

Nasogastric Tube Feeding- Ferndene and Ward 31A Practice Guidance Note Insertion and Management of NG Feeding Tubes – V01		
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Appendix 2	Technique measuring NG Tube Length
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1 Introduction

- 1.1 Displacement of nasogastric (NG) tubes can have serious implications if undetected. NG tubes can be misplaced into the lungs on insertion or displaced from the stomach into the oesophagus at a later stage. Incorrectly positioned tubes leave patients vulnerable to the risks of regurgitation and respiratory aspiration, which can cause serious harm and in some cases can be fatal (NPSA 2005). It is crucial to differentiate between gastric and respiratory placement on initial insertion to prevent potentially fatal pulmonary complications. Cumbria, Northumberland, Tyne and Wear NHS Foundation Trust (the Trust / NTW) is committed to reducing the incidence of incorrectly placed NG tubes.

2 Aim of the Practice Guidance Note (PGN)

- 2.1 The scope of this Practice Guidance Note (PGN) is to provide guidance to all healthcare professionals who care for patients with an NG tube for feeding and includes both adults and children. This PGN is aimed at standardising the care of patients with NG feeding tubes to ensure that insertion and ongoing management is safe, effective and comfortable for the patient. The PGN provides instructions for the safe insertion of NG tubes. This includes safe methods for checking the position of NG feeding tubes and unsafe methods, which should not be used.
- 2.2 This PGN should be used in conjunction with the CNTW Policy on NG feeding.

3 Roles and Responsibilities

- 3.1 Responsibility for ensuring the application of this PGN lies with the **Group Medical Director** of each **Locality Care Group**, supported by the **Group Nurse Director and Associate Nurse Director**.
- 3.2 Insertion and care of an NG tube should only be carried out by a professionally registered doctor or nurse who has undergone theoretical and practical training and is deemed competent or is supervised by someone competent. Practitioners must have documentary evidence that competence has been achieved. Removal of an NG tube should only be carried out by a professionally registered doctor or nurse.

4 Background

- 4.1 NG feeding tubes are tubes passed into the stomach via the naso-pharynx for the purpose of providing nutrition. NG tubes may be used across the Trust, in a wide range of clinical settings. Nasogastric feeding is an active nutritional support commonly used to maintain or improve the nutritional status of patients who are unable to take sufficient nutrition orally (Stroud et al 2003). It is the commonest way of providing artificial nutritional support to patients in hospitals.

5 Key principles

- 5.1 Insertion of NG feeding tubes should be carried out in accordance with procedures outlined in the Royal Marsden Manual procedure 'NG intubation

with tube using an introducer' (Dougherty & Lister 2008). Management of patients thereafter should be carried out in conjunction with this PGN and with the CNTW policy on NG feeding.

- 5.2 All information pertaining to the insertion and ongoing management of NG tubes should be recorded in the 'Key points of care for insertion of NG tube' – See Appendix 1; any additional information should be recorded in the patient's health care records as appropriate.

6 Contraindications

- 6.1 The following are relative contraindications for the insertion of a NG feeding tube:

- Anatomical deformities
- Maxillo-facial surgery/trauma/disease
- Oral, nasal or oesophageal tumours/surgery
- Basal skull fractures
- Severe gastro oesophageal reflux disease
- Mucositis
- Allergies – to NG tube or securing material.

- 6.2 These contraindications are not absolute, but in these patient groups the insertion of a nasogastric tube must be discussed with the medical team in charge of the patient's care and specialist advice sought from Acute Trusts where appropriate. The decision and plan of care should be documented in the patient's health care records. Such patients may require NG tube insertion under fluoroscopic control.

6.3 Complications

- 6.3.1 There are some potential complications to NG tube insertion that practitioners should be aware of in order to recognise and appropriately respond to these if and when they may occur i.e. pneumonia, pneumothorax, emphysema, pulmonary haemorrhage

7 The Decision to Insert a NG Feeding Tube

- 7.1 Consider: **Is NG tube feeding the right decision for this patient?**

- 7.2 The decision to start NG tube feeding should be made following a comprehensive risk assessment of physical, nutritional and psychological factors. A dietitian, a senior doctor responsible for the patients care, a senior ward nurse familiar with the patient and if appropriate the patient and their carers should be involved in the decision to insert an NG tube for feeding. A

decision must be made that balances the risks of feeding with the need to feed, in line with CNTW policy on NG feeding.

- 7.3 The risk assessment and the rationale for inserting a nasogastric tube should be recorded in the patient's health care records.
- 7.3 The following patient groups are at higher risk of placement error or tube migration:
- Patients with a reduced level of consciousness
 - Patients who are agitated or confused
 - Patients with swallowing dysfunction
 - Patients who are retching, vomiting or coughing.
- 7.4 Patients receiving medication which has an antacid effect are more likely to have stomach aspirate pH levels of 6 or above, making identification of an incorrectly placed tube more difficult.
- 7.4 Consider: Is this the right time to place the NG Tube for Feeding?**
- 7.4.1 The decision to initiate Ng feeding should be a planned one and should not be made out of hours.
- 7.4.2 Sometimes it may be necessary to re-site a blocked or displaced tube out of hours. This should only occur if there is an agreed care plan that this is required due to immediate risk, and if trained staff are available to replace the tube and accurately confirm placement. The National Patient Safety Agency (NPSA) has cited a number of errors occurring as the result of junior staff confirming tube position out of hours (NPSA 2011).
- 7.4.2 When a decision is made to insert an NG tube out of hours, the rationale for the decision must be documented in the patient's health care records. It is anticipated that these patients will be being cared for in areas where sufficient senior support is available at all times of night and day.
- 7.5 Consider: Is there sufficient knowledge / capacity to test for safe placement of the NG Tube?**
- 7.5.1 All staff involved in the insertion of NG tubes and/or position checks must have undergone training. They must be certified as competent to carry out this procedure and ongoing care.

8 Consent

- 8.1 Before insertion of an NG tube is undertaken, it must be confirmed that either the patient has capacity and is consenting, or that an appropriate legal framework is in place for treatment without consent i.e. Mental Health Act or Mental Capacity Act.
- 8.2. For a patient receiving treatment under a legal framework, consideration must be given as to whether restrictive measures will be required. If this is likely, then appropriate care plans should be in place prior to attempting insertion of the NG tube.

9 Type of Tube

- 9.1 NG tubes must be radio-opaque throughout their length at the time of insertion, and have visible external markings in 1cm increments along the length of the tube. NG tubes are available in a number of sizes and lengths, and the person inserting the NG tube should select the most appropriate.
- 9.2 Fine bore NG Feeding tubes are preferred for gastric feeding as large bore tubes (Ryles-type) NG tubes are harder to tolerate by patients and can cause rhinitis, oesophageal reflux and strictures. Wide bore NG tubes are therefore only recommended for gastric decompression or very short term feeding and would not normally be used within CNTW.

10.1 Insertion

- 10.1.1 It is the responsibility of the person inserting the NG tube to complete the insertion record section of the 'Key points of care for insertion of NG tube' form. All qualified healthcare professionals must ensure that the insertion record shows a signed and printed confirmation of correct NG tube position before using the NG tube.
- 10.1.2 Prior to insertion, the tube length should be estimated for each patient by measuring from the xiphisternum to the ear lobe, and then to the tip of the nose (see Appendix 2). Inserting the tube at the correct length for each patient increases the chances of successful tube aspiration. Aspiration of the tube allows for the pH to be checked on initial insertion and also thereafter if there is any cause for concern about tube position.
- 10.1.3 NG tube insertion is a clean procedure and health care professionals should adhere to universal infection control precautions throughout. The NG tube should **not** be flushed or lubricated with water prior to insertion (which is often done to lubricate the guide wire and tube) The pH of sterile and tap water is within a pH range of 4-5, therefore if water is included in nasogastric aspirate the Ph of the aspirate can be altered. This may give a false reading, indicating correct placement when the tube is in fact incorrectly placed. A small amount of lubricating jelly can be used to assist insertion and increase patient comfort.

- 10.1.4 If the patient has an intact swallow they should be encouraged to drink sips of water during insertion of the NG tube enabling the inserter to progress the tube safely and comfortably with each swallow (whilst considering the risk of false pH readings as described). For patients who do not have a safe swallow, mouth care swabs can be used to moisten the mouth which will make it easier for the patient to swallow as the tube is inserted. The tube should be removed immediately if the patient shows any signs of respiratory distress and, if possible, another attempt at insertion made.
- 10.1.5 If the tube meets resistance and cannot be advanced further the procedure should be abandoned, the patient reassured and a referral made to a more specialist practitioner, either within CNTW or within Acute Trusts, as appropriate.
- 10.1.6 Once the tube is safely inserted the pH of the aspirate should be checked and the internal tube length documented on the 'Key points of care for insertion of NG tube' form. Thereafter this can be referred to when assessing tube position (Wallace 2002).
- 10.1.7 It is possible for the tip of the tube to displace upwards into the oesophagus increasing the risk of aspiration, even if the external length appears unchanged (NNNG 2004). Removal and replacement of the tube may be necessary if this is suspected. If the NG tube is correctly positioned on initial insertion, displacement from the stomach into the lung is extremely unlikely (NNNG 2004).

10.2 **Safe Methods for Testing Correct Placement**

- Following initial insertion and on subsequent testing, there are two reliable methods for checking that the NG feeding tube is correctly positioned; testing the pH of a nasogastric aspirate and X-ray appearances. (Metheny 2001, Metheny 1989)

10.2.1 **pH Testing**

- pH testing is the first line test method of checking NG tube position. The pH of an aspirate from the NG tube can be tested effectively using CE marked pH indicator strips or pH paper (Stroud 2003). **A pH reading of between 1 and 5 confirms correct placement.** If the pH of the aspirate is between 1 and 5, feeding through the NG feeding tube can be commenced as soon as the insertion record has been completed (NPSA 2005, Metheny 2001);
- There are some limitations to the testing for gastric pH. Gastric pH can be affected by medications, particularly proton pump inhibitors (e.g. Omeprazole, Lansoprazole, Pantoprazole) and H₂ receptor antagonists (e.g. Cimetidine, Ranitidine, Nizatidine). Consideration should be given to changing the timing of medication administration or aspiration to enable correct pH readings to be carried out

- Gastric pH can also be altered by the prescribed feeds given to patients. In the case of continuous NG feeding, feed should be stopped for an hour before obtaining the aspirate. The decision to stop continuous feeding must however be subject to a risk assessment.

IMPORTANT

Adult patients - If unable to obtain an aspirate or the aspirate is higher than 5.0 on initial insertion; an X-ray MUST be obtained to confirm position.

Paediatric patients - If unable to obtain an aspirate consider; changing the child's position, checking inside the mouth to see if the NG tube is coiled up, offering a drink if not contraindicated, adjusting the position of tube either in or out, instilling 1-3mls air to expel any blockage such as stomach wall or debris. If concerns with the correct position of tube continue, discuss with relevant medical staff.

10.2.2 X-ray

- Chest x-rays are only used as a second line test where the pH indicator paper has failed to confirm correct placement. Although the use of x-ray is advocated in patients who are at risk of inadvertent placement into the respiratory tract, it should not be used 'routinely' to check tube position (NPSA 2005, Metheny 1990, Stroud 2003);
- X-ray is an accurate and reliable method for confirming tube position, however, there have been multiple reports of x-rays being misinterpreted (NPSA 2005). Other limitations to the use of x-ray include exposure to radiation, loss of feeding time and increased patient movement (Metheny 1990). It must also be remembered that an x-ray only confirms tube position at the time the x-ray was taken. The NG tube can become displaced at any time;
- When requesting an x-ray for the purpose of checking NGT position, the reason for the request must be included on the request form. It is the responsibility of the radiographer to ensure the NGT can be clearly seen on the x-ray;
- Care must be taken when interpreting x-rays and this should only be undertaken by a qualified trained and competent healthcare professional;
- Where tube position has been confirmed in this manner, a free text note to this effect should be made on the key points of care chart. Subsequent use of the tube will be subject to the checks detailed in section 10.8.10 of this PGN.

IMPORTANT

Nasogastric tubes must not be flushed with water, nor should any feed be introduced prior to confirmation of gastric placement.

This is important because:

- Any flush could cause an aspiration pneumonia if the tube is misplaced in the lungs;
- pH testing for gastric placement relies on collecting aspirate via the tube; anything introduced down the tube will contaminate this aspirate, potentially leading to false positive pH readings;
- A small amount of air may be used to flush a tube to relieve any blockage and to facilitate aspiration of gastric contents for pH testing as described above in section 10.8.2.

10.3 Unsafe Methods of Testing which must not be used

10.3.1 There are a number of methods of testing to confirm NGT position that have been widely used in the past, and which now must not be used.

- **These unsafe methods are**

10.3.2 'Whoosh Test'

- The auscultation of air injected into the feeding tube, or 'whoosh test', has often been used in the past to ascertain correct tube position. There are, however, reports on the ineffectiveness of this method (Metheny et al 1990, Metheny 1998). Cases have been highlighted where results indicated correct tube placement and feeds were started with disastrous results (NPSA 2005, Metheny 1998). The 'Whoosh test' must not be performed.

10.3.3 Litmus Paper

- Until relatively recently, it was common practice to identify position of NGT by testing gastric aspirate with Litmus paper.
- However, this practice is not recommended as litmus paper cannot indicate degree of acidity. It is not sensitive enough to reliably distinguish between gastric acid (pH 3-5) and bronchial secretions (pH >6) (NPSA 2005, MHRA 2004, Rollins 1997). Litmus paper must not be used

10.3.4 Absence of Respiratory Distress

- Observing for signs of respiratory distress is often ineffective in detecting a misplaced tube (Metheny et al 1990). This test is made even less effective with the widespread use of fine bore tubes which can enter the respiratory tract with few, if any, symptoms. If the patient has a reduced level of consciousness, even larger bore tubes can enter the respiratory

tract without causing symptoms. The absence of respiratory distress must not be used as a sign of correct placement.

10.3.5 Bubbling at the end of the Tube

- Placing the proximal end of the tube under water and observing for bubbling is unreliable. The stomach also contains air and could falsely indicate respiratory placement resulting in the unnecessary removal of correctly positioned tubes (Metheny et al 1990). Testing for bubbling from the end of the NG tube must not be performed.

10.3.6 Appearance of Aspirate

- Evidence indicates that relying on the appearance of feeding tube aspirate to rule out misplacement is unreliable as gastric contents can look similar to respiratory secretions (NPSA 2005). The appearance of aspirate must not be used as a sign of correct placement

10.4 Checking NG Tube Position

- The position of the NG tube should be checked in the following circumstances;
 - Before restarting feed after a rest period
 - Daily in the case of continuous feeding
 - Before administering medication
 - If there are any concerns that the tube may have become displaced (e.g. loose tape, episodes of retching or coughing, an obvious increase in external length);
- This check consists of checking the internal length of the tube by noting the length markings at the nostril, and also ensuring that the tube is securely taped or fastened. The check should be documented on the 'Key points of care for insertion of NG tube' form;
- If the internal length of the tube has changed, feed and medication must not be given via the NG tube until a further check of tube position has been made;
- This further check consists of checking the pH of aspirate and where required a chest X-ray as described above. This check should be recorded both on the 'Key points of care for insertion of NG tube' form and in the patient's health care records.

10.5 Problems obtaining an Aspirate

- Aspirating fluid from NG tubes can be problematic. Some useful advice is as follows:
 - Use the correct sized, purple-coloured oral/enteral polyurethane syringe as advised by the NGT manufacturer (60ml purple enteral syringes). Use a syringe and NGT with non luer lock connections.
 - Inject air (10-20mls for adults, 1-3mls infants and children depending on size) down the NGT prior to aspiration. This will clear any debris from the end of the tube and dislodge the tip of the NGT if it is imbedded in the gastric mucosa. The patient's medical condition should be taken into account prior to injecting air down the NG tube, and if there is any doubt as to whether this is appropriate air should **not** be injected;
 - If safe to do so, ask the patient to drink a small amount of water then try again to aspirate;
 - Change the position of the patient in order to move the fluid level in the stomach e.g. if sitting up, turn the patient onto the left side which will allow the tip of the tube to enter the gastric pool;
 - If possible advance the tube (10-20cm in an adult, 1-2cm in infants and children). This may allow the NG tube to pass into the stomach if it has been in the oesophagus.

10.6 Obtaining a pH of 5.5 or above

- The aspirate obtained may have a pH of 5.5 or above because the NGT has been misplaced into the lungs on initial insertion or become displaced at a later stage either into the intestine or the lung (pH >6.0);
- However, the pH of gastric fluid may also be elevated due to acid inhibiting drugs or due to the presence of feed in the stomach. Where patients are receiving acid inhibiting drugs a pH of 5 or less has still been found in the majority of cases (NNNG 2004). It is recommended however that aspiration be done as long as possible after giving medication to reduce the possible effect of drugs on gastric pH;
- The most likely reason for an elevated pH is the dilution of gastric acid by feed. Waiting for up to an hour will allow time for the stomach to empty and the pH to fall;
- If there is any doubt about the position of the tube and/or the pH of the aspirate then feeding should not be commenced and specialist advice should be sought.

11 Discharge to Community Care

- 11.1 Discharging a patient from Acute to Community Services with an NGT in place requires planning. A multidisciplinary risk assessment should be performed and documented (NPSA 2011) and should include relevant Dietician and Community Services.

12 Learning from Mistakes

- 12.1 Feeding into the lung as the result of a misplaced NG tube was designated a 'Never Event' in England by NHS England in 2015. 'Never Events' are serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented. In the interest of patient safety and in order to learn from any mistakes made within our Trust, all misplacement incidents must be reported to the Trust Clinical Governance and Risk Department and recorded as an incident on Datix.

13 Training

- 13.1 All staff who insert NG tubes and perform testing of gastric aspirate must have been trained to do so.
- 13.2 A competence assessment form can be found as Appendix 3. This form can be used as documentary evidence of ability to safely insert a nasogastric tube
- 13.3 For those staff who require new and refresher training, this will be provided through training agreements with Acute Trusts.

14 Monitoring

- 14.1 Compliance with this Policy will be monitored by the Clinical Nurse Manager, who will monitor the number and type of incident and carry out spot check audits.

15 References

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