

**Poster Session IV**  
**Poster #3**

***Anatomical Determinants of Forearm and Upper Arm Oscillometric Blood Pressure Differences***

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**Purpose:** To compare forearm and upper arm oscillometric blood pressures (BPs) and central aortic pressures. To explore the effects of anatomical structures on differences in forearm and upper arm oscillometric BPs. To compare the characteristics of waveforms in central aortic BP, femoral artery BP, forearm and upper arm (brachial artery) BPs. To explore the relationship of anatomical structures and characteristics of BP waveforms in the forearm and upper arm.

**Theoretical Framework:** Physiological characteristics of blood pressure measurement

**Methods:** This descriptive predictive study aims to include 50 patients undergoing non-emergent cardiac catheterization at a suburban teaching hospital. Prior to the catheterization, upper arm and forearm circumferences, brachial skin fold readings, distance of BP measurement sites from the heart, and ultrasound of the forearm and upper arm vessel depth and diameter are measured and recorded. During the catheterization procedure, with the patient flat, oscillometric upper arm and then forearm BP measurements are recorded while obtaining simultaneous measurements of the intra-aortic pressure using the cardiac catheter. Next, a radial tonometry pressure reading is obtained with a simultaneous measurement of intra-aortic pressure using the cardiac catheter. Forearm and upper arm oscillometric BP measurements with simultaneous intra-aortic pressures are repeated. At the end of the procedure, a femoral artery pressure is recorded with the intra-arterial monitoring system. The distance between the sites of the aortic root and femoral pressure readings are measured utilizing markings on the cardiac catheter. Data analysis will include paired t-test, Bland Altman Analyses and multiple regression analyses. A computational model of the circulation will be used to investigate factors that account for differences between aortic, brachial cuff, and radial cuff pressures

**Results:** Nine subjects have completed the study. Statistical analyses are pending further subject enrollment.

**Conclusion and Implications:** The results of the proposed study may be used to design more accurate non-invasive BP devices with new algorithms for the forearm BP site. Ultimately, healthcare providers will obtain more accurate BP measurements and potentially minimize under- and over-treatment of health problems.