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/m2 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)

<table>
<thead>
<tr>
<th>Mortality rates and hazard ratios</th>
<th>n</th>
<th>Mortality rates (Chi-square test)</th>
<th>Univariate Cox Proportional Hazards Model</th>
<th>Multivariable* Cox Proportional Hazards Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of malnutrition</td>
<td>537</td>
<td><em>p</em>&lt;0.001</td>
<td><em>p</em>&lt;0.001</td>
<td><em>p</em>&lt;0.001</td>
</tr>
<tr>
<td>Low risk</td>
<td>342</td>
<td>6%</td>
<td>Reference group</td>
<td>Reference group</td>
</tr>
<tr>
<td>Medium risk</td>
<td>39</td>
<td>26%</td>
<td>4.9</td>
<td>2.3-10.5</td>
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<tr>
<td>High risk</td>
<td>156</td>
<td>42%</td>
<td>9.3</td>
<td>5.6-15.3</td>
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</tbody>
</table>

*p* 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

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Cumulative length of hospital stay

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

<table>
<thead>
<tr>
<th>Risk of malnutrition</th>
<th>Cumulative number of days (median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>14</td>
</tr>
<tr>
<td>Medium risk</td>
<td>19</td>
</tr>
<tr>
<td>High risk</td>
<td>48</td>
</tr>
</tbody>
</table>
Hospitalisation costs

Costs of hospitalisation according to risk of malnutrition (MUST)

- Low risk
- Medium risk
- High risk

Risk of malnutrition
Dehydration

- **More than half** of stroke patients where 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

• Risk factors for dehydration:
  - Greater age
  - Female
  - Stroke severity
  - Prescribed diuretics

No gold standard in diagnosing dehydration
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

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

1. Dietary counselling
2. Food fortification
3. Nutritional supplements
4. Enteral feeding
5. Parenteral feeding
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

NG
NJ

PEG/RIG
PEG-J

JEJ
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 bridle 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: 5-15 mmol/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

Glycaemic management during the inpatient enteral feeding of stroke patients with diabetes

Joint British Diabetes Societies (JBDS) for inpatient care

December 2018
References


References


