Kaiser Permanente SCPMG Laboratory Systems

Medical Care Program Chemistry

California Division - South Procedure

**Responding to Reports of Pseudohyperkalemia**

**Purpose** This procedure provides instructions to respond to reports of suspected of pseudohyperkalemia.

**Scope** This procedure is intended for Clinical Laboratory Scientists and Medical Laboratory Technicians in the Medical Center Chemistry department.

**Definitions** The following definitions are provided for this procedure.

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Hyperkalemia | Hyperkalemia is a potentially serious medical condition in which elevated potassium levels can increase the risk of severe cardiac electrophysiology abnormalities (e.g., cardiac arrhythmias) and sudden death. |
| Pseudohyperkalemia | A false elevation of serum/plasma potassium levels usually due to the release of potassium from lysed red blood cells or white blood cells and from platelet activation. |

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| **Safety**  **Precautions** | All staff members performing these procedures must adhere to regional and  local workplace safety policies. These will include but may not be limited to:   * Equipment safety, proper body mechanics, sharps exposure * Proper use of gloves/personal protective equipment while performing these procedures * Exposure to body fluids * Proper handling of regular and biohazardous waste * Handling of regular and infectious waste * Proper cleaning of work area * Proper handwashing * Proper storage and disposal of chemical hazardous waste |
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**Causes of** The table below summarizes common causes of pseudohyperkalemia,

**Pseudohyperka** indications, and provides recommendations for resolution. **lemia**

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| --- | --- | --- | --- |
| **Cause** |  | **Indication** | **Resolution** |
| Pre-analytic factors | • | Visible hemolysis |  |
|  | • | Review of other results on sample (e.g. critically low calcium w/ high potassium is indicative of EDTA contamination) | Collect **plasma** sample  Avoid pre-analytic  processes that increase |
|  |  |  |
| Inherited defects in erythrocyte membrane structure | • | Patient diagnosis/chart review | rates of hemolysis\* |
| Thrombocytosis | • | Platelet count > 500 x 10^9/L |  |
|  | • | Patient diagnosis/chart review |  |
| Severe leukocytosis | • | WBC count > 50 x 10^9/L | Collect **serum** sample |
| (i.e. CLL) | • | Patient diagnosis/chart review |  |
|  |  |  | Avoid pre-analytic  processes that increase  rates of hemolysis\* |

\*Pre-analytic processes that have been shown to **INCREASE** rates of in-vitro hemolysis include:

* Use of narrow-gauge needles
* Use of syringe and needle rather than evacuated tube collection systems
* Sampling blood via IV catheter
* Non-standard (i.e. other than antecubital fossa) venipuncture site
* Prolonged use of tourniquet
* Excessive fist pumping/clenching
* Vigorous shaking of samples after collection
* Transportation of samples via pneumatic tube transport systems
* Long-lasting/excessive centrifugation

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**Procedure** Follow the steps below to collect, process, and perform testing on patients with suspected pseudohyperkalemia.

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| **Step** | **Action** |
| 1 | Collect both red top serum (no SST) and lithium heparin vacutainers taking the following precautionary steps (if possible) to reduce the likelihood of hemolysis:   * Venipuncture from antecubital fossa with standard gauge multi-sample safety needle * No tourniquet or fist pumping/clenching * Mix tubes gently |
| 2 | Walk specimen to the laboratory, avoid using pneumatic tube system |
| 3 | Process specimen immediately without delay |
| 4 | Temporarily turn auto-verification off (if applicable) |
| 5 | Analyze both serum and plasma samples |
| 6 | Report minimum potassium value between the serum and plasma samples  Note: Pseudohyperkalemia may be present if difference between serum and plasma potassium exceeds the total allowable error (0.3 mEq/L) |
| 7 | Turn auto-verification back on (if applicable) |
| 8 | Follow local procedures to notify the ordering provider of findings as needed. The assessment and instructions for subsequent potassium or electrolyte draws are to be made by the provider. |

Note: STAT orders should be placed for ambulatory patients with suspected pseudohyperkalemia. Patients should be drawn in a location with a testing laboratory to ensure timely processing and analysis.

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| **Non-Controlled Documents** | The following non-controlled documents support this policy:   * CMS, CDC, HSS. Clinical Laboratory Improvement Amendments of 1988 (CLIA) Proficiency Testing Regulations Related to Analytes and Acceptable Performance. Fed Reg 2019; 84:1536-1567. * College of American Pathologists, All Common and Chemistry Testing Checklist * Dewey, J., Mastenbrook, J., & Bauler, L. D. (2020). Differentiating Pseudohyperkalemia From True Hyperkalemia in a Patient With Chronic Lymphocytic Leukemia and Diverticulitis. Cureus, 12(8), e9800. <https://doi.org/10.7759/cureus.9800> * Higgins, C. (2018). Pseudohyperkalemia. Retrieved January 24, 2023, from [https://acutecaretesting.org/en/articles/pseudohyperkalemia.](https://acutecaretesting.org/en/articles/pseudohyperkalemia) |
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**Author(s)** Chemistry Working Group

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