

# **Nurse performed ultrasonography in confirming the position of nasogastric tube in the emergency department: A prospective single group diagnostic test study.**

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**Background:** Emergency nurses often encounter patients with nasogastric tube (NGT) dislodgements who require the re-insertion of the NGT. Gastric placement verification of the nasogastric tube (NGT) is a common task for nurses in Accident & Emergency department (AED). Such procedure is essential after NGT insertion, before each feeding and whenever malposition of NGT is suspected. To ensure the correct position of NGTs is critical because complications resulted from misplacement can be serious and life threatening. Conventionally, nurses perform pH test of the gastric aspirate and auscultation test (“Whoosh” Test) to confirm the placement of the NGT. However, there are limitations for using the conventional methods. Although radiological determination is regarded as the golden standard for verifying gastric placement of NGT, it is not practical to use x-ray routinely every single time before NGT feeding for gastric placement verification as it increases patients' exposure to radiation and consumes transportation resources. The utilization of ultrasonography in NGT placement verification is suggested in overseas literatures. However, empirical evidence supporting the use of ultrasonography in verifying the position of NGT in local accident and emergency departments (AED) is scanty. There is also a lack of validation of nurse performed ultrasonography in Hong Kong. With the support from hospitals and medical personnel, the possibility of nurse performed ultrasonography in verifying the position of NGT in AED was going to be reviewed.

**Methods:** This study was conducted in the AED of three local hospitals with approval from Research Ethics Committees of the Kowloon Central, Kowloon East, and Kowloon West Cluster. Written informed consents were obtained from patients before data collection. Standard treatments of patients were respected and disturbances were minimized during the study. Interventions of this study included bedside ultrasound performed by investigators with specific ultrasound training in addition to conventional pH test and “whoosh” test. The ultrasound scan consisted of three parts: Neck scan, epigastric scan and air injection test. Results were compared with chest or abdominal X-Ray for evaluation of accuracies.

**Results:** A total of 72 patients were included in the study with a male / female ratio of 27 / 45 and a mean age of  $84.76 \pm 8.46$  years. This study confirmed a high sensitivity and specificity of nurse performed ultrasonography in confirming the position of NGT in the AED. The high positive predictive value and positive likelihood ratio supported the confirmation of NGT position by bedside ultrasound. The high specificities and minimal negative likelihood ratios of ultrasonography tests also suggested the application of bedside ultrasound in ruling out patients with misplaced NGTs.

**Conclusion:** Nurse performed ultrasonography allow immediate bedside confirmation of the position of NGT in the emergency department. Apart from the reduction of radiation exposure and promotion of patient safety, bedside ultrasound is also beneficial to the overcrowded emergency department where conventional confirmation methods still possess their own limitations. Nurse performed ultrasonography can be incorporated into daily practice for providing extra evidence for the confirmation of NGT position. However, radiological confirmation is still necessary if ultrasound cannot verify the position of the NGT.