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## Pharmacokinetics of Midazolam and Ketamine in Critically Ill Adults on Extracorporeal Membrane Oxygenation (ECMO) Therapy

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**Pharmacokinetics of midazolam and ketamine in critically ill adults on  
Extracorporeal Membrane Oxygenation (ECMO) therapy**

**Introduction:**

Extracorporeal Membrane Oxygenation (ECMO) is a form of life support for temporary mechanical cardiopulmonary support. Critically ill adults receiving ECMO support are often sedated using ketamine and benzodiazepines. Previous studies have showed altered connects of benzodiazepines and ketamine in ECMO patients compared to non-ECMO patients. However, no studies have shown prospective data regarding the pharmacokinetics of these drugs in vivo.

**Objective:**

The primary purpose of this study is to characterize the pharmacokinetic parameters of Ketamine and Midazolam in adult patients on ECMO. As a secondary objective, we will develop a pharmacokinetic model of these drugs using various clinical endpoints.

**Methods:**

Blood samples from adult patients on ECMO were taken in regular intervals over the duration of the ketamine or midazolam infusion. Quantification in plasma is preformed through an assay developed using LC-MS/MS. Clinically relevant data for each patient including demographics, ICU diagnosis, ECMO parameters, vitals, serum chemistry, and details of ICU stay were collected.

**Results:**

Currently 10 patients have been enrolled in the study and concentration data has been analyzed. Results have shown a pattern of discrepancy between pre-oxygenator concentration and post

oxygenator concentrations. These results are consistent with the hypothesis that drug is being sequestered within the ECMO circuit. Further analysis correlating patient clinical data to concentration data will be used to develop a pharmacokinetic model for adult patients receiving ECMO.

**Discussion:**

Preliminary results show that there are altered kinetics of both ketamine and midazolam in adult patient on ECMO either due to the critically ill state of the patient or the ECMO circuit itself.