Diagnostic Odyssey of Myotonic Disorders

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Insights from a patient and caregiver survey, treating physicians and scientific literature.

Patient/caregiver surveys:

38 Participants with Myotonic Disorders

- 19 NDM with chloride channelopathies
- 10 DM1
- 7 NDM with sodium channelopathies
- 2 DM2

KOL roundtable to leverage insights from survey participants with experience in clinical practice:

- 7 paediatric neurologists
- 2 adult neurologists

Experts from : United Kingdom, Spain, Italy, Germany, France

Key

Symptoms · Treatment · Diagnosis · Barriers

NDM paediatric patient journey

DM paediatric patient journey

Birth

- Cl⁻ channelopathy: Symptoms may be present from birth.
- SNEL: Symptoms may present during infancy.
- No curative treatment for SNEL. Mexiletine (off-label) and flecainide.
- Present from birth with main symptoms being severe generalised weakness, hypotonia and respiratory compromise. Myotonia is usually absent in infancy, and muscle strength can improve with time if the infant survives.

1 Year

- Cl⁻ channelopathy: Myotonic symptoms may become apparent when children start to walk.
- Congenital DM1 diagnosed.

2 Year

- Na⁺ channelopathy: Age of onset can range from 2–30 years. Myotonia is usually mild, often involving eyelids, hands and tongue.

3 Year

- TMC myotonia: Onset within the first decade of life.
- Congenital DM1 myotonia: Myotonic symptoms can start to become apparent.

4 Year

- Parents may assume children will 'grow out' of symptoms as they develop.

5 Year

- Na⁺ channelopathy: Myotonic symptoms may become apparent when children begin to participate in sports.

6 Year

- Parents may be unable to describe symptoms of myotonia and focus on other DM symptoms.
- Myotonia is not reported by patients.
- Cl⁻ channelopathy: Symptoms usually present in the first decade of life with stiffness in legs more than arms, hands and face.

7 Year

- Childhood-onset DM1: Myotonia starts to become apparent from 7 years of age; increased impact at 13–18 years.
- PMC myotonia: Onset within the first decade of life.

8 Year

- Myotonia in DM is considered a secondary symptom, and is under-appreciated by HCPs.
- Diagnosis delayed due to patients developing coping strategies and lack of specialist diagnostic knowledge.

9 Year

- BMC myotonia: Onset from 4–12 years of age.
- HyperPP myotonia: Onset from 2–30 years of age.
- Clinical assessment is complicated by lack of myotonia during clinic visits and and difficulties to test for myotonia in clinic.
- Access to treatment can be hindered by lack of awareness of severity and impact of myotonia.

10 Year

- Diagnostic delays can range from 4 months from onset of symptoms to 20 years.
- Age of diagnosis is hugely varied from infancy to adulthood.
- Patients and caregivers may refuse treatment due to: bad taste, hesitancy, safety concerns.

11 Year

- Patients may be reluctant to worry their parents
- Myotonia treatment age ≥10 years. No curative treatment, off-label symptomatic treatment include acetazolamide, carbamazepine, flecainide, mexiletine
- Treatment age ≥10 years. No curative treatment, off-label symptomatic treatment include carbamazepine, flecainide, mexiletine.
- Parents may not actively pursue a diagnosis.
- Diagnosis difficult in patients with no family history.

12 Year

- Diagnosis can be delayed up to 18 years.
- Age of diagnosis is variable, but often in early adolescence.

13 Year

- Embarrassment may prevent children seeking advice about their symptoms.

16 Year

- DM2: Myotonic symptoms can present from 8 years, but are more commonly seen from late adolescence.

17 Year

18 Year

- Diagnosis of DM2 typically occurs in adulthood.
- Cardiac arrhythmias or other cardiac conditions may occur as patients enter adulthood.
- Access to treatment can be hindered by lack of awareness of severity and impact of myotonia.

NDM Ch- Channelopathy: 13-18 Years of Age

Combined prevalence = ~1:100,000 (higher in Scandinavia (7-10:100,000)

- BMC = ~1:25,0004
- TMC = ~1:400,0004

Predominant symptoms

- Limb stiffness (lower limbs more often)
- Grip myotonia
- Pain with stiffness
- Cold trigger
- Warm-up phenomenon

NDM Na+ Channelopathy: 13-18 Years of Age

Combined prevalence = ~1:100,0001

- PMC = ~1:250,0002
- HyperPP = ~1:200,0003

Predominant symptoms

- Pain with stiffness
- Episodic weakness
- Grip myotonia
- Cold trigger
- Eye closing myotonia
- Limb stiffness
- Facial stiffness
- SNEL: hypertonia and laryngospasm

DM: 13-18 Years of Age

DM1: Estimated prevalence of 3–15:100,000 (higher prevalence (≥20X) in Sweden, Basque of Spain and Quebec)

Childhood-onset DM1: no published data

Congenital DM1: exact global prevalence is unknown; however, congenital DM1 likely represents 10–30% of overall DM1 population

Estimates of incidence: 2–28:100,000 live births

DM2: prevalence unknown

BMC:Becker's myotonia congenita; Cl-: chloride; DM: myotonic dystrophy; DM1: myotonic dystrophy Type 1; DM2: myotonic dystrophy Type 2; HyperPP: hyperkalemic periodic paralysis; KOL: key opinion leader; Na+: sodium; NDM: non-dystrophic myotonia; PMC:paramyotonia congenita; SNEL:severe neonatal episodic laryngospasm.

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