An Audit of the visibility of Nasogastric tubes on Portable Radiographs

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Background
There are many clinically significant benefits to enteral feeding. Nasoenteric feeding is the most widely used method of enteral feeding and has been proven that enteral feeding helps maintain gastrointestinal integrity, reduces bacterial translocation, prevents mucosal atrophy and preserves immunocompetence and normal gut flora. A malpositioned nasogastric tube is associated with serious complications including vocal cord paralysis, oesophageal or tracheal perforation, bronchial placement can lead to pneumonia, atelectasis, lung abscess, pneumothorax, pulmonary haemorrhage, even patient death. It is therefore very important to have a good technique for performing radiographs for confirming the position of the nasogastric tubes. The purpose of this audit was to assess the quality of portable chest x-rays at our tertiary referral centre for confirming placement of nasogastric feeding tubes.

Standard
NHS patient safety alert 2011; reducing the harm caused by misplaced nasogastric feeding tubes in adults, children and infants.

Methodology
Fifty consecutive portable chest x-rays for NG tube placement were reviewed from ICU, Cardiothoracic ICU, High Dependency Unit (HDU) and 19 from the Neonatal ICU (NICU). Radiographs were assessed against the UK standard. The position of the nasogastric tube was assessed including visibility of the tube tip and whether or not inversion techniques were required for visibility.

Results of first cycle
Overall 85% of nasogastric tubes were deemed visible. Of these 10% were visible only with inversion techniques. In 15% of x-rays taken to confirm nasogastric tube the tube was not deemed visible. The nasogastric tube tip was visible in only 54%. In the remaining 46% although the tube appeared to pass below the hemi-diaphragm, the position of the tube tip could not be determined.

30% of x-rays were centered lower than would be appropriate for a chest x-ray resulting in the bottom of both hemi-diaphragms in the midline, the remainder were centered as a chest x-ray with the hemi-diaphragms much lower, resulting in difficulty visualising the lower end of the nasogastric tube including the tip.

First action plan
Results presented at department audit meeting. Designed a new comprehensive policy for our department partly adapted from NHS standards in conjunction with the radiography manager and clinical director. Also a policy on misplaced tubes and prioritisation of requests was created for our department. Several teaching sessions organised for radiographers and staff.

A teaching session was given to all interns and has subsequently been incorporated into the intern induction programme to ensure all interns entering the institution have had formal teaching on interpreting nasogastric tube position on x-ray.

New department policy
NG tube placement must be centered at the x-ray, to allow the nasogastric tube to sit below the bottom of the film. This prevents the tube appearing to pass below the hemi-diaphragm, thus a second view of both hemi-diaphragms is the motivating. X-rays for sedated or obese cannot be allowed out of the x-ray department.

Results of second audit cycle
Four months later audit cycle was continued with an audit of twenty portable chest x-rays. 90% of nasogastric tubes were visible with 60% centered with the bottom of the hemi-diaphragms in the midline and in 40% the tube tip was clearly visible.

Second Action plan
A second departmental training session was given at a departmental training day for all radiographers. Re-audit four months later. This showed improvement with 95% tubes visible and 90% of tube tips.

Conclusion
This audit lead to a significant improvement in nasogastric tube visibility. It resulted in a new and comprehensive policy for nasogastric tubes management. Also as a result a dedicated teaching session has been incorporated into intern teaching and induction.