Muscular Dystrophy UK

Fighting muscle-wasting conditions

Congenital myasthenic syndrome (CMS)

Overview

Congenital myasthenic syndrome (CMS) is a group of inherited conditions that are present from birth or early childhood.

Many different genetic mutations in a series of different genes can cause CMS. These mutations cause problems with the way the messages are transmitted from the nerves to the muscles, causing weakness (myasthenia) and causing the muscles to tire easily (fatigue).

Muscle weakness varies depending on the type of genetic mutation, so impact on mobility ranges from mild to severe. In the less severe cases, the condition may cause drooping eyelids and fatigue, but only mildly interferes with daily life. In the more severe cases however, where breathing or other essential bodily functions are greatly affected, CMS can be life-threatening or even fatal.

Symptoms usually start in early childhood, although there are some adult onset cases. Symptoms are similar to those of myasthenia gravis but can't be treated with the steroids and treatments, which are effective on myasthenia gravis.

Is Congenital myasthenic syndrome the same as myasthenia gravis?

No. When people talk about *myasthenia*, they usually mean *myasthenia gravis* – an autoimmune condition like rheumatoid arthritis, which can affect children and adults. Myasthenia gravis causes the body to produce proteins that block and destroy some of their receptors, making messaging from nerves to muscles less effective. Myasthenia gravis can be treated with steroids, immunosuppressive drugs and thymectomy (surgical removal of the thymus gland).

Symptoms

While various symptoms may need further investigation, they can vary greatly from person to person and not all symptoms will be found or experienced in the same way.

The following symptoms may be noticed in someone with Congenital myasthenic syndrome (CMS):

- **in the womb**: decreased movement and too much amniotic fluid (polyhydramnios)
- **from birth**: stiff joints (arthrogryposis), reduced movements, a weak suck and cry, difficulty feeding, swallowing and possibly episodic breathing difficulties
- **in childhood**: may start walking late, become tired with exercise, only able to walk short distances, unable to hold their arms above the head for long, and have difficulty climbing stairs. They may also have difficulty chewing food, scoliosis (curvature of the spine), a waddling gait and a tendency to fall easily. Sometimes there are distinctive facial features such as a prominent lower jaw, high arched palate and crowded teeth (maloclusion), droopy eyes when tired, reduced eye movement with occasional double vision and unclear or nasal speech. Children with CMS may also get frequent chest infections and need hospital treatment
- **in adulthood**: may have similar problems to those of children but these will be noticed at a later age. They are often poor at sport, easily fatigued especially on climbing stairs and have weakened ability to move their fingers and wrists.

Symptoms can vary greatly from person to person and not all will be present or experienced in the same way. Fatigue is a common characteristic.

Many other conditions that affect muscle, nerve and brain function can cause similar symptoms to the above.

How does CMS progress?

It is important to get a correct diagnosis to be able to predict the long-term outcome. If diagnosed early, CMS can be treated and prevented to some extent with medication. Almost all children with CMS will be able to walk independently and it does not affect intellect in any way. Some CMS is so mild that it is only diagnosed in late childhood, adolescence or even adulthood. Supportive treatment is offered in all cases.

Breathing support, help with feeding, monitoring of lung function, physiotherapy and speech and language therapy may be needed. Most people with CMS find their muscle strength improves with time and the need for medication reduces. In some rare cases, there is no treatment that helps. Some will need life-long medication to maintain muscle strength. In some instances, body strength may improve with treatment, but eyelid droop and eye movements do not.

Causes

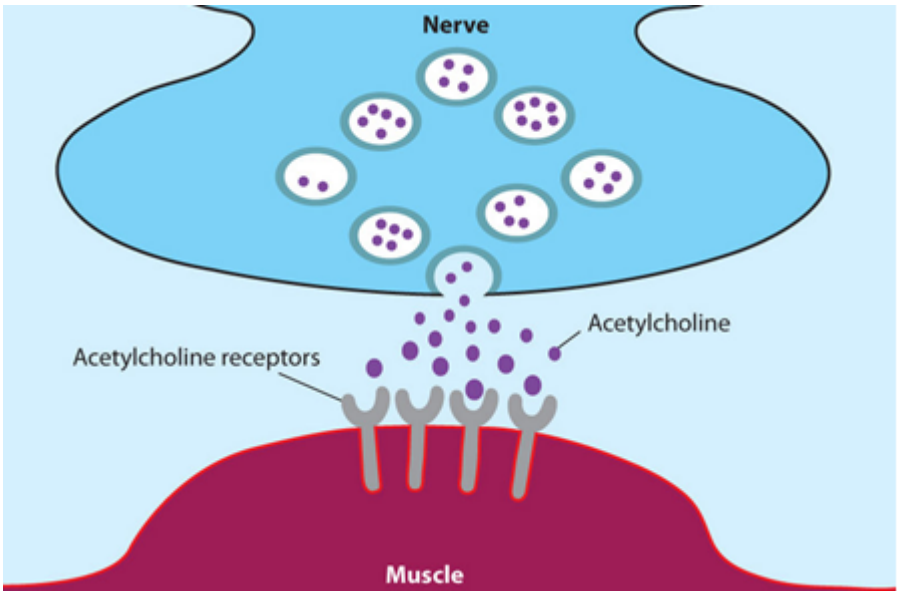
There are many types of Congenital myasthenic syndrome (CMS), dependent on where the problem in sending messages from the nerve to muscle occurs.

Identifying where the problem occurs may inform which drugs to prescribe to help with the management of symptoms. CMS can fall into three categories:

- **pre-synaptic:** at the nerve ending, where there is a fault in the production and release of the chemical (acetylcholine) that signals to the muscle to contract
- **synaptic:** in the gap between the nerve and muscle, or

- **post-synaptic:** on the muscle where there is a fault in the receptors that receive the chemical message.

Many of the defects are known to be caused by alterations in known genes and so can be identified using a DNA test. Some people require a muscle biopsy to test how the nerve-muscle junction works. There are forms of CMS that can't yet be identified but rapid advances in research are helping to find more of the genes responsible.



How is CMS inherited?

Children who have inherited an AR type of CMS will pass on one copy of the faulty gene to their child. They are also unlikely to have affected children because the chances that their partner also carries a faulty CMS gene are very small, unless they marry a blood relative.

The type of CMS known as 'slow channel CMS' is known to be inherited in a different way. It is an **autosomal dominant** (AD) mutation, which means it can be passed on from either parent to child. If either parent has the condition, there is a 50 percent chance any future pregnancy will result in a child with CMS. In other rare cases, the foetus may develop a sudden new mutation in its genetic make-up without the parents' carrying any faulty genes.

Diagnosis

A specialist needs to make a clinical diagnosis and carry out tests for Congenital myasthenic syndrome (CMS), which will include taking a clinical history and measuring the function and response of muscles and nerves to repeated stimulation.

Further tests are needed to exclude other causes of the symptoms, including specialised genetic investigations using DNA from a blood sample, and a muscle biopsy to exclude other similar muscle-wasting conditions. A final definite diagnosis is made through genetic analysis of a DNA sample.

Once a diagnosis of CMS is made, families should be referred to a specialist genetics centre for a full discussion of the genetic implications of the diagnosis. Prenatal diagnosis can be offered in a

future pregnancy if the genetic mutation has been identified.

Treatment

It is important to try to get as much gentle exercise as possible and to continue physiotherapy to prevent complications like joint stiffness (contractures), However, it may help to use a wheelchair for any distance, to help conserve strength.

Medication, anaesthesia and operations

Some drugs such as antibiotics, cardiovascular drugs and drugs for psychiatric conditions should be avoided by people with Congenital myasthenic syndrome (CMS) because they interfere with normal neuromuscular function and may make symptoms worse.

Always check with the doctor who treats your CMS before taking any new medication as it can be dangerous to start a new drug without consultation. It is also important to inform the anaesthetist and surgeon of your diagnosis before undertaking any surgery or treatment.

A Medic-Alert card or bracelet can be an important source of information to emergency care providers about CMS. Muscular Dystrophy UK has developed a printable, online neuromuscular care plan that you can complete with all the information health professionals will need to know specifically about your condition. Contact our care and support team and they will send you one.

In the event of serious health concerns

Your GP is your first point of contact for minor illness but for more serious concerns, you should contact your physician or paediatrician. In an emergency, dial 999 for an ambulance. It is also advisable to keep a list of useful numbers handy for family members and carers to contact in an emergency.

If your child has CMS, you should have a *rapid access* agreement to the paediatric service at the local hospital so you won't have to wait to be seen if he or she is unwell.

People who have breathing difficulties and recurrent chest infections should be under the care of a specialist respiratory centre and are advised to have the annual flu and pneumococcal vaccine. Parents and carers should also be trained in cardiopulmonary resuscitation.

Where to go for more information

Apart from your doctor and hospital specialist, there are specialist nurses in many centres who will offer help, advice and support to a family. Ask your GP or hospital specialist whether such a service exists in your area. The care and support team at Muscular Dystrophy UK can help you find your nearest specialist centre.

Disclaimer

If you have feedback about this factsheet or want to request references, please email info@musculardystrophyuk.org.

Here for you

The friendly staff in the care and support team at the Muscular Dystrophy UK's London office are available on 0800 652 6352 or info@musculardystrophyuk.org.

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