成人採間歇性鼻胃管灌食後，不關閉鼻胃管路，接上引留袋並置放高於枕頭，以降低吸入性肺炎?

Journal Club
引言人:王錦雲
2016年10月11日

Nasogastric Tube Feeding

- **Definition --**

  Nasogastric tube feeding is defined as the delivery of nutrients from the nasal route into the stomach via a feeding tube.

  (MOH NURSING CLINICAL PRACTICE GUIDELINES, 2010)

- Nasogastric feeding is most appropriate when starting EN

  (McClave, S. A., 2016)

- Nasal tubes are mainly used for short-term enteral feeding (4-6 wk) and in situations where other methods of enteral feeding are contraindicated.

  (Blumenstein, I., Shastri, Y. M., Stein, J., 2014)

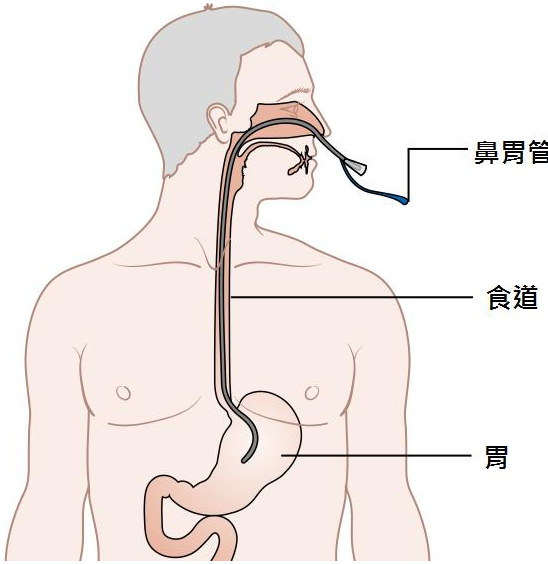
Indication

Indication for enteral tube feeding	Example
Unconscious patient	Head injury, ventilated patient
Neuromuscular swallowing disorder	Post-CVA, multiple sclerosis, motor neurone disease, Parkinson's disease
Physiological anorexia	Cancer, sepsis, liver disease, HIV
Upper GI obstruction	Oro-pharyngeal or oesophageal stricture or tumour
GI dysfunction or Malabsorption	Dysmotility inflammatory bowel disease, reduced bowel length (although PN may be needed)
Increased nutritional requirements	Cystic fibrosis, burns
Psychological problems	Severe depression or anorexia nervosa
Specific treatment	Inflammatory bowel disease, for short term enteral access during surgery i.e. head and neck cancer,
Mental health	Patients with Dementia

Commissioned by the National Institute for Clinical Excellence，2006

Tube-related complications of enteral tube feeding

Mechanical complications	Tube obstruction
	Primary malposition
	Perforation of the intestinal tract
	Secondary displacement of the feeding tube
	Knotting of the tube
	Accidental tube removal
	Breakage and leakage of the tube Leakage
	and bleeding from insertion site
	Erosion, ulceration and necrosis of skin and mucosa
	Intestinal obstruction (ileus)
	Hemorrhage
	Inadvertent IV infusion of enteral diet
Infectious complications	Infection at the tube insertion site
	Aspiration pneumonia
	Nasopharyngeal and ear infections
	Peritonitis
	Infective diarrhea
Metabolic complications	Electrolyte disturbances
	Hyper- and hypoglycemia
	Vitamin and trace element deficiency
	Tube feeding syndrome ("Refeeding syndrome")



World J Gastroenterol 2014 July 14; 20(26): 8505-8524

吸入性肺炎定義

- 指異物或胃內容物，由口咽吸入氣管，進入下呼吸道，導致肺部疾病；如果吸入肺部的物質是無菌的胃酸，可能會造成急性肺損傷（acute lung injury）；如果是含菌的腸胃道液或是夾帶口腔內大量細菌，就可能造成細菌性肺炎

（ Marik, 2011; Shimada et al., 2010 ）。

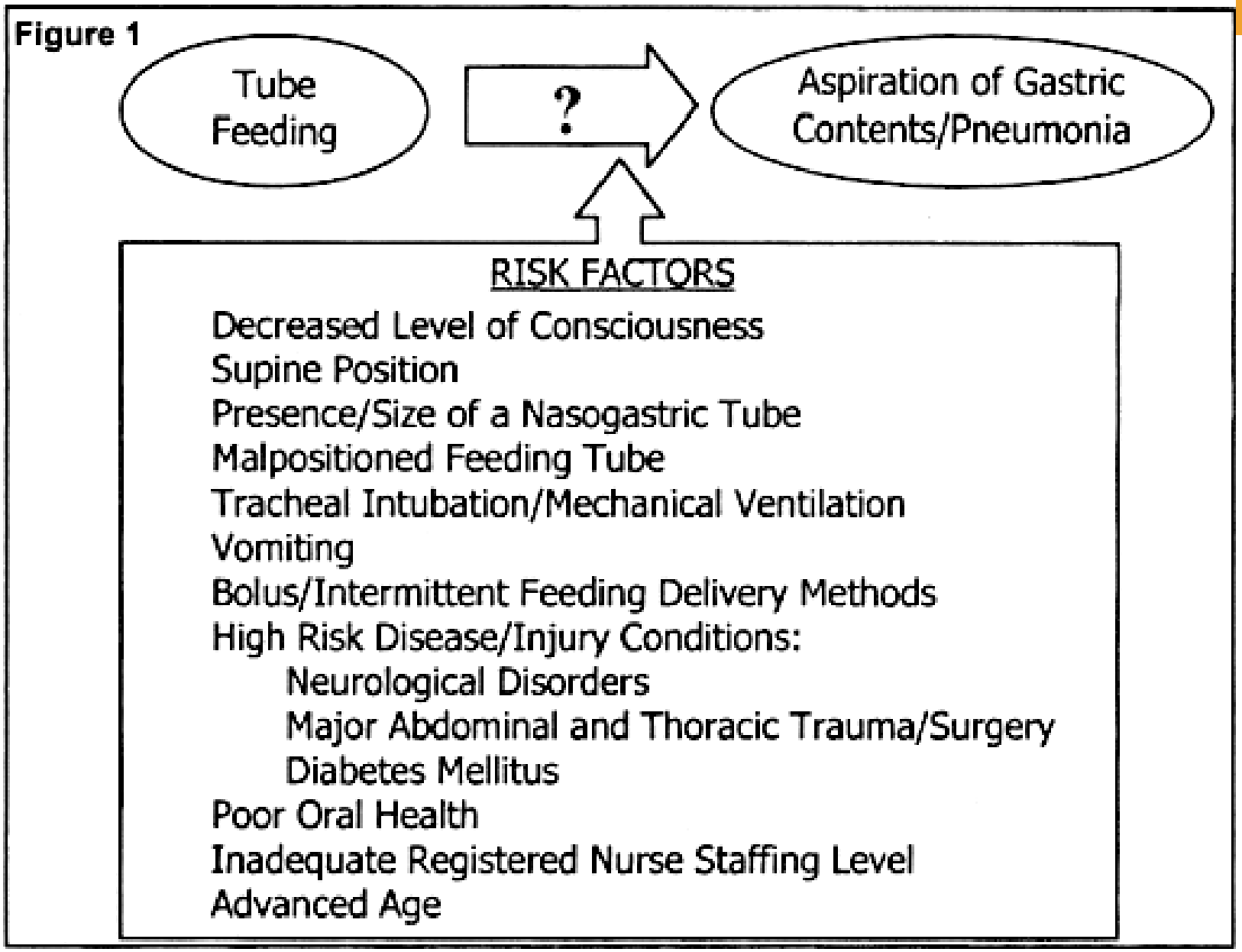


FIG. 1. Factors that influence whether or not tube feedings lead to aspiration.

Background

- **Nasogastric tube feeding may be accompanied by complications.**
- **Aspiration is one of the most feared complications of EN. (McClave, s. A, 2009)**
- **Thus, it is important for the practitioner to be aware of how to prevent these complications so that nasogastric tube feeding can be administered successfully and safely.**
- **Diagnosis of aspiration is difficult without the use of costly procedures; thus, the incidence of this condition is unclear. (American Association of Critical-Care Nurses ,2016)**
- **要實際預測肺吸入很困難，所以影像的檢查（胸部X 光）或是實驗室檢驗（檢測痰液中的胃蛋白酶、酸鹼值，或是添加葡萄糖於食物溶液中，再檢測痰液是否含糖）以及支氣管鏡檢查，雖較客觀，但是臨床要使用這些方法是有困難的(**廖、呂，2014)。

Background

- **aspiration is clearly a common problem in acutely ill patients.**
- **For example, videofl uoroscopically documented aspiration was reported in 42.6% of 1100 hospitalized adults (25% of the patients were aspirating silently).**
- **Reportedly, aspiration pneumonia represents 5% to 15% of pneumonias in the hospitalized population.**
- **Because no bedside tests are currently available to detect microaspirations, efforts to prevent or minimize aspiration take on added importance.**

(American Association of Critical-Care Nurses ,2016)

表三　兩組病人接受灌食七日後之胃排空與肺吸入指標　(n=80)

項目 \ 組別		持續灌食組 n=40 人數	間歇灌食組 n=40 人數	合計 n=80 人數(%)	P 值 Chi-square test
胃排空指標					
灌食量>1000ml					.000
	無	18	1	19(23.75)	
	有	22	39	61(76.25)	
胃殘餘量					.013
	無	32	39	71(88.75)	
	有	8	1	9(11.25)	
肺吸入指標					
痰液葡萄糖					.006
	無	18	30	48(60.00)	
	有	22	10	32(40.00)	
喘鳴					.051
	無	24	32	56(70.00)	
	有	16	8	24(30.00)	
發燒					.517
	無	27	31	38(72.50)	
	有	13	9	22(27.50)	
吸入性肺炎					.000
	無	17	35	52(65.00)	
	有	23	5	28(35.00)	

周幸生、林玉如、實意禎、吳麗芬(2003)

胃殘餘量(gastric residual volumes)

- 胃液每天產生的量約5 公升，每小時胃排空速度為232~464cc，因此當消化不良時，胃液排空便會減少

（Hurt & McClave,2010）

- 胃殘餘量與肺吸入沒有正比關係，但是當胃殘餘量大於200cc 時，吸入性肺炎的風險明顯增加（Metheny et al., 2008）

胃殘餘量(gastric residual volumes)

- **Feeding intolerance was primarily based on large gastric residual volumes (GRVs) together with other gastrointestinal symptoms.**
- **The 2013 Canadian clinical practice guidelines19 indicate that data are insufficient to recommend a specific GRV threshold;**
- **guidelines indicate that a GRV between 250 mL and 500 mL is acceptable as a strategy to optimize enteral nutrition in critically ill patients.**

(American Association of Critical-Care Nurses ,2016)

胃殘餘量(gastric residual volumes)

- 美國靜脈和腸道營養學會（ASPEN）營養支持指引中建議，每4 小時測量一次胃殘餘量，以胃殘餘量250cc 做為決定是否暫停灌食的切點；如果胃殘餘量超過500cc，則需禁食（Bankhead et al., 2009)

臨床問題(案例)

- 臥床病人採間歇式鼻胃管灌食後，不慎因咳嗽或抽痰因素，導致吸入性肺炎。

臨床問題

- 研究族群 (population)

  --臥床病人

- 介入措施(Intervention)

  --間歇灌食後不關閉鼻胃管

  ，並將管路放置高於胃部

- 比較措施(Comparison)

  --間歇灌食後關閉鼻胃管

- 結果(Outcomes)

  --造成吸入性肺炎機率

搜尋結果 - 無證據力佳的相關文獻

Iranian Journal of Basic Medical Sciences
www.mums.ac.ir/basic_medical/en/index
IJBMS

Pulmonary Complications of Gastric Fluid and Bile Salts Aspiration, an Experimental Study in Rat

Materials and Methods:

- **Forty eight male rats weighted 250-300 g were selected in six groups. After anesthesia and tracheal cannulation,**
- **received 0.5 ml/kg normal saline,**
- **0.5 ml/kg whole gastric fluid,**
- **0.5 ml/kg pepsin (2.5 µg/ml),**
- **0.5 ml/kg hydrochloric acid (pH=1.5)**
- **0.5 ml/kg bile salts (2.5 µg/ml)**

injection into their trachea and lungs. In sham group nothing was injected.

Table 1. The effect of aspiration of gastric fluid and its components on inflammation of bronchi, bronchioles and parenchyma in the studied groups (mean ±SD)

Groups	Bronchial inflammation	Bronchioles inflammation	Parenchyma inflammation
Sham	0.0±0.0	0.0±0.0	0.0±0.0
Normal saline	0.0±0.0	0.125±0.35	0.125±0.35
Hydrochloric acid	1.75±0.46*	2.0±0.0*	2.0±0.0*
Gastric fluid	2.5±0.53*,¥	2.0±0.0*	2.0±0.0*
Pepsin	2.87±0.35*,¥	2.875±0.35*,£	2.875±0.35*,£
Bile salts	3.0±0.0*,£	2.875±0.35*,£	2.875±0.35*,£
P- value	<0.001	<0.001	<0.001

*: $P<0.05$ in comparison to sham and normal saline groups
£: $P<0.05$ in comparison to hydrochloric acid and gastric fluid groups
¥: $P<0.05$ in comparison to hydrochloric acid group

Table 2. The effect of aspiration of gastric fluid, its components and bile salts on fibrosis of bronchi, bronchioles and parenchyma in the studied groups (mean ±SD)

Groups	Bronchial fibrosis	Bronchioles fibrosis	Parenchyma fibrosis
Sham	0.0±0.0	0.0±0.0	0.0±0.0
Normal saline	0.0±0.0	0.0±0.0	0.0±0.0
Hydrochloric acid	1.62±0.51*	1.0±0.0*	1.0±0.0*
Gastric fluid	2.12±0.35*	1.0±0.0*	1.0±0.0*
Pepsin	2.5±0.53*,¥	1.62±0.51*,£	1.62±0.51*,£
Bile salts	2.87±0.35*,£	2.0±0.0*,£,€	2.0±0.0*,£,€
P- value	<0.001	<0.001	<0.001

*: $P<0.05$ in comparison to sham and normal saline groups;
£: $P<0.05$ in comparison to hydrochloric acid and gastric fluid groups
¥: $P<0.05$ in comparison to hydrochloric acid group;
€: $P<0.05$ in comparison to pepsin group

Iranian Journal of Basic Medical Sciences
www.mums.ac.ir/basic_medical/en/index
IJBMS

Pulmonary Complications of Gastric Fluid and Bile Salts Aspiration, an Experimental Study in Rat

Results:

Parenchymal and airways inflammation and fibrosis of bronchi, bronchioles and parenchyma were significantly more in the test groups compared to saline and sham groups ($P<0.001$);

also inflammation in pepsin and bile salts groups (histopathology scores: 2.87 ± 0.35 and 3.0 ± 0.0 for bronchial, 2.87 ± 0.35 and 2.87 ± 0.35 for bronchioles, 2.87 ± 0.35 and 2.87 ± 0.35 for parenchymal inflammation) were more than hydrochloric acid and gastric fluid groups (1.75 ± 0.46 and 2.5 ± 0.53 for bronchial, 2.0 ± 0.0 and 2.0 ± 0.0 for bronchioles, 2.0 ± 0.0 and 2.0 ± 0.0 for parenchymal inflammation) ($P<0.05$).

The same results were found for fibrosis, so that the fibrosis in pepsin and bile salts groups were more than hydrochloric acid and gastric fluid groups ($P<0.05$).

現況

- Bolus feeding can be performed using a 50 ml syringe, either with or without the plunger. If the latter is removed, the syringe can be hung up to allow gravity feeding.

至少45~60度

鼻胃管插入及管灌技術標準規範

- 抬高床頭45-60度，無法坐起者可採右側臥位。
- 每一次灌食前，應測試鼻胃管位置，輕柔反抽檢查消化情形。
- 灌食前胃內殘餘量大於75mL~200mL，建議不要再餵食
- 灌食前反抽，觀察反抽物及空氣量，排出空氣，再將反抽物以重力引流方式灌回胃內， 若有未消化之食物,則應二小時後再反抽看看，若反抽物仍大於灌食量的一半時應暫緩灌食，且反抽物仍需灌回胃內，另有咖啡色液體則予以丟棄
- 灌食液溫度以37-40℃為宜，成人每次總灌食量不超過500ml。
- 將灌食空針抬高30-45cm先灌30ml 的溫開水，再將食物倒入空針內，藉重力以緩緩流入或慢慢推入至 胃中，每次灌食時間不可少於15-20分鐘。
- 灌食後30分鐘內不要立刻平躺、翻身及拍痰。

鼻胃管插入及管灌技術標準規範S8100308

Table 1 Care plan for patients with enteral nutrition through nasoenteral tube in the Internal Medicine Unit

Nursing interventions
Oral care daily and observation of the nasal skin.
Tube fixation with adhesive strip to the nose.
Flush the tube with 30 ml of water after each administration of nutritional formula or drugs.
Elevate head of bed of the patient 30° whilst receiving enteral nutrition.
Observation for gastrointestinal complications: diarrhoea, constipation, nausea or vomiting.
Check the gastric residue if the patient experiences nausea, vomiting or abdominal distension.
Check the blood glucose daily in non-diabetic patients and three times a day in diabetic patients.
Document the fluid balance daily.
Monitor daily the administered dose and the infusion rate.
Change the infusion set and infusion bags as prescribed.

Prevention of Aspiration in Adults

AACN Levels of Evidence

Level A Meta-analysis of quantitative studies or metasynthesis of qualitative studies with results that consistently support a specific action, intervention, or treatment (including systematic review of randomized controlled trials)

Level B Well-designed, controlled studies with results that consistently support a specific action, intervention, or treatment

Level C Qualitative studies, descriptive or correlational studies, integrative reviews, systematic reviews, or randomized controlled trials with inconsistent results

Level D Peer-reviewed professional and organizational standards with the support of clinical study recommendations

Level E Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations

Level M Manufacturer's recommendations only

(American Association of Critical-Care Nurses ,2016)

Actions for Nursing Practice

- Maintain head-of-bed elevation at an angle of 30º to 45º, unless contraindicated. [level B]

- Use sedatives as sparingly as feasible [level C]

- For tube-fed patients, **assess** feeding tube placement at 4-hour intervals to ensure that the tube has remained in the desired location. [level C]

--Encourage obtaining a radiograph to confirm tube position if the tube's position is in doubt

Actions for Nursing Practice

- For patients receiving gastric tube feedings, **assess** for intolerance to feedings every 4 hours by monitoring GRVs, abdominal discomfort, nausea/vomiting, and abdominal girth/distention. [level C]

--If patients are able to communicate, ask if they are experiencing abdominal discomfort or nausea

--a. A 60-mL syringe is most suitable for measuring residual volumes; withdraw as much fluid from the tube as possible to make an accurate assessment

--b. It is helpful to inject 30 mL of air before attempting to aspirate fluid from flexible, small-diameter tubes

Actions for Nursing Practice

- For tube-fed patients, **avoid** bolus feedings for those at high risk of aspiration. [level E]

  -- As indicated earlier, it is better to introduce feedings evenly over a period of hours to minimize the risk for regurgitation and aspiration of gastric contents

  --Consult with a clinical dietitian and a provider about the best feeding method for individual patients

- **Consult** with the patient's provider about obtaining a swallowing assessment before beginning oral feedings for a recently extubated patient who has undergone prolonged intubation. [level C]

(American Association of Critical-Care Nurses ,2016)

Actions for Nursing Practice

- Maintain endotracheal cuff pressures at an appropriate level, and ensure that secretions are cleared from above the cuff before it is defl ated. [level B]

--The American Thoracic Society recommends that endotracheal tube cuff pressures be maintained at greater than 20 cm H2O to prevent leakage of secretions around the cuff into the lower part of the respiratory tract

(American Association of Critical-Care Nurses ,2016)

非藥物非侵入性-預防鼻胃管灌食導致吸入性肺炎之實證照護措施文獻彙整

作者/年代	研究結果/建議措施	實證等級
Metheny et al.（2010）	建議可以有效降低肺吸入的方案： 1. 保持床頭大於 30 度。 2. 灌食管置放在小腸遠端（用 X 光做評估工具）。 3. 計算胃殘餘容積，依殘餘量（以 200cc 當切點）灌食。	IIb
Labeau et al.（2011）	使用 2% Chlorhexidine 漱口水可以有效預防吸入性肺炎。	Ib
Starks & Harbert（2011）	建議術後預防肺吸入的方案： 1. 設置抽痰設備，評估有痰時即予抽痰。 2. 抬高床頭 45 度。 3. 未確定沒有吞嚥困難之前，不由口進食。 4. 由語言專家教導吞嚥技巧。 5. 間隔 12 小時刷牙一次或是間隔 4 小時漱口一次。 6. 使用水性潤唇膏。	IIb

（廖、呂，2014）

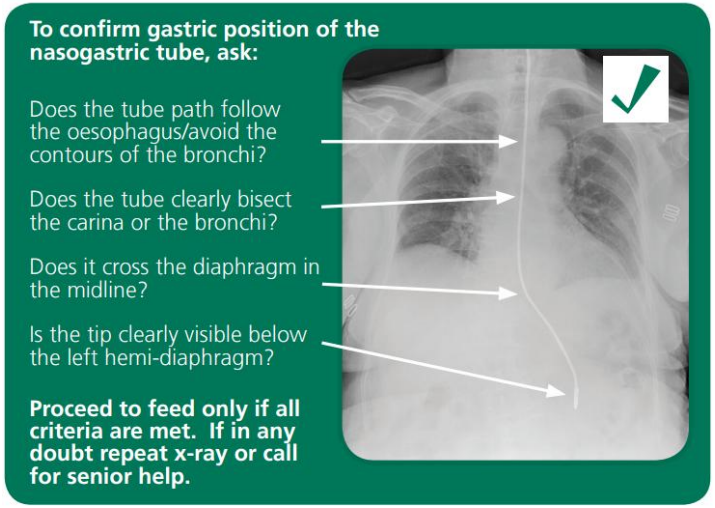
非藥物非侵入性-預防鼻胃管灌食導致吸入性肺炎之實證照護措施文獻彙整

作者/年代	研究結果/建議措施	實證等級
Loeb, Becker, Eady, & Walker-Dilks（2003）	調整進食時的姿勢、口腔衛生和使用管灌可以降低老人發生吸入性肺炎的風險。	Ib
Metheny（2006）	1. 當鼻胃管往外脫落太長時，重新固定位置後需再用 X 光評估位置。 2. 當胃殘餘量太多時，建議使用小腸灌食。 3. 抬高床頭大於 30 度是最有效的預防措施。	VII
Bourgault et al.（2007）	1. 使用 X 光評估管路位置是最正確的方式。 2. 灌食前後都用 20~120cc 的開水沖洗管路，可以預防管路阻塞。 3. 胃殘餘量建議措施 (1) 當胃殘餘量大於 200cc 時，則灌回 200cc，等一小時後再評估胃殘餘量。 (2) 若胃殘餘量仍大於 200cc，則仍灌回 200cc，然後禁食。 (3) 當胃殘餘量小於 200cc 時，將其灌回病人身上並維持原來的灌食量，或逐步加量。	VII
Eisenstadt（2010）	1. 建議採用灌食幫浦（feeding pump）控制灌食速率。 2. 避免使用制酸劑或氫離子幫浦阻斷劑（PPI）。 3. 避免使用鎮靜劑或安眠藥。 4. 給予吞嚥訓練。	VII
Mauri et al.（2010）	1. 灌食時採水平側躺與半坐臥姿勢，發生肺吸入的機率相近。 2. 使用呼吸器的患者，灌食時採用側躺來預防肺吸入是可行的。	IIb

（廖、呂，2014）

結語

- 適量的胃殘留量、確定鼻胃管在正確位置、適當的病患姿勢、口腔衛生和避免食道逆流吸入...等照護措施，皆可減少鼻胃管餵食患者的吸入風險，達到預防吸入性肺炎的效果。



討論重點摘要

- 間歇鼻胃管灌食後，是否同意採不關閉鼻胃管路
  - 實際案例分享
  - 實施不關閉鼻胃管管路的優點、缺點

- 鼻胃管灌食於臨床是很重要的議題，對於無法使用鼻胃管灌食，目前國、內外之醫療方式，朝向以PEG方式執行，以減少壓傷、吸入性肺炎等合併症
- 由於目前無適合的證據佐證，建議設計研究，於加護病房病人試行，評估其成效

臨床運用

- 成人採間歇鼻胃管灌食後，是否同意採不關閉鼻胃管路，接上引留袋並置放高於枕頭，以降低吸入性肺炎?

同意 8人

懷疑 26人

不同意 0人


THANK
YOU