Beaumont Laboratory
Royal Oak

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Related Documents:
Fluid pH By Radiometer RC.CH.CSL.ABL.PR.013

FLUID and STOOL PH

RC.CH.CSL.MT.PR.012.r04

Purpose

The purpose of this document is to provide technical staff with guidelines and policies for determination of fluid and stool pH. pH is defined as the negative logarithmic value of a hydrogen ion [H^+] concentration in solution, and is expressed without a unit of measure. The pH scale ranges from 0.00 to 14.00, and is represented by the equation: pH= - log [H^+]. The identification of the pH value allows fluids to be classified as acidic, neutral or alkaline. An acidic solution has a low pH, in the range of 0.00 to 7.34, while a neutral solution pH = 7.35 to 7.45, and an alkaline solution pH = 7.46 to 14.00.

Fluid pH is used to assist in the monitoring of non-specific physiologic changes in the body. For example, the pleural, pericardial and peritoneal cavities normally contain a small amount of interstitial fluid that bathes the organ surfaces. Inflammation or infections affecting these cavities cause fluid to accumulate that has an abnormal pH. Stool pH is used as a screening test for carbohydrate and fat malabsorption, and as an aid in the evaluation of small intestinal disaccharidase deficiencies. Urinary pH is monitored to determine the existence of systemic acid-base disorders and in the management of urinary conditions that require the urine to be maintained at a specific pH. Tests for gastric acidity are used to screen for the ability of the parietal cells in the stomach to produce hydrochloric acid. Parietal cells are affected by various auto-immune disorders, pernicious anemia, mucolipidosis and stomach cancers.

Specimen Collection and Handling

- Pleural, pericardial, or peritoneal fluid: sample should be collected anaerobically in a heparinized syringe, placed on ice.
- Stool: Fresh, random stool. Refrigerate. Stool must be liquid. **Test will not be performed on solid samples.**
  Stability: Freeze specimen if testing is not performed within one hour of collection.

Reagents

- Body Fluid: pH test strips and pH buffers.
- Pleural fluid: See Blood Gas instrument procedure (Radiometer ABL-825).
- Stool: pH test strips and pH buffers.

Quality Control

- **Body fluid and Stool**: Assay two levels of pH buffers (see QC sheet for which levels to run). Buffer solutions are pH 4.00, pH 7.00 and pH 10.00, this is completed to verify proper performance of the pH test strips.

- **Pleural fluid**: One level of Qualicheck® quality control, supplied by Radiometer America is run once per shift per instrument.

Procedure

Perform manually by dipping pH test strip into liquid/solution and match to the color chart immediately.

Pleural fluid: See Radiometer ABL-825 Operating Procedure

Interpretations

- Pleural: A fluid pH lower than 7.2 can indicate the need for chest tube drainage and antibiotics in cases of pneumonia. A pH of 7.4 or greater is typically seen in cases of malignancy. A finding of a pH as low as 6.0 indicates esophageal rupture allowing gastric fluid to accumulate.
- Stool: Decreased stool pH may be due to intestinal lactase deficiency, high lactose intake or decreased absorption of fat or carbohydrates. Increased stool pH may be seen in secretory diarrhea without food intake, colitis, villous adenoma or increased protein breakdown

Reportable Range

(AMR) Analytical Measurement Range = pH 0.00-10.00
(CRR) Clinical Reportable Range = pH 0.00-10.00

Reference Range

Stool: Newborns (0- 30 days) = 5.0-7.0
31 days old – unlimited = 7.0-7.5

Urine: 5.0-8.0

Gastric: 1.5 – 3.5

Pleural, pericardial, or peritoneal fluid: No reference ranges have been determined.

Limitations/Interfering Substances

Stool: Barium procedure and laxatives should be avoided for one week prior to the collection of the specimen.

References

Please refer to specific procedures (Routine Urinalysis, Gastric Analysis, Radiometer ABL 825 Operating Procedure) for references associated with each.

1. Kjeldsberg and Knight, Body Fluids, 3rd ed., Chicago, American Society of Clinical Pathologists, pp. 186-187.
2. Strasinger, Urinalysis and Body Fluids, 3rd ed., Philedelphia, F.A. Davis Company, 1994, pp. 56,174-177.
3. Tietz, Textbook of Clinical Chemistry, Burtis & Ashwood, eds, 3rd Ed., W.B. Saunders, 1999, pp. 1316-1318.

Authorized Reviewers

Section Medical or Technical Director

FLUID PH BY METER

Document Control

Location of Master: Master electronic file stored on the Beaumont Laboratory server under S:/AutoChem/DocumentControl/NEW/CSL/MT/Master Documents
Master printed document stored in the Front Desk Procedure Manual.
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Automated Chemistry Procedure Manual, STAT Lab

Document History

Signature	Date	Revision #		Related Documents Reviewed/ Updated
Prepared by: D. Tushman, MT(ASCP)SC	11/24/2006			
Approved by: R. Karcher, PhD	12/19/2006			
Reviewed by: (Signature)	**Date**	**Revision #**	**Modification**	**Related Documents Reviewed/ Updated**
R. Karcher, PhD	12/13/2007			
R. Karcher, PhD	01/25/2008	r01	New document control format	
R. Karcher, PhD	12/04/2008			
R. Karcher, PhD	11/10/2009			
Dr. Elizabeth Skyes	01/04/2011			
Elizabeth Sykes. MD	05/21/2014	r02	Changed ABL 725 to ABL 825, QC frequency for ABL 825, QC changed following pH meter procedure update	
Elizabeth Sykes, MD	11/05/2015			
Kenneth Simkowski, PhD	07/03/2017	r03	Changed pH meter to pH strips	
Elizabeth Sykes, MD	02/13/2018			
Elizabeth Sykes, MD	5/9/2020	r04	Changed the QC materials from MES/TRI buffer to manufactured buffers. Combined the Fluid and Stool pH procedures	