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

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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 chromatography-tandem mass spectrometric (LC-MS/MS) determination of the stored drugs versus freshly prepared reference standards.

![Chemical structures of neuromuscular blocking agents included in dilution investigation](image)

**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**

![Percent recovery of diluted cisatracurium stored in refrigerated temperatures (4.00°C ± 0.28)](image)

- Both cisatracurium and vecuronium can be prepared and stored up to 96 hours at the 10x and 100x dilution levels
- Rocuronium has a slightly shorter BUD for the 10x and 100x dilution (48 hours), but the 1000x dilution lasts longer than the other study drugs
- Higher dilution factor preparations have the most limited stability, and should be used immediately

**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.

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