Paediatric Intensive Care Unit Nursing Guideline:

Nasogastric tubes: insertion, confirmation of correct position and ongoing management

This guideline should be used in conjunction with the Cardiff and Vale University Health Board (C&V UHB) procedure for the insertion of nasogastric tubes (2012) available on the intranet.

Nasogastric tubes (NGT) are commonly inserted for feeding, gastric aspiration and decompression (Wilkes-Holmes 2006). However there is a risk that the tube can become misplaced into the lungs during insertion, or move out of the stomach at a later stage (NPSA 2011a). Between 2005 and 2010 feeding via a misplaced NGT resulted in 21 deaths and 79 cases of harm (NPSA 2011a).

Contraindications (C&V NHS Trust 2009)

- Possible skull fracture (an orogastric tube is ALWAYS passed in head injured patients)
- Haematological disorders
- Maxillo-facial surgery, trauma or disease
- Oesophageal tumours, strictures or surgery

Type of tube

Nasogastric tubes available on PICU are Medicina polyurethane tubes:

- 6fr/55cm
- 8fr/75cm
- 8fr/85cm which may remain in situ up to 30 days

and

- 12fr/100cm
- 14 fr/100cm which may remain in situ up to 7 days.

Note: Extra long tubes are available for naso-jejunal placement only (6fr/85cm and 8fr/120cm).

Recommended Nasogastric Tube Size

Small NGTs are associated with fewer complications and reduced risk of aspiration as the lower oesophageal sphincter is not compromised reducing the risk of reflux (Farrington et al 2009).

Patient	Standard feeds	High density/fibre feeds
Neonates	4 - 5 FR	6 FR
Children	6 FR	8FR
Teenagers/adults	8 FR	10 FR

(Medicina 2008, C&V UHB 2012)

Wide bore (Ryles) tubes should only be used for gastric aspiration and decompression and should be changed for fine bore tubes as soon as feeding is established to ensure patient safety and comfort (C&V NHS Trust 2009).

Inserting the Nasogastric Tube

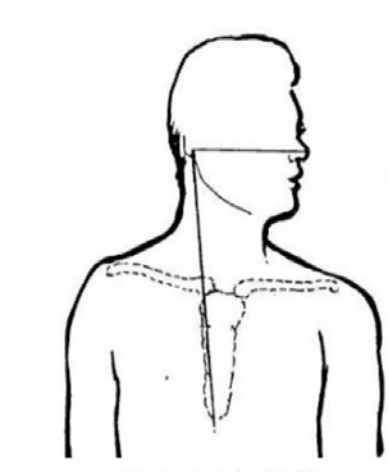
Only a registered nurse competent in passing a nasogastric tube or a doctor may undertake this procedure. Student nurses may insert NGTs under direct supervision (C&V UHB 2012).

Action	Rationale
Perform an assessment of the need for a NGT and document this in the notes. This should be performed by 2 competent health care professionals (to include senior doctor responsible for patient's care) (NPSA 2011a)	Risks of NGT must be balanced against the need to feed or administer medications (NPSA 2011a) Meets minimum standards set by NPSA (2011a)
Explain and discuss procedure with child and family. Obtain verbal consent (where appropriate) and document (C&V UHB 2012)	To ensure that informed consent is obtained as the procedure is distressing for the child and family.
Ensure the NGT to be used for feeding is radio-opaque throughout its length and has externally visible length markings (NPSA 2011a)	Allows confirmation of tube position by X-ray, measurement of length of tube required for placement in stomach and verification of position at nares
Prepare clean field and gather equipment: NGT, sterile water, pH indicator strips, adhesive tape, scissors, duoderm (if sensitive skin), 20/60ml enteral syringes	To reduce contamination of equipment and ensure procedure can be undertaken fully and without delays
Patient preparation: seek assistance of another nurse; explain procedure; place in semi-recumbent position; assess need for	Facilitates placement of NGT

bolus of sedation	
Wash hands, put on apron and gloves	To minimise cross infection
Ensure the nostril is clear of debris, suction if necessary	Facilitates placement of NGT
Measure the NGT as follows: Place exit port of tube at tip of nose, extend tube to earlobe, and then to xiphisternum (see diagram) (NPSA 2011a) Document this length	This gives an estimate of the length of tube needed to enter the stomach
Examine the NGT; stretch the NGT; ensure guidewire moves freely (Medicina 2008, C&V NHS Trust 2009)	Ensures the integrity of the NGT; removes any kinks/bends in NGT; ensures the guidewire can be removed without resistance
Dip end of NGT in sterile water	Lubricates NGT to ease passage (lubricating gel can block fine bore tube)
Pass the NGT: insert the tip of the NGT into the nostril, along the floor of the nasal passage into the oropharynx. Ask the patient to swallow and tip chin down if able. Advance the NGT and encourage the patient to swallow until the NGT reaches the desired length (C&V NHS Trust 2009)	Ensures smooth passage of the NGT
Remove the NGT immediately if: - the NGT meets resistance and cannot be advanced further - the patient develops respiratory distress Reassure the patient and try again in the other nostril (C&V UHB 2012)	- Forcing the NGT beyond an area of resistance will cause trauma and bleeding - Respiratory distress indicates misplacement of the NGT in bronchi/lungs
Confirm the correct position of the NGT: - Slowly aspirate 0.5 - 1ml using a 20/60ml enteral syringe - Place aspirate on pH strip, leave for 10 seconds - A pH of < 5.5 confirms gastric placement Air insufflation with abdominal auscultation is unreliable and should **not** be used (NPSA 2011a)	- Excess pressure exerted by smaller syringes can collapse the NGT making aspiration difficult (Wilkes-Holmes 2006) **-A pH of 1 - 5.5 is necessary to confirm that the tube is not in the lung** (NPSA 2011a) - the presence of aspirate does not rule out misplacement
If no aspirate obtained try the following: - Turn child onto left side - Inject air using an enteral syringe - Try using a smaller syringe - Wait 15-30 minutes then try again - Advance/withdraw tube by 1-2cm - Give mouth care if nil by mouth	- Allows the tip of the NGT to enter the gastric fluid pool - Pushes the exit port of the NGT away from the gastric mucosa. If belching is heard immediately the NGT is in the oesophagus (Medicina 2008) - Increased pressure may yield aspirate - The stomach could be empty - May reposition the NGT into the stomach - May stimulate gastric secretions - Water can react with the lubricant inside

- **Do NOT use water to flush (NPSA 2012)**	the NGT and test acidic
Once confirmed instil 5 mls sterile water and carefully remove the guidewire	Water eases the removal of the guidewire and clears the NGT of any debris.
Secure NG tube by taping to the cheek taking care not to cause pressure on nostril	Prevents displacement of the NGT and damage to the nostril
Dispose of all equipment according to UHB policy	Complies with national health & safety standards
In the unconscious or ventilated child a chest x-ray must be performed and the NGT position verified by the doctor and recorded in the notes prior to commencement of feed	Radiotherapy is recommended following the insertion of NGTs in high risk patients (C&V UHB 2012)
If positioned incorrectly: - NGT can be advanced or withdrawn by stated distance without the need for re-XR if a pH of 1-5.5 is obtained - CXR will be needed if pH of aspirate is not 1-5.5 or the NGT has been removed and replaced	To ensure gastric placement of NGT
Complete NGT bundle sticker and place in notes. Document length of NGT at nares on observation chart.	Complies with national recommendations (NPSA 2011a)

Diagram 1:



Estimation of length of NGT (NPSA 2011a):

Nose to Ear to Xiphisternum (NEX)

Orogastric placement: measure from the lips to the ear to the xiphisternum

Confirming Correct Tube Position during Ongoing Care

Action	Rationale
Document the length of the NGT at the nares daily on the observation chart (NPSA 2011a)	Acts as a reference point in determining if NGT has become misplaced
Aspirate and check the pH prior to: - Commencing feeds - Administering medication	A pH of 1 - 5.5 confirms the correct position of the NGT

- At least once per shift - In the presence of new or unexplained respiratory symptoms or reduction in O_2 saturation - Following evidence of tube displacement (loose tape, change in external length) (NPSA 2011a, C&V UHB 2012) Document the pH	
If the pH is 6 or above, perform a risk assessment: - Check whether the patient is on medication that may increase the pH of gastric contents - Check if the patient is on continuous feeds - Check pH at time of X-ray confirmation (on NGT bundle sticker) - Check for signs of displacement (position at nares; tapes secure; no coughing, retching or vomiting; no unexplained respiratory symptoms) **If none of the above, do not feed**. Wait for up to 1 hour and try again or consider x-ray (NPSA 2011a) Document your findings and action taken	- Antacids, H_2 antagonists and proton pump inhibiters increase the pH of gastric contents - Continuous feeds can increase the pH of gastric contents - Confirms this pH is normal for the patient - The position at the nares should be unchanged. The NGT may become displaced during coughing, retching or vomiting episodes or if the tapes are loose. Unexplained respiratory compromise may be due to pulmonary placement of the NGT. - If pH ≥ 6 the aspirate could be bronchial; feeding could result in death of the patient (NPSA 2012)
Check the position of the NGT at the nares and that the tapes are secure: - At the start of your shift as part of the patient assessment - Prior to administering medication or commencing feeds - Following coughing, retching or vomiting	Checking the position of the NGT at the nares is not sufficient as it could be coiled in the back of the mouth - pH testing is also needed (NPSA 2011a). However using >1 bedside assessment method to confirm correct placement is good practice.

Tips for Ongoing Management of the NGT

Check nostril with NGT regularly; clean with water as needed; adjust position of NGT as needed	Prevent skin breakdown
Change tape if tapes wet, soiled or loose	Allows for inspection of skin integrity; ensures NGT does not become misplaced
Clean exterior portion of NGT daily with mild soap and water and dry (Medicina 2008)	Prevents contamination of feed and medications
Flush internal threads of purple luer lock connector of NGT with sterile water to	Feed/debris in threads of luer-lock connector may act as 'glue' when dry and prevent

dislodge feed/debris if present	disconnection (Medicina 2008)
Flush NGT with sterile water: - Every 4-6hrs when feeding - Every 8 hrs if not in use - Before, after and between medications - Before and after feeding Recommended volume is 5-10mls for neonates and 10-20mls for children - use less if fluid restricted (Medicina 2008).	Maintains patency of the NGT
If the NGT becomes blocked, try flushing with warm water or fizzy water (Medicina 2008)	Passing a new NGT will cause distress, possible trauma and a CXR will be needed
Remove and replace the NGT if it becomes dislodged more than a few cms (a CXR will need to be performed before use)	Prevents aspiration of the feed
Ensure the patient does not become entangled in the NGT	NPSA(2011b) reports cases of harm resulting from entanglement

References

Cardiff and Vale University Health Board (2012) Procedure for the insertion of a nasogastric tube, confirmation of correct position and ongoing patient care in adults, children and infants (not neonates)

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