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Nurse accuracy in interpreting pH from pH strip testing

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In 2004, the medical device agency advised that nasogastric tube (NGT) position should be confirmed using pH sticks or papers⁽¹⁾. However, pH strips and sticks have limited evidence for validity or reliability. This study determines nurses' accuracy in assessing pH of a series of solutions using pH strips. Particularly, the identification of pH 5.5 or 6 in accordance with the thresholds used in current national guidance^(2,3) on identifying NGT position. Nine buffered solutions of pH 3–7 rising in 0.5 increments were produced by the biochemistry department and randomly assigned to 1 of 34 pots. Half of the sample had a pH ≤ 5.5 with double blinding to both participants and researcher. Ten nurses were asked to measure and record the pH of the solutions using a Merck 2–9 strip. Nurses were incorrect in 30% of pH measurements. At pH 6, 12% of the sample were identified as having a pH 5.5. The reliability and validity of the strip was good as confirmed by KAPPA; however, specificity and sensitivity was poor at pH 6 (64.7%) but better at pH 5.5 (88%), as determined by a receiver operator characteristic (ROC) curve. In this study, use of pH sticks to determine a pH threshold of 5.5 means 12% of pH 6 measurements will be misclassified as gastric when they could be respiratory. Adoption of a gastric pH threshold of ≤ 5.0 would have prevented any theoretically mal-positioned tubes being used.

1. Medical Device Alert (2004) Enteral feeding tubes (nasogastric) MDA/2004/026, MHRA Notice MHRS/MS/2004/026.

2. National Institute for Health and Clinical Excellence (NICE) (2006) Nutrition Support in Adults. Clinical Guideline 32.

3. National Patient Safety Agency (2005) Patient Safety Alert 05: Reducing the Harm Caused by Misplaced Nasogastric Feeding Tubes.