



**TREATMENT APPROACH TO MANAGE TANDAVA ROGA THROUGH AYURVEDA  
(W.S.R TO HUNTINGTON'S DISEASE) - A CASE STUDY**

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**ABSTRACT**

*Vayu- Yantra Tantra dhara* which is attributed for, sensory – neural, as well as motor functions comprising voluntary and involuntary functions. Vata dosha at its habitualness maintains all the attributes of the body in a harmonious condition. Any etiology which defects the vata circadian rhythm leads to hyperkinetic movements. Tandava roga as narrated by Acharya Sharangadhara is one such disease, which presents with Hyperkinetic movements. Among these hyper kinetic movements chorea is commonest one. Due to the similarities of clinical presentation, this hyperkinetic disorder with chorea can be related to Huntington's disease or Huntington's chorea. All the disorders having chorea, involuntary movements are tagged under the heading of vata vyadhi in Ayurveda. Here an attempt has been made to manage Tandava Roga symptomatically to ease the life of the patient.

**KEYWORDS:** *Vata dosha, Chorea, Huntington's disease, Tandava roga.*

**INTRODUCTION**

The word Tandava means Nruthyam, is a divine dance form performed by Hindu god, particularly attributed to lord Shiva with violent and frantic gesticulations. In literature of Ayurveda this Tandava Roga<sup>[1]</sup> also presents with violent and frantic gesticulations which are involuntarily originated with imbalance or disturbance in the pathway of vatadosha. Tandava Roga Nidana (causes), Lakshanas (signs & symptoms) and Chikitsa (treatment) are explained by acharya's.<sup>[2,3]</sup>

Our literature explains about the prevalence of the disease which is prevalent in adult female and subjects who are having alpa bala<sup>[4]</sup> (strength and tolerance).

Clinical presentation and the symptoms of Tandava roga explained as literature *Vama Bahum Samarabhyha Prayo Tatoparam Tatah Pado Tatoangani Chalyet Tandavamyha* (flitting type of movements predominantly starts from left hand later proceeds to legs and other parts of the body with time), *Mustina Kimapi Dravyam Samyagdarayitum KshmahSamarpayitumasye Vaapyadaniyam Na Tandavi* (the person who is diagnosed with Tandava disease will not be able to hold objects in hands, feed himself and give to anyone), *Nrityanniva Chalatyesh* (dancing like flitting movements), *Bibhatsee mukha cheshtitee* (different expression and movements of face), *Adhirah* (disturbed intellect) and *Nidrayam Kampavarjitah* (loss of movements during sleep).<sup>[5]</sup>

In comparison with contemporary science, the Tandava roga can be categorized under Hyper kinetic movement disorders, which are characterized by presence of variety of different involuntary movements.<sup>[6]</sup> Out of these disorders chorea is the most common and major forms of hyperkinetic disorders. Chorea is the term broadly used to describe jerky semi purposive which affects the limbs, face or trunk.<sup>[7]</sup> In other words chorea can be defined as explosive fidgety movements flitting around the body.<sup>[8]</sup> The clinical presentation in the patient may vary with the duration of time. The variation in the intensity of symptoms in the same patient makes difficulty in assessing prognosis. The etiology for manifestation of chorea is many. In adult life one of the noted causes of chorea is the inherited disorder Huntingtons disease<sup>[9]</sup>, by which the Tandava Roga can be understood. Since they share similar etiology and clinical presentations.

To be precise with, Huntington's disease-defined as relentlessly progressive chorea<sup>[10]</sup> usually with behavioral and cognitive dysfunction. Onset is typically between the age of 25-45years with prevalence of 2-8 cases per 1,00,000.<sup>[11]</sup> This is genetically inherited disorder with autosomal dominant transmission affecting both males and females in adult life.<sup>[12]</sup> Huntington's disease (HD) is characterized by rapid, non-patterned, semi purposeful, involuntary choreiform movements. In the early stages, the chorea tends to be focal or segmental, but it progresses over time to involve multiple body regions. Dysarthria, gait disturbances and oculomotor

abnormalities are common features.<sup>[13]</sup>

### OBJECTIVES

This paper presents a case study of Tandava roga (w.s.r to Huntington's disease) managed through Ayurveda.

### MATERIALS AND METHODS

A single case study, qualitative analysis.

### DIAGNOSTIC CRITERIA

1. Signs and symptoms of Tandava Roga
2. Signs and symptoms of Huntington's disease.

**APPROACH ABOUT THE CASE:** A male patient aged about 42 years belonging to middle class family working as Teacher in Government school from Kanakapura was admitted on 20/5/2020, SDM Institute of Ayurveda & Hospital(SDMIAH), Bengaluru having OPD No.224798 and IPD No.011501, with complaints of involuntary movements of right upper limb, neck and head since 5-6yrs, along with slight movements in the left fingers, uncontrolled body movements, difficulty in maintaing balance while walking, difficulty in speech and pain in neck due to uncontrolled movements, difficulty in holding objects, swallowing, chewing, and hearing.

Patient was asymptomatic 5-6years ago. Later he observed a gradual onset of involuntary movements progressed to the right shoulder and right leg, neck, head, and in the left fingers which was persisting at the time of consultation. The movements are exaggerated during

sitting and walking and subside during sleep and supine position.

During this period the patient consulted neurologists at MS Ramaiah medical college and hospital, NIMHANS and Fortis Hospital and was diagnosed as a case of Huntington's disease and was treated for the same but did not show any improvement. Patients' complaints are said to be aggravated since 3 years. Two years ago, patient met a road traffic accident while riding the bike and sustained minor abrasion-like injuries. No intracranial injuries were reported.

Later patient consulted at JSS Ayurveda Hospital at Mysore, where he was diagnosed with Tandava vyadhi and underwent Panchakarma treatment, after which he experienced slight betterment. But due to COVID-19 lockdown, patient was unable to continue the treatment and medications there and he was recommended to consult at SDMIAH and he visited our hospital for the same on 20/05/2020.

The patient is not having any significant previous history related to present clinical presentations. Patient was born out of an uneventful pregnancy of a non-consanguineous marriage. Patient's father was a known case of Huntington's disease and took his last breath 15 years ago at the age of 70years. Patient's brother, aged 47yrs is also said to be a known case of Huntington's disease. Patient has a daughter and a son aged 8yrs and 4yrs respectively, both are said to be apparently healthy.

### GENERAL EXAMINATION

<b>General Appearance</b>	Moderately ill	<b>Cyanosis</b>	Absent
<b>Built</b>	Lean	<b>Lymphnodes</b>	Normal. No Lymphadenopathy
<b>Nourishment</b>	Moderately nourished	<b>Tongue</b>	Slightly coated
<b>Pallor</b>	Absent	<b>Tonsils</b>	Normal
<b>Icterus</b>	Absent	<b>Edema</b>	Absent
<b>Clubbing</b>	Absent		

**VITALS:** Readings were recorded at the time of admission.

<b>Pulse Rate</b>	80bpm
<b>Respiratory Rate</b>	17/min
<b>Blood Pressure</b>	130/80 mmHg
<b>Heart rate</b>	80 bpm
<b>Temperature</b>	97.5F

### ASTHTA THANA PAREEKSHA

<b>Nadi</b>	Vata- Pitta
<b>Mootra</b>	5-6 Times a day
<b>Mala</b>	1-2times a day
<b>Jihwa</b>	Ishat liptha
<b>Shabda</b>	Prakrita
<b>Sparsha</b>	Prakrita
<b>Drik</b>	Prakrita
<b>Akruti</b>	Krusha

**DASHA VIDHA PAREEKSHA**

The readings of the dashavidha pareeksha are recorded at the time of admission.

**Prakriti:** Vata pitta

**Vikrithi:** Vata-Prana, Udana, Pitta, Kapha, Rasa, Raktha, Mamsa, Meda, Asthi.

**Saara:** Avara

**Sattva:** Avara

**Saatmya:** Shadrasa satmya

**Samhanana:** Avara

**Ahara shakthi: Abyavaharana:** Madhyama

**Jarana shakthi:** Madhyama

**Vyayama Shakthi:** Avara

**Pramana:** Avara

Height=165 cms

Weight=48kgs

BMI=17.5(underweight)

Vaya: Madhyama.

**SROTO PAREEKSHA**

**RASAVAHA:** Shithila gaatra

**MAMSAVAHA:** Anga Shaiithilya

**MEDOVAHA:** Dourbalya

**ASTHIVAHA AND MAJJAVAHA:** Due to involvement of Vata

**SYSTEMATIC EXAMINATION****RESPIRATORY SYSTEM**

NVBS heard

Air entry normal

No added sounds heard

**GIT System:** Soft, No Organomegaly, No fluid collection

**CVS:** S1, S2 heard, No added sounds

**MUSCULOSKELETAL SYSTEM**

Muscle hypertrophy/ Atropy- Absent

Joint Swelling/Restricted ROM/Crepitus- Absent

**CENTRAL NERVOUS SYSTEM**

**General Appearance:** Moderately ill

**Higher Mental Functions: Consciousness-** Alert

**Orientation-** Oriented to time, place and person

**Memory-** Short term memory

**Speech-** Repetitive

On 20/05- slow/difficult speech

On 04/06-Mild improvement was seen

**Intelligence:** Slightly reduced as said by patient's bystander.

**CRANIAL NERVE EXAMINATION**

**Cranial Nerve 1 (Olfactory):** Can perceive & identify smell

**Cranial Nerve 2 (Optic):** Normal visual acuity & color vision

Visual field couldn't able to elicit due to excessive involuntary movements.

**Cranial Nerve 3: (Oculomotor):** } Ocular movements-  
Difficulty to elicit

**Cranial Nerve 4: (Trochlear):** }

**Cranial Nerve 5: (Trigeminal):** Corneal Reflex normal

**Cranial Nerve 6: (Abducent):** Pupillary reflex -Normal

**Cranial Nerve 7: (Facial):** Affected. Motor functions like raising the eye brow, inflation of mouth are performed with difficulty. Jaw clenching: normal

**Cranial Nerve 8: (Vestibulocohlear)**

Vestibular function: No hearing impairment

Cochlear function: difficulty in maintain balance due to chorea.

Rhomberg's test- Negative

Tandem walking- Performed with difficulty.

**Cranial Nerve 9: (Glossopharyngeal):** No abnormality detected

**Cranial Nerve 10: (Vagus):** No abnormality detected

**Cranial Nerve 11: (Accessory):** Shoulder Shrug exaggerated on Right more than Left

**Cranial Nerve 12: (Hypoglossal):** No abnormality detected.

**CEREBELLAR SIGNS**

- Chorea- Present and profound
  - Pronator drift- Negative
  - Dysdiodochokinesia- can be performed
  - Co-ordination-Finger -shin test- can be performed
- Heel to shin test- can be performed.

**MOTOR FUNCTION**

The motor functions are elicited during the time of admission the findings are as given below.

- Bulk-Normal and symmetrical
- Tone-on 20/05/2020- Rigidity present in B/L upper limbs
- Power-RUL- Grade 4 LUL-Grade-4  
RLL-Grade 4 LLL-Grade -4

**SENSORY FUNCTIONS**

Able to perceive temperature, touch, pain and pressure.

**REFLEXES**

Superficial reflexes-

Babinski-Right-diminished, Left-Normal

Deep reflexes-

Knee jerk	Exaggerated (++)
Wrist	Exaggerated(++)
Elbow	Exaggerated (++)

**RADIOLOGICAL EXAMINATIONS**

CT scan and MRI have been done but not submitted by the patient.

**ROGA PAREEKSHA**

➤ **NIDANA-** Beeja dosha, Chinta, Under nourishment.

➤ **POORVA ROOPA-** Avyakta

➤ **ROOPA**

1. Bahu samarambhya prayo tatoparam

2. Tato angaani chaalayet

3. Mushtina kimpai dravyam samyak dharayitum akshamaha

4. Samarpayitum aasye vaapi adaaneyam vaa

5. Nrityanniva chaalayet
6. Beebhatsa cheshta
7. Adheeraha
8. Nidrayam kampavarjitaha

- **UPASHAYA-** Utthana shayana (supine position), Nidra (sleep)
- **ANUPASHAYA-** walking/ sitting (cheshta)

#### ➤ **SAMPRAPTI GHATAKA**

**Dosha-** Vata pradhana tridosha

**Dushya-** Rasa, rakta mamsa, meda, asthi, majja

**Agni-** Dhatwagni

**Agni dushti-** Dhatwagni mandya

**Aama-** Dhatwagni mandya janya

**Srotas-** Rasavaha to majjavaha

**Udbhava sthana-** Pakwashaya

**Sanchara sthana-** Sarva shareera

**Vyakta sthana-** Dakshina parshwa, greeva, shiras

**Roga marga-** Madhyama

**Sadhyasdhya-** Pratyakhyeya

#### **INTERVENTION**

Therapies were performed in two courses.

From 20/05/2020 to 25/05/2020(6days)

1. Sarvanga Agnichikitsa lepa.
2. Sarvanga dhara- Dhanyamla+ Dashamoola kashaya (with ratio of 1:4 litres)
3. Matra basti- Sahacharadi taila(30ml)+Kalyanaka ghrita(30ml)
4. Takradhara(shirodhara)

From 26/05/2020 to 04/06/2020(10days)

1. Sarvanga Abhyanga with Balashwagandha lakshadi taila
2. Takradhara(shirodhara)
3. Anuvasa basti- Mahamasha Taila(30ml)+ Panchatikthaka Guggulu ghrita(30ml)
4. Shirotalam with choorna kalka of Jatamamsi, amalaki, vacha 5gms each/day.

**SHAMANOUSHADHI (Oral medication) 20/05/2020 to 04/06/2020**

1. Brihat vata chintamani Rasa(Swadeshi) 1-1-1 A/F
2. Cap. Palsineuron (SG Phyto)- 1-1-1 A/F
3. Cap. Kapikacchu (SDM)1-1-1 A/F
4. Dhanada Nayanadi Kashaya (AVN)- 3tsp-3tsp-3tsp(with equal quantity of water) A/F

#### **OBSERVATIONS DURING TREATMENT**

1. Improvement in involuntary movement was observed with stability in neck seen.
2. Balance while walking observed with improvement in gait and gesture.
3. On the day of admission (20/05/2020) - the patient presented with rigidity (++) which reduced to (+) on 28/05/2020 and the rigidity completely relieved by 04/06/2020.
4. Improvement in speech in terms of improved phonation and articulation was observed.

5. Exaggerated reflexes as seen on 20/05/2020 were relieved by 04/06/2020.

#### **ADVISE ON DISCHARGE**

At the time of discharge certain Shamanaushadhis were prescribed along with Pathayahara and Vihara. Follow up visit was advised after 1month. The patient is advised to take the below mentioned medicines for the period of one month.

- Brihat vata chintamani rasa 1-1-1 tablet A/F
- Cap.Nurod 1-1-1 A/F
- Cap. Kapikacchu 1-1-1 A/F
- Dhanada Nayanadi kashaya 3tsp-3tsp-3tsp (with equal quantity of water) A/F
- Bhargavaproktha Rasayana 1tsp-0-1tsp A/f (with milk)
- Shirotalam with choorna kalka of amalaka, jatamamsi and vacha daily.

#### **DISCUSSION**

Tandava Vyadhi is narrated in Sharangadhara samhita<sup>[13]</sup> (Parishista 1) which comprises of neurodegenerative disorders. The aetiology, pathogenesis and symptomatology of Huntington's disease (Huntington's chorea) can be better understood and correlated with that of Tandava Vyadhi. Specific aetiology of tandava roga is quoted as vatavruddhi. Vatavruddhi significantly correlated with degenerative changes substantiates the etiology of the disease. The pathogenesis of Tandava Roga starts with Majja Dhatu (Mastulunga Majja Dhatu) kshaya and consequently pathology will be seen in terms of Balakshaya and Pratata Vata Rogi.<sup>[14]</sup>

This serious disease is of autosomal dominant inheritance (1051a) and is due to an expanded CAG repeat(a so-called) unstable trinucleotide sequence) on the short arm of chromosome 4. Onset after age 50 is more than twice as common when the patient's mother rather than father was affected parent. Clinically evident disease usually arises between the age of 30 and 50. Hyperkinesia develops gradually more slowly than in chorea minor and with greater admixture of athetotic movements. Gait is often severely impaired. Mental disturbances are typically found, but their severity need not parallel that of the involuntary movements. Gait is often severely impaired. Mental disturbances are typically found, but their severity need not parallel that of involuntary movements, they may arise earlier. The prognosis of Huntingtons disease is very poor.<sup>[15]</sup>

Neuro degenerative disorders causing cerebellar atrophy with marked loss of neurons in caudate nucleus and putamen. In further stages it causes changes in neurotransmitters leads to progressive symptomatology of rapid, non-patterned, semipurposful involuntary choreiform movement with myopathy and dementia (Pratata Vata Rogi & Bala mamsa kshaya). Hence, Nidanapanchaka's of Tandavaroga get correlated with that of Huntington's disease.

The symptomatology of Tandava vyadhi - Huntington's disease involves the Vata prakopa and Majja Dhatukshaya. The presenting complaints like difficulty in swallowing of food, speech, loss of strength (Balamamsakshaya) and change in behavior implies for Prana and Udana Vatavikruti.<sup>[16]</sup> Symptomatology of Progressive, rapid, non – patterned, semi purposeful movements of whole body gives the clue for Vyana Vatavikruti.<sup>[17]</sup> On the other hand, loss of appetite indicates for the pathology of Samana Vata vikruti.<sup>[18]</sup> As one of the etiologies of the Huntingtons disease is genetical, it can be interpreted as the vatavruddi affecting the beeja may lead to the changes in genetic combination leading to the alteration in gene finger printing. Masthiska being the one of site of Vatasthana, and one of the tri marma, when gets affected leads to vitiation of the all doshas and dhatus resulting into srotorodha. The margavarodha for the path of movement of vata dosha leads to smriti haani, bheebhtsa chesta and brings the changes in voluntary and involuntary functions.

Hence the treatment is planned in accordance with Srotoshodhaka, Sangahara, Amapachana, Agnideepana, Vata anulomana and Brihmana. To achieve this Snehana, Swedana, Rookshana and Basti were included as part of treatment. As it is Dhatukshayajanya and Dhatwagnimandya with srotorodha pathology, Pachana with agnideepana and Brumhana chikitsa was planned.

To achieve this initially started with Agnichikitsa lepa(sarvangalepa) which contains drugs of Ushna, Teekshna, Vatakaphahara quality like Maricha, Lavanga, Lashuna, Sarshapa, Haridra, Saindhava, Agnimantha, Nirgundi, Tulasi, Shigrupatra serve the purpose of Srotoshodhaka, Amapachaka as well as Agnideepana action and also is a variety of Upanaha Sweda which relieves Sthambha, Shoola. Takradhara-Murdha chikitsa helps for regulating sensory-neural functions as well as improving cerebral circulation. Matra basti with Sahaharadi taila and kalyanaka gruta will prevent the vata dosha getting agitated during the course of lepa.

After it is assured that the Srotoshodhana has occurred by assessing features like relief from rigidity or stiffness, Gourava, Shoola - Kevala Vaatavyadhi chikitsa was adopted in the form of Snehana-Swedana – Matra basti along with continuation of Takradhara and Shirotalam. Sarvanga Abhyanga with Balaashwagandhalakshadi thaila was given to address the vata vrudhi, and which is also acts as Brimhana, reduces the stiffness and the taila also acts as Rasayana, Brimhana and Indriya prasada.<sup>[19]</sup> Matra Basti was planned with the combination of (Yamaka Sneha) Kalyanaka Ghrita and Sahacharadi taila for the purpose of giving Chikitsa to all Pancha Vata and especially to give nourishment to the Majja and Mamsa Dhatu. Basti being the choice of treatment in vata prdhana vyadhi, helps in bringing vata to normalcy. Shirotalam, a variety of murdha chikitsa helpful in shirogata vata hence, Hetu Sthana Vishsha Chikitsa is planned accordingly in the present case. The

internal medications which are specifically beneficial for Mahagadas like Vatavyadhi are advised which also attributes the quality like neuro protective, neuro stimulant s by which one can achieve the main function of vata as Yantra Tandradhara where vata being regulated thereby controls the movements of the limbs and also sensory neural function too.

## CONCUSION

Tandava Rogaas mentioned by Acharya Sharangadhara, comprises neurodegenerative disorders which can be co related with Huntington's disease. Symptomatology of Tandava roga / Huntington's disease involves the Vatapradhana tridosha vitiation and Majja Dhatu kshayajanya mahagada. As the patient initially exhibited with symptoms indicative of margavarodhajanya and dhatwagnimandya avastha, approach with Rukshana-upanaha sweda in the form of Agnichikitsa lepa was given with due care of vata and later Kevala Vatavyadhi chikitsa in the form of Abhyanga, Swedana, Basti with Shirormarma paripalana measures were adopted. After 15 days of treatment, in male patient of tandava Vyadhi - Huntington's disease/chorea there was remarkable improvement seen in signs & symptoms.

## REFERENCES

1. Sri Sarngadharacharya. Sarngadhara Samhita with Subodhim Hindi commentary of Sri Prayagadatta Sharma. Parishishta 1/12. 7<sup>th</sup> ed. Varanasi (India): Chaukambha Amarbharti Prakashana; 1988.p.487.
2. Sri Sarngadharacharya. Sarngadhara Samhita with Subodhim Hindi commentary of Sri Prayagadatta Sharma. Parishishta 1/12. 7<sup>th</sup> ed. Varanasi (India): Chaukambha Amarbharti Prakashana; 1988.p.487.
3. Shri Govinda Dasji. Bhaisajyaratnavali commentary of Shri Kaviraja Ambikadatta Shastri. Chikitsa Prakarana 81, Vol. III. Reprint ed. Varanasi (India): Chaukambha Sanskrit Sansthan; 2009.p.581 – 582.
4. Sri Sarngadharacharya. Sarngadhara Samhita with Subodhim Hindi commentary of Sri Prayagadatta Sharma. Parishishta 1/12. 7<sup>th</sup> ed. Varanasi (India): Chaukambha Amarbharti Prakashana; 1988.p.487.
5. Sri Sarngadharacharya. Sarngadhara Samhita with Subodhim Hindi commentary of Sri Prayagadatta Sharma. Parishishta 1/12. 7<sup>th</sup> ed. Varanasi (India): Chaukambha Amarbharti Prakashana; 1988.p.616.
6. Anthony S. Fauci, Eugene Braunwald, Dennis L. Kasper, et al. Harrison's Principles of Internal Medicine, 17<sup>th</sup> ed, 2008, Vol. II, McGraw – Hill companies, USA, pp 2560.
7. C.R.W. Edwards, I.A.D. Bouchier, et al. Davidson's Principles and Practice of Medicine, 17<sup>th</sup> ed, ELBS with Churchill Livingstone, pp 1083.
8. Professor Parveen Kumar, Dr Michael Clark. Kumar & Clarks's Clinical Medicine, 17<sup>th</sup> ed, 2009, Elsevier limited, UK, pp 1149.
9. C.R.W. Edwards, I.A.D. Bouchier, et al. Davidson's Principles and Practice of Medicine, 17<sup>th</sup> ed, ELBS with Churchill Livingstone, pp 1083.
10. Anthony S. Fauci, Eugene Braunwald, Dennis L.

- Ksper, et al. Harrison's Principles of Internal Medicine, 17<sup>th</sup> ed, 2008, Vol. II, McGraw – Hill companies, USA, pp 2561.
11. C.R.W. Edwards, I.A.D. Bouchier, et al. Davidson's Principles and Practice of Medicine, 17<sup>th</sup> ed, ELBS with Churchill Livingstone, pp 1084.
  12. Anthony S. Fauci, Eugene Braunwald, Dennis L. Ksper, et al. Harrison's Principles of Internal Medicine, 17<sup>th</sup> ed, 2008, Vol. II, McGraw – Hill companies, USA, pp 2561.
  13. Sri Sarngadharacharya. Sarngadhara Samhita with Subodhim Hindi commentary of Sri Prayagadatta Sharma. Parishishta 1/12. 7<sup>th</sup> ed. Varanasi (India): Chaukambha Amarbharti Prakashana; 1988.p.487.
  14. Acharya YT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Sutra Sthana 17/68. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2011.p.103.
  15. Mumenthaler Mark, Heinrich Mattle, Neurology, International edition, Translated and adopted by Ethan Taub. P. 258.
  16. Acharya YT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Chikitsa Sthana 28/6-7.
  17. Acharya YT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Chikitsa Sthana 28/9. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2011.p.616.
  18. Acharya YT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Chikitsa Sthana 28/8. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2011.p.616.
  19. Dr. Anna Moreshwar Kunte. Astanga Hrudya with Sarvangasundra commentary of Arundatta. Chikitsa Sthana 22/45-46. Reprint ed. Varanasi (India): Chaukambha Publications; Vikram Samvat 2069.p.732.