ROLE OF RAJAYAPANA BASTI WITH REFERENCE TO DUCHENNE MUSCULAR DYSTROPHY: A REVIEW

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ABSTRACT

Duchenne muscular dystrophy is heterogeneous group of inherited disorders characterized by progressive muscle weakness and wasting. In Duchenne muscular dystrophy involves mutations in the dystrophin gene. Dystrophin is one of the large structural proteins in the cell membrane and absence of dystrophin leads integrity of muscle cells. Ayurvedic diagnose can be made as Adhiba Pravrit Mamsa-Vata-Kshaya due to Srothorodha. No any specified treatment schedule in any medical field related to Duchenne muscular dystrophy. Therapeutic approach of muscular dystrophy is represents on corticosteroids, physical therapy, and respiration assistance and gene therapy or muscle transduction. The Ayurvedic treatments relevant to Rasayana group of herbo-mineral medicines and specified Panchkarma therapies have definite protective influence and long survival on Dhatu Kshaya according to Ayurvedic classics. Keep upon this view especially Rajayapana Basti is selected for present conceptual study because of its beneficial Sadyo Balaganana and Rasayana effects. So this is an attempt has been made to review the relevant effect of Rajayapana Basti in Ayurveda with reference to Duchenne muscular dystrophy.

Key words: Duchenne muscular dystrophy, Adhiba Pravrit Mamsa-Vata-Kshaya, Panchkarma, Rajayapana Basti

INTRODUCTION

The word dystrophy comes from Latin and Greek roots meaning of faulty nutrition. The disease was first described by Neapolitan physician Giovanni Semmola in 1834 and Gaetano Conte in 1836. However DMD was named by French neurologist Guillaume-Benjamin-Amend Duchenne in 1806-1875. Duchenne muscular dystrophy (DMD) is known as x-linked recessive disorder. It affects muscles and lead weakness of muscular strength and function of muscles. This syndrome is marked by either generalized or localized. In DMD involve mutations in the dystrophin gene. Dystrophin is cytoskeletal protein localized in the inner surface of the muscle membrane and it forms dystroglycan-glycoprotein complex. This complex helps to maintain the integrity of muscle cells. So absence of dystrophin results in the destabilization of the entire dystroglycan-glycoprotein complex. So muscle mass is not growth well and cause to weakness of muscles. This condition is most apparent or symptomatic in skeletal muscle only heart and diaphragm muscle often involved. Most patients die because of heart failure or respiratory problems. Incidence of this is that affects 1 in 3600–6000 live male births worldwide. Each child of a carrier mother has a 50% chance of DMD. Though girls can be carrier, more than 80% shows no DMD related syndrome. No any treatment is at present in DMD definitely in any medical field. Therapeutic approach of muscular dystrophy is represents on corticosteroids, physical therapy, respiration assistance and gene therapy or muscle transduction. Gene therapy is already on research level and muscle transduction can further damage the weakened muscle. No universal agreement on which mechanism is predominant or how muscle is damaged when missing of dystroglycan-glycoprotein complex. Theories for muscle fiber necrosis may be mechanical hypothesis, calcium hypothesis, gene regulation hypothesis or vascular hypothesis. In mechanical theory loss of dystroglycan-glycoprotein complex and in calcium hypothesis influx of calcium into cytosol both are responses to lead the damage of cell membranes. In vascular theory the lack of blood flow causes the typical degeneration of muscle tissue. Due to gene regulation, failure of certain molecules localized in the muscle membrane cause compromised in the cell integrity. An increase in the activity of muscle proteolytic enzymes may accompany the membrane alteration. Leaving of this cell membrane function is vulnerable to degeneration.

Suspect of DMD

Disease can be typically diagnosed at around in age 5 and loss of ability to walk by age 9-12 and succumb to death in second decade due to respiratory failure or cardiomyopathy. It is severe and has progressive muscle degeneration. Suspicions are usually raised by one of the following three signs even when there is no family history. (1) Problems with muscle function- child walk later than other boys their own age, they have enlarged calf muscles and have trouble running, jumping or climbing stairs and fall easily. They may have a tendency to walk on their toes and “Gowers” sign is positive. (2) High levels of muscle protein creatinine kinase (CK) in a blood test. (3) High levels of the “liver enzymes" AST and ALT in a blood test. High levels of these enzymes in the blood are often associated with liver disease, but being progressive in muscular dystrophies.

Confirmation of DMD

DNA test, muscle biopsy analysis and prenatal test can be done for confirmation of DMD. High levels of CK (creatinine
Rajayapana Basti does priority which are supplying proper tone according to Ayurveda Vat.

Assessment criteria in DMD

Regular assessment should include tests is help show how the condition is progressing. It can be observed by strength of the particular muscles, range of joint motion, timed tests such as the time to get up off the floors time to walk a certain distance, time to climb several steps. Thereby gives important information on how the disease is changing and what sort of is responding to treatment. Motor function scales and activities of daily living also helps to identify the condition of disease.

Ayurveda aspect in DMD

Ayurveda diagnosis can be made as Adibala Pravrit Mamsa-Vata-Kshaya due to Srothorodha (obstruction in the microchannel). There is depletion of Mamsagni (~muscle tissue enzyme)lead the formation of Ama (indigested food)and it cause vitiation of Kapha Dosha. During the process of Srothorodha produces hypertrophy in particular region even as first Prakop (augmented) and then depletion of Vata elements. This complex pathogenesis causes responsible for progressive wasting and necrosis of the particular muscle fibers which locate in the chief sites of Vata Dosha. Mamsa (muscle tissue) and Meads (fat tissue) etc are main constituent of our body. Mamsa Kashaya (depletion of muscle tissue) may be present then the result get prolong vitiation of Majja Dhatu. (~vitated fat tissue). This obstruction of channels is responsible for the Mamsadhatu Kshaya. There is no any other excellent treatment for Vata Vyadhi such as Basti (enema)therapy. Niruha Basti (decocction enema) is the superlative therapy in Panchkarma field and it has a pivotal ability to re-construct of damaged muscles or nerves. Rajayapana Basti does priority which are supplying proper tone to the muscles & promoting the blood circulation with both Shodhana (elimination) and Brumhana (nourishing) properties of its own as well as very much beneficial which pacifies the provoked Vata Dosha, increases strength of the person, maintains health & longevity. Musthadi Rajayapana Basti mentioned under the Niruha Basti and it is the king of all Yapana Basti (~prolong enema) because of its superiority.

Probable mode of action of Rajayapana Basti

According to Ayurveda Vata is the elan vitae, Vayu are the strength and Vayu are the sustainer of the living beings. So suppose how justice DMD may consider as under Vata Vyadhi. When Vata is vitiated in the body due to various Vata Prakopa Hetu (~causes of aggravation of Vata) it lead Dhatu Kshaya (~Degeneration of tissue elements) in the body. Rajayapana Basti is having Sadhyo Balajana (quickly increase the power) and Rasayana (immunomodulation) properties means, it increase the power of the body and promotes strength of the body quickly. Rajayapana Basti should be added milk, meat soup or Majja, honey, ghee, etc. Most of the drugs include in Rajayapana Basti are having Vatahamsaka (pacifying Vata) and Rasayana effects. Bala (~strength of body) is depending on the Udana Vata (type of Vata) and its functions are manifestation of speech, effort, enthusiasm, strength and complexion. Diminution of these functions can be directly correlated with sign and symptoms of DMD. By this Sadhyo Balajanana and Vatashamaka properties of Rajayapana Basti, normalize and enhance the action of Udana Vata even enriched the Rasa Dhatu (~nutrient fluid).Deepana (kindling of digestive power) Pachana (process of digestion) properties of Rajayapana Basti help to kindling of Agni (~enzyme complex). Agni is very essentials for the formation of the Dhatus (tissue elements) and process of metabolic transformation. So all Dhatus are nourished properly where by Dhatuksheyana (depletion of tissue elements) become reduce.

Rajayapana Basti can be given for a long time period. Colon mucosa transport ions, small molecules and water through the colonic membrane back and forth between lumen and plasma as a systemic effect. So it can get absorbed Rasayana effects without involving of drugs metabolism which occurs in stomach. So directly and quickly body get effect of whole drugs. So body nourished quickly and longer time duration without any complication. Besides colon is enriched mucosal immune system. So immune system is even enhancing by the cleansing of colon. Drug can properly reach up to cell level due to removal of Srothorodha (~obstructions in micro channels) and helps to correction of Mamsagata Dushhti (vitated muscle tissue).According to Susruta there is better absorption occurs in Rasayana drugs after the elimination process. So body will quickly get Brihmana.

Enteric nervous system (ENS) is immensely complex of neurons and present in the wall of gastrointestinal tract. This system mediates directly to regulate the intestinal blood supply and mucosal epithelial water and electrolytes transport. Due to Sadhyo Balajana and Rasayana effect of Basti, the immensely number of nerves which located in ENS can get nourished directly. So can be supposed in DMD muscle weakness is getting decreased and muscles gets proper nourishment daily by given Rajayapana Basti.

Due to Madura (sweet), Guru (heaviness), and Jeevaneeya (rejuvenation) properties of milk gives Rasayana (immunomodulation property), Virshya (aphrodisiac), Balya (strength), Medhya (nervine tonic), and Brihmana benefits.

Due to Yogavahi (~property to assimilate other properties of other drugs and procedures), Rasayana and Tridoshahara (elimination of augmented Vata, Pitta and Kapha) properties of honey helps to nourished the muscles and scraps adhered Doshas (~morbid materials) from Srotas (micro channels). Paste helps to increase the functions of Brumhana & Balya (strength) upon the properties which they have and also gives required thickness to the Basti material. So Basti may be retained in Pakvashaya (large colon) for appropriate time. Due to Sukshima (subtle) property of rock salt it reaches up to the microchannel of the body. Due to its Tikshna (sharpness) property it helps to break down the morbid materials and Dosa Sanghata (~compactness of morbid materials), Sodium iron fulfills essential action during absorption process of Basti. By the adding of ghee enhances Vara (complexion), Bala (strength), Rasa (nutrient fluid), Shukra (semen) and Ojas (~vital nectar) in DMD due to the properties of Madura Rasa, Sheeta Veerya (cold potency) and Vatapittahara (pacifying Vata and pitta) properties. According to Ayurveda Ojas be considering as the strength of the body.

Ayurveda classics emphasized should be used arid zone meat of animals for Rajayapana Basti because of these meats having mainly Vata alleviating property. So it also enriched in proteins and it helps fulfilled the lack of proteins in DMD. In Rajayapana Basti can be used bone marrow as an ingredient instead of Mamsa Rasa. When bone marrow is administered through Basti, it may act as bone marrow implantation. It also helps to correction of depleted muscles in DMD. Rajayapana Basti drugs also enriched with Tikta Rasa.
Preparation of Rajayapana Basti\(^2\)

40g of each herbal ingredient and 08 seeds of Madanapala (Randia spinosa) should be taken. Then be washed all well and cooked by adding 2.56l of water till one fourth of water remains. To this decoction should be added 1.28l cow’s milk and boiled. Of R (Randia spinosa) weakened due to Curcumin (Curcuma longa L.) is a Tikta R (bitter taste) dominant plant. Thereby it may have positive impact on cell implantation by Tikta Rasa dominance and Tikta Rasa helps to reduce the degeneration of Asti (bone tissue) and Majja. It resultant to decrease of muscle wasting.\(^{30, 31}\) By all these impacts which are adding to the Rajayapana Basti given logical and beneficial effect in the DMD to enrich their weakened muscles.

CONCLUSION

In modern medicine there is no specified treatment for muscular dystrophy. So demand becomes toward the alternative approaches for contemporary treatments. Thus Panchakarma with reference to Rajayapana Basti can be shown logical and cost effective best influence due to its Sadhyo Balajanana and Rasayana effects. But Ayurveda never promises the cure of DMD whereas its approach gives quality of life and longer survival in the DMD patients. So it has being remained to postulate the hypothesis of Rajayapana Basti is best in the management of DMD as further clinical studies.

### Table 1: Stages of Duchenne muscular dystrophy

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre symptomatic</td>
<td>Early ambulatory</td>
<td>Late ambulatory</td>
<td>Early non ambulatory</td>
<td>Late non ambulatory</td>
</tr>
<tr>
<td>Delayed milestones, speech</td>
<td>Gowers’ sign, waddling</td>
<td>Increasingly labored gait, losing ability to climb stairs and rise from floor</td>
<td>Able to maintain posture, may develop scoliosis</td>
<td>Upper limb functions and postural maintenance is increasingly limited</td>
</tr>
</tbody>
</table>

### Table 2: Ingredients of Rajayapana Basti

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Charaka Samhita</th>
<th>Sushruta Samhita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mista</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ushira</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Balita</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Araghvada</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Rasna</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Manjishta</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Trayamana</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Panarnava</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Patha</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Bibhitaka</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Guduchi</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Salaparni</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Brahati</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tikta</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Kantakari</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Prishnaparni</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Gokshura</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Madanapala 08 seeds</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cow’s milk</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cow’s ghee</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Honey</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Meat soup (Arid zone animals)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Rock salt</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

#### Paste ingredients

- Satapushpa: Anethum vasum Kurz
- Maduka: Glycyrrhiza glabra Linn
- Katajapala: Holarrhena antialyveterica Wall
- Duruhrirda: Berberis aristata DC
- Priyangu: Callicarpa macrophylla Wahl
REFERENCES


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