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Purva rupeeyam of Bhela indriya sthana - An explorative study

Abstract

Maharshi Bhela was a direct disciple of 'Acharya Punarvasu Atreya' and he has composed a compendium, known as 'Bhela samhita'. Bhela Samhita is one of the prominent texts of the samhita period of Ayurveda (100 BC-400 BC) and it consists of 120 chapters divided among 8 sections. 'Indriya sthana' (which deals with prognostic aspects) is one among the eight sections of 'Bhela samhita' which comprises of 12 chapters. 'Purva rupeeyam' is the sixth chapter of 'Bhela indriya sthana', having 17 verses dealing with various signs and symptoms seen at the prodromal stage of diseases and leads to death at later stages. Proper knowledge of the conditions explained in 'Purva rupeeyam' chapter enables the physician to detect life threatening diseases at earlier or prodromal stages which further helps in clinical prognostic decision making. Studies on 'Bhela indriya sthana' have been lacking and the present work is aimed to explore the contents of 'Purva rupeeyam' (sixth chapter) of 'Bhela indriya sthana'. Various conditions such as internal haemorrhage, Cancer-related fatigue, chronic fatigue syndrome, congestive heart failure, multiple system atrophy, upper respiratory tract infections and their complications, severe mental illness, organic psychosis, schizophrenia, gelastic seizures, progressive primary aphasia, acute myocardial infarction, non-cardiac chest pain, gastroesophageal reflux disease, anaphylactic shock, diabetes and its complications, malabsorption syndrome, cachexia, sarcopenia, anorexia, vascular malformations, arteriovenous malformations, hemangiomas, idiopathic facial nerve palsy, black hairy tongue, central and peripheral cyanosis, tetanus, head and neck carcinomas and life threatening infections, liver cirrhosis, end-stage renal and liver disease, hepatorenal syndrome, hepatic encephalopathy with visual hallucination and non-beneficial treatment at end of life stages are documented in this chapter by 'Maharshi Bhela'. Further research works are required to substantiate the clinical findings mentioned in this chapter.

Keywords: bhela indriya sthana, cachexia, end-of-life stages, end-stage liver disease, end-stage renal disease, indriya sthana

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Abbreviations: TTP, thrombotic thrombocytopenic purpura; HUS, haemolytic uremic syndrome; SLE, systemic lupus erythematosus; DIC, disseminated intravascular coagulation; AUGIB, acute upper gastrointestinal bleeding; CVD, chronic venous disease; CRF, cancer-related fatigue; CHF, congestive heart failure; CFS, chronic fatigue syndrome; MSA, multiple system atrophy; RA, rheumatoid arthritis; HSP, Henoch-Schonlein purpura; WG, Wegener granulomatosis; URTI, upper respiratory tract infections; HIV, human immunodeficiency virus; TB, tuberculosis; CNS, central nervous system; PPA, primary progressive aphasia; GS, gelastic seizures; PBA, pseudobulbar affect; ALS, amyotrophic lateral sclerosis; PD, Parkinson's disease; PSP, progressive supranuclear palsy; MS, multiple sclerosis; AD, Alzheimer's disease; SMI, severe mental illness; AMI, acute myocardial infarction; NCCP, noncardiac chest pain; GERD, gastroesophageal reflux disease; T2DM, Type 2 diabetes mellitus; AIDS, acquired immunodeficiency syndrome; COPD, chronic obstructive pulmonary disease; BMI, body mass index; AVMs, arteriovenous malformations; AVF, arteriovenous fistulae; VMs, venous malformations; LMs, lymphatic malformations; VLMs, lympho-venous or veno-lymphatic malformations; CMs, capillary malformations; IH, infantile hemangioma; PWS, port wine stains; KH, kaposiform hemangioendothelioma; GBS, guillain-Barré syndrome; BHT, black hairy tongue; ENT, ear, nose and throat; VOCs, volatile organic compounds; CKD, chronic kidney disease; HE, hepatic encephalopathy; LC, liver cirrhosis; ESRD, end-stage renal disease; HRS, hepatorenal syndrome; NBT, non beneficial treatments; EOL, end-of-life stages; ICU, Intensive care unit;

Introduction

In Charaka Samhita (popular Ayurvedic text composed by Maharshi Agnivesha), it is stated that 'Maharshi Bhela (colleague of Maharshi Agnivesha) was a direct disciple of 'Acharya Punarvasu Atreya' and was one of the six disciples who have composed their own compendia'. Bhela Samhita composed by 'Maharshi Bhela' is to be placed in parallel to 'Charaka Samhita' from a historical perspective.[1] Bhela Samhita is one of the prominent texts of the samhita period of Ayurveda (100 BC-400 BC). Bhela samhita consists of 120 adhyayas (chapters) divided among 8 sthanas (sections). 'Indriya sthana' is one among the eight sections of 'Bhela samhita' and it consists of 12 chapters similar to that of 'Charaka indriya sthana' with few exceptions. 'Indriya sthana' deals with 'Arishta lakshanas' (signs and symptoms that denotes an imminent death) and also other prognostic aspects. Though possessing various unique concepts, 'Bhela Samhita' has been unexplored till date. 'Maharshi Bhela' has provided a lot of and notable contributions in the field of Ayurveda.[2]

'Purva rupeeyam' is the sixth chapter of 'Bhela indriya sthana'. The word 'Purva rupa' denotes 'prodrome'/'prodromal phase' of a disease. Various signs and symptoms especially manifesting at prodromal stage of a disease and indicating an impending death are explained in this chapter (purva rupeeyam). This chapter consists of 17 verses describing various 'arishta lakshanas' (signs of impending death) that are manifesting at prodromal stage of various diseases. The concepts mentioned in this chapter are unique.[3,4] Previous studies have highlighted the clinical and prognostic significance of 'Charaka

indriya sthana'. Various medical and surgical emergency conditions having poor prognosis and high mortality have been documented throughout 'Charaka indriya sthana'.[5–17] Various medical and surgical emergency conditions which leads to immediate death have been explored in the previous work conducted on 'Sadyo maraneeyam' chapter of 'Bhela indriya sthana'.[18] Contents of 'Purva rupeeyam' of 'Bhela indriya sthana'[3,4] are totally different and unique from that of 'Purva rupeeyam indriyam' (sixth chapter) of 'Charaka indriya sthana'.[9] The aim and objective of the present work is to explore the contents of the sixth chapter of 'Bhela indriya sthana' (purva rupeeyam) with the help of contemporary medical literature.

Review methodology

Ayurvedic literature published on 'Indriya sthana', 'Charaka indriya sthana', 'Bhela indriya sthana', 'Arishta lakshanas' and relevant articles of contemporary medicine (especially various medical and surgical emergency conditions which are having poor prognosis and high mortality) has been searched from electronic databases like 'Google' and 'Google scholar' by using relevant key words (related to both Ayurvedic and contemporary medicine). Studies published till 'October 2020', irrespective of their appearance or publication year were considered. Abstracts, full text articles, case reports that are published in 'English language' and having open access were only considered. No filters were applied during search. Authentic textbooks and pertinent websites were also referred.

Discussion

The word 'purva rupeeyam' denotes manifestation of signs and symptoms at prodromal phase and denotes an imminent death. Like other chapters of 'Bhela indriya sthana', 'purva rupeeyam' also contains the description of various arishta lakshanas. Physician should not attempt to treat those patients who had the manifestation of artishta lakshanas explained in this chapter at prodromal stages of illness. Proper understanding of the aristha lakshanas explained in this chapter will be helpful for the physician in prognostic decision making even at the early stages of the disease.[3,4] This chapter contains 17 verses which are explored (Table 1) in the following sections.

Table 1 Contents of 'Purva rupeeyam' chapter

Verse	Relevant condition
'*Antarlohita kaayastu – mrutyoruchyate nara*' (B. I. 6/1&2)	Internal haemorrhage associated with pallor, Erythema or Hyperaemia or Erythroderma associated with tissue ischemia
'*Antarglaano bahirpeeno – sarvopyete paraasuka*' (B. I. 6/3)	Cancer-related fatigue (CRF), Congestive heart failure (CHF), Systemic autoimmune diseases with gastrointestinal manifestations, Chronic fatigue syndrome (CFS), Multiple system atrophy (MSA)
'*Abheekshnam jwaryate yastu – kshipram shwaasena hanyati*' (B. I. 6/4)	Upper respiratory tract infections (URTI) and their complications
'*Ninaadi va pralaapi– panchatvam upagachhati*' (B. I. 6/5)	Dementia, Schizophrenia, Organic psychosis, Mood disorder with psychosis, Gelastic seizures, Delirium, Progressive primary aphasia (PPA), Severe mental illness (SMI)
'*Ghanam sashulam yo veda – vinaasham upagachhati*' (B. I. 6/6)	Acute myocardial infarction (AMI), Non-cardiac chest pain (NCCP), Gastroesophageal reflux disease (GERD)
'*Praswidyate cha kandumaan – kushtena sa vinashyati*' (B. I. 6/7)	Anaphylactic shock, Acute allergic reaction
'*Sukumarashcha yo jantu – sa pramehi vinashyati*' (B. I. 6/8)	Type 2 diabetes mellitus (T2DM) and its complications
'*Parinshoonashcha yo jantu – so atisaarena hanyate*' (B. I. 6/9)	Flushing disorders with gastrointestinal symptoms, Malabsorption syndrome with chronic diarrhoea,
'*Yasya agnishcha balam chaiva – yatha preta stathaiva sa*' (B. I. 6/10)	Cachexia-sarcopenia-anorexia;
'*Sadyo raktam shiro yasya – yatha preta stathaiva sa*' (B. I. 6/11)	Vascular malformations, Arteriovenous malformations (AVMs); Hemangiomas, Scalp aging,
'*Yasya netre lalaatam – yatha preta stathaiva sa*' (B. I. 6/12)	Idiopathic facial nerve palsy, Bell's palsy,
'*Shyaava kantakini jihwa – yatha preta stathaiva sa*' (B. I. 6/13)	Black hairy tongue (BHT), Central and peripheral cyanosis
'*Yasya nirbhadyate kantha – pratyaachaksheeta pandita*' (B. I. 6/14)	Tetanus

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Verse	Relevant condition
'Yasya urdhwa kaaye balavaan -- maanavasya marishyata' (B. I. 6/15)	Head & Neck carcinomas, Life threatening infections of head and neck, Neurological & vascular conditions of head and neck,
'Yasya chuchundari gandha -- yo veda sa vinashyati' (B. I. 6/16)	Liver cirrhosis (LC), Chronic kidney disease (CKD), End-stage renal disease (ESRD), End-stage liver disease (ESLD), Hepatorenal syndrome (HRS), Hepatic encephalopathy (HE) with visual hallucinations

(B. I. 6/XX): B - *Bhela samhita*; I - *Indriya sthana*; 6 - Sixth chapter; X - *Verse* number

'Antarlohita kaayastu -- mrutyoruchyate nara' (Verse 1&2)[4]

According to the above verse, 'the person whose body is reddish inside (antarlohita kaya) with pallor outside (bahirpandu), and vice versa (pallor inside and reddish outside) will die (mumurshata)'. 'Antarlohita' & 'Bahirpandu' denote internal bleeding or haemorrhage and external pallor respectively whereas 'Bahirlohita' & 'Antahpandu' denotes erythema or hyperaemia or erythroderma and ischemic tissues respectively.

Antarlohita kaya & Bahirpandu (Internal haemorrhage with external pallor)

Haemorrhage can be either external or internal (antarlohita kaya). Haemorrhage can be subdivided in to several anatomical areas such as external wounds, bleeding within the skull (intracranial and subarachnoid haemorrhage), chest cavity (hemothorax), abdominal cavity (abdominal & pelvic hematoma, hemoperitoneum), retroperitoneum (retroperitoneal hematoma), and from long bone fractures. Common sources of haemorrhage include organ damage (hepatic, splenic, renal, adrenal), vascular injury, coagulopathies, ectopic pregnancy and cyst rupture (leads to antarlohita kaya). Class II haemorrhage is associated with pallor (bahirpandu) and cold extremities. Severe internal bleeding can result in hemorrhagic shock and even death (mumurshata).[19] A systemic look for signs like pallor (bahirpandu), haemodynamic status, lymphadenopathy or hepatosplenomegaly is essential in a bleeding patient (antarlohita kaya). Haemophilia A (deficiency of factor VIII), B (deficiency of factor IX) & C (deficiency of factor XI), Von Willebrand disease (deficiency of Von Willebrand factor), platelet disorders like Glanzmann's disease and Bernaurd–Soulier disease, trauma, microangiopathic haemolytic anaemia, TTP, HUS, chronic renal failure, liver disease, SLE, haematological malignancies, DIC are the main causes for bleeding (antarlohita kaya).[20] Hemorrhagic shock (cause mumurshata) is hypovolemic shock from blood loss (antarlohita kaya).[21] Common causes for lower gastrointestinal haemorrhage are colonic diverticula, angiodysplasia, ischemic colitis, and inflammatory bowel disease, and intestinal tumours or malignancies (leads to mumurshata). Patients with massive lower gastrointestinal haemorrhage may demonstrate pallor (bahirpandu) along with other features.[22] AUGIB occurs due to peptic ulcers followed by esophagitis and esophageal varices (may cause antarlohita kaya).[23] Antarlohita' & 'Bahirpandu' denotes an internal haemorrhage (due to various visceral pathological conditions) associated with pallor.

Bahirlohita kaya & Antahpandu (Erythema or hyperaemia or erythroderma with tissue ischemia)

The word 'bahirlohita kaya' denotes reddish skin due to various conditions such inflammatory skin lesions, purpura, erythema, hyperaemia, erythroderma, and external pooling of blood whereas 'antahpandu' denotes ischemic tissues or viscera. Erythroderma is characterized by an intense generalized redness of the skin (bahirlohita kaya). The erythrodermic state is associated with significant risk of morbidity and mortality (mumurshata). Erythroderma may be a cutaneous manifestation of internal malignancy (may cause mumurshata). Reticuloendothelial neoplasms, internal visceral or blood vessel malignancies, laryngeal, thyroid, lung, esophageal, gastric, gallbladder, fallopian tube, colon, and prostate carcinomas and lymphomas (cause mumurshata) may manifest as erythroderma (bahirlohita kaya).[24] CVD is a progressive medical condition that results from venous hypertension (due to pooling of blood in veins) (bahirlohita kaya) and can lead to diminished venous integrity and function, or even skin alterations and ulceration.[25] After a period of arterial occlusion there is a marked increase in blood flow (bahirlohita kaya) to the ischaemic tissues (antahpandu?). This transient rise in blood flow is termed reactive hyperaemia (bahirlohita kaya?) and is believed to be caused by the release of local mediators and metabolites from the ischaemic tissues (antahpandu?).[26] Reactive hyperaemia (bahirlohita) can be seen in 'Raynaud phenomenon' also. In secondary Raynaud phenomenon, the underlying disease is the factor that disrupts normal vessel reactivity to cold temperatures which consequently leads to vasoconstriction and tissue ischemia (antahpandu). Secondary Raynaud phenomenon is associated with connective tissue disorders (such as scleroderma, systemic lupus erythematosus, Sjogren syndrome, antiphospholipid syndrome), obstructive vascular disease (which include thromboangiitis obliterans, microemboli, diabetic angiopathy, or atherosclerosis), infections (parvovirus B19, cytomegalovirus, hepatitis B, and hepatitis C), fibromyalgia, polycythemia, arteriovenous fistula, myalgic encephalitis, and malignancy (leads to mumurshata).[27] Acute skin failure is associated with persistent inflammation of the skin leads to marked peripheral vasodilatation and increased cutaneous blood flow (bahirlohita kaya), clinically evident as widespread scarlet erythema. This is especially evident in cases of chronic long-standing erythroderma (bahirlohita kaya). Acute skin failure constitutes a dermatological emergency that requires an intensive care approach (mumurshata).[28] The present verse denotes various conditions associated with peripheral blood pooling or haemorrhage in to the skin and connective tissues or hyperemia or inflammatory or autoimmune or allergic dermatological conditions associated with internal tissue ischemia or internal malignancies.

'Antarglaano bahirpeeno -- sarvopyete paraasuka' (Verse 3)[4]

According to the above verse, 'the person who has been suffering with 'antarglaani' (extreme fatigue or atrophy of internal or visceral organs or functional decline), 'bahirpeena' (obesity or weight gain), 'bahiraadhmaata' (generalized edema) and 'atyanta samaadhmaata' (excessive bloating) will die (paraasuka)'. CRF (antarglaani) is seen in more than 75% of patients with metastatic disease. Fatigue (antarglaani) is described as weariness, lassitude, burnout, apathy, malaise, impatience or inability to perform daily activities and is often the first symptom reported by patients before the diagnosis

of cancer is given (purvarupaavastha).[29] The chronic accumulation of more generalized edema (bahiraadhmaata) is seen in chronic systemic conditions (leads to paraasuka?), such as CHF, renal disease, thyroid disease, hepatic disease, pulmonary hypertension, protein-losing enteropathies and severe malnutrition. Hypothyroidism can cause generalized myxedema (bahiraadhmaata). Non pitting skin with edema characterizes lymphedema (bahiraadhmaata) which occurs due to secondary causes such as tumour (indicate paraasuka), trauma, and others.[30] Fatigue and lethargy (antarglaani) along with swelling can be seen in CHF. Right heart failure may manifest as oedema (bahiraadhmaata), right hypochondrial pain (liver distension) (atyanta samaadhmaata), abdominal swelling (ascites) (atyanta samaadhmaata), loss of appetite, and malabsorption (bowel oedema). An increase in weight (bahirpeena) may be associated with fluid retention (atyanta samaadhmaata) in some patients with CHF.[31]

Obesity (bahirpeena) as a risk factor for a number of health conditions such as diabetes, heart disease, and cancer (leads to paraasuka) has been established. Obesity has an association with some symptoms similar to those of CFS, such as increased levels of fatigue (antarglaani), and reduced physical functioning and vitality (antarglaani).[32] MSA (antarglaani) is an adult-onset, progressive neurodegenerative disorder.[33] Early symptoms in MSA are frequently autonomic (antarglaani) and predate (purvarupaavastha) recognition of motor manifestations. Post-exercise fatigue (antarglaani) is one among the most frequent initial symptoms (purvarupaavastha) in MSA. [34] Progressive systemic sclerosis (scleroderma) is a connective-tissue disease characterized by fibrosis of visceral organs (antarglaani). Constipation and pseudo-obstruction (atyanta samaadhmaata) can be seen in various autoimmune disorders. Bloating (atyanta samaadhmaata) occurs due to delayed gastric and esophageal emptying in polymyositis and dermatomyositis patients. Ascites (atyanta samaadhmaata) occurs due to peritoneal inflammation in SLE vasculitis. Various systemic autoimmune diseases (sarvopyete paraasuka with antarglaani) like SLE, RA, Sjogren's syndrome, Behcet's disease, Progressive systemic sclerosis (scleroderma), polyarteritis nodosa, Kawasaki disease, inflammatory muscle disorders, Giant cell arteritis, HSP, Takayasu arteritis, Cogna's syndrome, Churg-Strauss syndrome, WG, antiphospholipid antibody syndrome, and spondyloarthropathies are associated with a variety of gastrointestinal manifestations and complications (atyanta samaadhmaata?).[35] The present verse denotes various conditions associated with extreme fatigue/functional decline/atrophy and edema/obesity as discussed above.

Whether 'Maharshi Bhela' performed clinical autopsies?

Pathological conditions such as 'antarlohita kaya' (internal hemorrhage), 'antahpandu' (tissue ischemia) and 'antarglaani' (atrophy of visceral organs) (discussed in the previous three verses) denotes an internal pathology which can't be diagnosed without the help of imaging studies and other advanced medical tests. 'Maharshi Bhela', who belongs to samhita period (100-200 BC or even earlier)[2] and in the absence of imaging studies or other medical technological advancements during those period, how he was able to diagnose internal pathologies like 'antarlohita kaya'/'antarglaani'/'antarpandu'? It seems that 'Maharshi Bhela' might have performed clinical autopsies to diagnose or determine the cause of death and to find out internal pathological conditions in the absence of imaging or other advanced medical technology. The autopsy represents the examination of the body after its death in order to establish the cause and manner of death and also to evaluate any disease or injury that may be present. The autopsy also reveals the cause of death to the associated pathologies and explains the interaction between the two. Clinical autopsy is performed to find and better understand the causes of death.[36] 'Maharshi Bhela' also might have done clinical autopsy to find out the internal pathological conditions such as 'antarlohita kaya'/'antarglaani'/'antarpandu'.

'Abheekshnam jwaryate yastu -- kshipram shwaasena hanyati' (Verse 4)[4]

According to the above verse, 'the patient who has been suffering with recurrent fever (abheeksham jwaryate), preferring closed rooms (nivaatam abhinandati) (indicates hypothermia or chills), rhinorrhea (anushakta pratishyaya) and dyspnea (shwaasa) will die soon (kshipram)'. Various conditions such as URTI (caused by viruses including rhinoviruses, influenza viruses, parainfluenza and respiratory syncytial viruses), sinusitis, allergic rhinitis, nasal eosinophilia, pneumonia (staphylococcal), liver abscess, leptospirosis, HIV with TB infection, opportunistic respiratory infections, malaria, and relapsing fever etc resembles with the clinical description of present verse.[37] Prolonged fever (abheekshnam jwaryate) with pulmonary symptoms (pratishyaya & shwaasa) can be seen in conditions such as infective endocarditis, histoplasmosis, tuberculosis, Mycoplasma and Chlamydia infection, rickettsial infections, malignancy (haematological), and lymphoma.[38] The word 'abheekshnam' denotes relapses or episodes or recurrent nature of the fever and 'nivaatam abhinandati' denote preferring closed spaces or blankets which may be due to hypothermia or chills associated with fever. The room temperature is the most important factor in influencing heat loss due to convection and radiation from skin. Placing of the arms and legs medially and tucking the patients with blankets to maintain the extremities against the body will also reduce the amount of heat loss.[39] Hence staying in blankets or closed rooms or spaces counteracts hypothermia. 'Nivaatam abhinandati' denotes the approach of a fever patient to stay in a closed room denotes hypothermia or chills or shivering associated with fever. The word 'Kshipram' denotes quick or immediate death occurs in a recurrent fever patient with shortness of breath or dyspnea. Viral URTI may be complicated by secondary bacterial infections (kshipram hanyati) such as acute otitis media and sinusitis. Acute idiopathic pericarditis (kshipram hanyati) is a complication that is usually preceded by a recent URTI. Infection with influenza can cause severe illness and deaths (kshipram hanyati), particularly in children with high-risk medical conditions.[37] The present verse denotes respiratory tract infections associated with complications and leads to death.

'Ninaadi va pralaapi -- panchatvam upagachhati' (Verse 5)[4]

According to the above verse, 'the psychiatric patient (unmadena) who has been shouting loudly (ninaadi), speaking irrelevantly (pralaapi), laughing inappropriately (hasati atyartham) and also with weight loss (krusha) will die (panchatvam upagachhati)'. The clinical picture depicted here indicates various conditions like dementia, delirium, organic psychosis, schizophrenia, mood disorders, seizures, neurodegenerative and demyelinating diseases of the CNS. Dementia patients exhibit a wide variety of abnormal nonverbal vocalisations in the later stages of the illness such as screaming (ninaadi), singing, chanting, humming and grunting. Many such patients have shown severe and widespread cognitive deficits (unmadena). Abnormal laughter-like vocal output (hasati atyartham) accompanying mutism is seen in patients with PPA. 'Gelastic dementia' syndrome (hasati atyartham unmadena) is considered as a prototypical disorder of non-verbal vocal (ninaadi & pralaapi) and social behaviour (hasati atyartham) in neurodegenerative disease.[40] GS are a form of epilepsy characterized

by inappropriate, uncontrolled laughter (hasati atyartham). They are strongly associated with abnormal cognitive development and behavioural problems (unmadena). GS have also been found in patients with frontal and temporal lobe lesions. Abnormal laughter (hasati atyartham) can also be seen in PBA also known as involuntary emotional expression disorder. PBA is characterized by uncontrolled crying or laughing which is disproportionate or inappropriate to the social context (hasati atyartham) and may be associated with other conditions such as ALS, extrapyramidal and cerebellar disorders, PD, MSA, and PSP, MS, traumatic brain injury, AD, various types of dementias, stroke, and brain tumours (unmadena).[41] The lifespan of people having SMI (unmadena krusho) is shorter (panchatvam upagachhati) compared to the general population. This excess mortality (panchatvam upagachhati) is mainly due to physical illness. Nutritional and metabolic diseases (krusha), viral diseases, cardiovascular and respiratory tract diseases, musculoskeletal diseases, sexual dysfunction, stomatognathic diseases, and cancers are more prevalent among patients with SMI compared to the general population. People with SMI including schizophrenia, bipolar disorder, schizoaffective disorder and major depressive disorder (unmadena), have an excess mortality (panchatvam upagachhati) due to associated physical illness.[42] The present verse denotes higher mortality rate among patients with SMI.

'Ghanam sashulam yo veda -- vinaasham upagachhati' (Verse 6)[4]

According to the above verse, 'the patient who has been suffering with chest pain (hrudaya shula) characterized by heaviness (ghanam) or burning (daaham) along with weight loss or cachexia (krusha) will die (vinaasham upagachhati)'. This verse denotes various conditions such as cardiac angina with cardiac cachexia or noncardiac chest pain associated with cachexia or esophageal carcinoma with cachexia. AMI is a cardiac emergency (vinaasham upagachhati). Chest pain (hrudaya shula) is the most common presenting complaint of AMI. The classic manifestation of ischemia is usually described as a heavy chest pressure or squeezing (ghanam shulam) or a "burning" feeling (sadaaham shulam).[43] Chest pain (hrudaya shula) can also be found in unstable angina, aortic dissection, pulmonary thromboembolism and pericardial tamponade, chronic ischemic heart disease and pericardial disease. NCCP (hrudaya shula) may be the manifestation of gastrointestinal or non-gastrointestinal-related disorders. GERD is the most common contributing factor for NCCP. Patients with NCCP may report squeezing (ghanam shulam) or burning substernal chest pain (sadaaham shulam), which is indistinguishable from cardiac related chest pain.[44] Cardiac cachexia (hrudrogena krusha) is diagnosed when body weight loss (krusha) is greater than 6% in the absence of other severe diseases. The etiology of heart failure-associated cachexia (hrudrogena krusha) is multifactorial. Important factors for the manifestation of cardiac cachexia (hrudrogena krusha) include reduction in food intake, gastrointestinal abnormalities, immunological and neuro-hormonal activation and an imbalance between anabolic and catabolic processes.[45]

'Praswidyate cha kandumaan -- kushtena sa vinashyati' (Verse 7)[4]

According to the above verse, 'the patient who sweats excessively (praswidyate), has much of an itching constantly (kandumaan), consume foods that are contrary or allergic (viruddha ahara) and doesn't regularly take purgative measures (avirechana sheelashcha) will get destroyed (vinashyati) by that skin disease (kushta)'. In Ayurveda all skin diseases are categorized under 'Kushtha'. Viruddha Ahara (improper food combinations or allergic food items) is one of the causative factors of Kushta. Shodhana (purificatory) procedures are indicated to control Kushta. Shodhana procedures prevent the relapses of Kushta. Patients with skin diseases who doesn't undergo regular shodhana procedures and indulges in consuming viruddha ahara may not get relief and suffer with relapses.[46] The present verse indicates an acute allergic reaction or anaphylaxis or anaphylactic shock. Anaphylactic shock is medical emergency (vinashyati) characterized by circulatory collapse caused by severe acute allergic reactions. Anaphylaxis is an acute, systemic, IgE-mediated, and immediate hypersensitivity reaction (kushta). Generalized itching (kandumaan), nasal or throat itching, periorbital itching, itching of lips, tongue, palate, palms & soles, external audiotry canals (kandumaan), itching of genitalia, erythema, flushing, urticaria (hives), rash and edema can be seen in anaphylaxis. Sweating (praswidyate), light-headedness, incontinence, syncope, or coma may precede or accompany cardiovascular collapse in severe anaphylaxis (vinashyati). Various food items such as peanuts, shellfish, fin fish, milk, egg, tree nuts, fruits, vegetables, flour and food additives (viruddha ahara) may induce anaphylaxis.[47] The present verse denotes an anaphylactic shock.

'Sukumarashcha yo jantu -- sa pramehi vinashyati' (Verse 8)[4]

As per the above verse, 'a diabetic patient (pramehi) who indulges in sedentary life style (sukumara), consumes excessive fat (sneha) and meat (mamsa), and excessive day sleep (diva swapna) will die (vinashyati)'. T2DM comes under the broad category of 'Prameha'. T2DM (prameha) is a leading cause of disability and death (vinashyati) worldwide. Changed lifestyle, lack of exercise (sukumara), increased consumption of fatty (sneha), fast-food items, improper dietary habits and sedentary life (sukumara) are the main contributory factors for T2DM. Fat-rich food (sneha) has a strong association with the development of diabetes (prameha). Physical inactivity (sukumara) has been found to be an independent predictor of T2DM in both cross-sectional and longitudinal studies. Excessive sleep (swapna sukham) or day sleep (diwa swapna) are mentioned as etiological factors of T2DM.[48] Diabetes (prameha) is associated with increased mortality risk (vinashyati) due to cardiovascular disease, chronic lower respiratory diseases, pneumonia, influenza, and kidney disease. Untreated diabetes (pramehena vinashyati) leads to multi organ and systemic injury, including to the kidneys, heart, nerves, and blood vessels, which may increase the death rate (vinashyati) caused by diabetes complications (pramehena).[49] The present verse denotes T2DM and its complications which lead to death.

'Parinshoonashcha yo jantu -- so atisaarena hanyate' (Verse 9)[4]

According to the above verse, 'a diarrhoea (atisaara) patient who has been suffering with generalized edema (parishoona), sweating (sweda), rough or dry skin or complexion (parusha chhavi), and watery stools (bhinnam) or sitting down due to weakness or dizziness or hypotension (upavishati) will die (hanyate)'. The present verse denotes various conditions like gastrointestinal symptoms with flushing disorders or diarrhoea with malabsorption and nutritional deficiencies. Various causes of flushing (which includes sweating-sweda) such as dumping syndrome, mesenteric traction syndrome, rosacea, hyperthyroidism, thyroid storm, anaphylaxis, panic disorders, paroxysmal extreme pain disorder, and food & alcohol etc may be associated with non-specific gastrointestinal symptoms including abdominal pain, diarrhoea (atisaara) and nausea. Flushing, angioedema, diarrhoea, hypotension, dizziness and syncope can be seen in anaphylaxis. The combination of flushing, diarrhoea and hypotension suggests mast cell activation

syndromes, anaphylaxis, scromboid poisoning, pheochromocytomas, and carcinoid syndrome. Diarrhoea, malabsorption and flushing can be seen in thyroid storm.[50] Significant malabsorption of carbohydrate and fat usually causes chronic diarrhoea (atisaara), gas, bloating, and weight loss. Individuals with malabsorption may also present with manifestations of vitamin and mineral deficiencies (parusha chhavi). Edema (parishoona) suggests chronic protein loss in diarrhoea (atisaara). Patients with dumping syndrome may present with severe diarrhoea (atisaara), malabsorption, abdominal cramping, gas, and weight loss. Some have associated sweatiness (sweda) and dizziness (upavishati?). Muscle wasting, weight loss, growth retardation, ataxia (vitamin B12 deficiency induced) (upavishati?), dehydration (parusha chhavi), hyperkeratosis (vitamin A deficiency) (parusha chhavi), and dermatitis (zinc and essential fatty acids) (parusha chhavi) are some of the clinical consequences of malabsorption of nutrients, water and electrolytes in chronic diarrhoea (atisaara). Diseases that result in secondary lymphangiectasia such as lymphoma, tuberculosis, Kaposi's sarcoma, retroperitoneal fibrosis, constrictive pericarditis, and severe heart failure may result in fat malabsorption. The most common presentation is hypoproteinemic edema (parishoona). Diarrhoea (atisaara), malabsorption, and wasting (upavishati?) are common in individuals with AIDS (hanyate?).[51] The present verse indicates diarrhoea associated with malabsorption of nutrients, water and electrolytes.

'Yasya agnishcha balam chaiva -- yatha preta stathaiva sa' (Verse 10)[4]

According to the above verse, 'the patient who has been suffering with depletion of blood (ksheena lohita) and muscle (ksheena mamsa) with (alpa) or without (naalpa) having the disturbances in metabolism/digestion/absorption (ksheena agni) and physical strength/energy (ksheena bala) will die (yatha preta)'. The present verse denotes cachexia, sarcopenia and anorexia. Muscle wasting (ksheena mamsa) and cachexia (ksheena bala & mamsa) are commonly seen in elderly subjects who are chronically bedridden, non-ambulatory, having significant weight loss (ksheena balam), appear malnourished (ksheena bala) and those with chronic medical conditions (e.g. diabetes, chronic heart, kidney, lung, and liver disorders). Patients with chronic conditions including heart failure, COPD, HIV, cancer, renal and liver failure suffer from cachexia (ksheena bala & mamsa). Cachexia is an independent predictor of mortality (yatha preta). Sarcopenia is the progressive loss of muscle mass (ksheena mamsa) and strength (ksheena bala) with a risk of adverse outcomes including death (yatha preta). Cachexia is characterized by weight loss (ksheena bala) or reduced BMI along with presence of any 3 of the following: fatigue (ksheena bala), anorexia (ksheena agni), decreased muscle strength (ksheena bala), lab evidence of anaemia (ksheena lohita), hypoalbuminemia or elevated markers of inflammation. Various disease related factors such as inflammation, anorexia (ksheena agni) and insulin resistance can leads to fat and muscle loss (ksheena mamsa), anaemia (ksheena lohita), fatigue (ksheena bala) and ultimately cachexia. Weight and muscle loss (ksheena bala & mamsa) are associated with poor prognosis and increased mortality (yatha preta).[52]

'Sadyo raktam shiro yasya -- yatha preta stathaiva sa' (Verse 11)[4]

According to the above verse, 'red (rakta), yellow (peetakam) and tawny/yellowish brown (kapila) sudden (sadyo) discolouration of scalp (shiras) along with scorched appearance of scalp hair (plushta kesham) denotes an upcoming death (yatha preta)'. Sudden colour changes of scalp indicate various conditions like vascular malformations, scalp aging and systemic diseases. Haemangiomas and vascular malformations are divided into two distinct pathological groups: vascular tumours (also known as haemangiomas, angiomas, birthmarks and includes capillary, strawberry or cavernous lesions) and vascular malformations (high-flow & low-flow lesions). Lesions that demonstrate arteriovenous shunting such as AVMs and AVF are considered as high flow, whereas VMs, LMs or combined VLMs, together with CMs are considered as low flow. IH appears as bright red (rakta) lesions of the skin. CMs can cause skin thickening and discolouration (rakta/peetaka/kapila). PWS present at birth, growing and darkening in colour with age. Children usually present with a bluish, skin lesion in VMs. KH lesions present as isolated or multiple purplish, purpuric macules. More complex AVMs can result in life threatening complications.[53] The most frequent sites of vascular malformations on scalp are frontal, temporal, and parietal regions (shiras). On examination, scalp AVM may appear as soft and bluish lesion with coarse and dry overlying skin (plushta).[54] IHs grossly appears as bright red (rakta) lesions. The overlying skin often has a bluish hue in deep IHs. The colour changes from a bright red (rakta) to a grayish or dull purple (kapila) in more advanced involuting phase in IH. These changes are typically characterized by focal telangiectasias, atrophic wrinkling, hypopigmentation (peetaka?), or refined textural changes. Yellow discoloration (peetaka) can persist if ulceration occurred during the proliferative phase in IH. Life-threatening complications (yatha preta) associated with IHs, such as tissue destruction, distortion, and obstruction.[55] Aging of the hair affects hair colour, hair production, structural properties of the hair fiber (hair diameter, hair fiber curvature, stretching, bending, torsional rigidity, and lipid composition), and general appearance of hair (plushta kesha). Scalp aging is characterized by pale (peetaka) and dry scalp, with a certain degree of laxity. Aged scalp exhibits the features of photo-aged skin, including irregular pigmentation (peetaka or kapila), wrinkling, atrophy, telangiectasia (rakta), and findings of cutaneous premalignant and malignant diseases (yatha preta).[56] The present verse may also denote conditions such as anaemia, jaundice and other scalp diseases.

'Yasya netre lalaatam -- yatha preta stathaiva sa' (Verse 12)[4]

According to the above verse, 'the aggravated vayu causing deviation (jihmaani) of eyes (netra), forehead (lalaata), face (mucha), nose (nasa), and the eye-brows (bhruvau) in a person denotes an imminent death (yatha preta)'. The present verse denotes 'Bell's palsy'. Facial nerve palsy is the most common cranial nerve disease and its idiopathic form (Bell's palsy) accounts for 60–75% of cases. Idiopathic facial nerve palsy is characterized by sudden weakness of the muscles of facial expression on one side of the face (jihmaani mukha). The typical features of peripheral facial nerve palsy are a lack of wrinkling of the forehead (lalaata), low eyebrow position (eyebrow ptosis) (bhruvau), incomplete lid closure, hanging corner of the mouth (mukha), and a flattened nasolabial fold (mukha & nasa). An etiology can be identified in the remaining cases of facial nerve palsy (except idiopathic variety), such as neuroborreliosis, herpes zoster oticus (Ramsay Hunt syndrome), infection with rickettsia, HIV, human herpes virus, mumps virus, cytomegalovirus, rubella virus, sarcoidosis (Heerfordt syndrome), Sjögren syndrome, carcinomatous meningitis, Melkersson-Rosenthal syndrome, GBS, Miller Fisher syndrome (a GBS variant), petrous bone fractures, parotid tumours, and otogenic processes. Patients with more severe palsy and elderly patients recover less well (yatha preta).[57]

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'Shyaava kantakini jihwa -- yatha preta stathaiva sa' (Verse 13)[4]

According to the above verse, 'the person in whom the tongue (jihwa) appears as black/brown/dark/blue (shyaava), thorny (kantakini) and dry (sushka) along with black or blue or brownish discoloration (shyaava) of eyes (netra) and nails (nakha) should be considered as dead (yatha preta)'. The present verse denotes black hairy tongue associated with various fatal conditions or cyanosis (central and peripheral). BHT is characterized by a black (shyaava) and hairy appearing lesion on the dorsum of the tongue arising from abnormally hypertrophied and elongated filiform papillae (kantakini). Hairy tongue (jihwa kantakini and sushka) may also appear brown (shyaava), green, and yellow, blue (shyaava), or even unpigmented. HIV, debilitated general conditions, and malignancy places patients at a higher risk (yatha preta) for developing BHT.[58] Cyanosis (shyaava) may be intermittent or persistent. Central cyanosis typically involves the lips, tongue (jihwa), mucous membranes and nail beds (nakha), whereas peripheral cyanosis involves the fingers and toes. Pseudocyanosis is a bluish tinge (shyaava) to the skin or mucous membranes that is not associated with peripheral vasoconstriction or hypoxemia. Cardiac, vascular, respiratory, and hematologic diseases (yatha preta) can produce persistent cyanosis (shyaava).[59]

'Yasya nirbhadyate kantha -- pratyaachaksheeta pandita' (Verse 14)[4]

According to the above verse, 'the person who has been suffering with laryngeal spams (nirbhadyate kantha), dyspnea or gasping for breath (taamyati uchhai) and backward arching of the body (bahiraayaama) will die (pratyaachaksheeta)'. The present verse denotes 'Tetanus'. Tetanus is caused by 'Clostridium tetani' (an anaerobic bacillus which causes infection by contaminating wounds). Tetanus is categorized into generalized, neonatal, local, and cephalic. Generalized and neonatal tetanus affect muscles of the whole body (shareerina) and lead to opisthotonus (the backward arching of the spine due to rigidity of the extensor muscles of the neck and back) (bahiraayaama) and may cause respiratory failure (taamyati uchhai) and death (pratyaachaksheeta) due to rigidity and spasms of the laryngeal (nirbhadyate kantha) and respiratory muscles (leads to taamyati uchhai). Tetanus typically manifests as trismus/lockjaw, risus sardonicus, dysphagia (nirbhadyate kantha?), neck stiffness (nirbhadyate kantha?), abdominal rigidity, and opisthotonus (hyperactivity of muscles of the head, neck, and trunk) (bahiraayaama).[60]

'Yasya urdhwa kaaye balavaan -- maanavasya marishyata' (Verse 15)[4]

According to the above verse, 'the person who has been suffering with severe, fatal (balavaan) head & neck (urdhwa kaaye) disease (roga) which doesn't respond to treatment (dushkriya) will die (marishyata)'. The present verse denotes various conditions like head & neck carcinomas, life-threatening infections of head & neck and other neurological & vascular diseases especially affecting head and neck. Head & neck (urdhwa kaaye) tumours can occur at oral cavity, larynx, pharynx, nasal cavity, paranasal sinuses, and salivary glands, thyroid, parathyroid, bone, soft tissue, and neural structures of the human body. Head and neck cancer (urdhwa kaaye rogastu) is a deadly disease (marishyata) and continues to be a challenge for patients, for ENT specialists and oncologists (dushkriya).[61] Infections of the CNS (urdhwa kaaye rogastu) pose a challenge to physicians as they cause and also the inherent difficulties involved in their treatment (dushkriya). These infections mainly involve meningitis, encephalitis, and brain abscesses, (urdhwa kaaye rogastu) and tend to cause more morbidity and mortality (marishyata) than other organ systems.[62] Life threatening infections (marishyata) of head & neck (urdhwa kaaye rogastu) are most commonly originates from suppurative complications of dental, oropharyngeal, and otorhinolaryngeal infections. These infections may be fatal (marishyata) by causing local airway obstruction, and extending to vital structures. Otorhinocerebral infections (urdhwa kaaye rogastu) may cause intracranial suppuration (may leads to marishyata).[63]

'Yasya chuchundari gandha -- yo veda sa vinashyati' (Verse 16)[4]

According to the above verse, 'the person who is emitting musk-rat like odor (chuchundara gandha) and perceiving golden trees (visual hallucinations) (suvarna vrikshaamshcha yo veda) will die (vinashyati)'. Hundreds of VOCs are emitted from the human body and disease specific VOCs (chuchundara gandha) are emitted in infectious diseases, metabolic diseases, genetic disorders and other systemic diseases. Obnoxious or unpleasant or offensive odors (chuchundara gandha) can be seen in various conditions such as cancerous wounds, carcinomas, infections, metabolic disorders, uremia, CKD, liver diseases, gangrene and various others.[6] The present verse denotes a condition of HE or other fatal metabolic encephalopathies. LC (produces chuchundara gandha?) is an important problem in patients with ESRD (produces chuchundara gandha?). Encephalopathy is one among the most common prognostic variables in patients with cirrhosis.[64] HRS (produces chuchundara gandha?) involves development of renal failure in patients with severe liver disease and it is a life-threatening condition with poor prognosis. Mostly HRS develops in patients with advanced cirrhosis and they may present with hepatic encephalopathy (produces chuchundara gandha?).[65] Visual perception distortions (suvarna vrikshaamshcha yo veda) have been found in patients with HE. Visual agnosia, macropsia, distortion and prolongation of the images, spatial disorientation and a predominance of visual hallucinations (suvarna vrikshaamshcha yo veda) are seen in HE (produces chuchundara gandha?).[66]

'Ityebhi eedrushaishcha anyai -- aatmana sukham' (Verse 17)[4]

As per the above verse, 'the wise physician should not attempt to treat the conditions which are explained in this chapter or any other conditions similar to the conditions discussed till now (to protect his reputation and confidence)'. NBT especially at the EOL stages are futile and physician should avoid treating such cases. Attempting to treat incurable or fatal conditions having poor prognosis seen especially at EOL stages may generate false hope, inappropriate use of scarce healthcare resources and staff dissatisfaction with anticipated poor outcomes. Most of the ICU patients will die no matter how best the treatment is provided to them. Medically inappropriate care aggravates pain, suffering, and discomfort.[66] 'Maharshi Bhela' has suggested physicians to avoid treating the patients who are at EOL stages.

Conclusion

'Purva rupeeyam' is the sixth chapter of 'Bhela Indriya sthana' which contains 17 verses. Various signs and symptoms seen at prodromal stages of illness which leads to death at later stages have been explained in this chapter. Most of the verses are unique and not found in other classical Ayurvedic texts. Proper knowledge of the conditions explained in 'Purva rupeeyam' chapter enables the physician to detect

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life threatening diseases at earlier or prodromal stages which further helps in clinical prognostic decision making. Various conditions such as internal haemorrhage, CRF, CFS, CHF, MSA, URTI and their complications, SMI, organic psychosis, schizophrenia, gelastic seizures, PPA, AMI, NCCP, GERD, anaphylactic shock, diabetes and its complications, malabsorption syndrome, cachexia, sarcopenia, anorexia, vascular malformations, AVMs, hemangiomas, idiopathic facial nerve palsy, BHT, central and peripheral cyanosis, tetanus, head and neck carcinomas and life threatening infections, LC, ESLD, ESRD, HRS, HE with visual hallucination and NBT at EOL stages are documented in this chapter by 'Maharshi Bhela'. Physician should avoid treating the above conditions by detecting them early during prodromal stages of the diseases. Further studies are required to substantiate the findings of this chapter.

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Conflicts of interest

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