Wake Forest™
Baptist Medical Center

i-STAT Creatinine Education Module--MRI

Prepared by Angie Thayer, BSMT (ASCP), Clinical Lab POCT Coordinator

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i-STAT Support

- Angie Thayer 713-4136 or pager 806-6619
- Jane Houska 716-3252
- OR Blood Gas Lab 716-2181 (M-F 7am-7pm)
- Refer to the i-STAT System Manual and WFBMC specific i-STAT policies
- WFBMC POCT web site

i-STAT Policies/Procedures/Guidelines

- Posted on the WFBMC Intranet

- Departments—Point of Care Testing—Policies/Procedures/Guidelines

i-STAT Operator ID

- User specific
- Serves as identification of testing personnel
- Do NOT share operator ID’s
- Do NOT enter your operator ID into analyzer and allow use by another individual

Training and Competency Requirements

- Must be documented
- Initial training
- Initial competency evaluation by authorized site preceptor
- 6 month competency evaluation-NEW users
- On-going Annual competency evaluation—at least 2-point –usually written exam and direct observation
- Failure to maintain updated training and competency will result in loss of testing privileges

Safety

- Always wear gloves when handling analyzer
  - Including patient testing and performing QC
- Disinfect when contaminated with blood AND between EACH patient. Follow WFBMC policies
- DO NOT lean over the cartridge while filling with sample
- A safety shield is recommended
- Place gauze or tissue over snap when closing
- Do NOT send blood-contaminated i-STAT Resolution Requisitions to the Clinical Lab

i-STAT Components

- Analyzer
- Cartridge
- Simulator (Electronic Quality Control)
- Liquid Quality Control Materials
- Downloader
- Recharger

i-STAT Analyzer (Handheld)

- Volt Meter
- Testing occurs on the test cartridge bio-sensors
- Rechargeable batteries are utilized—care should be taken to keep batteries charged—do not discard rechargeable batteries

i-STAT Analyzer

- Will turn off after 2 minutes of non-use
- Can be turned on by pressing the on/off keypad—circle with line
- If operator or patient information has been entered, the analyzer will remain on for 15 minutes

Patient ID/Barcode Scanner

- The patient ID should be scanned to ensure correct ID entry
- Press and hold the SCAN key pad
- Confirm correct ID scanned—erroneous scans should be reported to Angie Thayer
- **Information should be scanned directly from the patient armband on the patient**
- CAUTION: Laser light—do not stare into beam or point at anyone

Analyzer display

- ‘Cartridge/Simulator Locked’
  - Cartridge or simulator locked in analyzer.
  - DO NOT remove when this message is displayed

- Flashing battery icon or ‘Low Battery’ indicates battery voltage is low and batteries need to be re-charged

Menu Options

- **Analyzer Status** —allows viewing of battery voltage-recommend keeping charged >8 volts
- **Data Review** —allows review/print of data stored in analyzer
- **Quality Tests** —quality control checks performed utilizing this menu
- **Other Menu options** —refer to System Manual for additional information

i-STAT Cartridges

- Testing occurs in the cartridge
- Cartridges have bio-sensors that “measure” the analytes tested
- There are different cartridge configurations available from i-STAT

i-STAT Cartridges

- Creatinine will be used by MRI.

Cartridge Storage

- Cartridges are stored refrigerated 2 to 8˚C until the manufacturer's expiration date.
- Do NOT use past manufacturer's expiration date
- Can be stored at room temperature (18 to 30˚C) per manufacturer instructions.
- DO NOT use past the room temperature expiration date!
- **Cartridges should NOT be returned to the refrigerator once they have been stored at room temperature.**

Cartridge Handling—All Cartridges

- Individual cartridges can be used after 5 minutes at room temperature
- A box of 25 cartridges must sit at room temperature for 1 hour prior to use
- Open by tear symbol
- Use cartridge IMMEDIATELY after opening
- Fill to blue triangle—leave “blood dome”
- Insert into analyzer immediately after filling with sample

Cartridge Handling-DO NOT's

- DO NOT use "quick heating"—holding close to body or near a warm surface
- DO NOT store or expose cartridges to extreme cold or heat such as freezing or stored above lights or computers
- Do NOT re-refrigerate cartridges once they have warmed to room temperature
- Do NOT touch bio-sensors
- Do NOT pre-rupture silver calibrant disc
- Do NOT re-use cartridges
- Do NOT leave exposed to air and moisture
- Do NOT use expired cartridges for patient testing

In-Dwelling Line Sample Collection

- Always adequately ‘clear’ line prior to collecting a sample for testing on i-STAT
- Inaccurate results will be given if samples are contaminated.
- Back flush line with sufficient amount of blood to remove intravenous solution, heparin, or medications that may contaminate the sample.
- **i-STAT Recommendation:** five to six times the volume of the catheter, connectors, and needle should be collected as ‘waste’ for creatinine samples.
- ***Accurate results depend on an adequate back flush to eliminate the possibility of sample contamination with IV fluids.***
- *Caution should be taken when collecting from lines which have had fluids that could adhere to the sides of the tubing. These lines may be difficult to adequately ‘clear’.*

Sample Requirements Creatinine Cartridge

- **ONLY whole blood should be tested on i-STAT**
- Non-anti-coagulated whole blood for creatinine testing should be tested within 3 minutes of collection
- Heparinized whole blood can be used for creatinine testing.
- MUST use the BD Vacutainer lithium heparin green top 4ml tube—FILL TO CAPACITY or results may be adversely affected.
- Heparinized samples may be tested up to 30 minutes after collection.

- Heparin is the ONLY acceptable anti-coagulant which may be used with the i-STAT creatinine cartridge

CREATININE Sample Considerations

- ALWAYS use a well mixed sample
- Mix samples for 15 seconds
- Always squirt out the first drop of blood from syringe samples
  - To check for clots and to get rid of any micro air bubbles
- NEVER ever run a sample that has or has had a clot. Inaccurate results may be obtained!

Creatinine GFR Results

- Estimated Glomerular Filtration Rate (GFR) values will be reported when results are downloaded into the electronic medical record.
- The values may be accessed via Wake One.
- The i-STAT handheld will NOT report GFR values.

Cartridges-Factors affecting results

- Refer to the i-STAT System Manual—Cartridge Test Information (CTI) sheets for factors which can adversely affect i-STAT results

Result considerations

- Unexpected and unexplained results should be repeated by another test method.

- Problems should be reported to Angie Thayer 3-4136

Result Considerations

- Samples diluted with IV fluids will give inaccurate results
- Results should be carefully evaluated
- Contamination may be indicated by:
  - Falsely decreased creatinine value

When Results Not Given, etc.

- Cartridge error—Look at Technical Bulletin
- Star out—occurs when specific bio-sensor compromised or there is an interferent in the sample
- Out of instrument range (>x value or <x value)—result is out of reportable range of the analyzer
  - Follow-up with repeat testing performed by Core Laboratory

Analyzer Error Codes

- Refer to i-STAT Technical Bulletin for cause of error
- If the same error code occurs multiple times with no apparent cause, notify the POCT Coordinator (Angie Thayer)
- Consider using a different analyzer and a different batch of test cartridges

Result Recall

- Turn on analyzer
- Select MENU
- Select 2 DATA REVIEW
- Select desired data
- PATIENT DATA requires entry of patient and operator ID information

Simulators

- Electronic Quality control that is used to validate the i-STAT analyzer
  - Pass or Fail
- QC results are automatically documented when the i-STAT analyzer is downloaded

Simulators-Internal

- An INTERNAL electronic simulator is performed automatically by the analyzer every 8 hours of use with each cartridge type.
- The internal simulator is performed when a patient cartridge is inserted.
- *Results will not be given if the simulator fails.*
- If the simulator passes, patient results will be displayed.

Simulators-External

- The EXTERNAL electronic simulator is the same as the internal simulator but is an external device and can be tested upon demand.

Simulators-External

- The external simulator should be used:
  - If the analyzer is dropped
  - If the internal simulator fails
  - If an error code occurs that indicates the simulator should be tested.
  - If analyzer performance is in question
  - Prior to and after performing the ceramic cartridge cleaning procedure

Liquid Quality Control

- Used to validate performance of test cartridges
- Consists of multiple levels
  - test cartridge specific
- Should be performed:
  - On each new cartridge shipment per cartridge type per cartridge lot # PRIOR to patient use—by Clinical Lab staff
  - Monthly—by testing site staff
  - If cartridge/analyzer performance is in question

i-STAT Maintenance, etc.

- Recharge batteries
- Disinfect outside of analyzer between patients
- Do not get moisture inside of the analyzer
- Perform ceramic cartridge pin conditioning when indicated by analyzer error codes. (scheduled conditioning is not recommended)
  - Each site has a ceramic cartridge and instructions for performing this procedure

Patient identity

- Follow WFBMC policy for verification of patient identity—Use 2 patient identifiers **at the patient bedside**
- Ensure sample identity throughout entire testing and reporting process
- Scan patient ID into the analyzer DIRECTLY from the patient armband on the patient
- Verify patient ID again on analyzer display

Patient Identity-Misidentifications

- Any mis-identified samples/results should be reported to the Clinical Lab immediately.
- An i-STAT Resolution Requisition should be completed by the person creating the error and sent to the ICU Blood Gas Lab—tube station 54 or faxed to 6-6586.
- The i-STAT analyzer will need to be downloaded so lab staff can access results to replace with a BADID code in the electronic medical record.
- It is the responsibility of the staff member who creates the error to notify appropriate patient care staff (MD) of the patient's who were involved in the mis-identification.

Analyzer Download

- Use the Downloader located in each site
- Analyzers should be downloaded after each case
- It is the responsibility of testing personnel to download i-STAT analyzers
- You can’t “over-download”

Analyzer Download

- The downloader will display “Communication in Progress” indicating a successful download of data
- Problems should be reported to the Help Desk
- Notify Angie Thayer of any on-going issues

Re-charger

- Can charge battery in compartment and battery in analyzer
- Rotate analyzers on chargers to ensure they stay adequately charged

Downloader Troubleshooting

- Troubleshoot the downloader
  - Check for green power light
  - Check all downloader cord/cable connections
  - Try unplugging and re-plugging the cables
- If troubleshooting does not resolve problem, report problems to the Information Services Help Desk.
- Also notify the Clinical Laboratory Point-of-Care Testing Coordinator

i-STAT Resolution Requisition—(Purple Sheet) Use

- Used to communicate with the Clinical Lab
- Any patient testing that needs to be credited should be requested by using the purple sheet.
- Patient results should always be included on the purple sheet
- Patient name, medical record #, and CSN should be documented on the purple sheets.

I-STAT Billing/Credits

- **All i-STAT testing MUST have a documented physician order.**
- Any i-STAT result which has a valid CSN and medical record # is automatically ordered, billed and resulted to that patient.
- It is the responsibility of the testing personnel to request credits for any i-STAT testing which should not be resulted or billed.

i-STAT Supplies

- Cartridges and paper can be obtained from the OR Blood Gas Lab M-F 7am-7pm
- Care should be taken to only get the amount of cartridges which will be used within the 2-week room temperature expiration dating
- Replacement analyzers can be obtained from the Clinical Laboratory Point-of-Care Testing Coordinator

Emergency Release of Cartridges

- Each site has a form which must be completed should i-STAT cartridges be needed outside of M-F 7am-7pm.
- The site picking up the cartridges is responsible for room temperature dating of the cartridges
- NEVER take cartridges that are marked with “Do Not Use”

College of American Pathologists (CAP)

- If there are concerns regarding result quality and the concerns are not adequately addressed by Lab or WFBMC management, CAP can be notified at 1-866-236-7212

Congratulations

- This concludes the i-STAT 1 power point presentation.
- Please note that this power point does not replace the i-STAT policies/procedures/guidelines.
- The presentation only gives highlights of i-STAT information
- Please complete the on-line i-STAT exam within 1 week of training.

Hands On Experience

- Change batteries and check battery voltage
- Test External electronic simulator
- Test/Discuss Liquid QC
- Test patient sample
- Recall results
- Discuss Menu Options
- Download of results