



Radiographers and Naso-Gastric (NG) Intubation (Second edition)

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Summary

SCoR issues this second edition of guidance in response to a National Patient Safety Agency (NPSA) report on patients harmed following a misplaced naso or orogastric tube not detected prior to use. Radiographic imaging provides an accurate snapshot of the position of a naso-gastric (NG) tube at the time of imaging and is recognised as the 'gold standard' test.

Executive summary

It is vital to minimise and, preferably, eliminate harm to patients caused by misplaced naso-gastric (NG) tubes. This guidance is issued by SCoR in response to a National Patient Safety Agency (NPSA) report on patients harmed following a misplaced naso or orogastric tube not detected prior to use. Radiographic imaging provides an accurate snapshot of the position of a naso-gastric (NG) tube at the time of imaging and is recognised as the 'gold standard' test. Such imaging must always be used and justified responsibly, and reported immediately. A misplaced NG tube must always be re-sited or removed after check imaging to minimise the risk of feeding or medicines administration via an incorrectly sited tube. This guidance identifies how radiographers are able to contribute to this goal.

Introduction

The National Patient Safety Agency (NPSA) define 'specific serious untoward incidents that can cause serious harm but should be avoidable if national guidance is followed' as a '*never event*'. Included in the Agency's list of 'never events' is 'misplaced naso or orogastric tube, not detected prior to use'. Between 2005 and 2010, 21 deaths and 79 cases of harm were reported from feeding through misplaced fine bore tubes but little information is available regarding overall numbers of misplaced tubes.

The single greatest cause of harm was due to misinterpretation of x-rays, accounting for 12 deaths and 45 serious incidents.

Radiographic imaging provides an accurate snapshot of the position of a naso-gastric (NG) tube at the time of imaging and is recognised as the 'gold standard' test. Its use is appropriate when other tests raise doubt as to whether or not an NG tube is correctly sited. Whenever imaging is carried out to determine the position of an NG tube, it must be evaluated immediately and a report issued stating:

- the anatomical position of the tip of the naso-gastric tube
- whether or not it is safe to feed or administer medicines via the tube
- what action is required if it is not safe to feed or administer medicine e.g. removal of the NG tube where it is anatomically misplaced such as in a bronchus or curled in the nasopharynx, or advancement of the tube by an estimated amount so that it enters the stomach
- the name and status of the person providing the report and the date and time of the report.

Radiographic Imaging must always be used and justified responsibly.

Radiographers' roles in NG intubation

In general, radiographers support the evaluation of NG intubation by undertaking chest radiography either on the ward or in the imaging department and may also undertake fluoroscopy for this purpose.

With appropriate education and training, they are also able to provide an initial interpretation of the check imaging to assist further in the immediate clinical care and management of the patient. Image interpretation of check imaging by suitably trained and competent radiographers is a sustainable service that has been shown to work well.

In addition, fully trained clinical reporting radiographers, advanced practice or consultant radiographers specialising in gastro-intestinal (GI) imaging are able to produce definitive reports and support those performing the immediate image interpretations.

The above roles are well understood but, despite this, there are times when the continuity of care of a patient with an NG tube has failed with adverse consequences. This guidance is provided to assist radiographers in implementing working practices to safeguard against, and minimise, this risk.

Where the person expected to produce the report is not confident of their findings, a radiologist's or a suitably qualified advanced practice radiographer's opinion must be sought prior to any further feeding or administration of medicines.

The individual reporting the imaging should be prepared to remove the NG tube in the imaging department if it is dangerously misplaced in order to avoid the risk of feeding or medicines administration via the tube occurring in error (see ['Requests for radiographers to re-site or to remove incorrectly positioned NG tubes'](#) and ['NG tube placement'](#)).

Primary Recommendations for Practice

- All fine bore NG intubation should take place during normal day-time hours¹ (including Saturdays, Sundays and Public holidays) when there should be sufficient radiographers available to undertake the imaging and provide the immediate image interpretations. During normal day-time hours there should also be sufficient clinical radiologists or clinical reporting / advanced or consultant practice GI radiographers available to support radiographers producing initial reports and to provide definitive reports when required.
- Where NG intubation is necessary during night-time, for example, to give medication and when a satisfactory pH measurement is not achieved after aspiration of fluid, imaging may need to be undertaken on an exceptional basis. It is vital that interpretation of all out of hours imaging to assess NG tube position takes place at the time of the imaging and ONLY by healthcare practitioners who have been trained and are deemed competent to do so by the clinical imaging department. Such individuals may be radiologists, radiographers, specialist nurses or other registered medical practitioners. Where radiographers provide this service

routinely and have undergone the necessary training and competence assessment, they are likely to be best placed to undertake the necessary check image interpretations out of hours.

- Consideration must be given to keeping a patient in the clinical imaging department until the imaging has been interpreted by an individual competent to do so. This is particularly important when the continuity of the chain of care for the patient is in doubt, for example, where a patient with a mis-sited tube may be returned to the ward into the care of a nurse previously uninvolved in the patient's care. In these circumstances the risk of inappropriate feeding or medicines administration is increased.
- At all times, the identity and status of the healthcare practitioner who interpreted the check imaging must be documented and there must be a clear statement of the site of the NG tube tip as seen on the check imaging.

1 'normal day-time hours' is used here to mean the hours during which a clinical imaging department is providing the majority or all of its services; these are for determination locally.

Additional Recommendations for Practice

- To improve visualisation of NG tubes on x-ray imaging, consideration should be given to standardising the NG tubes used to those made from surgical grade polyurethane with a tip impregnation of 40% barium. Using NG tubes with a hydrophilic coating of the lumen will also enable ease of guide wire movement and so facilitate accurate placement.
- All check images should be stored in PACS and should be annotated directly to show either a correctly sited NG tube tip or a mis-sited tube tip, together with the date, time of annotation and identity of person annotating the image.
- Imaging requests may ask for guidance on whether the position of the NG tube makes it safe for feeding or to administer medicines. The imaging report should state whether or not the NG tube, AT THE TIME OF IMAGING, is in a suitable position for feeding / administration of medicines but it must be made clear that the final decision to feed or administer medicines rests with the individual carrying out that task and that individual MUST be certain that the NG tube could not have become displaced in the period between imaging and feeding or administering medicine.
- Locally agreed protocols governing imaging in the context of NG tube management need to be in place and must be agreed between clinical imaging services and the relevant clinical teams. The protocols should specifically address the insertion, re-positioning and removal of NG tubes, and the time lag between the check imaging, the necessary evaluation of any check imaging and feeding or administering of medicines.
- A single protocol applicable across all clinical teams within the hospital / trust / board should be established.

Requests for radiographers to re-site or to remove incorrectly positioned NG tubes

- Removal and re-positioning of incorrectly placed NG tubes is normally the responsibility of the relevant clinical team responsible for the overall care of the individual patient.
- Multi-disciplinary team working may mean that the clinical imaging service undertaking any check imaging of NG tubes has agreed to undertake re-siting or removal of mis-placed NG tubes in order to reduce the risk of feeding or medicines administration through a mis-placed tube. This practice is acceptable, subject to clear documentation and agreement of the local governing protocols.
- In some protocols, advanced and consultant practice radiographers are identified as being able to re-site and remove mis-placed NG tubes. This is within the scope of practice of these radiographers provided that they have been properly trained, are competent and confident to

do so and work in accordance with the locally agreed protocol.

Education and Training

Image interpretation

Radiographers undertaking initial interpretation of NG tube placement must have undertaken appropriate training prior to being authorised to do so. The following links are two sources of good quality on-line learning to support this:

This is a freely available e-learning package and test developed by Robert Law, consultant GI radiographer, in collaboration with Merck Serono and endorsed by the NPSA.

www.e-lfh.org.uk/projects/image-interpretation (also known as e-IRI) (accessed Nov 2012)

The adult chest module of the e-Learning for Healthcare Image Interpretation project also covers mis-placed NG tubes. It is available free of charge to all staff employed in the NHS.

These on-line resources are useful learning tools for all radiographers who may examine patients with an NG tube in situ, regardless of whether the examination is related to the appropriate placement of the NG tube, or whether the imaging of the NG tube is incidental.

Radiographers are reminded that it is good practice to audit their practice regularly, so they need to audit their image interpretation of NG tube placements if undertaking such work.

NG tube placement

Where service providers have agreed that radiographers are appropriate healthcare practitioners to site and/or re-site NG tubes, particularly where fluoroscopic guidance is required, it is essential that training is undertaken beforehand, the individual radiographer is judged competent to do so and is authorised by their employer. NG intubation training is commonly available through nurse education departments in NHS trusts and boards, thus it is accessible locally.

Conclusion

Patients have been harmed and some have died from mis-sited NG tubes, with the mis-interpretation of check imaging by inadequately prepared junior medical staff being a significant factor. Effective team working in clinical imaging services² and appropriate use of such services can reduce such risks.

Radiographers undertake check imaging to assess NG tube placement and, subject to the necessary training and authorisation, are well placed to provide immediate image interpretations and instigate action when NG tubes have been mis-sited. Importantly, they are able to advise that it is unsafe to feed or administer medicine owing to a mis-sited NG tube.

Acknowledgements

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References

2. The Royal College of Radiologists and the Society and College of Radiographers. [Team Working in Clinical Imaging](#). London: RCR and SCoR, September 2012 (accessed Nov 2012)

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