

Methods for Nasogastric Tube Placement Verification

Andrea Black, Phillip Bowes, Roxy Decker, Ashley Kendall, Diana Lopez, Megan Zeid
Capital University

Spirit of Inquiry

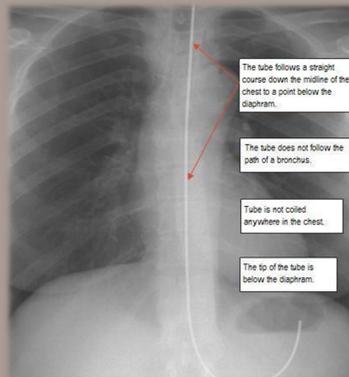
There is a limited amount of research on nasogastric (NG) tube placement verification. The gold standard for confirming accurate placement of NG tubes is through X-ray, but there is no single method upon which researchers agree can be used for continuous bedside monitoring.

Background

The primary interventions found during the background search included pH testing, x-ray, and NEX measurement (nose-ear-xiphoid process). Aspirate pH testing was the most prevalent result. This project is valuable to evidence based practice because there is limited evidence identifying reliable methods for bedside NG tube placement verification. Many hospitals still utilize the air-bolus and auscultation method, but evidence shows that this is no longer a safe or reliable confirmatory measure.

Searchable PICO: In patients with NG tubes, how does pH testing of gastric aspirate affect verification of correct tube placement?

The initial background search provided the most common interventions and searchable terms related to NG tube placement, which led to the formation of a PICO. The population of interest was patients requiring NG tubes, intervention was pH testing of gastric aspirate and outcome was verification of correct NG tube placement. Various databases were searched including CINAHL, PubMed and Cochrane. Search terms and combinations were (NG OR Nasogastric OR Feeding Tube) AND pH OR Gastric Aspirate AND (Placement OR Position).



Summary of Appraised Evidence

The results from the articles found that x-ray is the gold standard for confirming NG tube placement. Aspirate pH was the most favored method: eight out of ten articles recommended this intervention, one was inconclusive, and another did not study this method. Eight studies also found that auscultation is not recommended as a way of verification. Three articles examined aspirate visualization and concluded that it was an inappropriate method to correctly verify placement. One study found that using NEX was an incorrect method to measure the length of the NG tube prior to insertion, but rather use XEN + 10 (xiphoid, ear, nose plus 10 cm). One study also mentioned that the NG tube should be marked with a marker at the exit site. In conclusion all articles stated that there should be two methods used for bedside verification of NG tube position.

Synthesis of Evidence

The following table provides a synthesis of appraised evidence. A "yes" indicates the study recommends the method, a "no" indicates the study did not recommend the method, a "--" indicates it was not studied, and "inconclusive" indicates the study did not find sufficient evidence to approve or disprove a method.

Articles Interventions	1	2	3	4	5	6	7	8	9	10
Aspirate pH	YES	INCONCLUSIVE	--	YES						
Aspirate Visualization	--	NO	NO	--	--	--	--	NO	--	--
Auscultation	NO	NO	--	NO	NO	NO	NO	NO	--	NO
Bilirubin	--	--	--	--	YES	--	--	--	--	--
Capnography	--	NO	--	--	--	--	INCONCLUSIVE	--	--	--
Magnet	--	--	--	--	--	--	INCONCLUSIVE	--	--	--
Check location q4 hours	--	YES	--	--	--	--	YES	--	--	--
X-Ray	YES	YES	YES	YES						
Combination of two	YES	YES	YES	YES						
NEX	--	--	--	--	--	--	--	--	NO	--
XEN + 10	--	--	--	--	--	--	--	--	YES	--

Left. Figure 1. Chest radiograph representing properly placed nasogastric feeding tube with tip visible.

Recommendations for Practice

1. The NG tube needs to be measured using the XEN+10 method prior to insertion.
2. X-ray is always the gold standard for checking initial placement.
3. There should be two bedside methods used for ongoing placement verification
4. Auscultation is not a reliable method to use for verification.
5. The two best methods found are pH testing and marking the exit site from the nose with a marker.
6. If there is any question about movement such as a pH above 4.0 or the mark on the tube deviating up or down from the nostril, another x-ray to check placement should be obtained.

Implications for Further Research

Although there is no single method upon which researchers agree can be used for continuous bedside monitoring of NG tube placement, all studies that evaluated auscultation state that it should not be used to confirm location. Nevertheless, many hospitals still utilize this method, despite current evidence. Research should be disseminated to hospitals, and studies may be done to evaluate the outcomes of the recommended practice when implemented, compliance to these interventions, and further investigation of bedside methods to confirm NG tube placement.



Figure 2. Nurse using NG tube to administer medications and bolus feedings. <https://www.clinbc.org/Images/DYK/Nurse-using-NG-Tube-1503869492-by-Derek-Kaspr?width=450&height=247>

References

- ¹Boeykens, K., Steeman, E., & Dusburgh, J. (2014). Reliability of pH measurement and the auscultatory method to confirm the position of a nasogastric tube. *International Journal of Nursing Studies*, 1427-1433.
- ²Metheny, N. (2009). Verification of Feeding Tube Placement (blindly inserted). *AACN Practice Guidelines*, 1-4.
- ³Metheny, N., Clouse, R., Clark, J., Reed, L., Wehrle, M., & Wiersema, L. (1994). Techniques & procedures. pH testing of feeding-tube aspirates to determine placement. *Nutrition In Clinical Practice*, 9(5), 185-190.
- ⁴Metheny, N., Reed, L., Wiersema, L., McSweeney, M., Wehrle, M., Clark, J. (1993). Effectiveness of pH Measurements In Predicting Feeding Tube Placement: An Update. *Nursing Research*, 324-331.
- ⁵Metheny, N., Stewart, B., Smith, L., Yan, H., Diebold, M., Clouse, R. (1999). pH and Concentration of Bilirubin in Feeding Tube Aspirates As Predictors of Tube Placement. *Nursing Research*, 189-197.
- ⁶Neumann, M., Meyer, C., Dutton, J., Smith, R., (1995). Hold That X-Ray: Aspirate pH and Auscultation Prove Enteral Tube Placement. *Journal Of Clinical Gastroenterology*, 293-295.
- ⁷Proehl, J., Heaton, K., Naccarato, M.K., Crowley, M., Storer, A., Moretz, J., Li, S. (2010). Clinical Practice Guidelines: Gastric Tube Placement Verification. Retrieved from <http://www.ena.org/practice-research/research/CPG/Documents/GastricTubeCPG.pdf>
- ⁸Stepter, C. R. (2012). Maintaining Placement of Temporary Enteral Feeding Tubes in Adults: A Critical Appraisal of the Evidence. *MEDSURG Nursing*, 21(2), 61-102.
- ⁹Taylor, S. J., Allan, K., McWilliam, H., & Toher, D. (2014). Nasogastric tube depth: the 'NEX' guideline is incorrect. *British Journal Of Nursing*, 23(12), 641-644.
- ¹⁰Turgay, A., & Khorshid, L. (2010). Effectiveness of the auscultatory and pH methods in predicting feeding tube placement. *Journal Of Clinical Nursing*, 19(11-12), 1553-1559. doi:10.1111/j.1365-2702.2010.03191.x