Abstract:
Myotonic dystrophy (DM) is a clinically and genetically heterogeneous disorder. There are two major forms namely DM1 (for a century known as Steinert's disease) and DM2, recognized in 1994 as a milder version of DM1. The prevalence of DM is 1 in 8000 in the general population, but the proportions of myotonic dystrophy caused by DM1 and DM2 are unknown. These autosomal dominant conditions are among the most common forms of adult-onset muscular dystrophy. However, it is more than simply a muscular dystrophy per se, since affected individuals may show cataracts, cardiac conduction abnormalities, infertility, and insulin resistance. Furthermore, there is a severe congenital form of DM1 with marked developmental disability. The genetic disease is one of the best examples for a phenomenon called ‘anticipation’ in which the age of onset of the disease is early and the disease severity is greater in the successive generations. One consequence of the multi-systemic nature of this disorder is that individuals affected by DM1 or DM2 may first present to internists, cardiologists, ophthalmologists, endocrinologists, and pediatricians (in the case of DM1), before they see a neurologist. We present a classic case of a family of myotonic dystrophy, from the southern districts of Tamilnadu, with the phenomenon of genetic anticipation in this article.

Keyword: Myotonic dystrophy, autosomal dominant, anticipation, multisystem, triple repeat disorder

CASE REPORT
45 year old male patient presented with complaints of difficulty in using both lower limbs and upper limbs. He was apparently normal 20 years back when he noticed difficulty in releasing hands after holding an object firmly. He had insidious onset, gradually progressive weakness of distal followed by weakness of proximal muscles of the lower limbs in the form of difficulty in holding slippers, climbing upstairs and getting up from squatting posture. He was unable to walk without support for the past 1 year. He also had insidious onset, gradually progressive weakness of distal followed by weakness of proximal muscles.
of the upper limbs in the form of difficulty in mixing food, buttoning shirt, difficulty in raising arm above the head and difficulty in combing his hair. He also had difficulty in lifting his head from pillow and difficulty in turning in bed side to side. He also had history of insidious onset, gradually progressive, painless, diminution of vision for past 2 yrs. There was no history of sensory disturbances, cranial nerve involvement or bowel and bladder disturbances. He had no chest pain, palpitations or syncope.

He was the fourth born of second degree consanguineous parents. All his four siblings were normal. His paternal cousin brother had similar complaints. However his uncle and grandparents were normal. He got married at the age of 25 years and had 3 children. Eldest was a girl now aged 18 years and two boys aged 16 years and 11 years respectively. All of the three children had similar complaints which were manifest at an earlier age.

Examining, he was obese with frontal baldness, low set ears, bilateral immature cataract, malocclusion of teeth and gynaecomastia (HATCHET FACIES). His vitals were normal. His visual acuity was 6/24 in the right eye and ½ / 60 in the left eye and there was a posterior subcapsular cataract.

His levator palpebrae superioris, masseter, temporalis, orbicularis oculi and orbicularis oris were weak. He also had dysarthria for linguals, labials and gutturals. He had wasting involving his forearm extensors and small muscles of the hand while there was hypertrophy of his thigh and calf muscles. He had hypotonia in all groups of muscles. His power was 4/5 across the shoulder joint and 3/5 across other joints of the upper and lower limbs. He had significant grip and percussion myotonia. Sensory, cerebellar, autonomic, spine and cranial examination was normal. Other systemic examination was normal.

![Figure 1: Pedigree Chart](image)

**EXAMINATION**

On examination, he was obese with frontal baldness, low set ears, bilateral immature cataract, malocclusion of teeth and gynaecomastia (HATCHET FACIES). His vitals were normal. His visual acuity was 6/24 in the right eye and ½ / 60 in the left eye and there was a posterior subcapsular cataract.
**INVESTIGATIONS:**
Complete Blood Counts, Blood sugar, renal parameters, Creatinine kinase, Chest X – Ray, ECG and ECHO were normal. Ophthalmological opinion was obtained which revealed bilateral subcapsular lenticular opacities.

**DIAGNOSIS:**
Patient was diagnosed as a case of **MYOTONIC DYSTROPHY TYPE1** by classical clinical features such as weakness, myotonia & autosomal dominant inheritance with genetic anticipation.

**TREATMENT:**
He was treated with Tab Phenytoin 100 mg thrice daily and advised physiotherapy exercises.

**DISCUSSION**
Myotonic dystrophy (dystrophia myotonica, DM) is a chronic, slowly progressing, highly variable inherited multi-systemic disease. It is characterized by wasting of the muscles (muscular dystrophy), cataracts, heart conduction defects, endocrine changes, and myotonia. Myotonic dystrophy can occur in patients of any age. Genetically the disease is autosomal dominant. Classical myotonic dystrophy patients have muscle weakness, myotonia, and a range of other symptoms, in early to mid-adult life; congenital myotonic dystrophy patients have severe symptoms at birth; mildly affected adults may have weakness, myotonia, cataract, or diabetes in mid to late adulthood.

**GENETICS**
Myotonic dystrophy type 1 is one of a group of neurogenetic conditions termed ‘triplet repeat disorders’. It is caused by an expansion in the size of a three base-pair (triplet) CTG repeat sequence in the **DMPK gene**. As the number of repeats increase, signs and symptoms become more prominent, with earlier age of onset. The clinical severity tends to increase in successive generations in a family, a phenomenon termed ‘anticipation’. This is due to the dynamic nature of the repeat expansion, which tends to increase in size as it is passed from parent to child.

**CLINICAL FEATURES OF MYOTONIC DYSTROPHY**
The clinical expression of DM1 varies widely and involves many systems other than muscle. Affected patients have a typical “hatchet-faced” appearance due to temporalis, masseter, and facial muscle atrophy and weakness.
Frontal baldness is also characteristic of the disease. Neck muscles, including flexors and sternocleidomastoids, and distal limb muscles are involved early. Weakness of wrist extensors, finger extensors, and intrinsic hand muscles impairs function. Ankle dorsiflexor weakness may cause footdrop. Proximal muscles remain stronger throughout the course, although preferential atrophy and weakness of quadriceps muscles occur in many patients. Palatal, pharyngeal, and tongue involvement produce a dysarthric speech, nasal voice, and swallowing problems. Some patients have diaphragm and intercostal muscle weakness, resulting in respiratory insufficiency. Myotonia, which usually appears by age 5 years, is demonstrable by percussion of the thenar eminence, the tongue, and wrist extensor muscles. Myotonia causes a slow relaxation of hand grip after a forced voluntary closure. Advanced muscle wasting makes myotonia more difficult to detect. Cardiac disturbances occur commonly in patients with DM1. ECG abnormalities include first-degree heart block and more extensive conduction system involvement. Complete heart block and sudden death can occur. Congestive heart failure occurs infrequently but may result from cor pulmonale secondary to respiratory failure. Mitral valve prolapse also occurs commonly. Other associated features include intellectual impairment, hypersomnia, posterior subcapsular cataracts, gonadal atrophy, insulin resistance, and decreased esophageal and colonic motility. Congenital myotonic dystrophy is a more severe form of DM1 and occurs in 25% of infants of affected mothers. It is characterized by severe facial and bulbar weakness, transient neonatal respiratory insufficiency, and mental retardation. DM2, or PROMM (Proximal Myotonic Myopathy), has a distinct pattern of muscle weakness affecting mainly proximal muscles. Other features of the disease overlap with DM1, including cataracts, testicular atrophy, insulin resistance, constipation, hypersomnia, and cognitive defects. Cardiac conduction defects occur but are less common, and the hatchet face and frontal baldness are less consistent features. A very striking difference is the failure to clearly identify a congenital form of DM2.

TREATMENT

The myotonia in DM1 rarely warrants treatment, though some patients with DM2 are significantly bothered by the discomfort related to the associated muscle stiffness. Phenytoin and mexiletine are the preferred agents for the occasional patient who requires an anti-myotonia drug; other agents, particularly quinine and procainamide, may worsen cardiac conduction. A cardiac pacemaker should be considered for patients with unexplained syncope, advanced conduction system abnormalities with evidence of second-degree heart block, or trifascicular conduction disturbances with marked prolongation of the PR interval. Molded ankle-foot orthoses help stabilize gait in patients with foot drop. Excessive daytime somnolence with or without sleep apnea is not uncommon. Sleep studies, noninvasive respiratory support (biphasic positive airway pressure, BiPAP), and treatment with modafinil may be beneficial.

CONCLUSION

Myotonic dystrophy is a multisystem disorder that displays marked variability in signs and symptoms: the non-neuromuscular complications of myotonic dystrophy may be severely disabling or fatal.
Myotonic dystrophy is caused by an autosomal dominant gene mutation. Each affected person, male or female, has a 50% chance of transmitting the disease gene to their child.

Cardiac arrhythmias and conduction defects are common and their severity does not correlate with the severity of muscle involvement or the size of the gene mutation. Regular cardiac monitoring is required.

In myotonic dystrophy families, there tends to be progressively younger age of onset of disease with increasing clinical severity in successive generations.

Patients are at increased risk of anaesthetic complications, and should carry a ‘MedicAlert’ or similar card.

FURTHER READING


