Keywords: aspirate, gastric, pH, pH Indicator

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I. PURPOSE

This procedure provides instructions for performing gastric pH testing at the point of care. Cardinal pH indicator strips are used as a semi-quantitative screening test to rapidly determine the pH in gastric fluid.

II. ORDER

A physician’s order, standard protocol, or order by another health professional authorized to request laboratory tests is required for point of care gastric pH testing.
III. MATERIALS

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Source</th>
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<tbody>
<tr>
<td>Cardinal pH Indicator Strips</td>
<td>POCT Program Office</td>
</tr>
<tr>
<td>pH 2.0 Buffer</td>
<td>POCT Program Office</td>
</tr>
<tr>
<td>pH 6.0 Buffer</td>
<td>POCT Program Office</td>
</tr>
</tbody>
</table>

**Additional Supplies**
- Disposable Gloves
- JHMI-approved Biohazard Waste Container
- JHMI Date Opened Labels
  
  Standard Register Item #0509N

IV. STORAGE AND HANDLING REQUIREMENTS

<table>
<thead>
<tr>
<th></th>
<th>Temperature</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardinal pH Indicator Strips</td>
<td>Room Temperature (15-30°C)</td>
<td>Manufacturer's expiration date.</td>
</tr>
<tr>
<td>pH 2.0 Buffer</td>
<td>Room Temperature (15-30°C)</td>
<td>Manufacturer's expiration date.</td>
</tr>
<tr>
<td>pH 6.0 Buffer</td>
<td>Room Temperature (15-30°C)</td>
<td>Manufacturer's expiration date.</td>
</tr>
</tbody>
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A. The pH Indicator Strips and pH Buffers must be labeled with the open date.

B. Never use pH Indicator Strips or pH Buffers past the manufacturer's expiration date.

C. Protect the pH Indicator strips from exposure to the following:
   1. Excessive heat or sunlight.
   2. Acid or alkaline fumes.

D. Keep the pH Buffer aliquots tightly capped when not in use.

V. SPECIMEN TYPE

The preferred sample for testing is an aspirate obtained through an enteral tube (nasogastric or orogastric).

VI. SPECIMEN COLLECTION AND HANDLING

Prior to sample collection, patient identification must be verified using two unique identifiers.

1. Clean collection containers must be labeled with at least two unique patient identifiers in front of the patient (e.g. Name, DOB, MRN, and/or CSN).
2. All labeling should be done on the cup instead of the lid as applicable, which may become separated from the specimen.

It is recommended that all samples be tested immediately following collection.

VII. SAFETY PRECAUTIONS

A. Follow ICPM IFC023 Infection Control and Prevention: Standard and Isolation Precautions.
B. Wear gloves at all times when handling pH Indicator Strips.
C. Avoid unnecessary exposure to pH buffer solutions. Wash areas of contact with water immediately.
D. All patient specimens and used pH indicator strips must be discarded in the appropriate JHMI-approved biohazard container or waste receptacle.

VIII. PERFORMING QUALITY CONTROL (QC) TESTS

A. Two levels of External Quality Assurance, pH 2.0 and pH 6.0, will be performed:
   1. At least once per week on each opened container of pH Indicator Strips and bottle of pH buffer solution.
   2. When opening a new container of pH Indicator Strips or bottle of pH buffer solution.
   3. When patient results are questionable.
   4. By all new operators as part of initial hands-on training prior to testing patient specimens.
   5. At least once a year by each operator to demonstrate compliance with ongoing competency regulations.

B. Procedure:
   1. Prepare materials for testing:
      a. Put on gloves.
      b. Verify that pH buffers and pH Indicator Strips are dated and within the manufacturer's expiration date.
      c. Remove two pH Indicator Strips from the container and place on an absorbent surface covering (i.e. chucks, paper towel, etc).
   2. Perform the test:
      a. Record the applicable information on the Gastric pH QC log Sheet (see Appendix A).
      b. Mix the pH buffers gently by inversion, then uncap and dispense one drop of pH buffer solution onto one pH Indicator Strip for pH 2.0, and one pH Indicator Strip for pH 6.0.
      c. Immediately match the color combination on the pH Indicator Strips with the closest combination on the Color Chart supplied with each container.
         i. Note: Colors are unstable and results must be interpreted within 60 seconds.
      d. Record the actual number value of the pH test results on the Gastric pH QC Log Sheet.
      e. Discard the used pH Indicator Strips into a JHMI-approved biohazard waste container.
      f. Both levels of QC must pass before patient testing can be performed.

C. Corrective Action:
   1. If any QC test fails to give the expected results:
      a. Verify pH Indicator Strips and pH Buffer Solution aliquots are within the expiration date and that they have been properly stored.
      b. Ensure proper technique is being used, repeating testing with the same materials.
      c. If QC fails a second time, open and date a new container of pH Indicator strips. Repeat test.
      d. If QC fails a third time, open and date a new bottle of pH Buffer solution. Repeat test.
      e. If QC fails with the new pH Indicator Strips and pH Buffer solution(s), DO NOT PERFORM ANY PATIENT TESTING. Contact the POCT Office (5-2645) or by sending a CORUS message to "POCT Consult".
   2. Note any QC failures and corrective actions in the Comment Section of the Gastric pH QC Log Sheet.

IX. PATIENT TEST PROCEDURE

A. Prepare for the test:
   1. Confirm pH Indicator Strips are not expired and that QC testing has been performed successfully and documented within the last week. If not, QC must be completed prior to patient testing. Refer to Performing Quality Control (QC) Tests.
   2. Put on gloves.
   3. Confirm proper specimen labeling, with at least two unique patient identifiers on the cup, not the lid.
   4. Remove one pH Indicator Strip from the container.
B. Perform the patient test:
   1. Gently mix the patient specimen.
   2. Bring the pH Indicator Strip into contact with the specimen.
   3. Within 60 seconds, match the color combination on the pH Indicator Strip to the closest color combination on the
      Color Chart supplied with the paper dispenser.
   4. If a computer is not in the same room as that in which patient testing is performed, complete the Gastric pH Patient
      Result Log (see Appendix B). If a computer is available in the same room as testing, immediately result the test in
      the patient's electronic medical record.
   5. Discard the used pH Indicator Strip and patient specimen in the appropriate JHMI-approved biohazard receptacle.

X. EXPECTED RESULTS

Expected pH values for gastric fluid are between pH 0.0 and pH 5.0. Any pH greater than 5.0 should be considered negative for
a gastric fluid aspirate.

XI. RESULTS INTERPRETATION

The pH Indicator Strips cover a pH range of 0 to 6.0, with a sensitivity of 0.5. Each container includes a Color Chart that must
be utilized within 60 seconds after application of sample on the pH Indicator Strip to determine the pH value of the specimen.
The color combination on the Color Chart that most closely matches the pH Indicator Strip color development is the reported
pH value of the specimen.

Note: All test results should be considered in relation to a specific patient's condition and therapy; inconsistent results should be
repeated or supplemented with additional test(s), per unit policy.

XII. RESULTS REPORTING

All patient test results must be manually documented on the Gastric pH Patient Result Log (see Appendix B) if there is not
a computer in the room where testing is performed. This log must then be used to ensure results are properly documented in
Epic using manual entry. If there is a computer in the testing room, patient result entry must occur immediately following the
completion of testing.

A. Each of the fields must be filled out completely when completing the Gastric pH Patient Result Log.
   1. Record the patient's pH value exactly as it appears on the color chart of the pH Indicator Strips container.
B. Refer to unit policies and procedures for the steps to document Gastric pH values on the appropriate flowchart.
   1. Documentation of POC QC Completion must be included with each patient result recorded in the EMR.

In the event of an Epic downtime, all patient results must be recorded on the Gastric pH Patient Result Log until the downtime
is over, at which time all patient results must be manually entered in Epic.

XIII. INTERFERENCES

There are no known interferences at this time.

XIV. LIMITATIONS

A. Gastric pH strips are not to be used for pH determination of any fluids other than gastric (e.g. ocular, urine).
B. Do not touch the pH Indicator Strips with bare fingers. Gloves must be worn at all times when completing testing - QC
   and patient.
C. The exact color combinations of the pH values on the Color Charts may vary from lot to lot. As such, only the Color
   Chart accompanying each specific package of pH Indicator Strips should be used for result interpretation.
1. Note: If the Color Chart is missing, discard the container and open a new container of pH Indicator Strips. The open date must be recorded and QC completed and documented prior to use on patient specimens.

D. Avoid color comparison under fluorescent lights alone.

XV. OPERATOR TRAINING
A. Testing may only be performed by currently certified staff members who have been trained by a Point of Care Coordinator, Nurse Educator, or designated unit trainer. Training records must be kept in the employee's personnel file, and a copy sent to the Point of Care Testing Office.

B. Initial Training will include:
   1. Review the policy online.
   2. Completion of the Initial Training and Competency Assessment Checklist (see Appendix C), to be kept in the employee's personnel file.
   3. Successful performance and documentation of quality control (pH 2.0 and pH 6.0).
   4. Passing score on the quiz following the MyLearning module.

XVI. OPERATOR COMPETENCY
In order to maintain competency, operators must successfully complete and document both levels of quality control and the MyLearning module and quiz once a year. The competency calendar follows the fiscal year: July 1-June 30.

XVII. REFERENCES
A. Cardinal pH Paper product information provided by Micro Essential Laboratory, Inc., Brooklyn, NY 11210

XVIII. SIGNATURES

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<tr>
<td>William Clarke</td>
<td>11/09/2023</td>
</tr>
<tr>
<td>Medical Director of Point of Care Testing</td>
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