Chapter 4

Nasogastric Tube insertion

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Gastric access via the nasal passage is a common procedure that is used for diagnostic and therapeutic purposes. Enteral feeding via nasogastric (NG) tube

is a standard method used to restore or preserve nutrition. The earliest description of enteral feeding was described 3500 years ago in ancient Egyptians and Greeks. They mainly used enemas to infuse nutrients to preserve health and to treat diarrhoea. During that time rectal feeding was thought to be the preferred rout due to difficulty in accessing the upper gastro intestinal (GI) tract. Subsequently feeding into upper GI tract was introduced in the 12th century.

Nasogastric Tubes

Nasogastric intubation generally requires a narrow tube, as it has to pass through the nasal cavity. A wide bore feeding tube is used if drainage is needed; otherwise a fine bore tube is inserted. The tubes are generally made of polyurethane or silicone as this can withstand the gastric acidity well. These can be kept in situ up to 6 weeks where as the polyvinyl chloride (PVC) tubes can be kept for 2 weeks. If long term enteral feeding is needed a percutaneous endoscopic gastrostomy (PEG) is preferred.

Available Products

Ryle's tube: Ryle's tube is a commonly used type of NG tube, manufactured from non-toxic, non-irritant material. The distal end has a corrosion resistant stainless steel ball sealed into the tube. This helps in assisting the passage of tube into the stomach. There are four lateral eyes that help in efficient aspiration and food administration. The tube has markings at 50, 60 and 70cm from the tip for accurate placement. The size of the tube varies from 8 FG to 24 FG and they are colour coded accordingly. The NG tube is radio opaque throughout the length, hence it is easily visible on X-ray.

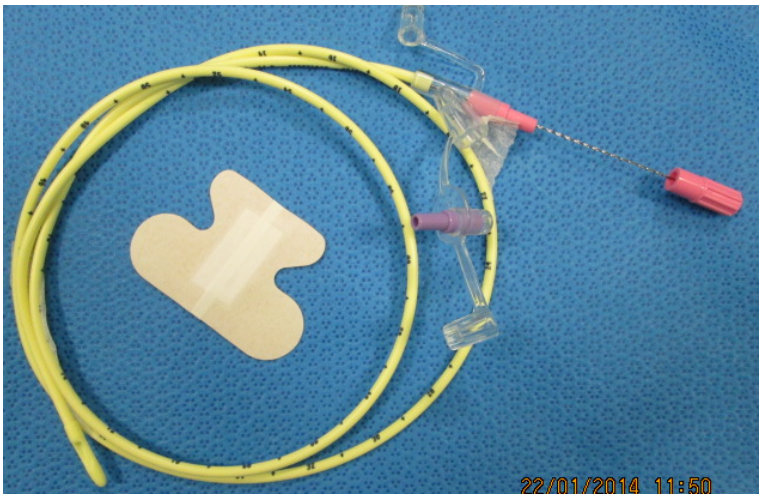

Figure 1: A fine bore feeding tube (note the guide wire). It is inserted with guide wire in situ. A chest x-ray must be performed after insertion to confirm the correct position. After confirming the correct placement, the guide wore is remove.

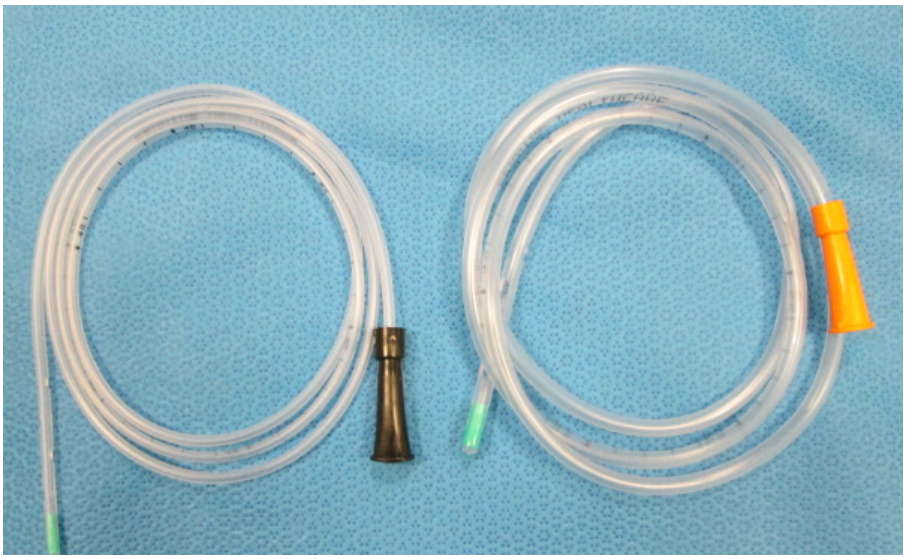

Figure 2: Nasogastric tubes of different sizes:10 French gauge size (colour coded as black at the proximal end and 16 French gauge (colour coded as orange at the proximal end).

Applied Anatomy:

Nasopharynx extends superiorly from the nares to the soft palate inferiorly. The posterior oropharynx begins below the soft palate and extends inferiorly to the glottis and the oesophageal opening. Oesophagus is a tubular conduit between oropharynx and stomach.

The NG tube is inserted into the nostril aiming horizontally and posteriorly along the floor of the nasal cavity. Once the tube has passed the soft palate and entered the oro-pharynx, loss of resistance is felt. At this stage a conscious patient may gag. The marking on the NG tube will assist in judging the position of the tip of the tube. In an adult the distance from the nostril (external nares) to cardiac orifice of the stomach is about 44 cm and from cardiac orifice to the pylorus of stomach about 12-14 cm. Certain pathology may impede the passage of nasogastric tube such as a deviated nasal septum, oesophageal narrowing at the beginning of the oesophagus behind the cricoid cartilage and the point where the oesophagus enters the stomach.

Indications for insertion of NG tube:

Can be broadly divided into diagnostic and therapeutic

Diagnostic:

- Check the quantity in upper gastrointestinal bleed
- Aspiration of gastric fluid contents
- Administration of radiographic contrast to GI tract

Therapeutic

- Gastric decompression
- Relief of symptoms in small bowel obstruction
- Lavage of gastric contents after ingestion of toxic substances
- Administration of medication
- Enteral nutrition
- Bowel irrigation
- Treatment of paralytic ileus
- Prevent aspiration and vomiting

Contraindications:

Further subdivided into absolute and relative contraindication

Absolute Contraindications

- Severe mid face trauma (cribriform plate disruption) due to the possibility of insertion of tube intra-cranially
- Recent nasal surgery

Relative contraindications

- Oesophageal varices or strictures
- Clotting abnormalities
- Alkaline ingestion
- Recent banding or cautery of oesophageal varices
- Base of skull fractures

Complications

Thoracic complications

- Patient discomfort: generous lubrication and gentle technique will reduce discomfort
- Epistaxis
- Bronchial placement leading to pneumonia atelectasis and lung abscess
- Bronchial perforation and pleural cavity penetration
- Empeyema and sepsis
- Pleural knotted tube
- Pulmonary haemorrhage
- Intravascular penetration
- Oesophageal perforation
- Atelectasis from tracheal placement with suction applied
- Intrapulmonary administration of drug and feeds

Non Thoracic complications

- Tube knotting and impaction in the posterior nasopharynx
- Tube double backing and kinking
- Tube obstruction and rupture with kinking
- Tube breakage
- Enteral perforation

- Intracranial entry
- Hypertension and tachycardia depending on depth of sedation
- Sub mucosal dissection
- Glottic injury
- Vocal cord paralysis (nasogastric tube syndrome)(Sofferman et al., 1990)
- Disfiguring scars at the anterior nares due to pressure and erosion from the NG tube

Equipment needed for insertion of Nasogastric tube

Nasogastric tube of selected size

Viscous Lidocaine 2%

10 ml Syringe

Glass of water with a straw

Water based lubricant

60 ml Toomey syringe

Adhesive tape or nasal dressing to fix the NG tube

Emesis basin or plastic bag

Wall suction set to low intermittent suction

Suction tubing and container

Insertion of Nasogastric tube in an awake patient:

Decision-making and consent

Before a decision is made to insert a NG tube an assessment should be undertaken ensure that nasogastric feeding is appropriate for the patient and rationale for the decision should be recorded in the notes. The procedure, risk, benefits, complications and alternatives should be explained to the patient.

Patient's nostrils should be examined for any septal deviation.

Insertion of NG tube

Position the patient sat upright with the neck slightly flexed

In adult patients 10 ml of viscous lignocaine gel 2% is instilled into the more patent nostril and request the patient to sniff it up to anaesthetise the nasal and the oral mucosa. In paediatric patients the dose should not exceed 4mg/kg of Lignocaine. Wait for 5-10 minutes to anaesthetise the mucosa.

Length of the tube to be inserted can be measured by measuring the length from the tip of the nose, around the ear down to just below the costal margin.
Lubricate the end of the nasogastric tube. The nasogastric tube should then be gently inserted along the floor of the nose directly perpendicular to the patient's head until it reaches the back of the nasopharynx.
At this time ask the patient to swallow some water to facilitate the progress of the nasogastric tube. Continue to advance the nasogastric tube until previously determined length is achieved.
If the patient experience any respiratory discomfort or is unable to speak the nasogastric tube should be immediately withdrawn.
The nasogastric tube should then be taped securely to avoid displacement.

Insertion in anaesthetised or sedated patients

Insertion of a NG tube in an anaesthetised or sedated patient can be most challenging procedure. If the patient is sedated and paralysed, place 2-3 fingers through patient's mouth into the oropharynx and guide the nasogastric tube into the hypopharynx. Lifting the thyroid cartilage anterior and upward might facilitate the entry of the nasogastric tube into the proximal oesophagus.

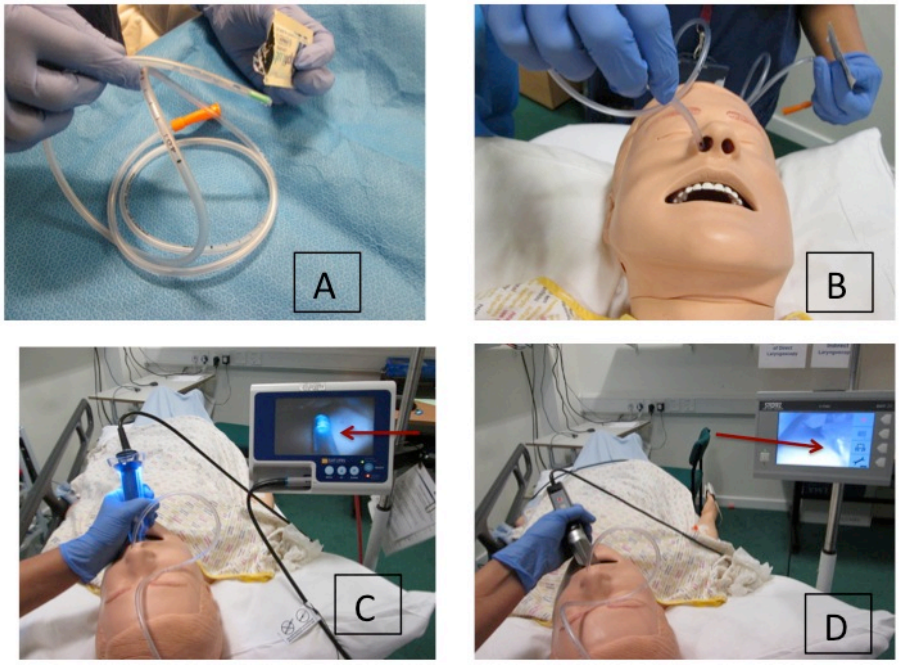

Figure 3: Insertion of NG tube in an anaesthetised patient. A; Lubricating the tip of the NG tube using water based lubricant. B; Inserting the NG tube along the floor of

Nose. C; Using Glidescope videolaryngoscope to visualise the tip of the tube (arrow). D; Using the C-MAC videolaryngoscope to visualise the tip of the tube (arrow)

Using direct laryngoscopy or video laryngoscopy will aid insertion of nasogastric tube by direct visualization of the tip of the tube in sedated and paralysed patients. Freezing the NG tube was shown to increase the success rate for insertion in anaesthetised patients.

There are several techniques have been described to improve success rate of NG tube placement in an anaesthetised patient. These include use of ureteral or angiography guide wire as a stylet, use of a slit endotracheal tube as conduit, head flexion and lateral neck pressure and outward and rightward pull on the cricoid cartilage Alternatively, indirect vision using videolaryngoscopes such as Glidescope can used to guide the NG tube.

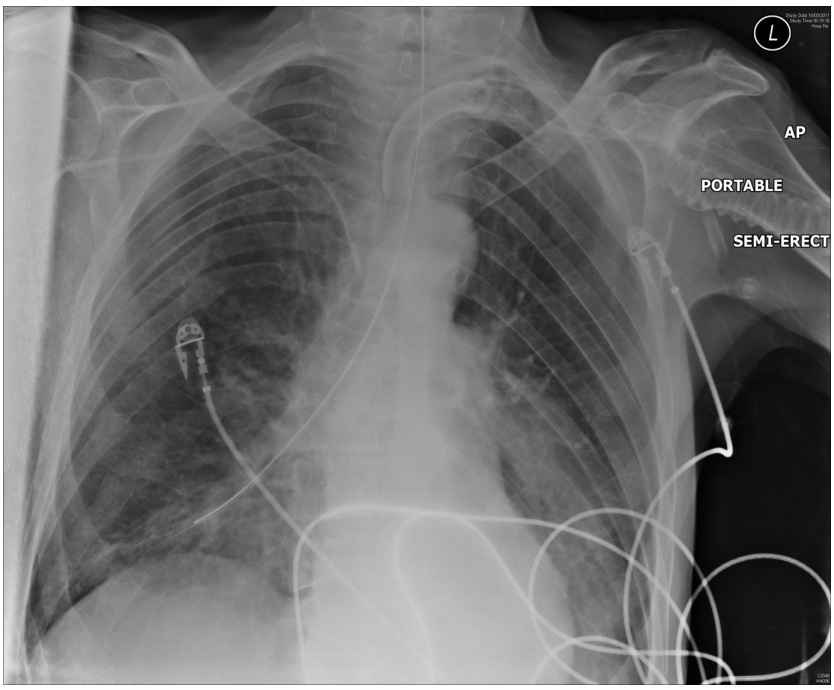

Figure 4: Chest X Ray illustrating nasogastric tube mal-positioned in the tracheo-bronchial tree.

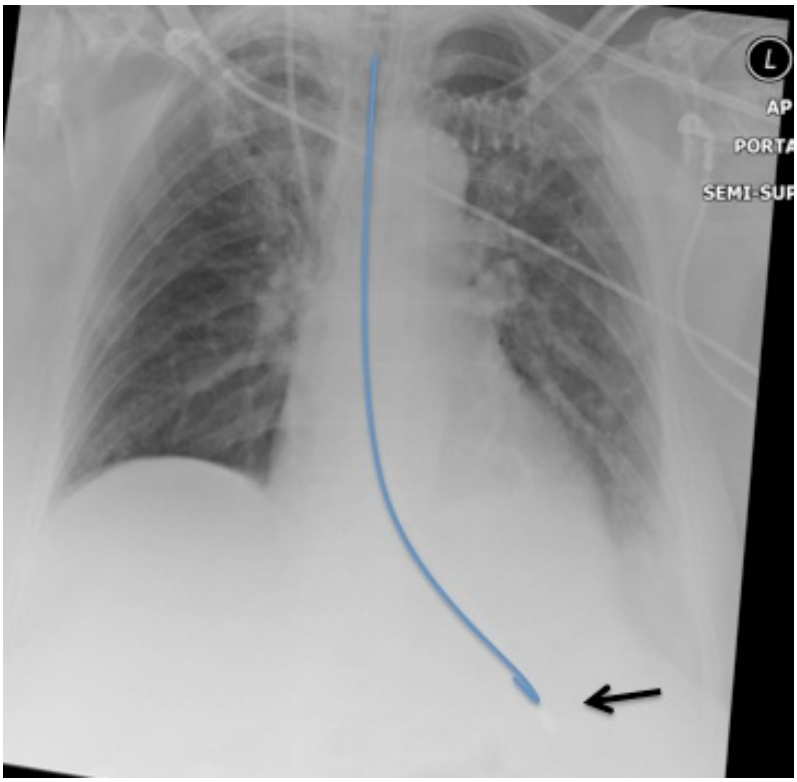

Figure 5: Chest X Ray illustrating nasogastric tube in the correct position (arrow)

Checking the placement of the nasogastric tube

Correct position should be confirmed

- Immediately after initial placement
- Before each feed
- Following vomiting , coughing or if there is decrease in oxygen saturation
- If tube is accidently dislodged or if the patient complains of discomfort

How to check

There are many methods to check whether the NG tube is in place. Some methods are unreliable and not recommended by the NPSA.

Unreliable methods

- Visual inspection of aspirate – findings indicate that the location of only 50% of feeding tubes were correctly identified using this method.
- Auscultation test/ whoosh test (listening for bubbling sound after air entry)

This is an unreliable method of differentiating between gastric and respiratory placement and is not recommended by the NPSA

- Testing the acidity and alkalinity using blue litmus paper as blue litmus paper is not sensitive enough to distinguish between gastric and bronchial secretion

Reliable methods (NPSA 2005 guidelines)

- First line method – pH Paper: the pH should be between 1-5.5 as the safe range.
- Second Line method – X-ray confirmation: X-ray is used as a second line test only when aspirate cannot be obtained or pH indicator paper has failed to confirm the location of the nasogastric tube

Post Procedure care

The NG tube is generally placed on either suction or gravity.

Nasogastric tube should be checked

- Following initial insertion
- Before administering each feed
- Before giving medicine
- At least once daily during continues feed
- Following episode of coughing, retching or vomiting

Nothing should be administered through the NG tube until correct placement has been confirmed and documented.

Further reading

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