THE VALLEY HOSPITAL  
Ridgewood, New Jersey

PATIENT CARE SERVICES (PCS) POLICY & PROCEDURE

SUBJECT: Blood Glucose

PURPOSE:
1. To describe the methodology of performing a bedside blood glucose.
2. To obtain capillary blood sample for testing glucose level.
3. To assure the proper calibration of the blood glucose monitor and set the proper code number.
4. To assure that the Accu-Chek INFORM blood glucose results performed by Nursing Units correlate with conventional laboratory blood glucose results.

POLICY:
1. It is the policy that bedside blood glucose monitoring be performed by credentialed staff and following a physician's order.
2. This bedside system is monitored and maintained by the Department of Pathology along with cooperation from Patient Care Services.

TEST PRINCIPLE:
The enzyme glucose dehydrogenase converts the glucose in a blood sample to gluconolactone. This reaction liberates an electron that reacts with a coenzyme electron acceptor, the oxidized form of the mediator hexacyanoferrate(III), forming the reduced form of the mediator, hexacyanoferrate(II). The test strip employs the electrochemical principle of biamperometry. The meter applies a voltage between two identical electrodes, which causes the reduced mediator formed during the incubation period to be reconverted to an oxidized mediator. This generates a small current that is read by the system.

WHO CAN PERFORM: RN, LPN, PCA II, Certified Nuclear Medical Technologist (CNMT), Respiratory Therapist (RT), Cath Lab Technologist, Mobile ICU Paramedic (MICP), RN/MICP, RN/Emergency Medical Technician (EMT) and Mobile ICU Nurse (MICN)

EQUIPMENT:
Accu-Chek Inform System and download/battery recharge cradle
Accu-Chek Comfort Curve Test Strips
Cotton balls or Gauze
Alcohol Swabs
Lancet (safety)
Gloves

This policy and procedure is divided into five sections. The sections are:

Section 1: Patient testing using Accu-Chek Inform System ............................................................. page 2
Section 2: Quality Control.................................................................................................................. page 3
Section 3: Calibration.......................................................................................................................... page 4
Section 4: Fingerstick Blood Glucose with Microtainer Lancet ......................................................... page 4
Section 5: Cleaning
SECTION 1: Patient Testing Using Accu-Chek Inform System
NOTE: "Accu-Chek meter and its accessory box must be cleaned after each use of patient testing using Clorox wipes".
PROCEDURE:
1. Correctly identify patient.
2. Turn the Inform monitor on. If "QC Due…” appears, run controls.
3. With the Main Menu displayed, press the Patient Test menu selection.
4. Compare the code number from the test strip vial with the strip code number indicated on the screen, or scan it if the vial is bar coded. If correct, press “Yes”. If incorrect, press No, replace the code key and follow the on-screen instructions to enter a new lot number.
5. Use the number keys to type in your operator ID. Press ENTER. You can scan in your ID if your ID is bar-coded.
6. Use the number Keys to type in the patient visit number (V#). Press Enter. You can scan in the patient ID if the patient is bar coded.
7. Don gloves remove Comfort curve Test Strip from vial and close the vial.
8. Insert Comfort curve strip into monitor. Screen will display an animated icon of blood droplet if strip is put in properly.
9. Have patient wash hands with soap and water or clean fingertip with alcohol swab. If alcohol is used, let the alcohol dry, it can interfere with the test results.
10. Obtain Specimen
   a. Finger Stick
      1. Use alcohol to cleanse the area of the finger stick. Use lancet, prick patient's finger to obtain small drop of blood.
      2. Wipe off first drop of blood with gauze. Do not squeeze severely. Excessive manipulation may introduce tissue into sample and alter results.
      3. Touch and hold drop to the edge of the yellow window on Comfort Curve Strip. Fill yellow window completely. Strip may touch patient's finger. If yellow window is not full, you may add more blood within 15 seconds.
11. When the result appears remove strip and discard it in a biohazard container.
   b. Analytical Measurement Ranges:
      1. 10-600 mg/dl.
      2. Less than 10 reads Lo
      3. Greater than 600 reads Hi
Enter comment code. (Up to 3 comment codes may be entered)
   c. Critical values
      1. Adult and Pediatric-less than 50 mg/dl or greater than 400 mg/dl.
      2. Newborn (0-15 days) and NICU-less than 30 mg/dl or greater than 400 mg/dl.
      3. Select Critical comment from the screen display or enter a text comment.
      4. Repeat test, if result still critical, contact physician and send blood sample to the laboratory to confirm the result, unless otherwise ordered.
12. Press the On/Off Button, to turn the monitor Off when you are finished. Clean the Inform monitor with alcohol and return it to the base when it is not in use to download results and recharge the battery.
13. Document results on MAR or nurses’ notes as appropriate. Critical value, treatment and notification of physician are documented in the Nurses notes.
14. Dispose of equipment in appropriate containers.
Validity of results: If you get unexpected results:
   a. Verify that strip code chip matches test strip LOT Number
   b. Verify by repeating test
   c. Collect blood for STAT venous blood glucose test and send it to the laboratory.

Interferences and limitation after Patient testing section.

Interferences and limitations:
Warning: If you are currently using drug therapies that contain or break down into maltose or galactose, do NOT use the Accu-Chek Comfort Curve test strip. Certain therapies can elevate the levels of maltose or galactose in your blood, leading to falsely elevated blood sugar test results. For example:
1. Certain types of intravenous immunoglobulin therapies (e.g., Octagam 5%)
2. Intravenous solutions containing maltose as a means for patient hydration

Note: the list of drugs mentioned above is not intended to be all inclusive and may not include recently introduced, new drugs. Therefore, always consult the drug package insert to determine whether it contains or breaks down into maltose or galactose.
2. Do not use during xylose absorption testing.
3. Hematocrit range is 20-65% for glucose measurements less than 200 mg/dL and 20-55% for glucose measurements greater than 200 mg/dL.
4. System measurement range is 10-600 mg/dL.
5. This system has been tested at altitudes ranging from sea level to 10,150 feet.
6. In situations of decreased peripheral blood flow, finger stick blood testing may not be appropriate, as it may not reflect the true physiological state. Examples would include, but are not limited to: severe dehydration caused by diabetic ketoacidosis or the hyperglycemic hyperosmolar nonketotic state, hypotension, shock, decompensated heart failure NYHA Class IV, or peripheral arterial occlusive disease.
7. The following compounds, when determined to be in excess of their limitation, may produce elevated glucose results:
   • Galactose greater than 10 mg/dL can give falsely elevated test results. Glucose values in neonates demonstrating symptoms of galactosemia should be confirmed with a laboratory reference.
   • Maltose greater than 16 mg/dL delivered intravenously, can give falsely elevated test results.

Compound Limitation
   - Bilirubin (unconjugated) less than 20 mg/dL
   - Lipemic Samples greater than 5000 mg/dL
   - Acetaminophen greater than 8 mg/dL
   - Uric acid:
     - Hypoglycemic range greater than 10 mg/dL
     - Euglycemic range greater than 12 mg/dL
     - Hyperglycemic range greater than 16 mg/dL

SECTION 2: Quality Control

Purpose:
The quality control procedure insures compliance with regulations, checks that the instrument is operating properly and tests the operator’s technique. High and low controls must be run once a day when the instrument is in use. It will also be performed when test results contradict clinical systems, when the Inform has been dropped or if the test strips have been exposed to extremes of heat, cold and/or humidity.

Additional Equipment:
Level I and Level II Control Solutions
**Control Testing:**
1. Turn the monitor on.
2. Enter the operator ID#. You can scan in your ID if your ID is bar – coded.
3. With the main Menu displayed, press **control test** to display the control test screen.
4. Control levels appear as buttons on the display. Press the button for the first level required for testing (level 1 for example).
5. Verify the current control solution lot number by comparing the lot number found on the side of the control solution vial with the control lot displayed on the screen or scan the vial bar code.
   - If correct, press Yes
   - If incorrect, press No and follow screen instructions to enter the correct lot number.
6. Verify the code number from the test strip vial with the strip code indicated on the Screen.
   - If correct, press Yes
   - If incorrect, press No and follow screen instructions to enter the correct lot number.
7. The insert strip screen appears. Gently insert the new strip into the meter with the silver bars facing up and toward the test strip port.
8. Once the strip has been inserted, the Apply Control Solution appears. Once the flashing drop appears, add the appropriate level of control solution to the edge of the test strip. The yellow window should be completely filled with control solution.
9. Once the test is completed, Pass or Failed message will be displayed.
   - If the result is out of range, the word failed will flash. (enter a comment from the displayed comments). If control values failed, blood glucose testing should not be performed.
   - If control results continue out of range after repeating a control test (Failed), Contact the Laboratory at Ext. 8552 or 8398.
10. Repeat steps 4 to 9 for the other control level.
11. Remove and discard the test strip, press the arrow to Main Menu to proceed with further testing or power the monitor off.

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**SECTION 3: Calibration**

1. The Inform monitor is calibrated by inserting the Comfort Curve Strip code key into the monitor.

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**SECTION 4: Fingerstick Blood Glucose with Microtainer Lancet**

**PROCEDURE:**
1. Clean fingertip with alcohol. Let the alcohol dry completely.
2. Hold lancet on outer aspect of finger site with moderate pressure, rotate sites with each stick.
3. Depress plunger with index finger to make puncture.
4. Immediately release plunger while holding lancet on site.
5. Wipe off the first drop of blood with gauze. Obtain a small drop of blood resting on the finger. Do not apply blood on top.
6. Touch and hold drop to the edge of the yellow window and blood will be pulled into the strip. Fill yellow window completely. If the first drop does not fill the yellow window, you may add more blood within 15 seconds of the first drop.
   a) Arterial Blood-Refer to A-Line Procedure (AACN)
   b) Neonatal – Refer to Heel Stick Procedure (Lippincott Manual)
7. When the result appears, remove strip. Clean Accu-Chek Inform meter **and its accessory box** with **CLOROX WIPES.**
8. Enter comment codes: if applicable. Return the meter to its cradle to recharge the battery, and download the results.
   Critical values
   1. Adult and Pediatric: less than 50 mg/dl or greater than 400 mg/dl.
   2. Newborn and NICU: less than 30 mg/dl or greater than 400 mg/dl.
   3. Repeat test, if still critical, send sample to the laboratory to confirm.
9. If Critical Values Obtained:
   1. Verify that strip code chip matches test strip LOT Number
   2. Verify by repeating test
   3. Collect blood for STAT venous blood glucose test and send it to the laboratory.
   4. Contact physician immediately, unless otherwise ordered.

SECTION 5: Cleaning

"Accu-Chek meter and its accessory box must be cleaned after each use of patient testing using Clorox wipes".

REFERENCES:

In November of 2000 a new format was developed and several policies and procedures were combined into one. Below is the history or review/revisions for those contained within this procedure

Using Accu-Data System and Accu-Chek Advantage
APPROVED: Medical Surgical Division - September, 1997
REVISED: Department of Pathology, September 2000. Revisions included condensing of several steps, no content changes. Nurse Practice Committee, Tentative Approval by Linda Cuoco, Chief Nurse Executive, pending October meeting of Nurse Practice.

Fingerstick Blood Glucose With Microtainer Lancet
APPROVED: Medical Surgical Division, June 1994
REVIEWED/REVISED: Medical Care Center, July 1996; August 1998; SON Care Center & Medical Care Center Standards Performance Improvement Committee, June 1999

Accu-Data and Accu-Chek Quality Controls
APPROVED: Medical Surgical Division, June 1994

Calibration of Accu-check Advantage
APPROVED: Medical Surgical Division, June 1994
REVIEWED/REVISED: July 1996, October 1997, October 1998; SON Care Center & Medical Care Center Standards/Performance Improvement Committee, June 1999; Nurse Practice Council, July 1999
Correlation of Accu-Data and Laboratory Blood Glucose Results

APPROVED: Medical Surgical Division, March 1993

RESPONSIBILITY:
It is the responsibility of Nursing leadership and the Medical director of the laboratory to implement, maintain, evaluate and revise this policy.

BLOOD GLUCOSE


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REVIEWED/REVISED DATE:
East 4 Practice Education Committee, March 2002
Medical Surgical Leadership, April 2002
Nurse Practice Education Council, June 14, 2002; January 14, 2005; February 11, 2005; July 8, 2005; April 14, 2006; May 11, 2007; November 14, 2008; December 11, 2009; March 12, 2010; January 14, 2011; May 11, 2012

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