Refrigerated Stability of Diluted Cisatracurium, Rocuronium, and Vecuronium for skin testing after perioperative anaphylaxis

Kristen Dinsmore  
*East Tennessee State University*

Bethany Campbell  
*King University*

Timothy Archibald  
*East Tennessee State University*

Greg Mosier  
*East Tennessee State University*

Stacy Brown PhD  
*East Tennessee State University*

See next page for additional authors

Follow this and additional works at: [https://dc.etsu.edu/asrf](https://dc.etsu.edu/asrf)

Part of the Allergy and Immunology Commons, Anesthesia and Analgesia Commons, Anesthesiology Commons, Medicinal and Pharmaceutical Chemistry Commons, Pharmaceutical Preparations Commons, Pharmacology Commons, and the Surgical Procedures, Operative Commons

Dinsmore, Kristen; Campbell, Bethany; Archibald, Timothy; Mosier, Greg; Brown, Stacy PhD; and Gonzalez-Estrada, Alexei MD, "Refrigerated Stability of Diluted Cisatracurium, Rocuronium, and Vecuronium for skin testing after perioperative anaphylaxis" (2018). *Appalachian Student Research Forum*. 146.  
[https://dc.etsu.edu/asrf/2018/schedule/146](https://dc.etsu.edu/asrf/2018/schedule/146)

This Oral Presentation is brought to you for free and open access by the Events at Digital Commons @ East Tennessee State University. It has been accepted for inclusion in Appalachian Student Research Forum by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact digilib@etsu.edu.
Refrigerated Stability of Diluted Cisatracurium, Rocuronium, and Vecuronium for Skin Testing After Perioperative Anaphylaxis

Kristen Dinsmore\(^1\), Bethany Campbell\(^2\), Timothy Archibald\(^1\), Gregory Mosier\(^1\), Stacy Brown\(^1\), and Alexei Gonzalez-Estrada\(^1\)

\(^1\)East Tennessee State University, Johnson City, TN; \(^2\)King University, Bristol, TN

### Introduction

Perioperative anaphylaxis is a life-threatening allergic reaction that may occur during surgery. Reports from several countries point to neuromuscular blocking agents (NMBAs) as a leading cause of anaphylaxis. Skin testing with different diluted concentrations of NMBAs are utilized during an allergy evaluation.

The purpose of this study is to investigate the refrigerated stability of these drugs when diluted by various factors and stored under refrigerated conditions.

Stability was investigated over a 14 day period using liquid chromatographic-tandem mass spectrometric (LC-MS/MS) determination of the stored drugs versus freshly prepared reference standards.

### Methods

Dilutions of NMBAs were prepared by serial dilution in normal saline by factors of 10x, 100x, 1,000x, 10,000x, and 100,000x (n = 5 of each).

Diluted drug preparations were stored in laboratory refrigerator and 1 mL aliquots were periodically removed over a 14 day storage period.

Potency of stored dilutions was compared to a fresh reference standard using LC-MS/MS.

### Results

![Figure 1: Chemical structures of neuromuscular blocking agents included in dilution investigation](image1)

![Figure 2: Extracted ion chromatogram of rocuronium, cisatracurium, and vecuronium diluted in saline (100x dilution shown)](image2)

LC-MS/MS Parameters:
- Column: Agilent Zorbax Eclipse XDB-C18 column (4.6 x 150mm; 3.5 micron particle size), 50°C
- Gradient Separation: Using 0.01% trifluoroacetic acid (TFA) (A) and acetonitrile (B), 10 – 90% B over 15 minutes, flow rate = 0.400 mL/min

Detection: Direct MS2 channels relative to specific drugs (see Figure 1)

![Figure 3: Percent recovery of diluted cisatracurium stored in refrigerated temperatures (4.00°C ± 0.28)](image3)

![Figure 4: Percent recovery of diluted rocuronium stored in refrigerated temperatures (3.88°C ± 0.15)](image4)

![Figure 5: Percent recovery of diluted vecuronium stored in refrigerated temperatures (3.80°C ± 0.17)](image5)

### Conclusions

The stability of cisatracurium, rocuronium, and vecuronium in saline decreases with higher dilution factors. Additionally, the variability between study samples (as reflected by standard deviation) increases with higher dilutions and with time. Dilutions of 10x and 100x were most stable for all of these drugs. Limitations in long-term stability of these drugs in aqueous solution is likely due to their vulnerability to hydrolysis.

### Acknowledgements

The authors would like to acknowledge The Bill Gatton College of Pharmacy at East Tennessee State University for funding associated with this project.