



## Review Article

www.ijrap.net (ISSN:2229-3566)



### A COMPARATIVE *AYURVEDIC* REVIEW OF ETIOPATHOGENESIS OF DUCHENNE MUSCULAR DYSTROPHY (INHERITED DISORDER)

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Received on: 17/11/20 Accepted on: 07/01/21

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DOI: 10.7897/2277-4343.120127

#### ABSTRACT

Duchenne muscular dystrophy (DMD) is an inherited disorder with severe progressive muscle weakness. In *Ayurveda*, *Adibala Pravritta Vyadhi* are also known as inherited diseases that caused by *Matruja beeja dushti (Shonita)* and *Pitruja beeja dushti (Shukra)*. Duchenne muscular dystrophy (DMD) has been classified under *Adibala Pravritta Vyadhi* as per *Ayurveda*. The main objective of this article is to describe the various aspect of etiopathogenesis of Duchenne muscular dystrophy (DMD) as per *Ayurvedic* literature. This article will be helpful to making the *Nidana* (Diagnosis) as per *Ayurveda* and also help in the *Chikitsa* (Treatment) of Duchenne muscular dystrophy.

**Keywords:** DMD, *Beejabhagaavyava*, *Beeja dushti*, *Adibala Pravritta*, *Shrotorodha*

#### INTRODUCTION

Duchenne muscular dystrophy is caused by an alteration (mutation) in a gene, called the DMD gene that can be inherited in families in an X-linked recessive fashion. The pooled global DMD prevalence was 7.1 cases per 100,000 males and 2.8 cases per 100,000 in the general population, while the pooled global DMD birth prevalence was 19.8 per 100,000 live male births.<sup>1</sup> The ancient *Veda's* have science as an integral part and described the genetic progression of diseases. The first reference regarding genetics was described in *Rigveda*.<sup>2</sup> Acharya Sushruta described the inherited disorders as *Adibala Pravritta Vyadhi* in *Vyadhisamuddeshiya* chapter in *Sutra Sthana* while describing the classification of diseases.<sup>3</sup> As per *Sushruta* and *Dalhana*, *Vataadi Doshas* is the main cause of vitiation of *Shukra* and *Shonita*, further *Dalhana* explained that *Matruja vikaras* derived from mother's *Shonita* (ovum) while *Pitruja vikaras* derived from father *Shukra* (sperm).<sup>4</sup> Acharya Charka also proves the importance of *Beeja* (genetic material) and explain the basics of genetics "that the part of the fetus is affected with morbidity in genes, wholly or partially of which the *Dosha* are vitiated *Beeja* (ovum/sperm), *Beejabhaga* (Chromosome) and *Beejabhagaavyava* (Genes) respectively."<sup>5</sup>

#### Different etiopathology by different authors

There are many articles available on *Ayurvedic* etiopathogenesis of Duchenne muscular dystrophy some of these have same description while some have different description regarding the etiopathogenesis of DMD. According to Trivedi Bharvi B *et al*, Duchenne muscular dystrophy cannot be directly co-related with any single disease in *Ayurveda*. This disorder can be considered under *Vata vikara* due to *Beeja Dushti* because of *Adibala Pravritta*. The important causative factors can be brought under *Aatma Karmaja* and *Beeja Dosha*. These factors bring

*Khavaigunya* at *Mamsa Dhatu* levels leading to vitiation of *Vata* which causes *Bhutagni* impairment.<sup>6</sup>

As per Ashutosh Chaturvedi *et al* pathogenesis occurs due to the *Beejabhagaavyava Dusti* which leads to *Vata Parkopa* takes *Sthana samshraya* in *Mamsa* and *Medo Dhatu* vitiates and depletes them (x-linked progressive degenerative disorder of muscle tissue). In the *Ansha-ansha kalpana* of the *Dhatu*s clearly signifies the involvement of the *Dhatvagni mandya* causes *Kshaya*. *Agnimandya* caused at the level of the *Dhatu*s leads to the formation of *Ama*. *Madhavkara* explained *Shrotodushti* as a type of *Ama* itself. While *Shrotorodha* a subtype of *Shrotodushti* produces the hypertrophy in the particular region, it also manifests as first *Parkopa* then depletion i.e., due to *Vata*. This complex variety of pathogenesis indeed is responsible for the progressive wasting and necrosis of muscle fibers. Therefore, it was well-understood thousands of years back with its severity and termed as *Asadhya*.<sup>7</sup> Pathogenesis of disease was also described by Dr. Jyoti Kaushik *et al* as *Adibala-Pravritta Mamsa Vata Kshaya* due to *Shrotorodha*. The depleted *Dhatvagni* forms *Aama* instead of proper *Mamsadhatu*. *Shrotorodha* also produces hypertrophy in a particular region.<sup>8</sup> Role of *Dhatu Avarna* is also described in pathogenesis of DMD by Dr. Mukesh Meena i.e. vitiated *Vata Dosha* play a major role in muscular dystrophy that is developed after mutation in the genome because the *Vata Dosha* is more provoked and obstructed (*Avrita*) by *Rasa*, *Raktadi Dhatu*s, then mainly *Mamsa* and *Meda* are affected as they are the main constituents of our body (As the body of human being is mainly supported by skeletons and muscles, which are the chief sites of *Vata Dosha*. As a result of this, *Meda* and *Mamsa Dhatu Kshaya* as well as *Virddhi* (Degeneration and regeneration of muscle fibers, particularly calf muscles that is responsible for pseudohypertrophy of calf muscles and hypertrophy of tongue) occurs, by which nervous tissues supplying to that affected parts lacks proper nutrition and gets deactivated. This pathophysiology leads to Muscular Disorders. The cardinal feature is *Cheshtahani*

(frequent falling, difficulty in climbing and standing), which indicates a decrease in *chala guna* of *Vata*.<sup>9</sup> A different correlation with *Jataharini* is described by Srivastva Niraj et al, in this article DMD is compared to *Paurasadini Jataharini* (in which delivered child dies before 16 years of age) one of the *Asadhya Jataharini* mentioned in *Kashyapa Samhita*.<sup>10</sup> Dr. Monica Tararam Hume et al<sup>11</sup> and Dr. Akshay A Patankar et al<sup>12</sup> also described the *Beejabhagaavyava Dusti* (Genetic involvement) and *Mamsa Dhatu Dushti* in the etiopathogenesis of Duchenne muscular dystrophy.

## CONCLUSION

Duchenne muscular dystrophy (DMD) has not been directly correlated with any disease in *Ayurveda*. After comparison of different authors, it is concluded that DMD is *Adibala Pravritta Vyadhi* and there is certainly involvement of *Beejabhagaavyava* (Genes) leading to *vitiation* of *Vata* which causes *Bhutagni* and *Dhatvagni* impairment which further lead to *Aama* instead of proper *Mamsadhatu* and *Shrotorodha* also produces hypertrophy in a particular region. Some authors described *Doshik Avarna* on *Rasa*, *Raktadi Dhatus* and some correlated with *Paurasadini Jataharini* (in which delivered child dies before 16 years of age), both conditions are also a topic of research and need more relative evidence. Duchenne muscular dystrophy (DMD) is *Adibala Pravritta Vyadhi* which is caused by a defect in *Beejabhagaavyava* (Genes) resulting in *Mamsa Dhatu Dushti*.

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## Cite this article as:

Ravi Shankar Khatri et al. *A Comparative Ayurvedic Review of Etiopathogenesis of Duchenne Muscular Dystrophy (Inherited Disorder)*. *Int. J. Res. Ayurveda Pharm.* 2021;12(1):124-125 <http://dx.doi.org/10.7897/2277-4343.120127>

Source of support: Nil, Conflict of interest: None Declared

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