

## London Nursing Stroke Competencies

# *Nutrition, Hydration and Diabetes in Acute Stroke*

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# Malnutrition

*“A state in which a deficiency, excess or imbalance of energy, protein and other nutrients causes measurable adverse effects on tissue / body form, body function and clinical outcome” (Elia, 2003)*

Undernutrition is defined by BAPEN (2003) as:

- a body mass index (BMI) **<18.5kg/m<sup>2</sup>** and
- unintentional weight loss of **5-10%** within the last three to six months

# ***Malnutrition and Stroke***

- Prevalence of malnutrition in patients admitted to hospital following a stroke ranges from **6% to 62%** (Foley et al., 2009)
- Quarter of patients become more malnourished in the first weeks after a stroke (Yoo et al., 2008)
- Malnutrition is an independent predictor of **poor outcomes** after stroke (FOOD Trial, 2003)
- Malnutrition is an independent predictor of **mortality, LOS, and hospitalization costs** at 6 months post stroke (Gomes, Emery & Weekes, 2015)

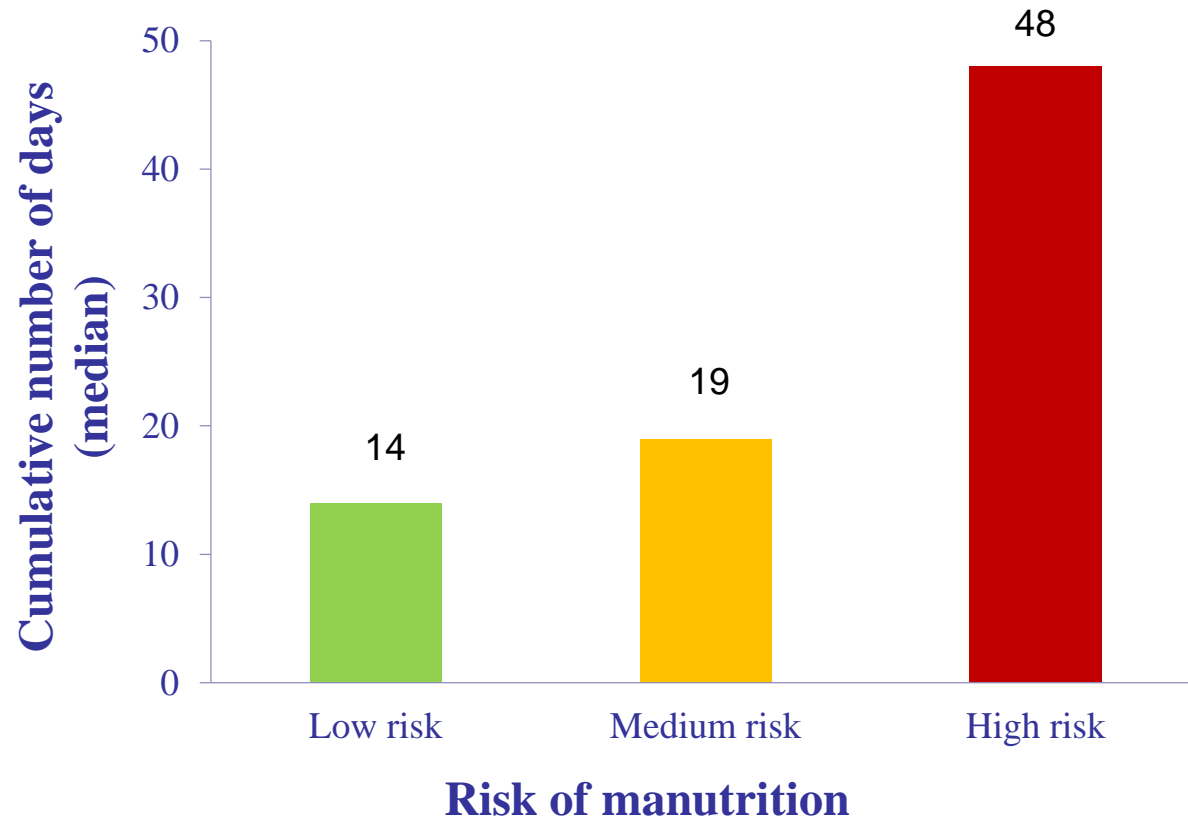
## Risk of Malnutrition Is an Independent Predictor of Mortality, Length of Hospital Stay, and Hospitalization Costs in Stroke Patients (Gomes, Emery & Weekes, 2015)

Mortality rates and hazard ratios	n	Mortality rates  (Chi-square test)	Univariate Cox Proportional Hazards Model		Multivariable* Cox Proportional Hazards Model	
			Hazard Ratio	95% CI	Hazard Ratio	95% CI
<b>Risk of malnutrition</b>	537	$p < 0.001$	$p < 0.001$		$p < 0.001$	
<b>Low risk</b>	342	6%	Reference group		Reference group	
<b>Medium risk</b>	39	26%	4.9	2.3-10.5	3.7	1.7-8.2
<b>High risk</b>	156	42%	9.3	5.6-15.3	5.7	3.3-9.9

\*adjusted for age, gender, ethnicity, type and severity of stroke (NIHSS score) + stroke risk factors:  
HT, diabetes, dyslipidemia, smoking, IHD, heart failure, AF, previous TIA and heavy alcohol  
consumption

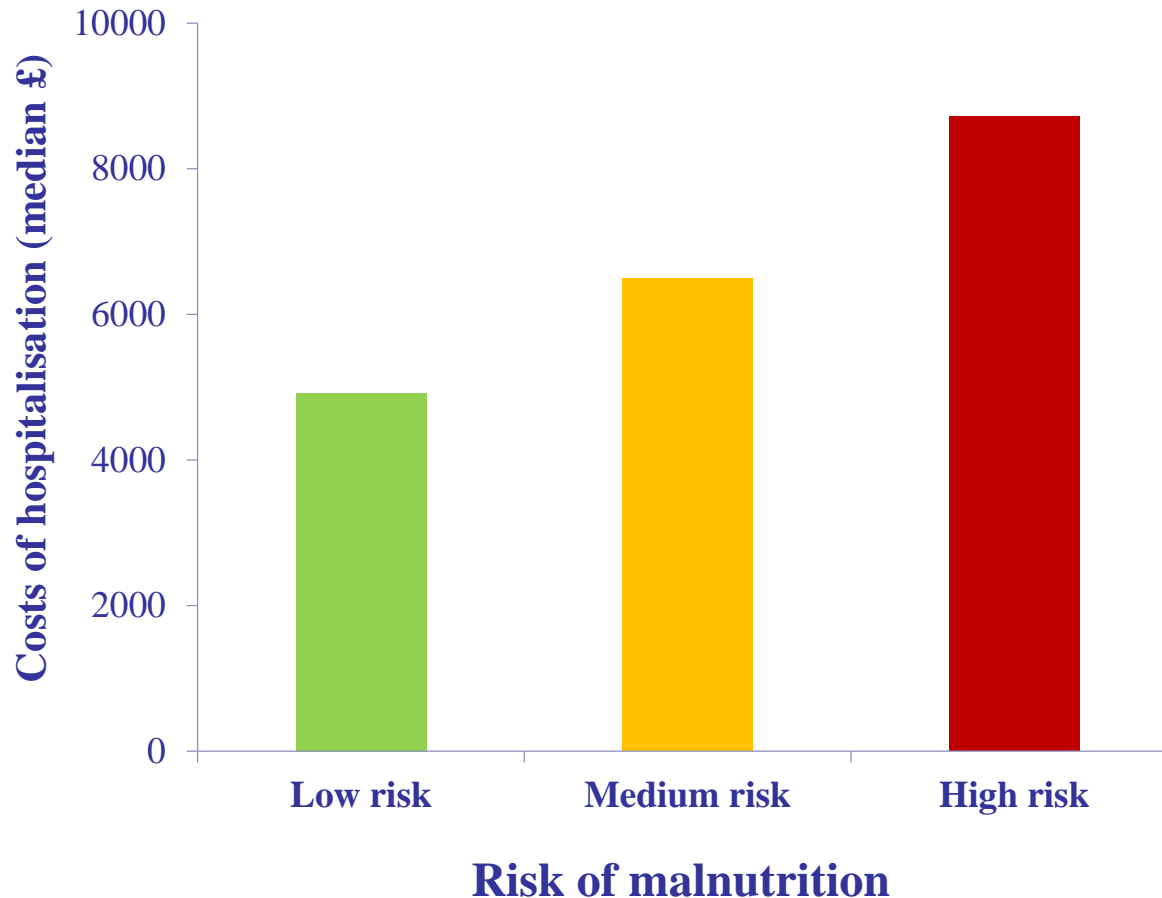
# Cumulative length of hospital stay

Median number of days in each category of risk of malnutrition (MUST)



# Hospitalisation costs

Costs of hospitalisation according to risk of malnutrition (MUST)



# *Dehydration*

- **More than half** of stroke patients were dehydrated at some point during their admission
- Associated with **poor outcomes and is a predictor of institutionalisation and death** (Rowat, Graham & Dennis, 2012)
- Patients with acute stroke should have their hydration assessed using multiple methods within **four hours** of arrival at hospital, and should be **reviewed regularly** and managed so that normal hydration is maintained' (National clinical guideline for stroke, 2016)

# Dehydration

- **Commonly used methods:**

- ☐ monitoring of fluid intake
- ☐ dry mouth / symptoms of thirst
- ☐ urine colour or volume
- ☐ blood pressure and heart rate
- ☐ urea: creatinine ratio
- ☐ plasma osmolality

**No *gold standard* in  
diagnosing dehydration**

- **Risk factors for dehydration:**

- ☐ Greater age
- ☐ Female
- ☐ Stroke severity
- ☐ Prescribed diuretics





# ***Post stroke dysphagia***

- Prevalence of dysphagia in stroke patients between 28 and 65%
- Dysphagia improves significantly during the early days and after two weeks  
90% of patients swallow safely
- Dysphagia is associated with increased **mortality, morbidity, and institutionalization** due to increased risk of **aspiration pneumonia, malnutrition and dehydration**

# *Texture modified diet*



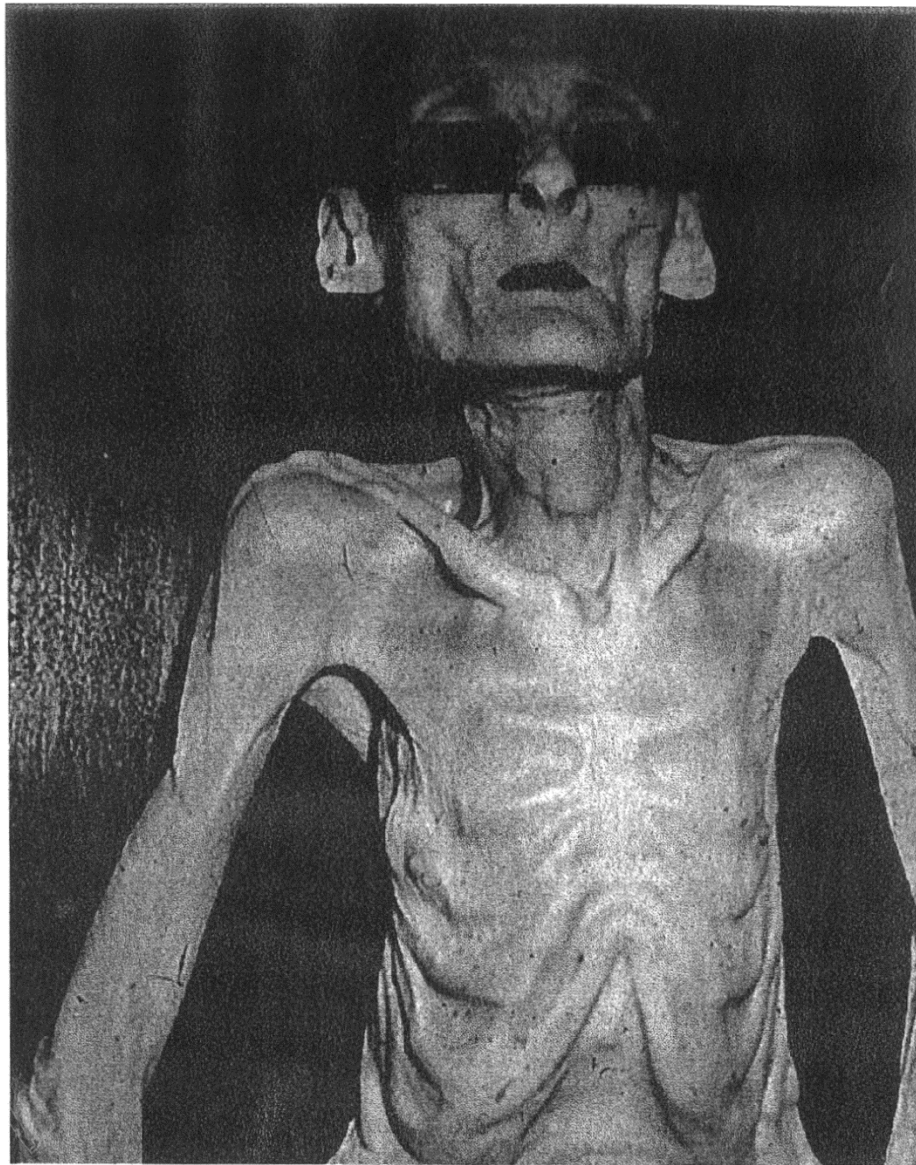
- Texture modified diets are often nutritionally inadequate (Foley et al, 2006)
- May require supplementary tube feeding and/or ONS (NICE 2006)
- Wright et al. (2005)
  - 55 older inpatients (25 normal diet vs 30 modified diet)
  - 24 hour weighed intake and food charts
  - Modified diet group consumed 40% less energy and protein
  - **Why?** Reduced choice, more feeding difficulties, presentation, less palatable

# *Thickened fluids*

- Patients requiring thickened fluids are less likely to meet fluid requirements (Whelan 2001, Vivanti et al 2009) and nutritional needs
- Thickened fluid intake was 455mls/day on average. Whelan (2001)
- Vivanti et al (2009) - patients got more fluid from their food than they did from thickened fluids

# Identifying Malnutrition









# ***Nutritional Screening***

- All patients should be screened for malnutrition and the risk of malnutrition at the time of admission and at least weekly thereafter (National clinical guideline for stroke, 2016)
- Referred to an appropriately trained healthcare professional for detailed nutritional assessment, individualised advice and monitoring
- MUST has been validated for use in patients with stroke (Gomes, Emery & Weekes, 2015)
- Audited in the RCP Sentinel stroke national audit programme (SSNAP)
- Results reported quarterly and available for individual Trusts

# ***Causes of Malnutrition***



Reduced  
dietary  
intake

Increased  
nutritional  
needs

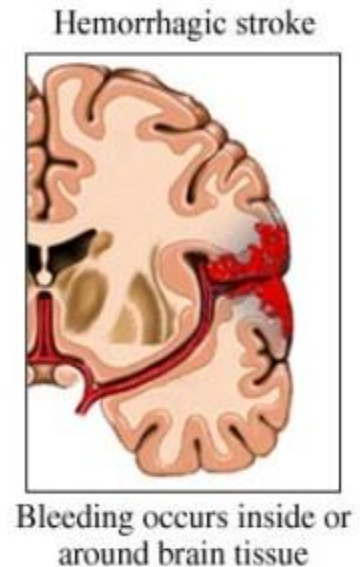
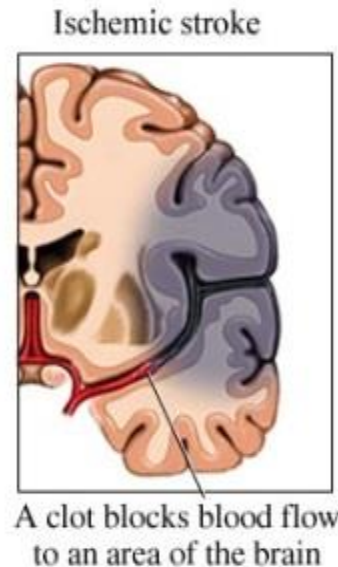


# *Factors impacting oral intake following stroke*

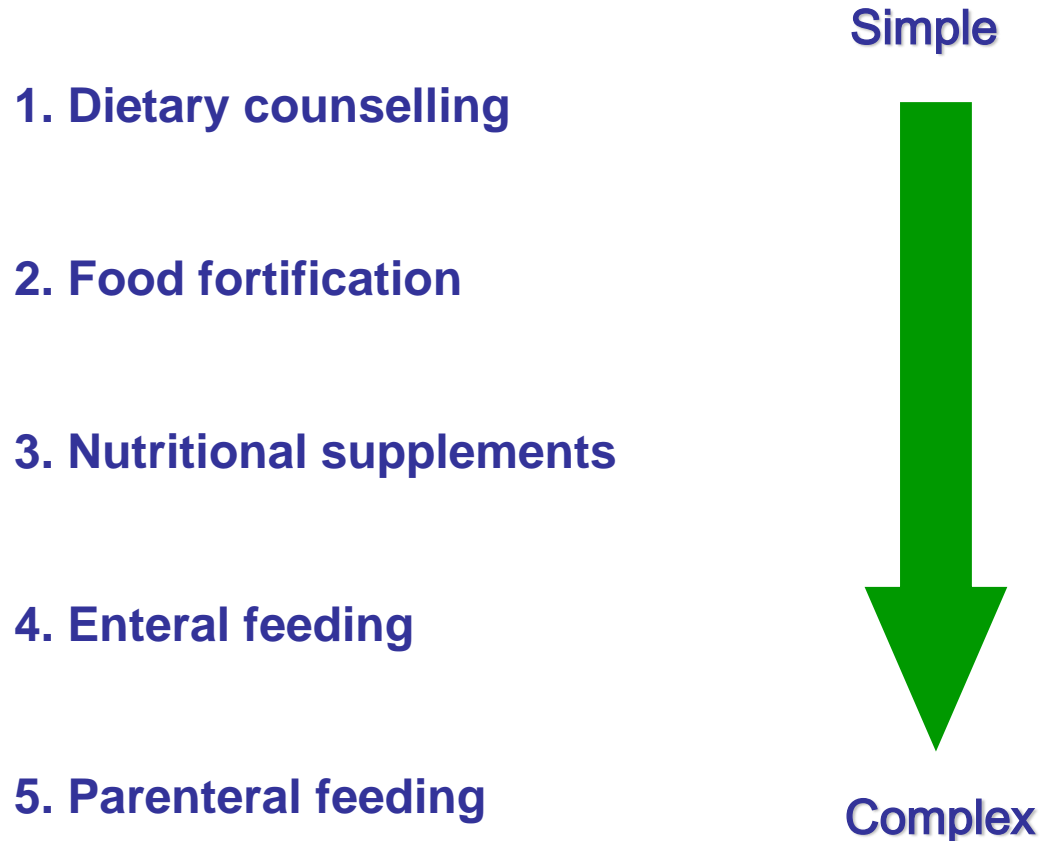
Physical	Psychological	Organisational
Dysphagia Drowsiness Hemiparesis Visual impairment Cognitive impairment Pain GI symptoms Co-morbidities e.g. diabetes Poor dentition Sore or dry mouth Oral thrush Changes in taste and smell Polypharmacy	Depression Anxiety Bereavement Mental illness Apathy Poor motivation Loneliness Self-esteem Independence Substance abuse	Lack of feeding assistance Adapted cutlery Inappropriate menu choices Unfamiliar foods Cold food Timings of meals Interruptions to mealtimes Rushed mealtimes Ward environment Ward culture Staff knowledge

# *Increased nutritional needs*

- Ischaemic stroke (Weekes and Elia, 1992)
- Haemorrhagic stroke (Piek et al., 1989)
- Fever, infection or inflammation
- Open wounds - pressure ulcers
- Malabsorption
- Increased losses
- Activity levels



# *Tackling the problem*



# ***Food fortification***

*Food fortification is adding high energy/ protein foods to meals to increase the calorie/ protein content.*

Examples of food fortification on the wards:

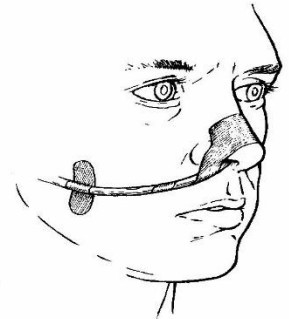
- Add **sauc**es such as full fat mayonnaise to meals
- Grated **cheese** portions to add to mashed potato, soups and to sprinkle over main dishes
- **Butter or unsaturated spread** portions to add to vegetables and potatoes
- **Honey, jam or sugar** sachets to add to fruit juice, desserts and cereals

# ***Oral Nutritional Supplements***

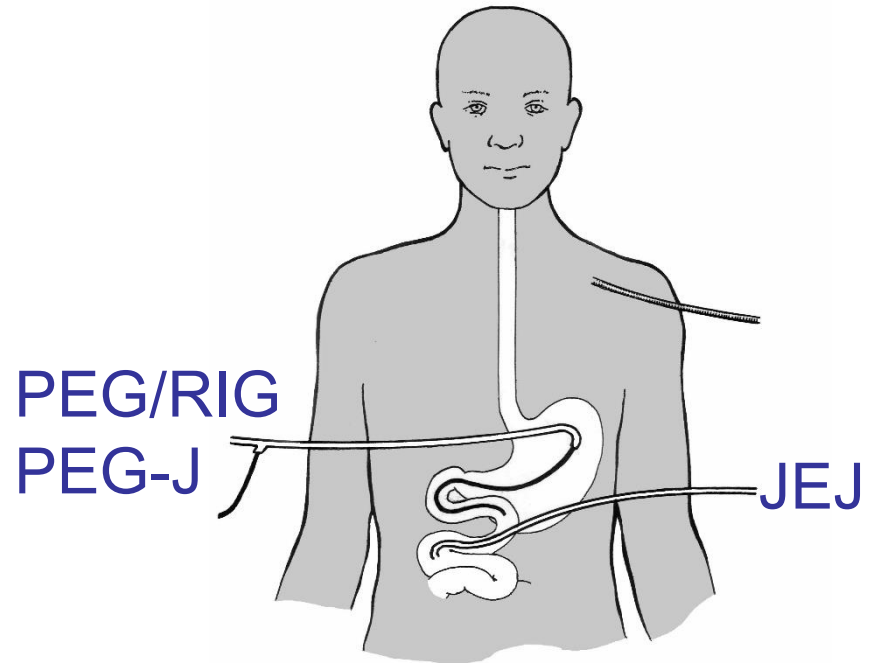
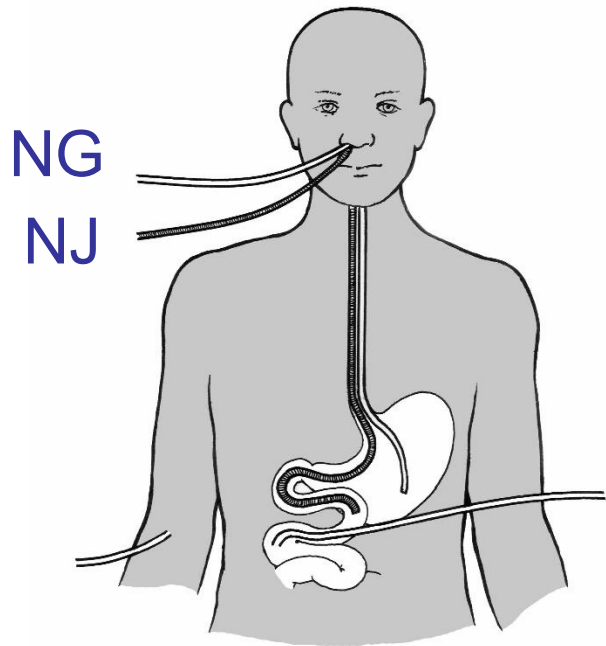
- Oral nutritional supplements come in a range of **styles, formats, types, energy and protein densities, flavours**
- Improving palatability:
  - Pre thickened for dysphagic patients
  - Mix with milk or hot chocolate or coffee
  - Better tolerated chilled
  - Explore different flavours
- Significantly reduced pressure sores, increased energy intake and increased protein intake (Geeganage et al, 2012)

# *Tube feeding*

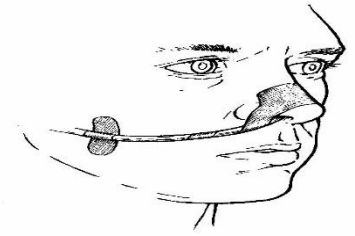
- When to introduce
- Nasogastric feeding
- Gastrostomy feeding
- Complications
- Ethical considerations



# *Tube Feeding*



# Nasogastric tube feeding



- People with acute stroke who are unable to take adequate nutrition and fluids orally should be:
  - considered for tube feeding with a nasogastric tube within 24 hours of admission
  - considered for a nasal bridge tube or gastrostomy if they are unable to tolerate a nasogastric tube
- Contraindications and complications



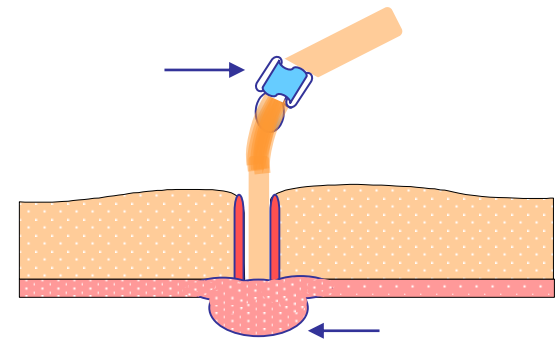
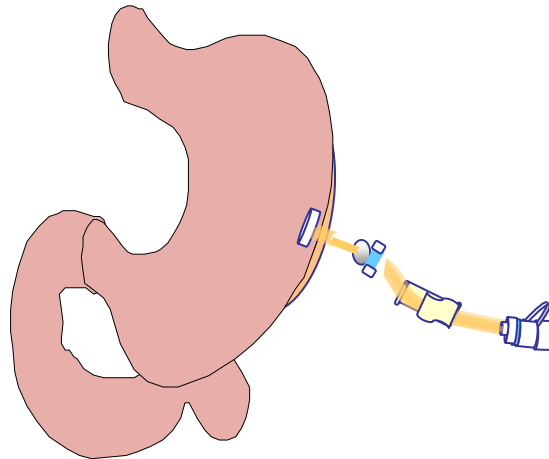
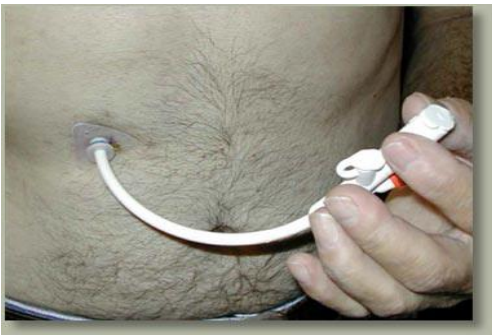


# ***When to check tube position?***

- On initial placement
- Before feeding, flushing or giving medications (unless feed in progress)
- Following wretching, vomiting, coughing or suctioning
- If the tube appears to have moved
- After a patient has pulled at the tube
- With new, unexplained respiratory symptoms

# Gastrostomy Feeding

- Gastrostomy feeding should be considered for patients who:
  - Who need but are unable to tolerate NGT
  - Unable to swallow adequate food and fluid orally at 4 weeks
  - At long term high risk of malnutrition
- Contraindications
- Complications



# ***Diabetes and Acute Stroke***

Two main types of diabetes:

type 1 diabetes – where the body's immune system attacks and destroys the cells that produce insulin

type 2 diabetes – where the body doesn't produce enough insulin, or the body's cells don't react to insulin

Treatment for diabetes: Lifestyle changes(diet, exercise, weight loss), tablets(e.g. Biguanide, Sulphonylureas, DPP-4 inhibitors), insulin(e.g. short, medium and long acting insulin)

Diabetes almost **doubles** the chances of having a stroke and is a contributing factor **in 20% of strokes** in England, Wales and Northern Ireland (Stroke Statistics, 2017)

# *Acute Stroke and Hyperglycaemia*

- Hyperglycaemia occurs in **30–40%** of patients with acute ischaemic stroke including individuals without a known history of diabetes(Luitse et al, 2012)
- Associated with poor functional outcome, possibly through aggravation of ischaemic damage by disturbing recanalisation and increasing reperfusion injury(Luitse et al, 2012)
- Nondiabetic ischaemic stroke patients with hyperglycemia have a **3-fold higher 30-day mortality rate** and in diabetic patients with ischaemic stroke **2-fold** higher (Capes et al, 2001)
- Target range for blood glucose in acute stroke: **5-15mmol/L**(National clinical guideline for stroke, 2016)

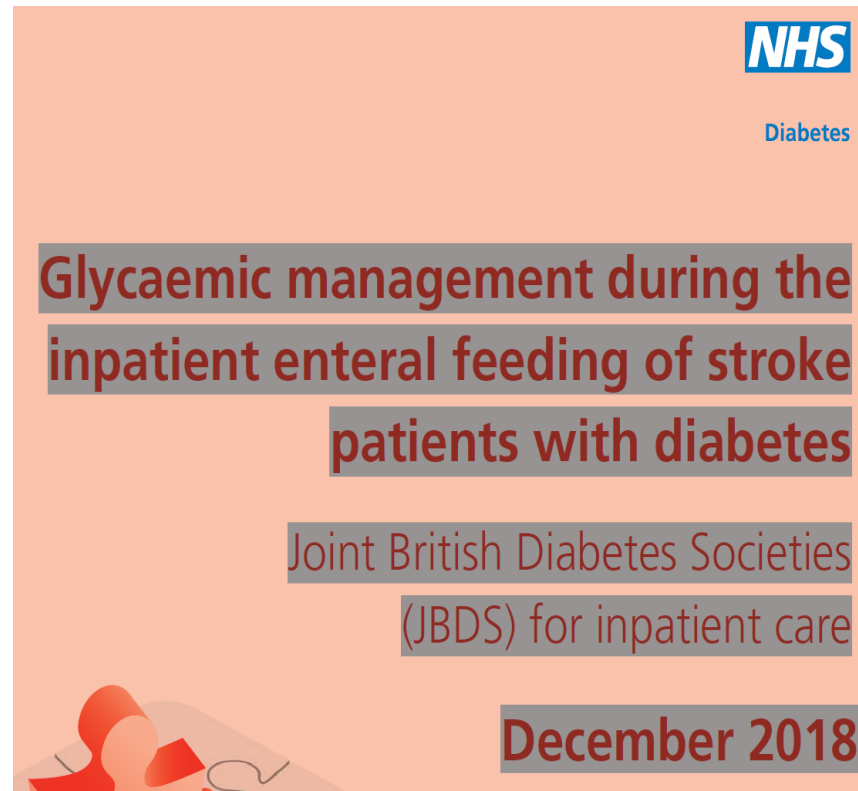
# Diabetes in Stroke – Monitoring/ Treatment



- Close monitoring of blood glucose to detect hyper/hypo glycaemia
- Enteral tube feeding: **Random daily** capillary blood glucose initially until stable, **four hourly** if unstable or has diabetes
- In case of hypoglycaemia (CBG's **<4 mmol/L**) or hyperglycaemia (CBG's **>15mmol/L**) treat in accordance with inpatient Trust guidelines, inform medical team and consider referring to the diabetes specialist team if hypoglycaemia/hyperglycaemia
- Consider diet/ enteral tube feeding, medication/ insulin and timing

(National clinical guideline for stroke, 2016, BAPEN, 2016)

# *Further Reading – Diabetes*



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