AMYOTROPIC LATERAL SCLEROSIS: A REVIEW FROM AN AYURVEDIC PERSPECTIVE

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ABSTRACT

Amyotrophic lateral sclerosis (ALS) is a type of Motor neuron disease (MND) which is a disease afflicting the motor part of the nervous system. It includes the disturbances related to both upper motor neuron and lower motor neuron. It is usually characterised by steady, continuous, progressive degeneration of cortico-spinal tract, anterior horn cells, bulbar motor nuclei or any of the above mentioned parts of the nervous system. Symptoms of the motor neuron disease include muscle weakness, atrophy, fasciculations, emotional disturbances and in severe cases respiratory muscle weakness. Severity of the symptoms may vary in different individuals. Diagnosis of the disease is confirmed by nerve conduction study, electromyogram and exclusion of other diseases by MRI and other laboratory findings. In Ayurveda, we can come to a conclusion that this disease is coming under the category of Vatavyadi. Based on the features observed in the disease, this clinical condition is usually correlated with Dhatukshayajanyar Sarvangavata. The following paper illustrates the hypothesis put forth based on the comparison of findings of motor neuron disease and symptoms mentioned in literatures of Ayurveda.

Key words: Amyotropic Lateral Sclerosis, motor neuron disease, Dhatukshaya, Sarvangavata

INTRODUCTION

Amyotrophic lateral sclerosis is the most common motor neuron disease (MND). This is usually presenting with random asymmetric symptoms involving both upper motor neuron (UMN) and lower motor neuron (LMN) signs. The aetiology of the disease is usually unclear to western medical fraternity. The disease is most commonly observed among males and in 5th or 6th decade of life. There will be selective loss of function of upper or lower motor neurons resulting in the progressive loss of functions of either upper or lower motor neurons or both. The motor neuron cytoskeleton is affected at the initial stage of the illness followed by focal enlargement of proximal motor neurons due to the accumulations of neurofilaments and proteins. These affected neurons undergo shrinkage later on with accumulation of pigmented lipid (lipofuscin). The sequel to the shrinkage of neurons is denervation and consequent atrophy of corresponding muscle fibres. As denervation progresses, muscle atrophy is readily recognised by clinical examination as well as through muscle biopsy. Hence the term ‘amyotrophy’ arises in the ALS. The loss of motor neurons of cortex leads to the thinning of the corticospinal tracts. These corticospinal tracts travel via internal capsule and brain stem to the anterior and lateral white matter of the spinal cord. The loss of fibres in the lateral columns results in the fibrillary gliosis of the spinal cord. Hence the term ‘lateral sclerosis’ arises in the ALS. However, diabetes mellitus can also be responsible for amyotrophy. This is characterised by gradual weakness in quadriceps group of muscles in elderly diabetic people, though there may be a possibility of involvement of muscles in leg, hip and foot.

Clinical features of ALS

The patient initially presents with muscle cramps, weakness, muscle atrophy of hands and feet. Weakness usually progresses to forearms, shoulders and lower limbs. Fasciculations, spasticity, exaggerated deep tendon reflexes, extensor plantar responses, clumsiness and stiffness of the movement, weight loss, fatigue and difficulty in controlling facial expressions and difficulty in tongue movements are observed. Other symptoms include hoarseness of voice, dysphagia, slurred speech, increased production of saliva and tendency to choke on consumption of liquids. This is followed by inappropriate, involuntary uncontrollable excesses of laughter or crying. Sensory system, consciousness, cognition, voluntary eye movements, sexual function, functions of urethral and anal sphincters are usually not affected in the progression of pathogenesis in case of Amyotropic lateral sclerosis.

Death is observed in 50% of the patients due to failure of respiratory muscles within a period of 3 years. 20% of the individuals suffering from ALS die within a span of 5 years and 10% of the patients die within 10 years. Survival of the individual suffering from ALS after 30 years of onset is rare. In bulbar involvement of ALS, deterioration of health and death occur rapidly as it is one of the vital part controlling respiration, deglutition, circulation.

Ayurvedic interpretation of amyotrophic lateral sclerosis

This disease is usually comparable to Dhatukshayajanya Sarvangavata. Here an attempt is made to compare the progression of symptoms and analysis of each symptom with abnormality of Dosa (bioenergy) and Dushya (body tissues). As the disease is considered to be chronic and debilitating illness, we can infer the Dhatukshaya (loss of body elements) likely to occur. As the disease involves Sarvanga (whole body) and in almost all the cases, Vata Doshha likely to be vitiated throughout the course of the disease, the diagnosis of Sarvanga Vata is made. The following table shows the chronology of the symptoms in the patient of amyotrophic lateral sclerosis, terminology used for these clinical features and likely involvement of Dosha and Dhatu in the pathogenesis of the disease from the onset till the complete manifestation of the disease.
and terminology in vitiation of Vata (bio energy) Dosha consumption of substances having Ruksha (dry) quality, excess in the body. The dominance of Vata Dosha (bio energy) can be described in detail in the coming pages.

Table 1: Symptoms of Amyotrophic lateral sclerosis with terminology in Ayurveda, involvement of Dosa and Dhatu in the disease process

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Ayurveda terminology</th>
<th>Dosa vitiation</th>
<th>Dhatu involvement</th>
</tr>
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<tbody>
<tr>
<td>Stiffness</td>
<td>Stambha</td>
<td>Vata vitiation</td>
<td>Rasa kshaya</td>
</tr>
<tr>
<td>Muscle weakness</td>
<td>Aksha glani</td>
<td>Vata vitiation</td>
<td>Rasa, Mamsa kshaya</td>
</tr>
<tr>
<td>Atrophy</td>
<td>Mamsa Shoshah</td>
<td>Vata vitiation</td>
<td>Mamsa kshaya</td>
</tr>
<tr>
<td>Fasciculation</td>
<td>Sphurana</td>
<td>Vata vitiation</td>
<td>Mamsa kshaya</td>
</tr>
<tr>
<td>Muscle cramps</td>
<td>Udveshtana/ Avamotana</td>
<td>Vata vitiation</td>
<td>Mamsa kshaya</td>
</tr>
<tr>
<td>Facial weakness</td>
<td>Ardita</td>
<td>Vata vitiation</td>
<td>Mamsa kshaya</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>Annapravesha kricrata</td>
<td>Vata vitiation</td>
<td>Rasa kshaya</td>
</tr>
<tr>
<td>Dysarthria</td>
<td>Vak sanga</td>
<td>Vata vitiation</td>
<td>Mamsa kshaya</td>
</tr>
</tbody>
</table>

As per the Sushruta, these Lakshana are considered to be Dosha Lakshana (the clinical features which indicate the disease till the complete manifestation of the disease, Vata Dosa (bio energy) will be dominant. Based on the concept of Kriyakala (time for the treatment of the disease), the earliest sign observed Dhatukshayaja Sarvangavata is related to Koshtha (alimentary canal) i.e. Stabdha Koshtha (reduced motility in the Koshtha region) and Purna Koshtha (fullness of the abdomen). The Lakshana observed during Prakopa (stage of aggravation) are Koshtha toda (pricking type of pain in abdominal region) and Koshtha Sancharana (movement of vitiated Vata in the abdominal region). The Lakshana observed during Prasara (stage of spreading) stage are Vamagamana of Vata (displacement of Vata to other parts of the body) and Atopa (discomfort of abdominal region with pain). These Lakshana indicate the earliest manifestation of the disease. As per the Sushruta, these Lakshana are considered to be Dosa Lakshana (the clinical features which indicate the increase of Dosa in the body).

The clinical features of amyotrophic lateral sclerosis observed are indicating that there is generalised Vata (bio energy) vitiation in the body. The dominance of Vata Dosa (bio energy) can be observed from the onset of the illness till the complete manifestation of the disease. Stiffness (Stabdha), muscle weakness (Aksha glani), atrophy (Mamsa Shoshah), fasciculations (Sphurana), muscle cramps (Avamotana), facial weakness (Aksha glani), dysphagia (Annapravesha Kricrata) and dysarthria (Vak sanga) will indicate the dominance of Vata (bio energy) throughout the progression of the illness from onset to complete manifestation of the disease. Further, there will be abnormality of Vyanavata, Pranavata and Udvanavata (subtypes of Vata bio energy) are affected during the progression of the disease. Thus, this is considered to be Vataja Nanatmaja Vikara.

As far as the western medicine is concerned, there is no specific causative factor for the manifestation of amyotrophic lateral sclerosis. Based on the fundamentals of Ayurveda, we can go retrospectively. The duration of the illness is prolonged and progression of the disease is slow suggests the causative factors which provoke the Vata (bio energy) are responsible for the pathological process. In other words, the measures such as excess amount of exercise, the measures which are leading to the lightness of the body, falling from height, the manoeuvres which are leading to Dhatukshaya (depletion of body elements) in the body, depriving of sleep during night time, suppression of the natural urges, exposure to cold atmosphere, excess consumption of substances having Ruksha (dry) quality, excess consumption of food substances having Kashaya (astringent), Katu (pungent) and Tikta (bitter) taste are responsible for the vitiation of Vata (bio energy) Dosa. From the onset of the disease till the complete manifestation of the disease, Vata Dosa (bio energy) will be dominant.

The Lakshana such as Gatrastabdhata (stiffness of the body parts), Akshaglani (muscular weakness), Mamsasosh (atrophy of body parts), Sphurana (fasciculations), Udveshtana/ Avamotana (muscle cramps), Ardita (facial weakness), Annapravesha Kricrata (difficulty in swallowing), Vaksanga (dysarthria) are considered to be Vyadhi Lakshana (the clinical features which indicate the manifestation of the disease in the body). These Lakshana appear in the patients during or after the stage of Sthanasamshraya (stage of localisation).

Dosa (bioenergy): By analysing the clinical features explained in the context of amyotrophic lateral sclerosis it is evident that from the onset of the disease till the complete manifestation of the disease, dominance of Vata Dosa (bio energy) is observed.

Table 2: Samprapti Ghataka of the Dhatukshayajanya Sarvangavata

<table>
<thead>
<tr>
<th>Factor of Samprapti Ghataka of the disease</th>
<th>Factor involved in the disease process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosa</td>
<td>Vata</td>
</tr>
<tr>
<td>Dushya</td>
<td>Rasa, Raktu, Mamsa</td>
</tr>
<tr>
<td>Srotas</td>
<td>Rasavaha, Raktavaha, Mamsavaha and Annava Srotas</td>
</tr>
<tr>
<td>Srotadushti Pakara</td>
<td>Sanga, Vamargamana</td>
</tr>
<tr>
<td>Aygi</td>
<td>Jatharagami mandya, Rasa, Raktu, Mamsa Dhatvagni mandya</td>
</tr>
<tr>
<td>Ama</td>
<td>Koshtha Shasha and Dhatushi Ama</td>
</tr>
<tr>
<td>Udhsava Sthana</td>
<td>Pakwashaya</td>
</tr>
<tr>
<td>Sancchara Sthana</td>
<td>Sarva Sharira</td>
</tr>
<tr>
<td>Vyakta Sthana</td>
<td>Sarva Sharira</td>
</tr>
<tr>
<td>Vyadiyavastha</td>
<td>Chirakari</td>
</tr>
<tr>
<td>Vyadhi bheda</td>
<td>Adhyatimika, Doshabala Pravritta, Sharirika and Pakwashaya Samaththa Vikara</td>
</tr>
<tr>
<td>Rogamarga</td>
<td>Jahiya, Madhyama and Abyantara</td>
</tr>
<tr>
<td>Sadhyasadhya yata</td>
<td>Asadiya – Prayakhyeya</td>
</tr>
</tbody>
</table>

The clinical features of amyotrophic lateral sclerosis in the context of amyotrophic lateral sclerosis it is evident that from the onset of the disease till the complete manifestation of the disease, dominance of Vata Dosa (bio energy) is observed.
Therefore, as per the fundamental principles of Ayurveda, Amyotrophic lateral sclerosis is a Vataja Nanatmaja Vikara (Vata will be dominant from the onset till the complete manifestation of the disease). As the duration of the illness is prolonged, mechanism of Dhatukshaya (depletion of body elements) likely to be responsible for the disease manifestation.

Dushya: Rasa (plasma tissue), Raktta (blood tissue) and Mamsa Dhatu (muscular tissue) are likely to be afflicted during the pathogenesis of the disease. As the disease is showing chronic course and stiffness of the body parts, Rasa Dhatu (plasma tissue) suspected to be involved in the pathogenesis. In the late stage of the disease process, the person is unable to consume the food substances. This also suggest the involvement of the Rasa Dhatu (plasma tissue) during the pathogenesis. The Lakshana such as Mamsashosa (atrophy), Sphurana (fasciculations), Udveshtana or Avamotana (muscle cramps), Ardita (facial weakness) and Vaksanga (speech disturbances) are supporting the involvement of Mamsa Dhatu (muscular tissue) in the disease manifestation. Involvement of Raktta (blood tissue) can be predicted as Kandara (tendon) will be involved in the disease process and Kandara (tendon) is considered to be Upadhatu (by-product) of Raktta Dhatu (blood tissue). The word ‘Udbhava Sthana’ refers to the site where in a particular Dosa is produced in the Koshta (alimentary canal). Hence, as per the fundamentals of Ayurveda, the disease seen: In case of Dhatukshayajanya Sarvangavata, the disease is considered to be Nija Vikara (disease caused due to endogenous factor) and Vataja Nanatmaja Vikara (Vata will be dominant from the onset till the complete manifestation of the disease). The word ‘Udbhava Sthana’ refers to the site where in a particular Dosa is produced in the Koshta (alimentary canal). As the disease is showing chronic course suggest the involvement of whole body in the pathogenesis. Hence, Sarva Sharira (whole body) is considered to be Sanchara Sthana (area of movement of Dosha) in Dhatukshayajanya Sarvangavata.

Sanchara Sthana (area of movement of Dosa): The word ‘Sanchara Sthana’ refers to the area of the body where in vitiated Dosa (bioenergy) will move in the body. In case of Dhatukshayajanya Sarvangavata, the clinical features observed during the course of disease suggest the involvement of whole body in the pathogenesis. Hence, Sarva Sharira (whole body) is considered to be Sanchara Sthana (area of movement of Dosa) in Dhatukshayajanya Sarvangavata.

Vyaakta Sthana (part of the body full blown symptoms of the disease seen): In case of Dhatukshayajanya Sarvangavata, the clinical features are seen all over the body. Hence, Sarva Sharira (whole body) is considered to be Vyaakta Sthana (part of the body where full blown symptoms of the disease seen) in Dhatukshayajanya Sarvangavata.

Vyadhayavastha (stage of the disease): Amyotrophic lateral sclerosis is a slowly progressive disease. In other words, it shows complications in the long run. Hence, the Vyadhayavastha in this clinical condition is Chirakari (long standing illness).

Vyadhi bheda (type of the disease): As far as the types of disease based on fundamentals of Ayurveda are concerned, Dhatukshayajanya Sarvangavata is a Adhyatmika Vikara (disease manifests in the patient due to deeds done by self). Among the type of Adhyatmika Vikara, it is further classified under Doshabala Pravritta Vikara (disease manifests in the patient due to the dominance of the Dosa or bioenergy), Sharirika Vikara (disease related to the body) and Pakvashayasamuttha Vastha (disease having the origin in the large intestine). This type of classification will be helpful in determining the Sadhyasadaytha (prognosis) of the disease as well as planning line of treatment at a particular stage of the illness.

Rogamarga (course of the disease): The presenting complaints such as Stabdhatta (stiffness), Akshaglani (muscular weakness),...
Mamsashosha (atrophy), Sphurana (fasciculations), Udveshtana/Avamotana (muscle cramps) are suggestive of the involvement of Bahya (external) Rogamarga. The presence of Vaksanga (dysarthria), Ardita (facial weakness) imply the involvement of Madhlyama (middle) Rogamarga. The presence of Annapravesha Kricchrata (inability to swallow) is suggestive of Abhyantara (internal) Rogamarga involvement. Thus, during the progression of the disease, all the three Rogamarga will be involved4.

Sadhyasadhyata (prognosis): Several criteria are explained to determine the Sadhyasadhyata of any disease. Based on following factors, Dhautukshayajanya Sarvangavata is considered to be Pratyakhyeya Vikara (incureable disease)13.

- First of all, based on onset of the disease, this disease is more common in 5th or 6th decade of life and is slow progressive disease. This implies the disease is more common during the age group where in Vata (bioenergy) dominance commences.
- The disease is having the dominance of Vata Doshaa (bioenergy) from the commencement of disease till the complete manifestation of the disease.
- The disease manifests in the individuals during 5th or 6th decade of life. This disease is presented with the clinical features such as stiffness (Stabdhatana), muscle weakness (Aksha glani), atrophy (Mamsashoshaa), fasciculations (Sphurana), muscle cramps (Avamotana), facial weakness (Aksha glani), dysphagia (Annapravesha Kricchrata) and dysarthria (Vak Sanga). By observing the above said Lakshana, it is evident that Vata Doshaa (bioenergy) will be dominant throughout the progression of the disease.

CONCLUSION

The disease amyotrophic lateral sclerosis is a slowly progressive disease usually manifests in the individuals during 5th or 6th decade of life. This disease is presented with the clinical features such as stiffness (Stabdhatana), muscle weakness (Aksha glani), atrophy (Mamsashoshaa), fasciculations (Sphurana), muscle cramps (Avamotana), facial weakness (Aksha glani), dysphagia (Annapravesha Kricchrata) and dysarthria (Vak Sanga). By observing the above said Lakshana, it is evident that Vata Doshaa (bioenergy) will be dominant throughout the progression of the disease.

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