PATIENT ASSESSMENT

PART 3 – MEASUREMENT OF GASTRIC FLUID pH

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pH is the measurement of the acidity or alkalinity of a solution, or a negative logarithmic scale of hydrogen ion concentration in a solution. The greater the hydrogen ion concentration, the more acidic the solution, which is expressed as a lower pH. The lower the hydrogen ion concentration, the more alkaline the solution, which is expressed as a higher pH. The pH scale goes from 1 (strongly acidic) through 7 (neutral), to 14 (strongly alkaline).

Normal gastric juices are acidic in nature, having a pH of approximately 1–3. Hydrochloric acid is secreted by gastric parietal cells to kill or reduce the growth of certain bacteria and to facilitate the denaturation of proteins as they enter the gastro-intestinal tract.

The measurement of the acidity of gastric fluid using pH indicator strips can be used to confirm the position of feeding tubes placed in the stomach. A pH of less than 5.5 would indicate gastric placement, while a pH of 6 or above may indicate bronchial secretions and possible incorrect tube placement in the bronchial tree (National Patient Safety Agency, 2005).

Feeding via an enteral tube (or the administration of medicines) should not begin until the tube position has been confirmed (Dougherty and Lister, 2004). Confirming tube position using pH indicator sticks may prevent repeated radiological investigation but this is considered the gold standard in confirming position and may be appropriate for certain patient groups.

**WHEN TO MEASURE GASTRIC FLUID pH**

With reference to enteral feeding this will be directed by organisational policy, however it would be considered good practice to confirm tube position at the following times:

- Following new insertion, or repositioning of tube;
- Prior to commencing each feed;
- Prior to administering medication via tube;
- Following any evidence that is suggestive of tube displacement such as loose dressings, obvious tube movement (as noted by measurements on the tube), respiratory distress;
- Excessive gagging or vomiting.

**FACTORS INFLUENCING GASTRIC FLUID pH**

The therapeutic effect of certain drugs, such as histamine blockers and proton pump inhibitors, is to reduce gastric acid to prevent peptic ulceration. The resultant effect will be an increase in pH.

The administration of enteral feed may also influence pH. The feeding pattern,
either intermittent or bolus, may play a role in this. Many organisations recommend a continual infusion with a 6 to 8-hour overnight rest period for some patients to allow natural acidity to return to normal, although this may not be appropriate to all.

A sufficient volume should be aspirated from the tube to ensure that any feed in the tube lumen does not affect pH.

**PROBLEMS OBTAINING SAMPLES**

It may be difficult to obtain samples of gastric aspirate, particularly through fine-bore tubes. In preference, fine-bore tubes should be used for feeding purposes and larger-bore tubes (Ryles tubes) should be used for short-term nasogastric drainage.

Syringes used in feeding tube manipulations should have been specifically designed for use with enteral tubes (NPSA, 2007). Using these syringes may reduce the risk of drug administration errors. Typically they are translucent purple in colour.

NPSA (2005) recommends the following actions if difficulty is experienced in obtaining aspirates:

- Turn the patient onto her or his side;
- Inject 10–20ml (adults only) of air, using a large volume syringe, into the tube and attempt aspiration again after 20 minutes;
- Advance the tube by 10–20cm.

**pH INDICATOR STICKS**

pH indicator sticks are similar to urinalysis sticks (Fig 1). There are many brands and pH ranges available.

Sticks with a pH range of 0–6 are used in many clinical areas, however one of the difficulties encountered with these in practice has been the difficulty in distinguishing the colour bars in the critical 5–6 range. As such, a stick with a more precise range may be required.

**THE PROCEDURE**

Ensure you have the correct equipment – paper towel, large-volume syringe, pH indicator sticks, disposable gloves and a disposable apron.

- Wash hands;
- Don gloves and disposable plastic apron;
- Remove pH indicator strip from box, check expiry, place on an absorbent towel;
- Using a large-volume syringe, aspirate tube as directed by organisational policy (Fig 2);
- Flush feeding tube as directed by organisational policy;
- ‘Inject’ a small amount of fluid onto the reagent strip. Alternatively if a large volume of fluid is aspirated the stick may be dipped in the fluid (Fig 3);
- Place the indicator stick on absorbent towel for the recommended time;
- Read the pH against the reference guide (Fig 4);
- Dispose of materials/apron gloves;
- Wash hands (Fig 5);
- Document result and report accordingly (Fig 6).

![Fig 4. Read the pH against the reference guide](image)

![Fig 5. Wash your hands](image)

![Fig 6. Document the result](image)

**REFERENCES**

