London Nursing Stroke Competencies

Nutrition & Hydration

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Malnutrition and Stroke

• “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)

• Under nutrition 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

• 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) and 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)

• 543 patients recruited from consecutive admissions

• 51% were males and the mean age was 75 years

• 87% had an ischemic stroke

• Highly significant increase in mortality with increasing risk of malnutrition

• Adjusting for age, severity of stroke, and a range of stroke risk factors

• For those patients who survived, the LOS and hospitalization costs increased with increasing risk of malnutrition
Mortality rates and hazard ratios of patients according to risk of malnutrition (assessed with MUST)

<table>
<thead>
<tr>
<th>Risk of malnutrition</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>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hazard Ratio</td>
<td>95% CI</td>
</tr>
<tr>
<td>Low risk</td>
<td>342</td>
<td>p&lt;0.001</td>
<td>Reference group</td>
<td>Reference group</td>
</tr>
<tr>
<td>Medium risk</td>
<td>39</td>
<td>6%</td>
<td>4.9</td>
<td>2.3-10.5</td>
</tr>
<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>

*padjusted 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)

Risk of malnutrition

Low risk: 14 days
Medium risk: 19 days
High risk: 48 days
Hospitalisation costs

Costs of hospitalisation according to risk of malnutrition (MUST)

<table>
<thead>
<tr>
<th>Risk of malnutrition</th>
<th>Costs of hospitalisation (median £)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>4,000</td>
</tr>
<tr>
<td>Medium risk</td>
<td>6,000</td>
</tr>
<tr>
<td>High risk</td>
<td>8,000</td>
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</table>
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 tests were found consistently useful in diagnosing current water-loss dehydration (Hooper et al., 2015)
Dehydration in Hospital-Admitted Stroke Patients
Detection, Frequency, and Association
(Rowat, Graham & Dennis, 2012)

- Blood results of 2591 stroke patients in 2 hospitals between 2005 and 2009
- Dehydration was defined as U:C ratio of 80
- A median of 4 (range, 2–9) tests per patient were performed during a median length of stay of 17 (range, 5–54) days
- 36% were dehydrated on admission
- 26% were not dehydrated on admission but had at least 1 blood test indicating dehydration at some point during their admission
- Total: 62% patients with dehydration at some point during their admission
Dehydration in Hospital-Admitted Stroke Patients Detection, Frequency, and Association
(Rowat, Graham & Dennis, 2012)

• Risk factors for dehydration:
  – Age
  – Female
  – Total anterior circulation syndrome
  – Prescribed diuretics
  – Receiving parenteral fluids or enteral tube feeding

• Dysphagia prevalent in 56% of dehydrated patients vs 30% of hydrated patients (p<0.001)

• Mortality or discharged to institution: 43% of dehydrated patients vs 18% of hydrated patients (p<0.0001)
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, 2012)

• 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
Step 1
BMI score

- BMI kg/m²
  >20 (>30 Obese) = 0
  18.5-20 = 1
  <18.5 = 2

Step 2
Weight loss score

- Unplanned weight loss in past 3-6 months
  % Score
  <5 = 0
  5-10 = 1
  >10 = 2

Step 3
Acute disease effect score

- If patient is acutely ill and there has been or is likely to be no nutritional intake for >5 days
  Score 2

Step 4
Overall risk of malnutrition

Add Scores together to calculate overall risk of malnutrition
Score 0 Low Risk  Score 1 Medium Risk  Score 2 or more High Risk

Step 5
Management guidelines

0 Low Risk
Routine clinical care
- Repeat screening
  Hospital – weekly
  Care Homes – monthly
  Community – annually for special groups
  e.g. those >75 yrs

1 Medium Risk
Observe
- Document dietary intake for 3 days
- If adequate – little concern and repeat screening
  Hospital – weekly
  Care Home – at least monthly
  Community – at least every 2-3 months
- If inadequate – clinical concern
  – Follow local policy: set goals, improve and increase overall nutritional intake, monitor and review care plan regularly

2 or more High Risk
Treat
- Refer to dietitian, Nutritional Support Team or implement local policy
- Set goals, improve and increase overall nutritional intake
- Monitor and review care plan
  Hospital – weekly
  Care Home – monthly
  Community – monthly
- Whatever detrimental or no benefit is expected from nutritional support e.g. imminent death

All risk categories:
- Treat underlying condition and provide help and advice on food choices, eating and drinking when necessary
- Record malnutrition risk category
- Record need for special diets and follow local policy

Obesity:
- Record presence of obesity. For those with underlying conditions, these are generally controled before the treatment of obesity

Re-assess subjects identified at risk as they move through care settings
See the MUST explanatory booklet for further details and The MUST report for updating evidence.
Malnutrition

• Causes:
  – Reduced dietary intake
  – Increased nutritional needs
Factors impacting oral intake following stroke

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

- In acute stroke, the prevalence of dysphagia has been reported as 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 in part to aspiration, pneumonia, malnutrition, and dehydration.
  - Systematic review (n=8) of malnutrition and dysphagia following stroke.
  - Dysphagia was reported in 24% to 52% of patients.
  - Dysphagic patients were more than twice as likely to be malnourished.
Texture modified diet

- Aims of dysphagia management:
  - Minimise risk of malnutrition and dehydration
  - Minimise risk of aspiration pneumonia
  - Maintain oral intake

- Texture modified diets are often nutritionally inadequate (Foley et al, 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
  - Only 13% of modified diet group finished their meal
  - Reduced choice, more feeding difficulties, presentation, less palatable
- May require supplementary tube feeding and/or ONS (NICE 2006)
Thickened fluids

- Patients requiring thickened fluids are less likely to meet fluid requirements (Whelan 2001, Vivanti et al 2009) and nutritional needs
- Whelan (2001):
  - 24 inpatients with dysphagia following stroke
  - Randomised to powder thickened or pre-thickened drinks
  - Fluid intake (IV, NG, oral etc) was measured for 2 weeks
  - Thickened fluid intake was 455mls/day on average.
  - Patients on pre-thickened drinks drank almost 100% more.
- Vivanti et al (2009) - patients got more fluid from their food than they did from thickened fluids
- Types of thickener: gum-based vs starch-based
- Methods for optimising fluid intake
Oral nutrition support: a nice spot for lunch?
This Ward Operates a **Protected Mealtimes Service**

At Lunch from [ ] to [ ]

AND

at Supper from [ ] to [ ]

Please avoid entering the ward or visiting during mealtimes

*Please speak to the nurse in charge for more information*
Red Tray

Mealtime Volunteers

Guy’s and St Thomas’ 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

- Additional fillings in sandwiches e.g. cheese and ham plus coleslaw with full fat mayonnaise
- Cream added to puddings and porridge
- Sauces added to ice cream
- Pureed chicken added to cream of chicken soup
- Single/double cream portions for adding to breakfast cereals, hot drinks and soups
- Butter or unsaturated spread portions to add to vegetables and potatoes
- Grated cheese portions to add to mashed potato, soups and to sprinkle over main dishes
- Sugar sachets to add to fruit juice, desserts and cereals
- Condiments such as mayonnaise and salad cream sachets for adding to salads or jacket potatoes
- Switching individual diet plans to full fat yoghurt and full fat milk for all food and beverages allowances
- Serving fruit in syrup instead of fruit in natural juice. Offer with cream for an even greater impact.
- Honey or jam for addition to desserts.
Oral Nutritional Supplements

- Oral nutritional supplements come in a range of:
  - styles (milk, juice, yogurt, dessert, savoury)
  - formats (liquid, powder, pudding, pre-thickened)
  - types (high protein, fibre-containing, low volume)
  - energy and protein densities
  - flavours

- They provide energy, protein and essential micronutrients
- Are better tolerated when chilled
- Variable ability to thicken using thickeners
Oral Nutritional Supplements

  - effectiveness of nutritional support in acute and subacute stroke
  - significantly reduced pressure sores, increased energy intake and increased protein intake
  - No significant difference in death, dependency or length of hospital stay

- Supplements may show benefit in those who have signs of malnutrition

- Nutritional support should be initiated for people with stroke who are at risk of malnutrition. This may include oral nutritional supplements, specialist dietary advice and/or tube feeding (National clinical guideline for stroke, 2012)

- Routine oral nutritional supplements are not recommended for people with acute stroke who are adequately nourished on admission and are able to take a full diet while in hospital (National clinical guideline for stroke, 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
Nasogastric tube feeding

- Widespread variation in the management of NG tubes

- Beavan et al. (2010)
  - Multi-centre RCT using four different hospitals in the UK
  - Patients who required NGT feeding due to dysphagia following acute stroke
  - 104 patients (51 in the intervention group vs 53 in control)
  - Primary outcome measure: the proportion of prescribed feed and fluid delivered over the two weeks following randomization
  - Intervention group received 17% more feed than the control group (75% vs 57%) ($P = 0.002$)
  - No serious adverse events related to use of nasal bridle reported but epistaxis reported in 37% with bridle vs 15% in control
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
Gastrostomy or NGT?

- 2 Cochrane Reviews comparing NGT and gastrostomy

- Gastrostomy feeding was associated with:
  - fewer feeding failures
  - higher feed delivery
  - fewer incidents of gastrointestinal bleeding
  - fewer pressure sores

- No significant difference in terms of
  - mortality
  - dependency or length of hospital stay
  - incidence of chest infection or pneumonia

- Starting tube feeding early after stroke may reduce death although the information available remains inconclusive

Gomes et al., 2015.
Geeganage et al., 2012
Ethical considerations

- Informed consent vs in best interests
- Intensity of nutritional intervention should match that of medical care plan
- Establish ceiling of nutritional intervention collaboratively with MDT and NOK
- SLT assessment e.g. re: risk feeding supported by care bundle
- Involve pt, family & carers as early as possible and manage their expectations
- State realistic goals with time limits.
- Review these with the medical team to determine whether still of overall benefit; if not, then stop
- MDT input with prioritised for dignity and respect
Key learning points

• Malnutrition and dehydration increase mortality and poor outcomes
• Post stroke dysphagia increases the risk
• Regular nutritional screening and monitoring is essential
• Patients with stroke who are unable to take adequate nutrition and fluids orally should be assessed for NGT feeding with 24 hours of admission
• Patients receiving modified diet and thickened fluids:
  – are at an increased risk of malnutrition and dehydration
  – may need parenteral fluids, oral nutritional supplements and / or supplementary tube feeding
• Patients with stroke who are unable to swallow adequate amounts of food and fluid orally by four weeks should be considered for gastrostomy feeding
• High quality nutritional care is underpinned by effective MDT working, a collective approach, and adequate staff knowledge and skills
References

References


