Multi-Minicore Disease an insidiously progressive muscular dystrophy: a case report.

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Patient

12-year-old male presenting to outpatient pediatrics rehabilitation clinic with hypotonia, respiratory distress, and scoliosis.

Case

Developmental history included birth at term via C-section due to breech presentation. NICU stay of 11 days, due to gasping breaths and hypo-oxygenation. Attained all milestones with a delay of a few months. Received PT since 8 months of age due to hypotonia. He required AFO as a child. No family history of muscle disease. The patient developed nocturnal respiratory distress at the age of 12, was put on nocturnal non-invasive ventilation. He presented to the clinic with scoliosis, the curvature rapidly increased in the last year to 60 degrees, requiring surgical intervention. Echocardiography showed an increased velocity in the right ventricle. He was able to walk without aid. His intelligence was intact.

Assessment/Results

His physical examination was significant for painful scoliosis at the thoracolumbar spine. Patient able to walk without aid. Able to run, though reported by partents to be slower than others. No enlarged calves noted. Gower sign was positive. His manual muscle testing was 4/5 throughout with marked hypotonia. Genetic testing was positive for selenon gene two pathogenic variants c.713dup and c.-11_81del were identified.

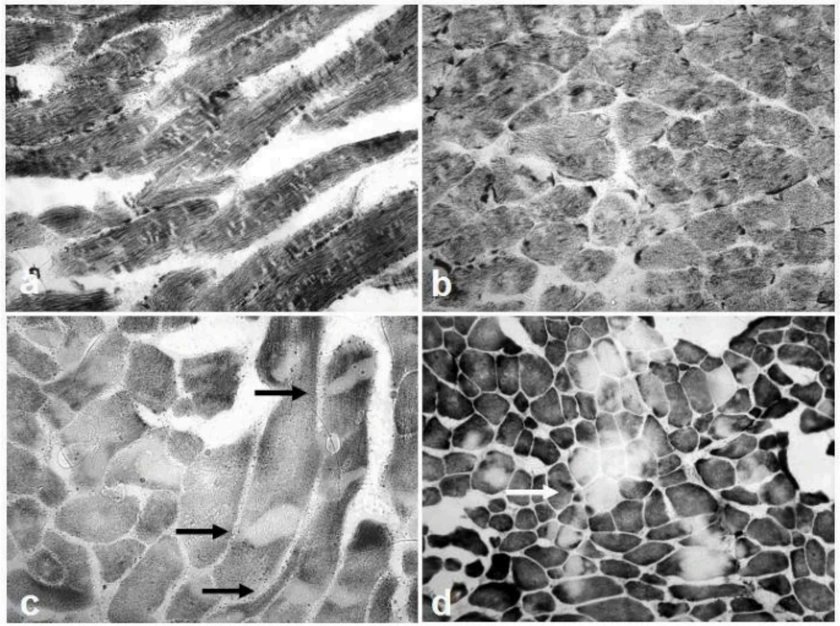

Figure 1: Histopathological features of Multi-minicore disease. NADH-TR (a–c) and cytochrome oxidase (COX) (d) stains. Predominance of darker staining type 1 fibres noted. "Minicores" range from numerous small lesions of limited extent (a-b) to few multiple large lesions often extending throughout the entire fibre diameter ("multicores") (c, →) and occasionally affecting the same area in adjacent fibres (d, →). Obtained from https://ojrd.biomedcentral.com/articles/10.1186/1750-1172-2-31 with permission.

References

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Conclusion

Hypotonia since birth in conjunction with respiratory distress and scoliosis raises the possibility of multi-minicore disease. Genetic testing with muscular biopsy may lead to the diagnosis.

Discussion

Multi-minicore disease (MmD) is a type of muscular dystrophy [1]. It comprises 0.40% of all muscle diseases and 26.6% of all myopathies [2].

The weakness is present at birth, it is predominately proximal, affecting axial muscles, particularly the head and neck. Delay acquiring head control may be an early sign. The weakness is slowly progressive or non-progressive. A common feature is a high-pitched voice and myopathic facial features that may be associated with a high arched or cleft palate [3]. In most cases, the multi-minicore disease is associated with respiratory difficulties and progressive scoliosis. Rigid spine muscular dystrophy is characterized by limited flexion of the lumbar and cervical spine. Respiratory impairment may lead to secondary cardiac failure [4].

Selenon gene is located at 1p36.11, it produces selenoprotein N, which protects from oxidative stress. Mutations have been shown to lead to multi-minicore disease. Other mutations such as Skeletal Muscle Ryanodine Receptor (RYR1) Gene mutation have also been implicated.

Muscle biopsy is positive for the presence of multiple "minicores," that correlates with a lack of mitochondria in muscle fibers (Figure 1). "Minicores" may be present in other conditions such as Marfan's, cerebro-retino-muscular syndrome, Type III glycogenosis, inflammatory myopathies, emetine myopathy, muscular dystrophies, therefore the diagnosis should be made when a) minicores are dominant on the histological specimen and b) clinical features of a congenital myopathy are present
The treatment is supportive ventilation, an aggressive pulmonary toilet, and physical therapy.