome food containing old *Shali* type of rice, *Yava*, *Godhuma* mixed with the *Yusha* of *Mudga*, *Adhaki*, *Masura*, *Mamsa Rasa* of *Jangala* Animals. Following these foods, specific

medicines on the basis of the aggravated *Doshas* should be administered.

Samshodhana is acting on *Pandu* in two ways. First by expelling excessive *Pitta* and secondly by relieving any *avarana* of *Kapha*. Expulsion of metabolic

waste and correction of deranged metabolism in *Pandu* is the chief goal of *samshodhana*.

SAMSHAMANA IN PANDU ROGA

Post-Samshodhana, Samshamana treatment is to be applied in *Pandu Rogi*. *Tikta Rasa aushadhas* are the

choice of drugs for *Pandu Rogi*. However, few variations arise due to *Doshika* predominance in its different types. Major *Yogas* for *Pandu Roga* as mentioned in several *Ayurvedic* texts are given in table 19.

Table 19: Major formulations for *Pandu Roga* in *Ayurvedic* texts

Vati	Churna	Ghrita	Asava Arishta	Yogas	Rasa
Mandura Vataka	Navayasa Churana	Katukadya Ghrita	Dhatrayarista	Dhatri Phala Rasa + Kshaudra	Lauha
Punarnava Mandura	Ajasakritadi Churana	Pathya Ghrita	Bijakarista	Ikshu Rasa + Kshaudra	Pravala
Shilajatu Vataka		Danti Ghrita	Gaudarista	Mantha + Kshaudra	Mukta
Kautajadi Gutika		Draksha Ghrita	Lauhaasva	Yashtimadhu Churna + Madhu	Shankha
Bibhitakadi Vataka		Haridradi Ghrita	Punarnavasva		Swarnmakshik
		Dadimadya Ghrita			Shilajit
		Brihatyadi Ghrita			Mandoora

Acharya Charaka has also described *Samshamana* of *Pandu Roga* according to *Dosha* predominance. *Vatika Pandu* must be treated chiefly by *Snehana* e.g., *Dadimadi Ghrita*, etc. In the treatment of *Pittaja Pandu* mainly *Tikta* and *Sheetala Dravya* should be used e.g., *Kutki*, *Amalaki*, etc.

In the treatment of *Kaphaja Pandu Katu*, *Tikta*, and *Ushna Dravyas* should be used e.g., *Punarnava*, *Gomutra*, etc. Mixed treatment should be given in *Tridoshaja Pandu*. Some commonly prescribed formulations for *Pandu Roga* are listed in table 20.

Table 20: Commonly used formulations for *Pandu Roga* as per *Dosha Bheda*

Vataja Pandu	Pittaja Pandu	Kaphaja Pandu
Dadimadi Ghrita	Mahatikta Ghrita	Panchgavya Ghrita
Kalyanak Ghrita	Avipatti Churna	Punarnavadi Kashaya
Navayas loha	Arogyavardhini Vati	Vyoshadi Kashaya
Tapyadi loha	Punarnavadi Mandoora	Gomutrasava
Vidangadi Loha	Drakshavleha	Gomutra Haritakai
Draksharishta	Draksharishta	Navayasa Loha
Dhatrarishta	Dhatrarishta	Tapyadi Loha
Lohasav	Vasaguduchyadi Kashaya	Gomutra Haritaki Lehya
	Parpatakarishtha	Kaishore Guggulu
	Chawanprash Avleha	Punarnava Guggulu

PATHYA – APATHYA:

A. Pathya-

- B. When the alimentary system has been cleaned by the preliminary procedures (*Snehana* and *Shodhana*) the patient should be given wholesome

food namely old rice, Barley, or Wheat either with soup peppered with green gram, pigeon pea, or lentils or wholesome meat juice of Jangala creatures. *Sushruta* has mentioned the use of drinks containing the juice of *Amalaki*, *Ikshurasa*, Salt, and Honey. Similarly, Vegetables and fruits which are beneficial in *Pandu* have been mentioned in *Bhaishajya Ratnavali*. They are *Patola*, *Guduci*, Leaves of *Chaulai* and *Punarnava*, *Pakva Amala*, *Karjura*, *Rasona*, *Palandu*. [29]

C. *Apathya* -

D. According to *Bhaishajya Ratnavali*, the followings should be avoided in *Pandu Roga*- *Raktavis-ravan*, *Dhumrapan*, *Vegadharana*, *Svedana*, *Maithuna*, *Shimbi Patrashaka*, *Masha*, *Pinyaka*, *Tambula*, *Sarshapa*, *Sura*, *Mridbhakshana*, *Divasvapna*, *Tikshna*, *Lavana*. [29, Chapter 12/149-152]

CONCLUSION

- Pandu* is a *Tridoshaja Vyadhi* with a predominance of *Pitta*. The increased *Pitta* is of *Ushna*, *Teekshana* quality leading to *Dhatu Shaithilya* and *Dhatu Kshaya*. The deranged *Pitta* is propelled by increased *Vata* into the body through *dhamanies* (blood vessels). Also, increased *Kapha* by doing *Avarana* leading to *Pitta Prakopa*.
- Pandu* comprises metabolism errors chiefly encompassing nutritional deficiencies, liver diseases, and hypothyroidism.
- Pandu* primarily manifests as *Varna*, *Bala*, and *Agni Naasha*. *Agni Naasha* is due to the effect of the disease rather than its cause. These are also the prime manifestations of anemia, liver diseases, and thyroid deficiencies.
- The characteristic feature of *Pandu* matches greatly to: -
 - Panduta* & *Karna Kshveda* as pallor & *Tinnitus* in anemia respectively.
 - Akshikoota Shotha* & *Shishir Dwesha* as periorbital swelling & cold intolerance in hypothyroidism respectively.

- Shrama* and *Anna Dwit* as fatigue and loss of appetite in liver diseases respectively.
- Iron deficiency anemia has a major correlation with *Pandu Roga*. Almost all Ayurvedic *Samhitas* have signified the use of *Lauha* preparation in the treatment of *Pandu*. As *Rakta Dhatu* is also called as *Lohitam* and *Loha* is similar to *Rakta Dhatu* by its *Dravya samanyata*. Thus, the major pathogenesis of *Rakta Kshaya* in *Pandu* can be reversed by using *Lauha* preparations.
 - Cow urine, cow milk, *Ghrita*, *Takra*, *Rasa Aushadhi*, and various other drugs rich in vitamins like *Amalaki*, etc., are advised in *Pandu Roga*, working as an alternative to vitamin and mineral supplementation for nutritional deficiencies.
 - Though objective loss in *Pandu* is more of *Rakta* and *Meda Dhatu* however the *Poorvaroopa* and *Saamana Roopa* of *Pandu* significantly align with *Rasa Kshaya Lakshanas* and *Ras Pradoshaj Vikara's*. Since treatment is a balanced plan of relieving symptoms as well as pathogenesis. Thus, taking subjective features into consideration, classifying *Pandu* in *Ras Pradoshaj Vikara's* (despite *Rakta Kshaya* being its prime pathogenesis) is effective.
 - The chief treatment modalities of *Snigdha*, *Teekshana Shodhana* given by *Charaka Samhita* are appropriate to expel the *Kapha* and excessive *Pitta* from the body. Also, these measures help the body correct deranged metabolism, as in many liver diseases.
 - A thorough understanding of the basic principles of *Pandu Roga* helps to devise a personal treatment guideline for many contemporary disorders.

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