



Mast Cell Activation Syndrome-an over view

Mast Cell Activation Syndrome (**MCAS** - also know as Mast Cell Activation Disorder) is a relatively unknown condition that may affect some people with postural tachycardia syndrome (PoTS) and is caused by abnormal mast cells or abnormal release of chemicals contained within them. PoTS and MCAS are not very well understood and the overlap between the two conditions is complicated. At this moment in time there may seem to be more questions than answers.

Normal mast cell function

Mast cells are a normal part of our body's immune system and help to fight infection. They constantly interact with the environment, and these are the cells that may be involved in allergic and inflammatory reactions. Mast cells are found in most organs of the body, and especially in locations that are in close contact with the external environment, such as skin, airways, and intestines. When they are activated they release chemicals such as histamine that create all the symptoms that we commonly associate with allergies.

Mast cell disorders

When mast cell function or numbers are abnormal this can result in a number of different medical conditions:

1. **Mastocytosis** occurs when there are too many mast cells in the body. This condition does not occur in PoTS.

2. **MCAS** occurs where the body has a normal number of mast cells, but they don't function properly. It is likely that the signs and symptoms of MCAS are caused by the chemicals that are released inappropriately when mast cells are stimulated. It was first recognised in 1991 and the diagnostic criteria were proposed in 2010.

Commonest signs and symptoms of mast cell activation syndrome

(In over 50% of patients)

- Fatigue (83%)
- Skin writing (Dermographism) (76%)
- Pain all over the body (Fibromyalgia) (75%)
- Near fainting and fainting (71%)
- Headache (63%)
- Itching/nettle rash (urticaria)(63%)
- Tingling (58%)
- Nausea/vomiting (57%)



- Chills (56%)
- Skin swelling that moves around the body (56%)
- Eye irritation (53%)
- Breathlessness (53%)

Others signs and symptoms reposted include:

- variable blood pressure
- excessively fast heart rate
- blocked nose
- wheezing
- flushing
- diarrhoea, abdominal cramps, nausea

On rare occasions, some people with MCAS may have a severe life threatening allergic reaction (anaphylaxis which includes rapid swelling under the skin and tissues of the mouth and airways (angioedema) which requires immediate medical treatment.

It is important to remember that many of these symptoms can occur in other conditions and if patients have these symptoms, it does not necessarily mean that they have MCAS. They must have additional features as seen in the diagnostic criteria below.

Diagnosis

Diagnosis of MCAS is usually made when similar conditions such as mastocytosis or pheochromocytoma (a growth on the adrenal glands) have been ruled out, and then the following three criteria are met.

1. Typical clinical signs and symptoms - as in list above
2. High levels of chemicals released by the mast cells during an episode are found in the blood

or urine. The tests should be done during or shortly after an episode.

3. Appropriate response to typical treatments for MCAS.

Triggers

Most MCAS patients have identifiable triggers which cause the mast cells to release their chemicals. However these triggers can be very variable and sometimes it can be difficult to identify them. Known triggers should obviously be avoided if possible.

These are a list of some of the common triggers

- Alcohol
- Heat
- Medication
 - antibiotics
 - non-steroidal anti-inflammatory drugs e.g. ibuprofen and aspirin
 - morphine
 - certain drugs used to relax muscles during surgery
 - substances used to improve visibility of organs during certain x-rays
- medical procedures (eg, general anaesthesia, biopsy, endoscopy)
- wasp/bee stings, other insect bites
- fever or infection
- exercise
- physical stimulation (e.g. pressure, friction)
- emotions/stress

These are some other triggers reported by MCAS patients*:

- certain foods
- environmental toxins e.g. pesticides/perfumes
- bacteria/fungi/mould
- artificial colours/flavourings
- menstrual cycle



Treatment

There is no permanent cure available for MCAS and management is based on the avoidance of triggers and medication to help to control symptoms.

The following are medications used to help control symptoms of MCAS:

1. Medication that blocks histamine. Examples include loratadine and cetirizine, which dampen down the effect of histamine released by the mast cells. Ranitidine is another type of histamine blocker which is more commonly used to reduce the amount of acid produced by your stomach, but may also be used in MCAS.
2. Medication that stabilises the mast cells to stop them releasing their chemicals. Examples include sodium chromoglycate, ketotifen and montelukast.

Mast cell activation in PoTS

Mast cell activation syndrome should be considered in patients with PoTS when tachycardia on standing is associated with intermittent flushing. MCAS is likely if a urine sample provided within 4 hours of a flushing episode (this is not the same as a 24 hour urine sample) contains abnormally high levels of methylhistamine. This test is very specialised therefore not routinely carried out.

Patients may experience breathlessness, headache, light-headedness, diarrhoea, nausea, vomiting and passing excessive amounts of urine. One of the triggers for these episodes may be prolonged standing. Patients often develop high blood pressure on becoming upright.

In addition to the usual treatments for MCAS, methyldopa and clonidine may be useful to treat patients with both MCAS and PoTS.

Mast Cell Activation Syndrome and hypermobility

MCAS is thought to be common in the general population, and therefore is likely to also occur in patients with hypermobile Ehlers-Danlos Syndromes (hEDS) and hypermobility spectrum disorder (previously known as Ehlers-Danlos type III and joint hypermobility syndrome) Several researchers have noted a possible link between the Ehlers-Danlos Syndromes and mast cell disorders, primarily patients with the hypermobility type of EDS.

The treatment for mast cell disorders in patients with hypermobility disorders is the same as in those without.

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Details regarding the sources of evidence used in the production of this leaflet are available on the PoTS UK website.

See www.potsuk.org/sources_of_evidence

* Currently no available medical evidence. Based on patient experience and opinion.



GLOSSARY

ANAPHYLAXIS - A severe form of allergic reaction, which is life threatening and requires immediate medical attention

DERMOGRAPHISM - sometimes called skin writing. An exaggerated response to skin stroking which results in an initial red line then a wheal.

DIAGNOSTIC CRITERIA - conditions that need to be met to confirm that a person has a medical condition.

EHLERS-DANLOS SYNDROMES -a group of inherited disorders affecting the connective tissues (tissues that give structure to our body). Patients can have problems affecting many of their body systems including joints, skin, blood vessels, gut, bladder and bones.

FIBROMYALGIA - a long-term health condition that causes many symptoms, especially muscle and bone related pain

HISTAMINE - a chemical compound which is released by cells in the body in response to injury or allergy and has an effect on some types of muscle and blood vessel

INFLAMMATORY REACTION - a localised physical condition in which part of the body becomes reddened, swollen, hot, and often painful in response to injury or infection.

MAST CELL - a type of white blood cell that is part of the immune system and contain many chemicals including (amongst at least 20 others!) histamine and heparin

MASTOCYTOSIS - a very rare condition. It is caused by excessive multiplication and therefore higher than normal numbers of mast cells in the body.

METHYLHISTAMINE -a chemical that is produced when histamine is broken down in the body.

POTS - short for postural tachycardia syndrome, a condition that causes sustained increase in heart rate on standing, and is associated with symptoms similar to those found in low blood pressure.

URTICARIA - a rash consisting of slightly elevated patches (wheals) in the skin that are redder or paler than the surrounding skin and often itchy