How can MH-susceptible patients be identified?

Because MH is usually an inherited disorder, all members of a family in which MH has occurred must also be considered MH susceptible and treated accordingly, unless proven otherwise. Even those who have had prior uneventful operations cannot be certain they are at risk – deaths have occurred after patients have undergone earlier, successful surgeries. Certainly any family with a history of anaesthetic deaths or complications should make this known to the anaesthetist before undergoing surgery.

Is there a test for MH?

There is currently no simple diagnostic test available for screening the general population. The most accurate diagnostic test involves a biopsy of skeletal muscle from the thigh. It is usually reserved for families where an MH episode has occurred or when a patient has had a previous suspicious reaction to an anaesthetic. The test is available at only one centre in New Zealand, Palmerston North Hospital.

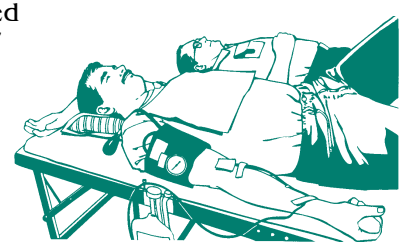
Can MH susceptible patients have surgery?

Yes. Surgery is safe for known MH-susceptible patients by using non-triggering anaesthetics and special precautions.

In surgery for a known MH-susceptible, the anaesthetist will:

- avoid the use of known MH-triggering anaesthetics
- be familiar with the signs and treatment of MH
- use a continuous temperature monitor
- have an MH cart in the operating room stocked with adequate supplies of dantrolene, and all relevant emergency equipment required for a crisis.

Palmerston North Hospital has successfully anaesthetised a number of susceptible patients.



Why test for MH if other anaesthetics are available?

The anaesthetic drugs which trigger MH are the most commonly used agents. For some anaesthetics, it is best to have the full range of agents available, otherwise risk of complications to the patient increases. In other operations the alternative anaesthetics are satisfactory and there is a minimal increase in risk.

Communications Ref: 0709

Malignant Hyperthermia

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MidCentral Health

The sudden unexpected death of a healthy individual undergoing minor surgery is a tragedy almost beyond comprehension in this day of modern medical miracles. Yet this still happens from the syndrome known as Malignant Hyperthermia (MH). Of those who survive, some could be left with severe brain damage, failed kidneys, or impaired function of other major organs.

What is Malignant Hyperthermia?

MH is a chain reaction of symptoms (a syndrome) triggered in susceptible individuals by commonly used general anaesthetics and, possibly, some other drugs. The symptoms include a greatly increased body metabolism, muscle rigidity and fever up to 47°C or more. Death may result from cardiac arrest, brain damage, internal haemorrhaging or failure of other body systems.

Who is susceptible to MH?

MH susceptibility is genetically inherited. The basis for the underlying problem in some families is a single defective gene, usually inherited from one parent. In other families the genetic pattern is not clear.

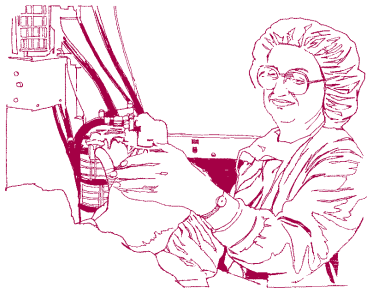
Those who are susceptible may be completely unaware of this risk unless exposed to anaesthetics leading to a life threatening crisis. And it should be noted that not everyone who has the MH gene develops an MH episode during every triggering anaesthetic.

What drugs trigger MH?

The volatile gaseous inhalation anaesthetics (halothane enflurane, isoflurane, sevoflurane, desflurane) are MH triggers. The muscle relaxant suxamethonium is also a trigger.

Are other anaesthetics safe?

Yes. Barbiturates, narcotics (opiods) and tranquillisers, along with the inhaled gas Nitrous Oxide, are safe for MH susceptible persons. Local anaesthetics have also been found to be safe.



Anaesthesia induction agents (which are injected intravenously to put the patient to sleep), do not induce MH.

Muscle relaxants other than suxamethonium are safe drugs to use.

What is the incidence of MH?

The exact incidence of MH is unknown. The rate occurrence has been estimated to be as frequent as 1:5,000 or as unusual as 1:65,000 administrations of triggering general anaesthesia.

What causes an episode?

Research evidence points to a derangement of the processes which regulate muscle contraction. Certain commonly used anaesthetic agents and the muscle relaxant suxamethonium induce increase in concentrations of calcium in the muscle cells. High calcium levels cause the muscles to contract and become rigid, leading to a greatly increased metabolism. This process results in heat production (fever) and muscle cell breakdown.

How is MH treated?

MH had a mortality rate of nearly 80% at the time it was identified in 1960. Treatment consisted only of cooling the patient and treating the specific symptoms but not the underlying cause.

Since 1978 in New Zealand, the antidote drug dantrolene sodium (Dantrium) has been available for the treatment of MH and has contributed greatly to a dramatic decline in mortality. The syndrome must be identified and treated early for a successful outcome. Greater awareness among anaesthetists and other medical professionals in the past few years has resulted in earlier diagnosis and treatment. The best treatment is prevention, through detection of those at risk prior to surgery.