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Malignant Hyperthermia
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Inclusion

Providing care to patients in the operating room as a nurse anesthetist is a challenging yet rewarding and challenging. There is a need to be quick on your feet and think critically to make sure the patient is safe. It is important to have good communication in the operating room so that all of the medical staff are on the same page.

Pathophysiology

The RYR1 (ryanodine receptor calcium channel) is used in cardiac muscle and skeletal muscle to release calcium (Ca2+) from the sarcoplasmic reticulum (SRR) in response to depolarization of the sarcolemma (membrane). Calcium release from the SRR is necessary for muscle contraction. However, in the presence of a triggering agent (e.g., succinylcholine), calcium release from the SRR is enhanced, leading to increased intracellular calcium levels. This can lead to an increase in myocardial contractility, which can result in tachycardia and hypertension. Additionally, increased calcium levels can lead to increased muscle contraction, which can cause muscle rigidity, hyperthermia, and increased oxygen consumption.

Signs and Symptoms

- Ventilation/ventilation
- Tachycardia
- Hyperthermia (body core temperature may rise at a rate of 1°C to 2°C every 5 minutes with average of 39.0°C to 40.0°C, with core temperature ranging from 45.5°C to 46.5°C)
- Acute cardiovascular collapse
- Rhabdomyolysis
- Disseminated intravascular coagulation
- Pulmonary edema

Significance of Pathophysiology

Malignant hyperthermia (MHD) is a rare, autosomal dominant disorder that occurs in patients with an abnormality in the RYR1 gene. When a patient is administered an triggering agent, such as succinylcholine, the RYR1 gene is activated and calcium release from the SRR is enhanced, leading to an increase in intracellular calcium levels. This can lead to muscle rigidity, hyperthermia, and increased oxygen consumption. If untreated, MHD can be fatal, with a mortality rate of up to 50%.

References


Conclusion

Malignant hyperthermia is a rare, autosomal dominant disorder and medical emergency that requires immediate recognition and treatment in order to increase the patient's chance of survival. This is because the response to the triggering agent is often severe and can lead to a cascade of biochemical and physiological changes that can rapidly lead to death. In order to manage malignant hyperthermia, it is essential to recognize the signs and symptoms and to implement timely and effective treatment. This includes the use of dantrolene, a muscle relaxant that inhibits the release of calcium from the sarcoplasmic reticulum, and the use of cooling therapies to reduce body temperature. Early recognition and treatment are critical in reducing the mortality rate associated with malignant hyperthermia.