



# Itching for an answer: should sugammadex be given for suspected vecuronium anaphylaxis?



Michael P Puglia II MD<sup>2</sup>, Allan F Simpao MD<sup>1</sup>, Jorge A Galvez MD<sup>1</sup>, Denis H Jablonka MD<sup>1</sup>

<sup>1</sup>Department of Anesthesiology and Critical Care, Perelman School of Medicine, University of Pennsylvania and Children's Hospital Of Philadelphia, Philadelphia, PA

<sup>2</sup>Department of Anesthesiology, Mott Children's Hospital, University of Michigan, Ann Arbor, MI

## Summary

- Anesthesia NOW! Called for a CODE!
- 32 month-old male with pulseless cardiac arrest immediately after induction of anesthesia and intubation.

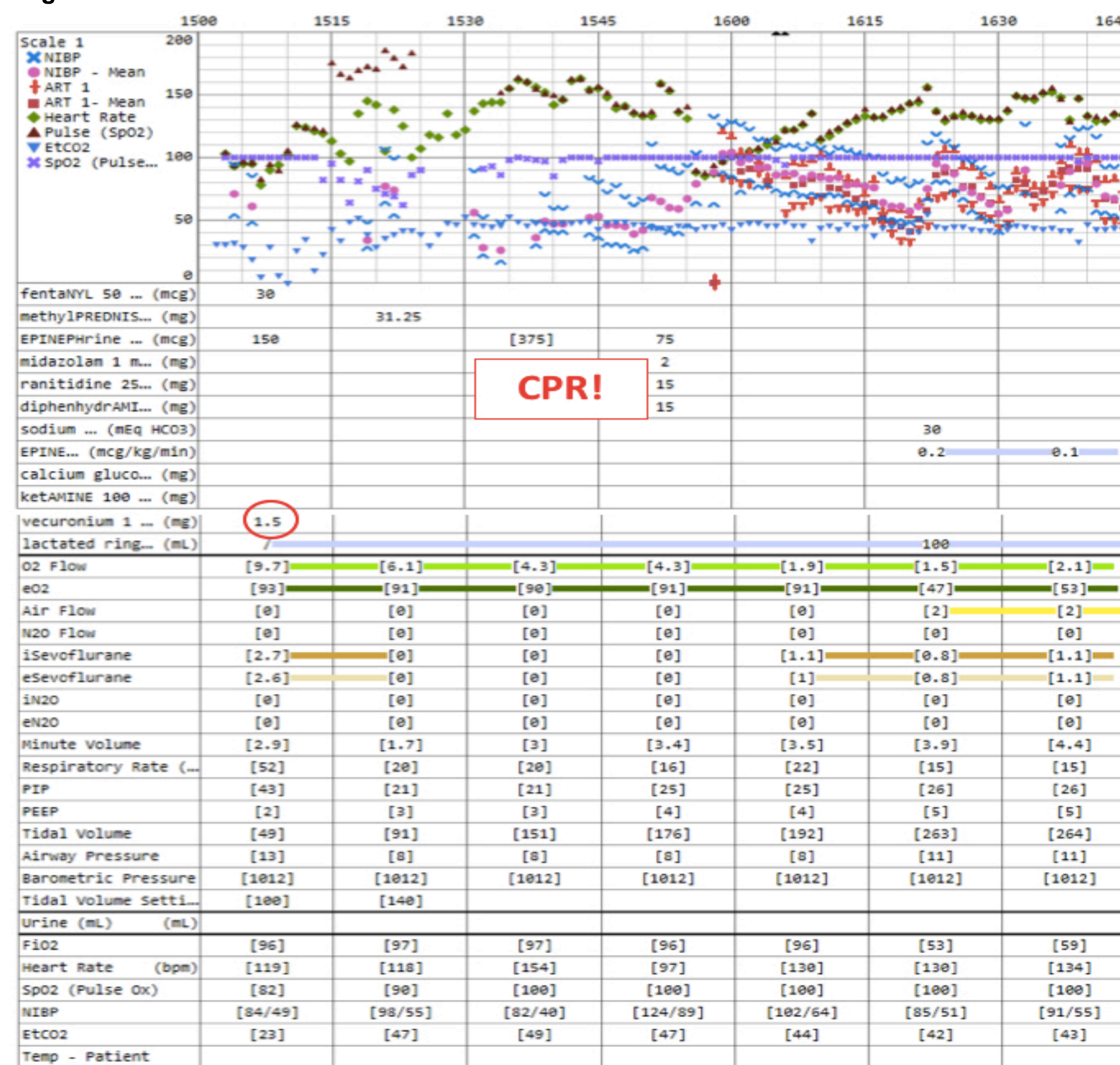
## Patient

- At 6 months old, oligodendoglioma -> hydrocephalus -> VPS
- Uneventful sedations and general anesthetics for imaging and VPS revisions
- Allergies to Tegaderm and amoxicillin, but no formal testing
- Presented with signs and symptoms indicating VPS malfunction
- Somnolent upon arrival to the preop area. His vital signs were stable. A peripheral IV was present and functioning well.

## Anesthetic

- Sevoflurane induction, followed by fentanyl IV bolus (1mcg/kg) and vecuronium (0.1mg/kg)
- After intubation, ventilation became difficult with decreased lung compliance noted.
- The child became gray and dusky. A call for help was made as SpO<sub>2</sub> dropped.
- Help arrived and the team began to deliver CPR.
- No palpable pulses, so the team continued chest compressions, epinephrine, steroids and antihistamines and obtained additional IV access (Figure 1)
- A presumptive diagnosis of anaphylaxis was made and a blood sample was sent for a tryptase level
- Spontaneous circulation resumed. Surgery proceeded.
- Anticipating this child would require future VPS revisions, consultation with an allergy specialist became critical

Figure 1. Anesthesia record



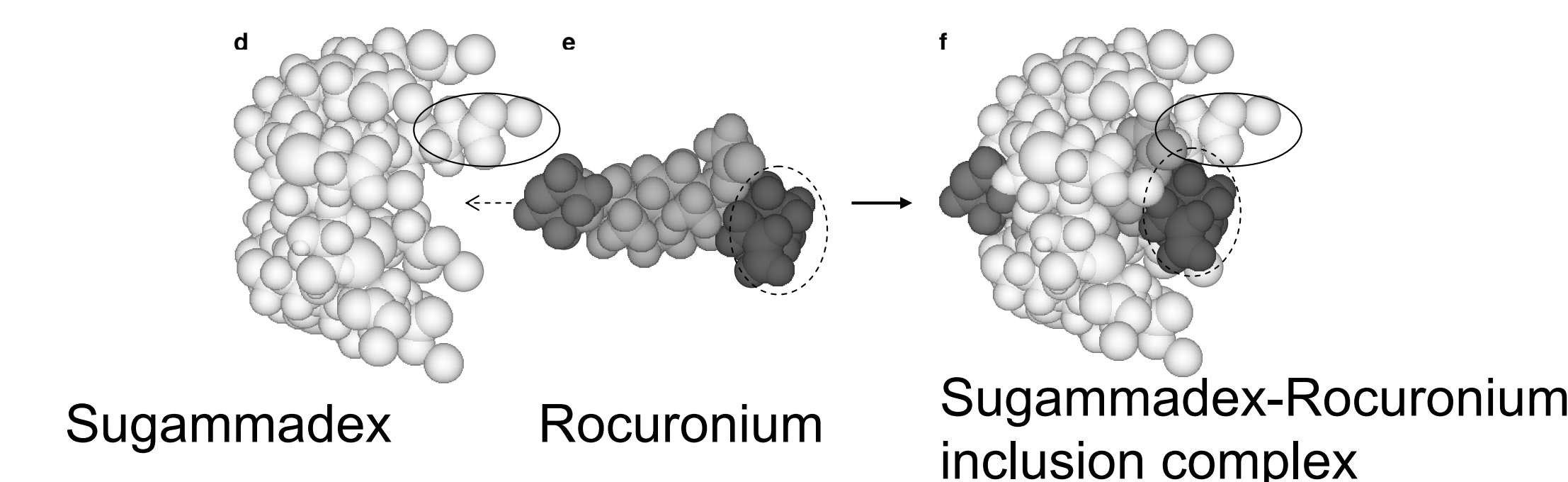
## Laboratory data

- Tryptase level: **58** ug/L (ref <= 10.9 ug/L) **HIGH**
- Skin prick test: **Highly positive for vecuronium**, negative for rocuronium

## Discussion

- Neuromuscular blockers (NMB's) cause most anesthesia related anaphylaxis.
- An elevated tryptase level indicates mastocyte degranulation and usually confirms the diagnosis.
- Sugammadex has been described in the treatment of aminosteroid NMB related anaphylaxis. Its mechanism of action involves encapsulating rocuronium or vecuronium with rapid clearance from the circulation (Figure 2).
- IgE antibodies crosslink with offending agents at the basophil and sustain the release of inflammatory and vasomodulation substances (1).
- Sugammadex was considered but ultimately not administered in this case. The patient had full and complete recovery from this event without sequelae.
- Questions:
  - Does sugammadex-aminosteroid complex prevent IgE cross-linkage and halt the immunologic process?
  - To what extent does sugammadex bind other, important steroids?
  - What would be the "correct" dose of sugammadex in suspected NMB anaphylaxis?

Figure 2. Sugammadex-rocuronium interaction



## Conclusions

- Wider use of sugammadex may lead to higher rates of aminosteroid NMB administration and thus more frequent NMB-related anaphylaxis events.
- Sugammadex might have the potential to ameliorate NMB-induced anaphylaxis.
- While human trials to address this question may be unfeasible, in vitro studies may offer insight into sugammadex' ability to reduce IgE crosslinking.