HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Laboratory and Blood Bank (Chemistry)		
Document:	Internal Policy and Procedure		
Title:	Analysis of Potassium Level		
Applies To:	All Laboratory staff		
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1. PURPOSE:

1.1 The purpose of this policy & procedure is to provide all information related to the analysis of Potassium level in blood (serum/plasma) & urine on DimensionEXL200 ,Synchron DXC700 and Atelica CI .machines.

2. DEFINITONS:

2.1 Cation: a positively charged ion, i.e. one that would be attracted to the cathode in electrolysis.

3. POLICY:

3.1 Potassium is the second most abundant cation in the body. About 98% of potassium is intracellular and that is particularly in the skeletal muscle.

3.2 Although hyperkalaemia is defined as a serum potassium concentration of > 5.5 mEq/L, it is moderate (6 to 7 mEq/L) and severe (> 7 mEq/L) cases of hyperkalaemia that are life threatening and require immediate therapy. The most common cause of hyperkalaemia in infants and children is "pseudo hyperkalaemia" from haemolysis of the blood sample when the sample is obtained from a heel stick or a small-bore intravenous line. When pseudo hyperkalaemia is suspected, the test to determine the serum potassium level should be repeated from a free-flowing venous sample before any treatment is administered. Otherwise, hyperkalaemia is most commonly seen in patients with end-stage renal disease or in those who experience acute renal failure.

3.3 Hypokalaemia occurs when a serum potassium concentration is < 3.5 mEq/L, and it can become life-threatening when the serum potassium concentration falls below 2.5 mEq/L. Hypokalaemia can result from intracellular shifts of potassium, increased losses of potassium, or decreased ingestion or administration of potassium. The main cause of hypokalaemia in podiatric patients is excessive gastrointestinal losses such as diarrhoea or vomiting. Because serum potassium levels do not correlate with intracellular potassium levels, hypokalaemia does not reflect total body potassium stores.

4. PROCEDURE:

4.1 **Specimen:**

- 4.1.1 Type: Serum, plasma or urine
- 4.1.2 Tube Type:
  - 4.1.2.1 Gel tube, Plain tube; Li-Heparin, and urine containers
- 4.1.3 Amount Required: 2.0 to 3.0 ml blood,24h urine sample
- 4.1.4 Delivery Arrangements:
  - 4.1.4.1 Sample to be delivered to the lab as soon as possible. If the sample is serum should be ensuring complete clot formation before centrifugation. Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may exhibit increased clotting time. If the specimen is centrifuged before a complete clot forms, the presence of fibrin may cause erroneous results.
- 4.1.5 Temperature Restrictions:
  - 4.1.5.1 At room temperature.
- 4.1.6 Unacceptable Specimen: See sample rejection criteria policy.

4.1.7 Specimen Retention:
4.1.7.1 Period of retention: up to one week after separation of the sample.
4.1.7.2 Storage condition: store at 2-8 °C
4.1.8 Safety Precaution:
4.1.8.1 Treat all samples material as infectious and handled in accordance with the OHSA standard on blood borne pathogens.

4.2 **Principle:** Indirect potentiometric technique

4.2.1 There are five electrodes used to measure electrolytes on the Dimension system. Three of these electrodes are incorporated into the QuikLYTE® integrated multisensor and are ion selective for sodium, potassium and chloride. A reference electrode is also incorporated in the multisensor. After a diluted sample is positioned in the sensor Na+, K+ and Cl^- ions establish an equilibrium with the electrode surface. A potential is generated proportional to the logarithm of the analyte activity in the sample. The electrical potential generated on a slandered solution, and the concentration of the desired ions is calculated by use of the Nernst equation.

4.3 **Method:**

4.3.1 See policy of loading sample on machine (Ref: Operative Manuals' of Dimension ExL200 and SynchronDXC600.

4.4 **Calculation:**

4.4.1 Instrument system automatically calculates the Analytic activity and gives results in the form of print out.

4.5 **Format:** Numeric

4.6 **References range:**

4.6.1 Serum/plasma(mmol/L): 3.5-5.1 mmol/L
4.6.2 Urine (mmol/24hr): 25-125 mmol/L

4.7 **Dilution Information:**

4.7.1 Specimens with values exceeding the linearity range are flagged and diluted with the automatic dilution.

4.8 **Test Limitation:**

4.8.1 Recognizing:
4.8.1.1 Haemolysed sample(HB>500 mg/dl)
4.8.1.2 Lipemia: because of absorbance flagging > 1000 mg/dl
4.8.1.3 Icterus: bilirubin > 94 mg/di
4.8.2 Avoiding Error:
4.8.2.1 Following acceptance criteria of the sample
4.8.2.2 By following the maintenance protocol. Daily, weekly, month
4.8.2.3 Run control before starting the tests
4.8.3 Error Correction:
4.8.3.1 Look for a fibrin clot or air bubbles
4.8.3.2 Repeat the sample from the original tube
4.8.3.3 Ask for another sample

4.9 **Specific Performance Characteristics:**

4.9.1 Assay range:
4.9.1.1 Serum/plasma: 1 - 10 mmol/L
4.9.1.2 Urine: 1 - 300 mmol/L

5. MATERIALS AND EQUIPMENT:

5.1 **Reagent:**

5.1.1 QuikLYTE® Standard A
5.1.2 QuikLYTE® Standard B
5.1.3 QuikLYTE® Flush Solution
5.1.4 QuikLYTE® Sample Diluent
5.1.5 QuikLYTE® Dilution Check
5.1.6 Salt Bridge Solution

5.2 **Calibration:**

5.2.1 Refer to insert sheet of QuikLYTE® integrated multisensor.

5.3 **Quality control:**

5.3.1 Normal and pathological control. One time in 24 hours (once per day)

5.3.2 If more frequent control monitoring is required, follow the established quality control procedures your laboratory

5.3.3 If quality control results do not fall within an acceptable range defined by your laboratory, may be affected and corrective action should be taken

5.3.4 Quality Control retention:

5.3.4.1 Unopened control vial is stable up to expiry date printed on the label when stored at cold room.

5.3.4.2 Opened control vial is stable for: After reconstituting and tightly capped at 2 — 8 °C All analytes will be stable for 7 days except Bilirubin (Direct) for 4 days.

5.3.5 QC Procedure:

5.3.5.1 Verify that the correct QC values have been entered into the QC file. For details refer to Operator Guide of DimensionEXL200 ,Synchron DXC700 and Atelica CI .machines.

5.3.5.2 Allow QC to come to room temperature.

5.3.5.3 Gently remove the stopper to avoid loss of the lyophilized pellet and add exactly 5.0 ml distilled or de-ionized water.

5.3.5.4 Leave to stand for 20 minutes. Mix bottle several times by inversion to allow homogeneity.

5.3.5.5 Gently invert just prior to use. Avoid foaming.

5.3.5.6 Open bottle, place a minimum of 1000 ul of each level in separate sample cup, and place on the assigned positions.

5.3.5.7 Cap bottle tightly and store at 2-8°C. Immediately after use.

5.3.5.8 Perform QC as indicated in Operator Guide of DimensionEXL200 ,Synchron DXC700 and Atelica CI . machines.

5.3.6 QC Expected Values:

5.3.6.1 Refer to the Bio-Rad Lyphochek assayed chemistry controls value sheet for Dimension

6. RESPONSIBILITIES:

6.1 Chemistry shift on charge is responsible for, running calibration and control and samples of K+

6.2 Chemistry staff are responsible for running Na samples all over the day

7. APPENDICES:

N/A

8 REFERENCES:

8.1 Tietz Text Book of clinical chemistry and molecular diagnostics 4th Edition,2006

8.2 Company Leaflets of reagents, and machine operator.

9. APPROVALS:

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