Improving the safety of nasogastric tube confirmation in a District General Hospital

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Background

- Misplacement and use of a nasogastric tube (NGT) in the pleura or respiratory tract where the tube is not detected prior to commencement of feeding or medical administration is a Never Event

- NGT misplacement continues to present a risk of death and severe harm to patients

- Multiple NHS Improvement Patient Safety Alerts

- However reported incidents of misplaced NGTs continue
  - Sept 2011 – March 2016
    - 95 incidents of misplaced NGTs
    - Misinterpretation of CXRs by non-trained medical staff cites as the most common error

Aim

- Identify and compare local practice of doctors confirming NGT placement against national standards
All junior doctors within the trust were invited to participate in an online questionnaire.

The questionnaire was designed to assess:
- Prior training on NGT confirmation
- Access to training on NGT confirmation
- Knowledge of
  - Criteria for pH testing & CXR
  - Four key aspects of confirming NGT placement on CXR

Responses submitted anonymously.

Results

59 respondents

Demographics:

- Medicine: 36%
- Surgery: 34%
- Stroke: 22%
- ITU: 8%
- Unknown: 8%
Results

- **39% (23/58)** had evidence of **formally assessed competence**

- **77% (46/59)** had previously received **training** on confirming NGT position

- **42/58** not aware of the RBH e-learning module
Only 35% (20/55) identified 5.5 as the highest acceptable pH.

78% (45/58) correctly identified pH as the 1st line test (13/58 CXR and 0/58 Whoosh test).
0% of respondents correctly listed all 4 criteria for CXR confirmation.

To confirm gastric position of the nasogastric tube, ask:

- Does the tube path follow the oesophagus/avoid the contours of the bronchi?
- Does the tube clearly bisect the canna or the bronchi?
- Does it cross the diaphragm in the midline?
- Is the tip clearly visible below the left hemi-diaphragm?

Proceed to feed only if all criteria are met. If in any doubt repeat x-ray or call for senior help.
Implementing change

- Lack of awareness and training of junior doctors in NGT placement confirmation

Intervention

- Junior doctor education
- Implement a mandatory trust wide policy
- Ensuring only radiologists or clinicians with formal evidence of competence report on CXRs to confirm NGT position
Process

- MDT approach
  - Radiology Nutrition Support Team (Doctors, dieticians, specialist nurses)

- Meeting with directorates

- Devised provisional policy

- Clinical governance
  - Published within the Adult NG Tube policy (v10)

- Dissemination
  - Trust Intranet
    - Poster displays (New policy & educational)
  - Induction & Nutrition Training Programmes

6 months

Out of hours (1700 – 2200): RAD: Radiologist of the day

0900 – 1700:
  - “Hot” reported by radiology

1700 – 2200:
  - Contact RAD
**Patient Safety Alert**

**NPSA/2011/PSA002**
10 March 2011

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**Nasogastric tubes: x-ray interpretation aid**

- Is nasogastric tube feeding the right decision for this patient?
- Is this the right time to place the nasogastric tube and is the appropriate equipment available?
- Is there sufficient knowledge/expertise available at this time to test for safe placement of the nasogastric tube?

**To confirm gastric position of the nasogastric tube, ask:**

- Does the tube path follow the aortic arch and the contours of the bronchus?
- Does the tube clearly cross the carina of the bronchus?
- Does it cross the diaphragm in the midline?
- Is the tip clearly visible below the left hemidiaphragm?

**Proceed to feed only if all criteria are met. If in any doubt repeat x-ray or call for senior help.**

Below are two examples where the nasogastric tube has been incorrectly identified as being in the stomach:

**1st Line**

\[
\begin{align*}
& \text{pH} \\
& \text{pH} \leq 5.5 \quad \Rightarrow \quad \text{Safe to use} \\
& \text{pH} > 5.5 \\
& \text{(or clinical concern of misplaced tube)}
\end{align*}
\]

**2nd Line**

\[
\begin{align*}
& \text{CXR} \\
& \text{9am-5pm} \quad \Rightarrow \quad \text{Hot reported by radiology} \\
& \text{5pm-10pm} \quad \Rightarrow \quad \text{Contact RAD for report} \\
& \text{Overnight (10pm-9am)} \quad \Rightarrow \quad \text{Reported the following morning} \\
& \text{Consider delaying NGT insertion as is rarely an emergency procedure}
\end{align*}
\]

Doctors may continue to interpret CXR position only if they have certified competence to do so e.g. RBH e-learning module. Use of the new radiology service is encouraged.

For more information, see Adult NG tube policy V10 CG202
We re-audited practice post-intervention with

• 2nd online questionnaire
• Retrospective analysis of a cohort of patients with NGT placement
Results

2nd questionnaire: 56 respondents

- Awareness of pH testing as 1st line test improved (91% c.f. 72%)

- 78% (44/56) had evidence of competence in NGT confirmation (c.f. 39%)

- 54% (30/56) aware of new trust policy
New policy compliance

- Retrospective analysis
- Reviewed notes of all patients who had a NGT inserted in a two-week period. Patients identified by dieticians.
- Cohort of 20 patients
- Variety of wards (general medical, stroke, ICU, COTE, surgical)

Results

- **All patients** correctly had pH testing as the 1st line test
- Of 20 patients, CXR not indicated in 3
- **94% (16/17) compliance rate** in reporting prior to NGT use
  - 1 feed started prior to report. No documentation of r/v by competent clinician

- Secondary outcomes
  - Mean time from CXR to report = 458 minutes
  - Incomplete documentation of NGT insertion in 8/20
Conclusions

• Improved awareness and formal competency in NGT position confirmation amongst juniors (78% vs. 39%).

• Improved knowledge of pH as the 1st line test for NGT will reduce unnecessary CXRs and therefore radiation exposure to patients

• Improved adherence to NPSA policy on correctly confirming NGT placement, which will ultimately lead to improved patient safety
Next steps...

• Signposting CXR for NGT position check as part of the *Electronic Paper Record* request

• Streamlining time between CXR to reporting

• Conventional training should also include advice on appropriate documentation post NGT insertion.
Thank you

Any questions?
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