

# Sadyo maraneeyam of Bhela indriya sthana - An explorative study

## Abstract

Bhela samhita is an Ayurvedic (Indian system of medicine) treatise written by 'Maharshi Bhela' (belongs to 1000-2000 BC). Maharshi Bhela was the student of popular preceptor 'Acharya Punarvasu Atreya' and colleague of 'Agnivesha' (author of the popular Ayurvedic text 'Charaka samhita'). Bhela samhita consists of 8 sections and 120 chapters. 'Indriya sthana' is one of the eight sections of 'Bhela samhita' which comprises 12 chapters. 'Bhela Indriya sthana' deals with prognostic aspects. 'Sadyo maraneeyam indriyam' is the fourth chapter of 'Bhela indriya sthana' which contains the description of various emergency conditions with high mortality rates. The word 'sadyo maraneeyam' denotes an immediate death caused by various emergency conditions. Though previous works have explored 'Charaka indriya sthana', studies on 'Bhela indriya sthana' are lacking. The present work is aimed to explore the contents of 'Sadyo maraneeyam indriyam' of 'Bhela indriya sthana'. Various emergency conditions such as coronary artery disease, cardiovascular disease, acute coronary syndrome, Granulomatosis with polyangiitis, increased intra-cranial pressure, abdominal compartment syndrome, cancer cachexia, increased intra-abdominal or intra-pelvic pressure due to benign or malignant tumours, prostate cancer, neurosyphilis with saddle nose and ocular manifestations, gastro-duodenal perforation or ulcer, perforation of peptic ulcer, acute abdomen, inflammatory bowel disease, ulcerative colitis, Crohn's disease, lower gastrointestinal bleeding, upper gastrointestinal bleeding, colon cancer, proctalgia fugax, disseminated intravascular coagulation, idiopathic thrombocytopenic purpura, Henoch-Schönlein purpura, coagulation disorders, cardiac cachexia, coma, shock, pulmonary cachexia, acute respiratory distress syndrome, and chronic obstructive pulmonary disease etc are documented in this chapter by 'Maharshi Bhela'. 'Maharshi Bhela' has provided a list of signs & symptoms or clinical features of emergency conditions having poor prognosis.

**Keywords:** bhela indriya sthana, bhela samhita, charaka indriya sthana, charaka samhita, indriya sthana, emergency conditions

**Abbreviations:** CAD, coronary artery disease; CHD, coronary heart disease; CVD, cardiovascular disease; SCD, sudden cardiac death; ICU, intensive care unit; ACS, abdominal compartment syndrome

## Introduction

'Maharshi Bhela' was the disciple of the great preceptor 'Acharya Punarvasu Atreya' and colleague of 'Maharshi Agnivesha' (author of the popular Ayurvedic text 'Agnivesha tantra' commonly known as 'Charaka samhita') (1000-2000 BC). Maharshi Bhela' has composed an Ayurvedic treatise known as 'Bhela samhita' similar to that of 'Agnivesha tantra'. Planning and arrangement of the subject matter in the 'Bhela samhita' is similar to that of 'Charaka samhita' but the former is incomplete in many aspects. Apart from the similarities with other texts, 'Bhela samhita' has a number of unique ideas which give originality to the work.<sup>1</sup>

Bhela samhita consists of 8 sthanas (sections) and 120 adhyayas (chapters). 'Indriya sthana' is one among the eight sections of 'Bhela samhita' which consists 12 chapters. 'Bhela Indriya sthana' deals with prognostic aspects similar to the indriya sthanas of other Ayurvedic texts. Various 'Arishta lakshanans' (fatal signs and symptoms associated with high mortality rate) are documented throughout 'Bhela indriya sthana' 'Sadyo maraneeyam indriyam' is the fourth chapter

of 'Bhela indriya sthana' which contains the description of various emergency conditions associated with immediate death. Some of the concepts mentioned in this chapter are unique and different from other Ayurvedic classical texts.<sup>1-3</sup> The red flag signs and symptoms (arishta lakshanans) explained in 'sadyo maraneeyam' chapter seems to have great prognostic potential and they needs to be explored. Previous studies have explored various emergency conditions mentioned in 'Charaka indriya sthana' which are fatal and associated with death.<sup>4-16</sup> No studies have been conducted on 'Bhela indriya sthana' and it is unexplored till date though it contains various unique concepts. The present work is aimed to explore the contents of the 'Sadyo maraneeyam indriyam' of 'Bhela indriya sthana'.

## Review methodology

Ayurvedic literature pertaining to 'Bhela Indriya sthana' has been collected from different published versions of Bhela samhita. Other classical Ayurvedic texts were also referred to find out relevant material. Electronic databases 'Google' and 'Google scholar' have been searched to find out the relevant studies published till 'July 2020', irrespective of their appearance/publication year. Relevant key words related to Ayurvedic and contemporary medicine was used for the search. Abstracts, full text articles, case reports, reviews and book chapters published in 'English language' and having open access were only included in the present work. This article explores the contents of fourth chapter Sadyo maraneeyam.

## Sadyo maraneeyam

The word 'sadyo' means 'immediate' or 'quick' and 'marana' means 'death'; hence the term 'Sadyo maraneeyam' indicates the conditions causing an immediate death. Various emergency medical

and/or surgical conditions which lead to an immediate death are mentioned in this chapter (Table 1). 'Sadyo maraneeyam indriyam' chapter consists of 11 verses only. The following description deals with the exploration of those 11 verses of 'Sadyo maraneeyam indriyam' chapter of 'Bhela indriya sthana'.

**Table 1** Contents of the 'Sadyo Maraneeyam Indriyam' chapter

Verse	Relevant condition
'Yadaaturasya hrudayam-sadyo jahyaati sa jeevitam' (B. I. 4/1)	Cardiovascular disease (CVD); Coronary artery disease (CAD); Myocardial infarction (MI); Coronary heart disease (CHD); Sudden cardiac death (SCD);
'Aaturasya yadaa vayu-sadyo jahyaati sa jeevitam' (B. I. 4/2)	Increased intracranial pressure (ICP) due to cerebro-vascular events; Granulomatosis with Polyangiitis (GPA)
'Yasya koshtagato vayu-sadyo jahyaati sa jeevitam' (B. I. 4/3)	Intra-abdominal or intra-pelvic benign or malignant tumours; Increased intra-abdominal pressure (IAP); Abdominal compartment syndrome (ACS); Intra-abdominal hypertension (IAH)
'Yasyaaturasyeha vaataat-sadya praanaan jahaaati sa' (B. I. 4/4)	Prostate cancer; Benign prostate hyperplasia (BPH)
'Yasyobhe pindike stabdhe-sadya praanaan jahaaati sa' (B. I. 4/5)	Neurosyphilis with saddle nose and ocular manifestations;
'Aamaashaya samutthaana-sadya praanaan jahaaati sa' (B. I. 4/6)	Gastroduodenal perforation or ulcer (GDPU); Perforation of peptic ulcer (PPU); Acute abdomen; Upper gastrointestinal bleeding (UGIB)
'Pakvaashaya samutthaana-sadyo jahyaat sa jeevitam' (B. I. 4/7)	Proctalgia fugax; Lower gastrointestinal bleeding (LGIB); Clostridium difficile infection (CDI); Colon cancer; Inflammatory bowel disease (IBD); Ulcerative colitis (UC); Crohn's disease (CD)
'Shonitam romakupebhyo-sadyo jahyaat sa jeevitam' (B. I. 4/8)	Idiopathic thrombocytopenic purpura (ITP); Disseminated intravascular coagulation (DIC); Henoch-Schönlein purpura (HSP); Upper gastrointestinal bleeding (UGIB); Coagulation disorders
'Hrudayasya tu samghatam-sadya praanaan jahaaati sa' (B. I. 4/9)	Cardiac cachexia; Heart failure associated with chest pain and cachexia;
'Yasya ksheena shareerasya-sadya praanaan jahaaati sa' (B. I. 4/10)	Pulmonary or cardiac or cancer cachexia; Stupor; Shock; Delirium; Acute respiratory distress syndrome (ARDS)

(B. I. 4/XX): B - Bhela samhita; I - Indriya sthana; 4 - Fourth chapter; X - Verse number

### 'Yadaaturasya hrudayam -- sadyo jahyaati sa jeevitam' (Verse 1)<sup>3</sup>

'The aggravated vayu or vata dosha (one among the three body humors responsible for body movements and nervous system functions) seizes up (samgruhy) the heart (hrudayam), constricts or obstructs the coronary arteries (dhamani samparipeeda) and leads to death (sadyo jahyaati)'. 'Maharshi Bhela' has explained the pathology of coronary arteries and its fatal consequences in this verse. Cardiovascular disease (CVD) is a group of diseases that include the blood vessels (dhamani) and heart (hrudaya), thereby including coronary artery disease (CAD) (dhamani samparipeeda), coronary heart disease (CHD), and acute coronary syndrome among several other conditions. Acute coronary syndrome is a subcategory of CAD, whilst CHD results of CAD. CAD is characterized by atherosclerosis in coronary arteries and can be asymptomatic, whereas acute coronary syndrome is almost always associated with the symptoms, like unstable angina, and myocardial infarction (MI) regardless of the presence of CAD. CHD mortality results from CAD and CHD is a major cause of death (sadyo jahyaati) in developing and developed countries. There is a strong relationship between CHD and sudden cardiac death (SCD) (sadyo jahyaati).<sup>17</sup> Coronary atherosclerosis (hrudaya dhamani samparipeeda) may lead to stable angina, due to bare stenosis or restenosis (samparipeeda) of lesions. Life threatening symptoms (unstable angina, myocardial infarction or SCD) (sadyo jahyaati) usually arise from plaque disruption and superimposed thrombosis, whereas additional arterial

spasm (samparipeeda) or microembolisation of atherothrombotic materials may worsen the situation. But many non-atherosclerotic coronary diseases (fixed stenosis, aneurysm, dissection, thrombus/embolus, small vessel disease and spasm) (hrudaya dhamani samparipeeda) may become symptomatic due to similar flow limiting complications.<sup>18</sup> CAD (including acute MI) is responsible for about half of the cardiovascular deaths. Chronic stable angina of CAD in approximately half of all patients, is usually caused by the obstruction of at least one large epicardial coronary artery (hrudaya dhamani) by atheromatous plaque (samparipeeda?).<sup>19</sup> Verse 1 denotes SCD due to coronary artery pathology. It is astonishing to find out that, 'Maharshi Bhela' had documented the condition like 'Coronary artery pathology' and its consequences (such as SCD) accurately thousands of years ago without having the resources like advanced radio-imaging technology which is available in modern medicine.

### 'Aaturasya yadaa vayu-sadyo jahyaati sa jeevitam' (Verse 2)<sup>3</sup>

'The aggravated vayu or vata dosha in a patient spreads all over the body (shareeram anupadyate) causes dilated pupil/watering eyes (epiphora)/orbital disease (utthane netra nishyanda) and ultimately leads to death' (sadyo jahyaati). The word 'aaturasya' denotes the eye and/or orbital pathology is the manifestation (secondary) due to some other medical condition. The word 'utthane netra nishyanda' denotes different conditions like 'dilated pupil' or 'epiphora' or 'exophthalmos'

or 'enophthalmos' or 'photophobia'.<sup>2,3</sup> The integrity and functionality of the neurological pathways can be ascertained through the analysis of pupillary behaviour (pupil size and pupillary light reflex) (utthane netra nishyanda?). In the management and prognosis of severe traumatic brain injury (TBI), abnormalities of pupillary response or anisocoria (pupil size asymmetries) are often associated with neurological deteriorations, and poor neurological outcome (aaturasya vayu shareeram anupadyate). Pupillary abnormalities can be seen in conditions like descending and traumatic transtentorial herniation and brainstem compression. The pupillary changes in the neurological intensive care unit (ICU) are highly associated with brainstem oxygenation and perfusion/ischemia (sadyo jahyaati). High ICP (intracranial pressure) are associated with pupillary abnormalities of brain-injured patients. Tracking and classifying pupillary changes would be of particular utility in the early evaluation of patients with suspected intracranial pathology and elevated ICPs.<sup>20</sup>

Granulomatosis with polyangiitis (GPA) (formerly known as Wegener granulomatosis) is a systemic autoimmune disease of unknown etiology characterized by granulomatous inflammation, tissue necrosis, and vasculitis in medium and small sized vessels. Ocular and orbital manifestations (utthane netra nishyanda?) are common in almost half of patients with GPA, affecting every structure of the eye, with a wide range of severity. GPA may be broadly divided into a limited form (absence of renal involvement and restricted to upper and lower respiratory tracts) and a systemic form (involves kidneys and other systems) (aaturasya vayu shareeram anupadyate). Patients with the systemic form suffer a more severe course (sadyo jahyaati) of the disease compared to those with the limited form. Common signs and symptoms of orbital GPA include proptosis, epiphora (netra nishyanda), diplopia, sudden onset of pain, erythema, eyelid oedema and reduced vision. Exposure keratopathy, corneal ulceration, ocular perforation, enophthalmos, chronic orbital inflammation, optic nerve compression and ischemia, orbital disease, dacryoadenitis, dacryocystitis, ptosis, lid granuloma, chalazion, entropion, trichiasis, florid xantheleasma, conjunctival hyperaemia, cicatrizing conjunctivitis, symblepharon, foreign body sensation, blurred vision, vision loss and possibly bloody tears can be seen in GPA. Epiphora (netra nishyanda) is another symptom of orbital involvement that is often provoked by nasolacrimal duct obstruction or by lacrimal sac mucocele. Nasolacrimal duct obstruction (causing netra nishyanda) can be either secondary to inflammatory spread from adjacent sinonasal disease, or a direct result of focal GPA inflammation. As a result of the nasolacrimal blockage, dacryocystitis and epiphora (netra nishyanda) can occur. GPA had a dismal prognosis, with a median survival time of 5months and greater than 80% mortality (sadyo jahyaati) only one year following diagnosis.<sup>21</sup> The above verse may also indicate some other conditions such as idiopathic sclerosing orbital inflammation, thyroid or Graves orbitopathy, sarcoidosis, temporal arteritis, Churg-Strauss syndrome, Polyarteritis nodosa, Kawasaki disease and IgG4-related disease.<sup>22</sup> 'Maharshi Bhela' has documented secondary ocular manifestation due to an underlying disease which is associated with high mortality rate.

### **'Yasya koshtagato vayu -- sadyo jahyaati sa jeevitam' (Verse 3)<sup>3</sup>**

'The person who has been suffering with 'koshtagata vata' associated with cachexia (ksheena lohita mamsasya) will die soon (sadyo jahyaati)'. 'Koshtagata vata' is characterized by the features like 'nigraha mutra varchasa' (retention of urine and faeces), 'bradhna' (hernia), 'hrudroga' (heart disease), 'gulma' (tumours), 'arshas' (piles)

and 'parshwa shula' (pain in flanks).<sup>23</sup> 'Koshtagata vata' denotes a pathological state of increased 'intra-abdominal pressure' (IAP) due to various causes. The word 'ksheena lohita mamsasya' denotes extreme loss of skeletal muscle tissue, fat loss and anaemia commonly seen in 'Cachexia'. Verse 3 denotes a condition of increased IAP due to intra-abdominal or intra-pelvic malignancy or benign tumours or metastasis associated with cancer cachexia and death.

Abdominal compartment syndrome (ACS) is a systematic dysfunction of multiple organs (vayu upavrutta shareerina), including the heart and blood vessels (hrudroga), lung (parshwa shula), kidney (mutra nigraha), stomach and intestine (varcho nigraha), and the brain, resulting from a marked increase in intra-abdominal pressure (IAP) (koshtagata vata) from any cause. During ACS, the IAP is sustained at more than 20mm Hg (koshtagata vata). Abdominal tumours are one among the various clinical risk factors that increase in IAP. The mortality from the disease is high (sadyo jahyaati).<sup>24</sup> Intra-abdominal hypertension (IAH) associated with organ dysfunction (vayu upavrutta shareerina) defines the abdominal compartment syndrome (ACS). Elevated IAP (koshtagata vata) adversely impacts pulmonary (parshwa shula), cardiovascular (hrudroga), renal (mutra nigraha), splanchnic, musculoskeletal/integumentary, and central nervous system physiology. The combination of IAH and disordered physiology results in a clinical syndrome with significant morbidity and mortality (sadyo jahyaati). The ACS is a condition with a potentially high lethality (sadyo jahyaati) that must be recognized early and effectively managed in order to optimize outcome.<sup>25</sup> Large intra-abdominal tumours change the anatomy and physiology of the patient. The musculature of the abdominal wall becomes stretched (koshtagata vata) beyond the limits of rapid recovery as the tumour increases in size.<sup>26</sup>

Weight loss is the hallmark of any progressive acute or chronic disease state (vayu upavrutta shareerina). In its extreme form it results in significant lean body mass (including skeletal muscle) (ksheena mamsa) and fat loss and is referred as Cachexia. Muscle and fat wasting (ksheena mamsa) lead to poor outcomes and even death (sadyo jahyaati). Metastatic cancer leads to both cachexia and death independent of each other. Decreased haemoglobin due to anaemia of inflammation and/or chronic disease (ksheena lohita) as well as functional iron deficiency can be seen in 'Cancer cachexia'.<sup>27</sup> Cachexia is associated with poor quality of life, reduced physical function, and poor prognosis in cancer patients (vayu upavrutta shareerina sadyo jahyaati). It involves multiple pathways: pro cachectic and proinflammatory signals from tumour cells, systemic inflammation in the host, and widespread metabolic changes such as increased resting energy expenditure and alterations in metabolism. Anaemia (ksheena lohita) is one of the characteristic features of Cachexia syndrome.<sup>28</sup> Verse 3 represents the condition of IAP due to large intra-abdominal or intra-pelvic benign or malignant or metastatic tumours associated with cancer cachexia and death.

### **'Yasyaaturasyeha vaataat -- sadyo praanaan jahati sa' (Verse 4)<sup>3</sup>**

'The patient (aaturasya) in whom aggravated vayu or vata dosha causes excessive localized (na sansarati cha anyatra) growth known as 'Vatashtheela', he will give up life immediately (sadya praanaan jahati)'. 'Vatashtila' is a type of 'Mutraghata' (obstructive uropathy) and it has shown resemblance with BPH (benign prostate hyperplasia). In this condition, aggravated vata dosa gets localized in between vasti (urinary bladder) and guda (rectum), produces a dense fixed firm glandular swelling called 'Vatashtila' causing vinmutra

sanga (obstruction of faeces and urine) with adhamana (abdominal distension) and ruja (pain) in vasti pradesha (supra pubic region).<sup>29</sup> The present verse denotes a condition of 'Prostate cancer' and its fatal consequences. The word 'vivardhate' in the above verse denotes aggressively growing tumour and 'na sansarati cha anyatra' denotes localized or non-metastatic growth. Prostate cancer is the second most common cause of cancer and the sixth leading cause of cancer death (praanaan jahati) among men worldwide.<sup>30</sup> The natural course of a cancer can be estimated from tumour volume, aggressiveness (vivardhate), and disease extent. The tumours scoring 8-10 on Gleason histological score are considered the most aggressive, while those with scores less than or equal to 6 are potentially indolent.<sup>31</sup> 'Maharshi Bhela' has mentioned the condition of prostate cancer with fatal complications in verse 4.

### **'Yasyobhe pindike stabdhe -- sadyo praanaan jahaati sa' (Verse 5)<sup>3</sup>**

'The person who has been suffering with spasticity of both calves (pindike stabdhe), deviation of nasal septum or distorted nose (naasa jihma) along with ocular manifestations (vyavrutte aksheeni) will die soon or immediately (sadya praanaan jahati)'. Similar verse is found in 'Charaka indriya sthana', 'Sadyo maraneeyam indriyam' chapter. In 'Charaka indriya sthana', the phrase 'pindike shithilikruty' has been used instead of 'pindike stabdhe' and the word 'vyavrutte aksheeni' was excluded. The verse 5 denotes a condition of 'Neurosyphilis' with ocular manifestations.<sup>13</sup> Involvement of spinal cord vessels leads to meningomyelitis and causes muscular atrophy, spastic weakness of lower extremities (pindike stabdhe) in 'Neurosyphilis'. Untreated neurosyphilis can result in devastating neurological sequelae, including permanent paralysis, dementia and death (sadyo jahaati praanaan). Saddle nose (nasal cartilage destruction) (jihma naasa) and rhinitis (snuffles) are seen in syphilis.<sup>13</sup> Treponema pallidum (the causative agent of syphilis) disseminates to the central nervous system (CNS) within days after exposure. Clinical include asymptomatic neurosyphilis, acute meningeal syphilis, meningovascular syphilis, paretic neurosyphilis, and tabetic neurosyphilis. Most cases are reported in HIV (Human immunodeficiency virus) infected patients.<sup>32</sup>

Ocular syphilis (vyavrutte aksheeni) is a manifestation of the chronic syphilis infection which occurs more frequently during the latent stages of infection. It is considered as a variant of neurosyphilis in which recurrences or relapses are common. In immunocompetent patients, ocular syphilis presents more often in the elderly, while in younger patients, it is usually a result of HIV co-infection. Visual prognosis is poor prognosis when the infection involves the macula. The most common ocular syphilis presentation is uveitis (anterior, intermediate, posterior, or panuveitis). Ocular syphilis can also be presented as stromal keratitis, necrotizing retinitis, iridocyclitis, optic atrophy, and retinal vasculitis especially in patients with long-standing tertiary syphilis. A late presentation of ocular syphilis denotes the reduced immunity of elderly patients and the presence of multiple other comorbidities.<sup>33</sup> Verse 5 may also denote various other conditions such as distal myopathies, skeletal muscle atrophies, spinal muscular atrophies, neuromuscular diseases and muscle wasting in HIV patients associated with secondary nasal infections and ocular manifestations etc.

### **'Aamaashaya samutthaana -- sadyo praanaan jahaati sa' (Verse 6)<sup>3</sup>**

'The person who has been suffering with acute sharp pain (parikartika) originating from stomach (aamaashaya), intense thirst

(trishna) along with severe redness or burning sensation (teevra raga/ teevra daaha) will die immediately (sadya praanaan jahati)'. Similar verse is found in 'Charaka indriya sthana', 'Sadyo maraneeyam indriyam' chapter. In 'Charaka indriya sthana', the word 'bhinna purisha' has been used instead of 'teevra raaga' of the present verse. The verse no. 6 denotes a condition of 'Gastroduodenal perforation or ulcer (GDPU)' or 'Perforated peptic ulcer (PPU)' or acute abdomen. PPU is a surgical emergency and is associated with short-term mortality (sadya praanaan jahati). Patients with PPU may present with severe, sudden-onset epigastric pain (aamaashaya parikartika), which can become generalised.<sup>13</sup> The clinical presentation of a perforated peptic ulcer is characterized by abrupt onset of abdominal pain at the epigastrum (aamaashaya parikartika), and some patients exhibit fever, signs of hypovolemia (trishna), and abdominal distension<sup>34</sup> Verse 6 denotes various conditions like perforation of peptic or duodenal ulcer, upper gastrointestinal tract hemorrhage, acute pancreatitis, ruptured abdominal aortic aneurysm, upper gastrointestinal malignancy and/or acute abdomen etc.

### **'Pakvaashaya samutthaana -- sadyo jahyaat sa jeevitam' (Verse 7)<sup>3</sup>**

'The person who has been suffering with acute sharp pain (parikartika) originating from lower abdomen or large intestine (pakvaashaya), intense thirst (trishna) along with throttling like feeling or pain localized to anus or lower rectum/spasm of anal sphincter or (gala graha/guda graha) and restlessness (ugra) will die immediately (sadyo jahyaat sa jeevitam)'. Similar verse is found in 'Charaka indriya sthana', 'Sadyo maraneeyam indriyam' chapter. In 'Charaka indriya sthana', the word 'guda graha' has been used instead of 'gala graha' of the present verse. Proctalgia fugax or functional recurrent anorectal pain is characterized by the episodes of sharp fleeting pain localized to the anus or lower rectum (ugra guda graha). Spasm of the anal sphincter (guda graha) is commonly implicated in proctalgia fugax. Hemorrhoids, cryptitis, ischemia, abscess, fissure, rectocele and malignant disease etc are the other causes of anorectal pain. Ulcerative colitis (UC) and Crohn's disease (CD) (collectively termed as inflammatory bowel disease - IBD), are characterized by bloody diarrhoea, colicky abdominal pain (pakvaashaya samutthaana), urgency, tenesmus (parikartika) and fluid depletion (trishna). UC is a severe disease having a high mortality (sadyo jahyaat sa jeevitam) and major morbidity.<sup>13</sup>

The acute complications of colon cancer include obstruction, bleeding, and perforation, which are common in acute abdominal surgical conditions (sadyo jahyaat sa jeevitam). Thirst (trishna) can be found due to persistent bleeding in colon cancer patients. Fluid and electrolyte loss (trishna) and infection (toxaemia) are seen in obstruction caused by colon cancer. Most patients with intestinal obstruction due to colon cancer have abdominal pain (parikartika). The intestinal ischemic necrosis and intestinal strangulation can be manifested as persistent severe abdominal pain (pakvaashaya samutthaana).<sup>35</sup> Toxic megacolon is a life-threatening disease (sadyo jahyaat sa jeevitam) and is one of the most serious complications of Clostridium difficile infection (CDI). Abdominal pain and tenderness (pakvaashaya samutthaana parikartika), tachycardia (ugra?) and hypotension in patients diagnosed with CDI are important signs of a progression to toxic megacolon. Dehydration (trishna) and abdominal cramps (parikartika) are also seen in CDI. Early diagnosis and treatment are crucial due to the increased mortality (sadyo jahyaat sa jeevitam) (colonic perforation, peritonitis, septic shock and multiple organ dysfunction).<sup>36</sup> This verse denotes various conditions like IBD,

colon cancer, toxic megacolon, CDI, diverticulosis, rectal ulcers, lower gastrointestinal bleeding (LGIB), and proctalgia fugax etc.

**'Shonitam romakupebhyo -- sadyo jahyaat sa jeevitam'**  
(Verse 8)<sup>3</sup>

'The person who sweats blood (shonitam romakupebhyo ksharati) and vomits blood (shonitam mukhato bhedi ateeva) will die soon (sadyo jahyaati sa jeevitam)'. This verse denotes hematohidrosis or purpura or petechiae along with hematemesis. Hematohidrosis (also known as hemidrosis or hematidrosis) (shonitam romakupebhyo ksharati) is a condition in which a human being sweats blood due to the rupture of capillary blood vessels that feed sweat glands and it commonly occurs in extreme physical or emotional stress. The causes are systemic disease, vicarious menstruation, excessive exertion, psychogenic, and idiopathic factors. Hematohidrosis also found to be associated with primary thrombocytopenic purpura, otorrhea with otoerythrosis.<sup>37</sup> Bleeding into the skin or mucosa from small vessels produces a purpuric rash, or smaller petechiae (shonitam romakupebhyo ksharati). The rash may indicate reduced number or function of platelets, bleeding diathesis (von Willebrand disease), or defective supporting tissues. The most feared causes of a purpuric rash (sadyo jahyaati sa jeevitam) are meningococcal sepsis and acute leukaemia. Purpura is secondary to disseminated intravascular coagulation (DIC), depletion of platelets and coagulation factors from the consumptive coagulopathy. Purpura (shonitam ksharati) can be seen in other conditions such as congenital bleeding disorders, acquired thrombocytopenia secondary to sepsis or leukaemia, Immune thrombocytopenic purpura (ITP), viral infections, vasculitis illness such as 'Henoch-Schönlein purpura (HSP)', bone marrow failure syndrome, malignant bone marrow infiltration, nutritional deficiencies, senile purpura, acquired haemophilia, and drug related.<sup>38</sup> Hematemesis (and coffee-ground vomitus) is vomiting of blood (shonitam mukhato bhedi ateeva) from the upper gastrointestinal tract or after swallowing blood from a source in the nasopharynx. Bright red hematemesis (shonitam mukhato bhedi ateeva) usually implies active hemorrhage from the esophagus, stomach or duodenum. UGIB (upper gastrointestinal bleeding) (shonitam mukhato bhedi ateeva) can be seen in conditions like vitamin K deficiency, sepsis, coagulation disorders, HSP and various other causes.<sup>39</sup> Verse 8 denotes various bleeding disorders associated with high mortality.

**'Hrudayasya tu samghatam -- sadya praanaan jahaati sa'** (Verse 9)<sup>3</sup>

'The patient who has been suffering with severe chest or cardiac pain (atyartham peedayet shulam) with or without prior history of trauma (hrudayasya samghatam) along with cachexia (pariksheenasya) will die soon (sadya praanaan jahaati sa)'. The verse no.9 denotes heart failure-induced cachexia or cardiac cachexia with high mortality. Cachexia (pariksheenasya) is a prevalent pathological condition associated with chronic heart failure (hrudayasya samghatam). Its occurrence predicts increased morbidity and mortality (sadya praanaan jahaati sa). Skeletal muscle wasting (pariksheenasya) is an important component of cachexia; it often precedes cachexia development and predicts poor outcome in heart failure. Heart failure (hrudayasya samghatam) is caused by structural and functional abnormalities in the heart leading to impaired ventricular ejection and/or filling capacity. The main causes of heart failure are myocardial ischemia (atyartham peedayet shulam), systemic arterial hypertension, dilated cardiomyopathy and Chagas' disease, and valve disease. Following cardiac injury (hrudayasya samghatam), the ensuing molecular, structural, and functional ventricular changes

are known as cardiac remodeling. This process is accompanied by cardiac and systemic neurohormonal and inflammatory activation, which adversely affects the heart and jeopardizes different organs and systems (sadya praanaan jahaati sa).<sup>40</sup> Weight loss (pariksheenasya) in individuals with lung, pancreatic, and gastrointestinal cancers is accompanied by wasting of cardiac muscle (hrudayasya samghatam). Cardiac dysfunction (hrudayasya samghatam) in preclinical cancer models is associated with myocardial fibrosis, atrophy, and altered ultrastructure.<sup>41</sup> Nocturnal ischemic chest pain (atyartham peedayet shulam) may also be a manifestation of heart failure (hrudayasya samghatam). Cachexia and muscle wasting (pariksheenasya) are one among the various signs of heart failure (hrudayasya samghatam). Cardiac cachexia and weight loss (pariksheenasya) are important markers of disease severity.<sup>42</sup>

**'Yasya ksheena shareerasya -- sadya praanaan jahaati sa'** (Verse 10)<sup>3</sup>

'The person who has been suffering with cachexia (ksheena shareerasya), loss of consciousness (sangnaam harati) and obstruction of channels or respiratory failure (vyahanti mahasrota) will die soon (sadya praanaan jahaati sa)'. The word 'Mahasrota' denotes trachea along with bronchi and bronchial tree.<sup>43</sup> Life-threatening alterations (sadya praanaan jahaati sa) in central and peripheral nerve functions are the central manifestations of systemic critical illness. Neurological failure (sangnaam harati) is related to various factors such as changes in inflammatory and immune signalling pathways (vyahanti mahasrota?), hypoxia, circulatory shock (sangnaam harati), infection, endocrine changes, metabolic changes, and medications. Acquired neurologic disorders such as delirium (sangnaam harati) and ICU-acquired weakness (ksheena shareerasya) are associated with adverse outcome (sadya praanaan jahaati sa). Cognitive impairment (sangnaam harati) and neuromuscular weakness (ksheena shareerasya) are prevalent in survivors of critical illnesses in particular ARDS (acute respiratory distress syndrome) (vyahanti mahasrota?) and sepsis. The cognitive impairment observed in patients with advanced COPD (chronic obstructive pulmonary disease) (vyahanti mahasrota?) is likely reflective of both hypoxia and hypercapnia. Respiratory disease (vyahanti mahasrota?) is known to cause short-term effects of hypoxia and long-term effects after ARDS. Organ dysfunction including uremia, hepatic failure, endocrine, and metabolic disturbances present with neurologic findings may manifest in the critically ill patient. Cachexia is one among the acute generalized weakness syndromes in critically ill patients.<sup>44</sup>

**'Yetai evam vidhai lingai -- pariksheta aaturam bhishak'**  
(Verse 11)<sup>3</sup>

'The physician (bhishak) should examine (pariksheta) the patient (aaturam) to find out the above said fatal signs and symptoms (evam vidhai lingai) and similar other symptoms (anyashchaapi) also to determine the prognosis or pathological states (vikrutim praaptam)'. Proper knowledge of Arishta lakshanas (fatal signs and symptoms) makes the physician confident while determining the prognosis and proper clinical decision making. The process of dying is irreversible and recognizing that a patient has entered the last days of life presents a unique area for research. Several bedside clinical signs (evam vidhai lingai) have very high specificity rates for impending death. Arishta lakshanas denote terminal illness, progressive and advancing disease, irreversible damage and impending death. Physician should use his own analytical skills and personal experience to identify various Arishta lakshanas in diverse patient populations. Arishta lakshanas described in the current chapter are only for example purpose and

they don't include all possible forms. Hence physician should update himself to identify various novel arishta lakshanas similar to the arishta lakshanas mentioned in the current chapter. 'Maharshi Bhela' has emphasised the need of updating the knowledge of physicians to diagnose various arishta lakshanas and improve the clinical decision making process regarding prognosis.

## Conclusion

'Sadyo maraneeyam indriyam' is the fourth chapter of 'Indriya sthana' of 'Bhela samhita' which deals with the description of various emergency conditions associated with high mortality generally seen in the patients with terminal illness. Various medical and surgical emergency conditions like CAD, CVD, acute coronary syndrome, GPA, increased ICP, ACS, cancer cachexia, increased intra-abdominal or intra-pelvic pressure due to benign or malignant tumours, prostate cancer, neurosyphilis with saddle nose and ocular manifestations, GDPU, PPU, acute abdomen, IBD, UC, CD, LGIB, UGIB, colon cancer, proctalgia fugax, DIC, ITP, HSP, coagulation disorders, cardiac cachexia, coma, shock, pulmonary cachexia, ARDS, and COPD etc are documented in this chapter by 'Maharshi Bhela'. 'Maharshi Bhela' has provided a list of signs & symptoms/clinical features (arishta lakshanas) in this chapter which seems to possess clinically applicability and useful to diagnose terminal illness or end-of-life stages. Thousands of years ago 'Maharshi Bhela' has identified and documented various emergency conditions based on some clinical features. Concepts of emergency medicine have existed since samhita period. Questionnaire or screening methods can be developed based on the clinical features mentioned by 'Maharshi Bhela' in this chapter for using them in prognostic research. Further studies are required to substantiate the claims made in this chapter. The descriptive results of the present study provide fundamental understanding on potential ideas and pave the path for future research directions.

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## Conflicts of interest

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