

Unraveling the Heat: A Case Report of Malignant Hyperthermia

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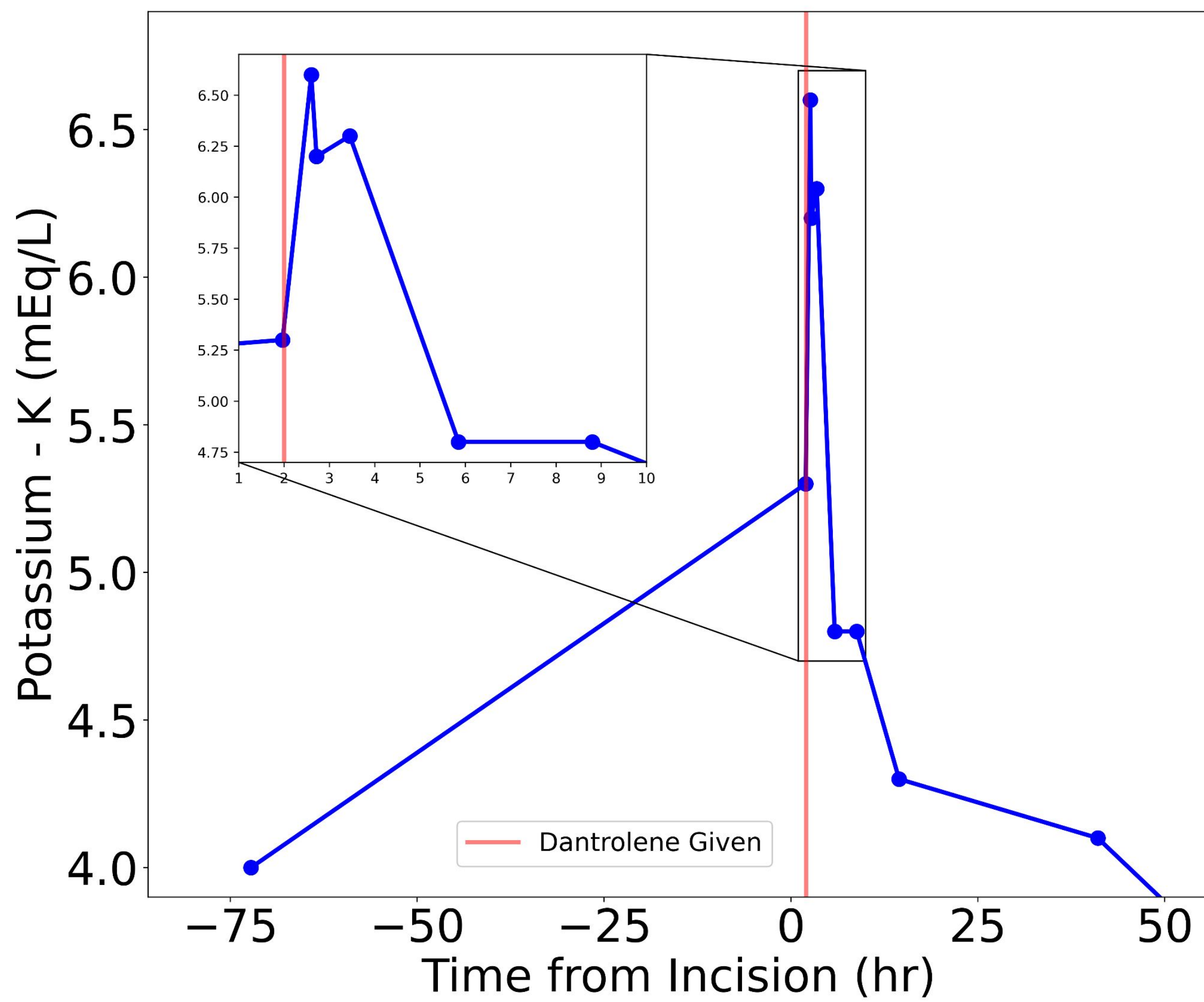
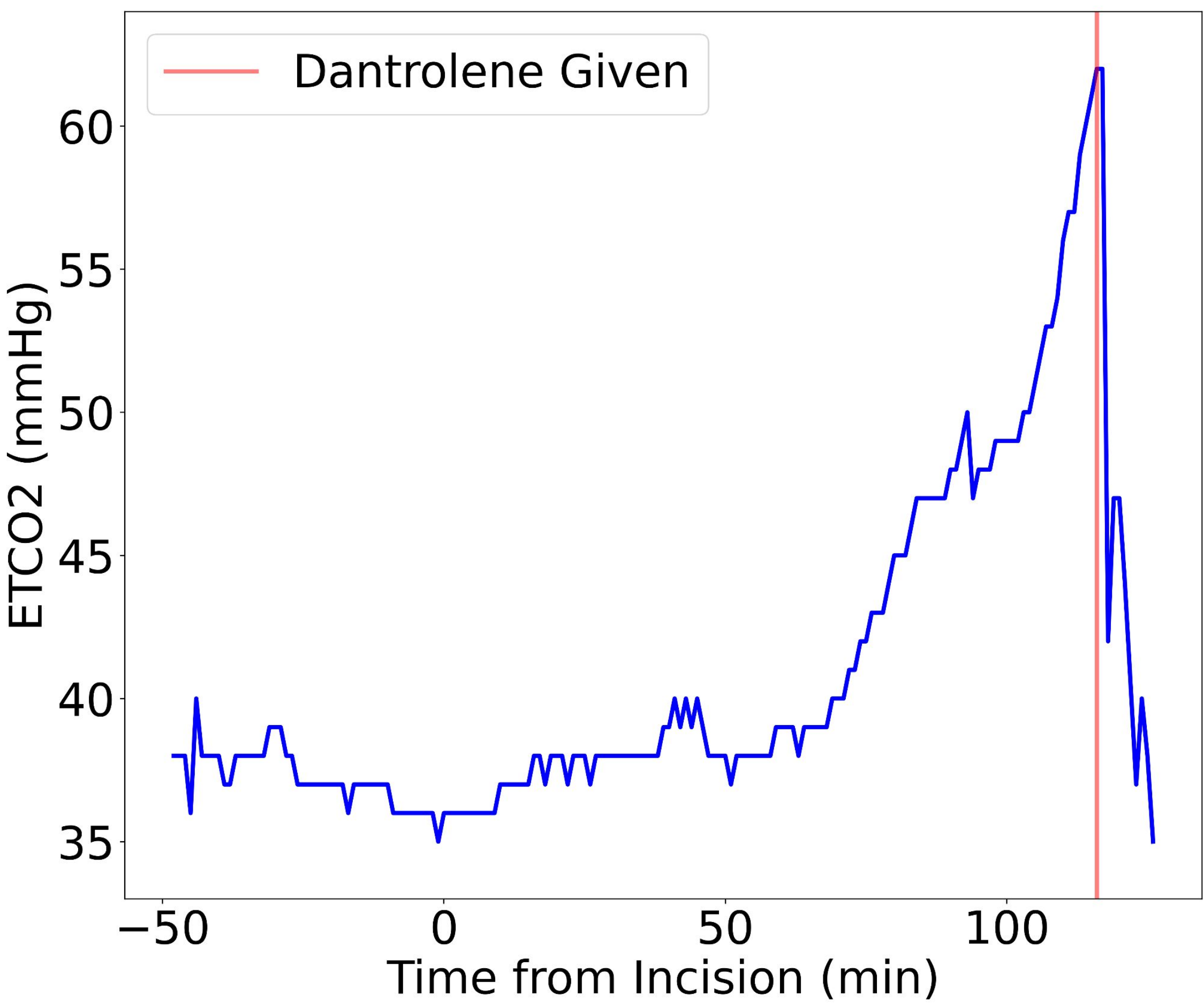


Learning Objectives:

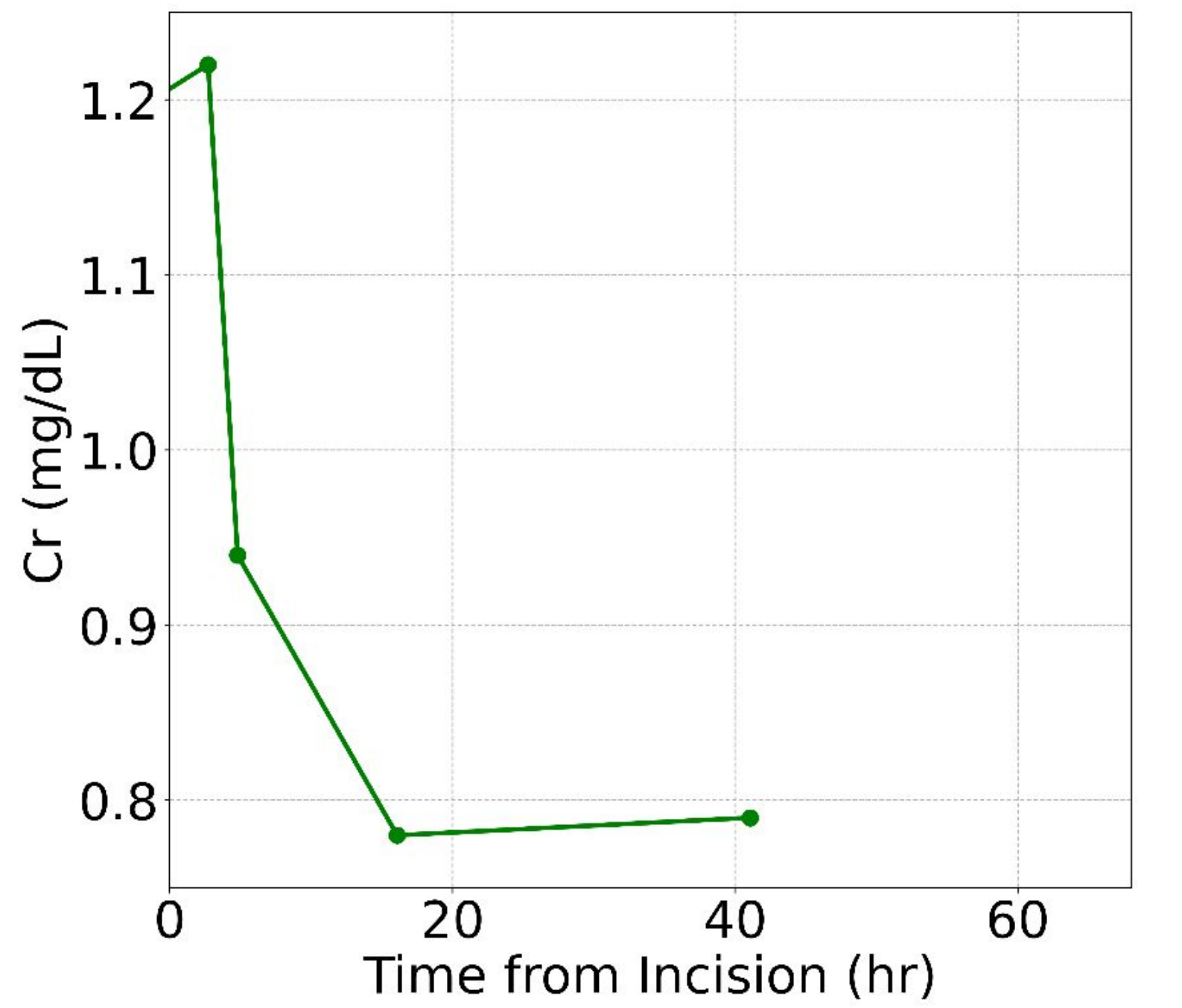
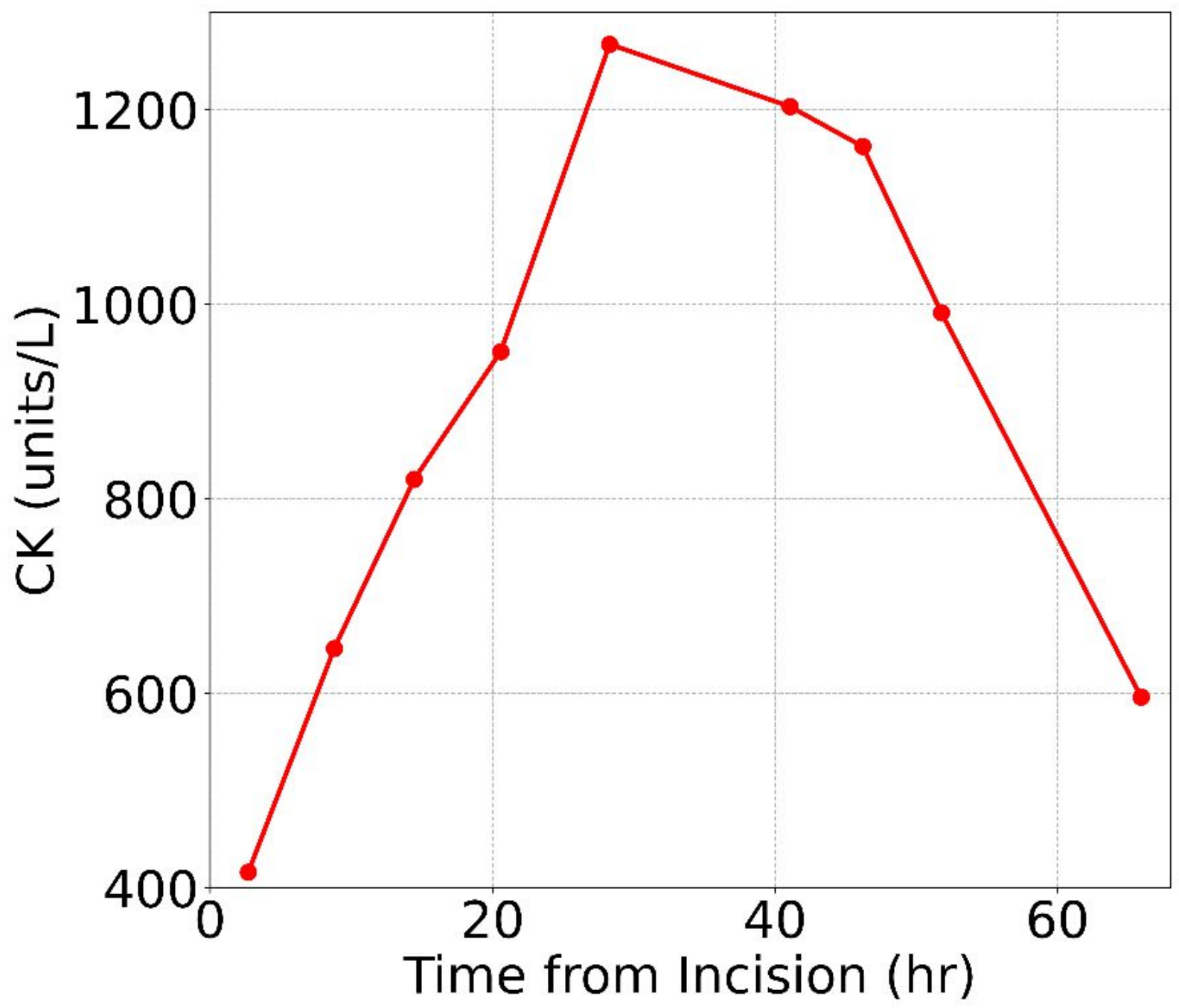
- To recognize the signs and symptoms of malignant hyperthermia (MH)
- To review the appropriate therapies for MH
- To review a recent clinical case to understand the importance of promptly treating a patient who shows subtle signs of MH

Case Presentation

- 31 yo male with BMI 40 and no prior surgical history presented for tibial plateau fixation
- About 2 hours after intubation, the patient's ETCO₂ rose significantly, despite alterations to ventilatory parameters (increasing tidal volume, respiratory rate and minute ventilation)
- When ETCO₂ reached 55 mm Hg, the patient was hyperventilated with an Ambu bag on 100% O₂ and transitioned to TIVA
- OR team was made aware of a potential MH diagnosis
- ABG showed K 6.6 mEq/L, respiratory acidosis (pH 7.24, pCO₂ 62 mmHg, HCO₃ 24.4 mEq/L)
- ETCO₂ reached 62 mmHg and dantrolene was given for suspected MH
- Patient was brought the SICU intubated for further observation and subsequent dantrolene administration
- Extubated POD#1



Lab Value	2 Days Pre-op	1 Day Pre-op
WBC	10.4	13.0
Hgb	14.7	14.3
K	4.0	—
Na	139	—
BUN	12	—
Cr	0.84	—
CO2	22	—



Discussion

MH is an autosomal dominant genetic disorder primarily caused by mutations in the ryanodine receptor RYR1. Known triggers for MH include halogenated anesthetics, succinylcholine, and rarely, physiologic stressors. The incidence of MH is variable with reports between 1:50,000 and 1:100,000 adults and may be more common than clinicians realize.¹

Identifying MH can be difficult because clinical signs are nonspecific and are associated with normal surgical sequelae, such as tachycardia, hypercarbia, and hypotension. This patient's vital signs and lab abnormalities both suggested MH. This patient had hyperkalemia to a maximum of 6.6 mEq/L. Dantrolene is implicated in hyperkalemia, however, this is usually in patients taking calcium channel blockers.² Additionally, his creatinine was 0.84 mg/dL and rose to 1.22 mg/dL. The patient's elevated creatine kinase (CK) to 1267 U/L was further evidence of muscle damage. Although surgery could be a risk factor for increased CK, orthopedic studies suggest CK would not rise that significantly with surgery alone.³ Therefore, it is important to recognize that MH can present on a spectrum. Fulminant MH may not present dramatically, but high suspicion may lead to faster treatment and improved patient outcomes.

Conclusion

- Signs of malignant hyperthermia (MH) can be subtle with variable progression
- Presentation can occur *anytime* in the intraoperative and postoperative periods
- Outcome is linked to prompt treatment

References

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