

# Point of Care Testing on Adult Patients with Insulin and Vasopressor

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## Published In/Presented At

Marouchoc, R., Rupp, R. (2014, June 5). *Point of Care Testing on Adult patients with Insulin and Vasopressor*. Poster presented at LVHN UHC/AACN Nurse Residency Program Graduation, Lehigh Valley Health Network, Allentown, PA.

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# Point of Care Testing

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# Background/Significance

- The purpose of this project is to develop a standard of care for adult critical care patients on insulin drips to begin utilizing arterial point of care sampling as opposed to capillary point of care testing when vasopressor treatment is initiated.

# PICO QUESTION

- P** - Adult critical care patients on insulin drips and vasopressor therapy, specifically Epinephrine, Nor-Epinephrine and Neo-Synephrine
- I** - Arterial point of care testing
- C** - Capillary point of care testing
- O** - Determine accuracy of capillary point of care testing compared to arterial point of care testing for patient's on insulin drips and vasopressor therapy compared to arterial point of care testing, is capillary point-of-care glucose testing accurate on adult critical care patients on insulin drips and receiving vasopressors, specifically Epinephrine, Nor-Epinephrine and Neo-Synephrine?

# TRIGGER

- Knowledge vs. Problem
  - We know there is a point during the use of vasopressors that the capillaries clamp down, resulting in inaccurate blood sugar results when using capillary POC testing.
  - The problem is that LVHN's current policy states that the standard of care is to use POC testing unless otherwise indicated.

# EVIDENCE

- When utilizing the Accu-Check point-of-care device, the accuracy of finger stick method in critically ill patient's is inaccurate, the value of blood glucose is over-estimated and the potential to miss episodes of hypoglycemia increases (Critchell, Savarese, Callahan, Aboud, Jabbour & Marik, 2007).
- "...Capillary sampling led to a significant overestimation of blood glucose in both normal and low blood-sugar measurements" (Kanji et al., 2005).
- "Although glucose meter analysis of arterial blood may be less accurate than blood/gas chemistry analysis, it is still significantly better than capillary sampling" (Kanji et al., 2005).

# EVIDENCE

- “Unstable hemodynamics (low perfusion index, use of a vasopressor, presence of edema and low mean arterial pressure) and insulin infusion were associated with increased risk of inaccuracy. These factors might decrease peripheral blood-glucose concentrations through microcirculatory disturbance and increased tissue glucose consumption” (Inoue, Egi, Kotani & Morita, 2013).
- “Glu-ABGs and Gluco-A were significantly more accurate than Gluco-C. Thus, for blood-glucose measurements in critically ill adult patients, arterial blood samples should be used rather than capillary blood samples” (Inoue, Egi, Kotani & Morita, 2013).
- “On average, bedside glucose gives an unreliable estimate for plasma glucose. All of those taking care of critically ill patients should be aware of the limitations of bedside glucometry.” (Finkielman, Oyen & Afessa, 2005).

# Current Practice at LVHN

## Patient Care Manual: Bedside Glucose Testing:

17. Obtain testing sample of blood. Refer to *Lancet Device for Blood Glucose* *MediChoice Pre-Set Safety Lancet* instructions for product use in the Patient Care Manual for capillary sample.

a. Arterial or Venous

- (1) Obtain arterial sample as per *Arterial Blood Samples Drawn from an Arterial Line* procedure.
- (2) Place the syringe on the end of the StatStrip.

17. Fresh whole blood – capillary, venous, arterial or neonatal may be used. Venous blood samples should be reserved for situations when a capillary or arterial sample is not available. Whichever source is used, it must be used on a consistent basis. This is because venous and capillary blood may differ in glucose concentration by as much as 70 mg/dL.

- a. Avoid applying too much blood when using a syringe. Keep the meter horizontal or with strip pointing downward when applying blood to prevent blood from entering meter.





# RESULTS

- It was our hope that the results of the data collected would expose the unreliability of POC capillary testing on patients with insulin drips on vasopressors. With this data, we were then planning to propose a revision of the current policy. Unfortunately due to time constraints, we were unable to collect adequate data to support our project at this time.

# Practice Change

- The practice change we were trying to achieve was in the situation of a critical patient being started on vasopressors, who is also on an insulin drip, the standard would be to collect arterial samples of blood for hourly POC testing to allow for accurate titration of the insulin drip.

# Implications for LVHN

- By achieving this practice change, we would eliminate the uncertainty of the accuracy of capillary POC testing on patients who have been on vasopressors for any length of time. This would allow for more accurate, safer glycemic control.

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