COMMON COMPLICATIONS

Malignant Hyperthermia

Intraoperative teaching · CA-1

THE QUESTION

Where the evidence disagrees

This topic was selected because an evidence synthesis beats a textbook on it: the trials disagree, or the guidance has moved recently.

THE EVIDENCE

What each source contributes, and how strong it is

Study design first — a cohort and a randomised trial do not carry the same weight.

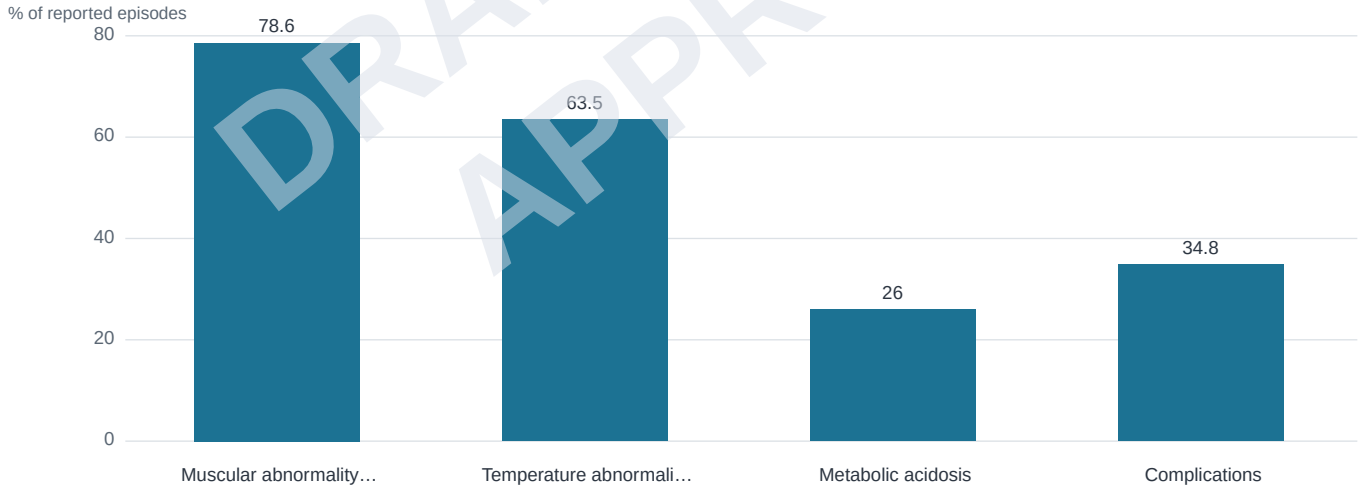
Design	Year	Journal	What it found
Guideline	2025	Journal of anesthesia	This 2025 Japanese Society of Anesthesiologists guideline recommends treating
Review	2024	Critical care medicine	This expert review states that malignant hyperthermia presents with early-onset
Guideline	2025	British journal of anaesthesia	This guideline provides the first consensus definition of a clinical malignant
Meta-analysis	2017	Canadian journal of anaesthesia =	This retrospective cohort study and systematic review found that patients with
Guideline	2020	Anaesthesia	This guideline states that genetically susceptible individuals are at risk of
Review	2022	Cureus	This review article notes that severe or fulminant cases of drug-induced

6 resolved citations behind this deck; every point above traces to one of them.

THE NUMBERS

Muscle and ventilation change before the temperature does

Hypercarbia and tachycardia come first; fever is a late confirmation, not the trigger to act.



Only a quarter had metabolic acidosis, and a third suffered a complication. Treating on the respiratory and muscular signs is treating early enough to matter.

Larach et al., North American MH Registry, Anesth Analg 2010 · PMID 20081135

WHERE THE GUIDANCE SITS

What the guidelines and pooled evidence say

4 findings, each on the slide that follows.

JOURNAL OF ANESTHESIA 2026

This 2025 Japanese Society of Anesthesiologists guideline recommends treating

This 2025 Japanese Society of Anesthesiologists guideline recommends treating suspected malignant hyperthermia by immediately stopping triggering…

BRITISH JOURNAL OF ANAESTHESIA 2026

This guideline provides the first consensus definition of a clinical malignant

This guideline provides the first consensus definition of a clinical malignant hyperthermia event, establishing a standardized criterion for…

This retrospective cohort study and systematic review found that patients with

This retrospective cohort study and systematic review found that patients with exertional rhabdomyolysis may carry MH-causative RYR1 or CACNA1S…

ANAESTHESIA 2021

This guideline states that genetically susceptible individuals are at risk of

This guideline states that genetically susceptible individuals are at risk of developing malignant hyperthermia if exposed to any potent inhalational…

WHERE THE GUIDANCE SITS

This 2025 Japanese Society of Anesthesiologists guideline recommends treating

Guideline · Journal of anesthesia

This 2025 Japanese Society of Anesthesiologists guideline recommends treating suspected malignant hyperthermia by immediately stopping triggering agents and administering an initial intravenous dantrolene dose of 1-2 mg/kg, reflecting a higher initial dose based on international standards.

JSA guideline for management of malignant hyperthermia in 2025, Journal of anesthesia 2026 · PMID 41504952

WHERE THE GUIDANCE SITS

This guideline provides the first consensus definition of a clinical malignant

Guideline · British journal of anaesthesia

This guideline provides the first consensus definition of a clinical malignant hyperthermia event, establishing a standardized criterion for recognizing suspected cases during anaesthesia.

European Malignant Hyperthermia Group 2025 guidelines for the investigation of malignant hyperthermia susceptibility, British journal of anaesthesia 2026 · PMID 41478797

WHERE THE GUIDANCE SITS

This retrospective cohort study and systematic review found that patients with

Meta-analysis · Canadian journal of anaesthesia =

This retrospective cohort study and systematic review found that patients with exertional rhabdomyolysis may carry MH-causative RYR1 or CACNA1S variants, suggesting an increased risk for malignant hyperthermia even without a prior adverse anesthetic reaction.

Malignant hyperthermia susceptibility in patients with exertional rhabdomyolysis: a retrospective cohort study and updated systematic review, Canadian journal of anaesthesia = Journal canadien d'anesthesie 2017 · PMID 28326467

WHERE THE GUIDANCE SITS

This guideline states that genetically susceptible individuals are at risk of

Guideline · Anaesthesia

This guideline states that genetically susceptible individuals are at risk of developing malignant hyperthermia if exposed to any potent inhalational anaesthetics or suxamethonium.

Malignant hyperthermia 2020: Guideline from the Association of Anaesthetists, Anaesthesia 2021 · PMID 33399225

IN PRACTICE

What the cohorts and reviews add

2 findings, each on the slide that follows.

CRITICAL CARE MEDICINE 2024

This expert review states that malignant hyperthermia presents with early-onset

This expert review states that malignant hyperthermia presents with early-onset hypercarbia, temperature rise

CUREUS 2022

This review article notes that severe or fulminant cases of drug-induced

This review article notes that severe or fulminant cases of drug-induced hyperthermia, including malignant hyperthermia, may evolve into an…

IN PRACTICE

This expert review states that malignant hyperthermia presents with early-onset

Review · Critical care medicine

This expert review states that malignant hyperthermia presents with early-onset hypercarbia, temperature rise, and muscular rigidity following exposure to inhalational volatile anesthetics and succinylcholine, and recommends acute management with dantrolene, active cooling, and hyperventilation.

Malignant Hyperthermia, Critical care medicine 2024 · PMID 39171998

IN PRACTICE

This review article notes that severe or fulminant cases of drug-induced

Review · Cureus

This review article notes that severe or fulminant cases of drug-induced hyperthermia, including malignant hyperthermia, may evolve into an inflammatory syndrome best described as heat stroke.

Drug-Induced Hyperthermia Review, Cureus 2022 · PMID 36039261

IN THE ROOM

What this changes about the next case

Colour is the strength of the evidence behind each step, not the urgency.

1. **1**
   This 2025 Japanese Society of Anesthesiologists guideline recommends treating suspected malignant hyperthermia by immediately stopping triggering agents and administering an initial intravenous dantrolene dose of 1-2 mg/kg, reflecting a higher initial dose based on international standards.
2. **2**
   This guideline provides the first consensus definition of a clinical malignant hyperthermia event, establishing a standardized criterion for recognizing suspected cases during anaesthesia.
3. **3**
   This guideline states that genetically susceptible individuals are at risk of developing malignant hyperthermia if exposed to any potent inhalational anaesthetics or suxamethonium.
4. **4**
   This retrospective cohort study and systematic review found that patients with exertional rhabdomyolysis may carry MH-causative RYR1 or CACNA1S variants, suggesting an increased risk for malignant hyperthermia even without a prior adverse anesthetic reaction.
5. **5**
   This expert review states that malignant hyperthermia presents with early-onset hypercarbia, temperature rise, and muscular rigidity following exposure to inhalational volatile anesthetics and succinylcholine, and recommends acute management with dantrolene, active cooling, and hyperventilation.

KEY TAKEAWAYS

What to carry into the next case

This 2025 Japanese Society of Anesthesiologists guideline recommends treating
Journal of anesthesia 2026

This expert review states that malignant hyperthermia presents with early-onset
Critical care medicine 2024

This guideline provides the first consensus definition of a clinical malignant
British journal of anaesthesia 2026

This retrospective cohort study and systematic review found that patients with

This 2025 Japanese Society of Anesthesiologists guideline recommends treating

QUESTIONS I'LL ASK YOU IN THE ROOM

1. Walk me through your setup for this before we start.
2. What are you watching on the monitor that would tell you this is going wrong?
3. What is your first move if it does?

4. What would you want ready in the room before induction?

BOARD QUESTIONS

1. In the North American MH Registry series of 286 episodes, which combination was present in the large majority of patients at presentation?

A. Muscular abnormality together with respiratory acidosis
B. Metabolic acidosis without respiratory acidosis
C. Temperature above 39°C as the first recorded sign
D. Masseter spasm as the sole abnormality

2. A resident says fever is the cardinal sign of malignant hyperthermia and that its absence argues against the diagnosis. Using the North American registry data, what is wrong with that reasoning, and where does temperature actually sit in the sequence?

3. In that same registry series, roughly what proportion of patients suffered a complication (excluding recrudescence, cardiac arrest and death), and what was the median total dantrolene dose actually given?

A. About 35% had a complication; median dantrolene 5.9 mg/kg
B. About 5% had a complication; median dantrolene 2.5 mg/kg
C. About 60% had a complication; median dantrolene 10 mg/kg
D. About 35% had a complication; median dantrolene 1.0 mg/kg

ANSWER KEY

1. A. Muscular abnormality together with respiratory acidosis

78.6% presented with both muscular abnormalities and respiratory acidosis, while only 26.0% had metabolic acidosis. Rising EtCO2 with muscle rigidity is the usual presentation; most patients did not present with a metabolic picture.

Larach et al., Clinical presentation, treatment, and complications of malignant hyperthermia in North America 1987-2006, Anesth Analg 2010 · PMID 20081135

2. Temperature abnormality was among the first three signs in 63.5% of episodes — common, but neither invariably first nor universal, and the median maximum temperature was 39.1°C rather than the extreme values often quoted. Hypercarbia, sinus tachycardia and masseter spasm were the frequent initial signs. Those signs are available earlier than a temperature is, which is why the registry data argue against waiting for fever to act.

Temperature abnormality was common but neither first nor universal — a third of episodes did not have it among their first three signs. It should not be required before treating.

Larach et al., Clinical presentation, treatment, and complications of malignant hyperthermia in North America 1987-2006, Anesth Analg 2010 · PMID 20081135

3. A. About 35% had a complication; median dantrolene 5.9 mg/kg

Complications occurred in 63 of 181 patients (34.8%), and the median total dantrolene dose was 5.9 mg/kg — above the 2.5 mg/kg initial dose most people remember. Plan for repeat dosing from the outset.

Larach et al., Clinical presentation, treatment, and complications of malignant hyperthermia in North America 1987-2006, Anesth Analg 2010 · PMID 20081135

This 2025 Japanese Society of Anesthesiologists guideline recommends treating

SOURCES

[1] JSA guideline for management of malignant hyperthermia in 2025, Journal of anesthesia 2026 · PMID 41504952

[2] Malignant Hyperthermia, Critical care medicine 2024 · PMID 39171998

[3] European Malignant Hyperthermia Group 2025 guidelines for the investigation of malignant hyperthermia susceptibility, British journal of anaesthesia 2026 · PMID 41478797

[4] Malignant hyperthermia susceptibility in patients with exertional rhabdomyolysis: a retrospective cohort study and updated systematic review, Canadian journal of anaesthesia = Journal canadien d'anesthesie 2017 · PMID 28326467

[5] Malignant hyperthermia 2020: Guideline from the Association of Anaesthetists, Anaesthesia 2021 · PMID 33399225

[6] Drug-Induced Hyperthermia Review, Cureus 2022 · PMID 36039261

[7] Larach et al., North American MH Registry, Anesth Analg 2010 · PMID 20081135