Blood Pressure Analysis on ICU Patients Receiving Vasopressor Therapy from the Mimic II Database

**Presenting Author:** Michael Ma, Department of Anesthesiology & Perioperative Care, UCI Medical Center, Orange, CA

**Co-Authors:** Michael-David Calderon, Joseph De Los Santos, Roberta Andreatta MD, Joseph Rinehart MD
Department of Anesthesiology & Perioperative Care, UCI Medical Center, Orange, CA

**Background:** Blood pressure management in the ICU frequently involves vasopressor therapy especially in patients with septic, neurogenic, or cardiovascular shock. Too low of a blood pressure risks organ failure secondary to hypoperfusion while too high of a blood pressure risks ischemic injury. Currently, vasopressor therapy is hand-titrated to a target mean arterial pressure. In an ideal setting, changes in vasopressor infusion rates quickly follow changes in blood pressure measurements. However, due to a variety of nursing, workflow, and patient factors, this may not be the case. Few studies, if any, have examined blood pressure variability in a large number of ICU patients who receive vasopressor therapy.

**Methods:** The clinical data used in this study was obtained from the MIMIC II Database (1). The MIMIC II Database contains extensive clinical data of ICU patients who were admitted to Beth Israel Deaconess Medical Center. Blood pressure data was derived from the numerics record of the MIMIC II database. Patients who had valid blood pressure data (values >250 mmHg were considered to be invalid MAP values and were excluded from the study) while on at least a single dose of norepinephrine, vasopressin, or neosynephrine (or any combination of these) were included in this study. For the purposes of this study, the ideal mean arterial pressure was considered to be 60-80 mmHg. The targeted MAPs were unknown in this study.

**Results:** A total of 581 ICU patients were included in the study. The average MAP for all patients was 75.51 with a standard deviation of 17.04. The average standard deviation for each patient was 12.65. Patients spent 63.12% of total time (in which blood measurements were recorded) with a MAP between 60 and 80, 9.25% of time with a MAP less than or equal to 60, 27.63% of time greater than or equal to 80, 1.41% of time less than or equal to 50, and 12.31% of time greater than or equal to 90.

**Conclusion:** Preliminary findings on this data set suggest that ICU patients on vasopressor infusions spend significant time with a MAP greater than 80 mmHg. This may be due to unnecessary vasopressor infusion which may be a result of significant lag between blood pressure changes and vasopressor infusion rate changes. The data suggests that there is
room for improvement in the blood pressure management of patients receiving vasopressor therapy and that there may be a need for more accurate titration.

References:

Figure 1. Average Blood Pressure During Vasopressor Infusion By Patient