Nutrition in rehab

L. Poulia (GR)
Nutritional support for stroke patients during rehabilitation

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Introduction

• Radical cystectomy
  ▫ major surgery
  ▫ high nutritional risk

• Postoperative morbidity
  ▫ High ... 64% at 90 days and LOS: 17.4 days
  ▫ Reduced by enhanced recovery after surgery (ERAS) protocols ... nutritional care
Outline

• Rehabilitation
• The role of Dietitian in the rehab team
• Post stroke problems related to nutritional status
  ▫ Dysphagia
  ▫ Malnutrition
  ▫ Special considerations during meals
• Nutritional management of stroke patients
• Hydration
• Nutritional support
The Stroke Continuum

http://www.strokebestpractices.ca/
Rehabilitation

A set of measures that assist individuals who experience, or are likely to experience, disability to achieve and maintain optimal functioning in interaction with their environment (WHO)

Optimise activity and enable participation in order for the individual to live the life they wish (Gutenbrunner, 2007)

- Starts in the hospital as soon as possible following a stroke.
  - May begin two days after the stroke
  - Continues as necessary after discharge
- Depending on stroke severity, rehab can include:
  - A rehabilitation unit in the hospital
  - A sub-acute care unit
  - A rehabilitation hospital with individualized inpatient therapy
  - Home care
  - Outpatient therapy
  - A long-term care facility providing skilled nursing care
Goals of stroke rehabilitation

- Prevent, recognize and manage co-morbid medical conditions
- Maximize functional independence
- Optimize psychosocial adaptation of patients and families
- Facilitate resumption to prior life roles
- Enhance QoL
The stroke-rehab multidisciplinary team
Role of the dietitian

• Raise **awareness** of the impact of **malnutrition** on recovery
• Implement and monitor **nutritional screening**
• Assess **nutritional requirements**, and advise on using **artificial nutrition, food fortification or supplements** as appropriate
• Advise on a **texture modified diet**
• Adapt the nutrition care to **existing or newly diagnosed medical conditions** (i.e. diabetes mellitus, hyperlipidaemia)
• Liaise with **catering department** to ensure provision of nutritionally adequate meals for dysphagic patients
• Facilitate **discharge** for patients requiring ongoing artificial nutrition
• Liaise closely with SLT

SIGN 118, 2010
Post stroke problems related to nutritional status

- Dysphagia
- Restricted arm function, ability to self feed/drink
- Communication problems
- Cognition problems (memory, attention, perception)
- Visual problems
- Absence of teeth and dentures and poor mouth hygiene
- Depression/ anxiety
Dysphagia

Dysphagia is a disorder or a symptom that can be caused by structural, physiological and/or neurological impairments affecting the preparatory, oral, pharyngeal, and/or esophageal stages of swallowing

- 64-70% of stroke patients have dysphagia (Martino et al 2005)
- 22-42% of stroke patients seen to aspirate on videofluoroscopy (National Clinical Guidelines for stroke, 2004)
Swallowing

1. Bolus of food
2. Tongue blocks the oral cavity
3. Soft palate blocks the nasal cavity

Upper esophageal sphincter (UES) closed
UES opens
Epiglottis blocks the larynx
UES re-closes

Esophagus
The Normal Swallow

Oral Stage:
Keeping the food/fluid in the mouth, forming a cohesive bolus, moving it to the back of the mouth in preparation to swallow

Pharyngeal Stage
The trigger of the swallow, protection of the airway and opening into the oesophagus (elevation of the larynx leads to opening of the cricopharyngeal sphincter at the top of the oesophagus

Oesophageal Stage
Food/fluid passing to the stomach via peristalsis

The Disordered Swallow. What you might see..

Oral Stage:
Poor lip closure
Drooling
Inability to take food from a fork
Leakage of food/fluid from the mouth whilst chewing/drink

Poor tongue movement may lead to:
Inability to form a food bolus or control liquid
Inability to propel food/drink to the back of the mouth ready for swallowing
Food falling and pocketing in the cheeks and unable to clear it out

Other problems affecting the oral stage:
Reduced sensation: patient can’t feel the food in the mouth and is at risk of biting the check or lip without realising
Reduced tone in facial muscles: will result in food pocketing in the affected side, also harder for dentures to stay secure in the mouth

Pharyngeal Stage
Swallowing reflex: may be delayed to trigger or absent. The bolus will then fall into the pharynx and then into the unprotected airway
Laryngeal elevation and vocal cord closure: may be absent, or incomplete leaving the airway unprotected, increasing the risk of aspiration
Pharyngeal muscles: weakness may lead to food &/or fluid being left behind after the swallow and subsequently falling into an unprotected airway after the swallow
Dysphagia

Aspiration pneumonia

↓ Immune system

↑ risk of infections

Malnutrition and dehydration

Problematic wound healing

Increased risk of pressure ulcers

Lean body mass catabolism

Further reduction of the ability to swallow

Frailty/ limitation of independency

Brady R, 1999
Dysphagia and aspiration

ASPIRATION IS:
Food or fluid entering the airway below the level of the vocal cords

Acute signs (immediately following oral feeding)
- Coughing and choking
- Change of colour
- Sounds of respiratory difficulty – wheezing or gurgling
- Wet sounding/ gurgly voice
- Rapid respiratory rate

Chronic signs
- Weight loss – unintentional
- Hunger
- Recurrent chest infections
- Frequent coughing/choking
- Avoidance of food &/or drink

- Stroke patients with dysphagia have 3fold risk to develop aspiration pneumonia
- Patients with severe dysphagia have an 11fold higher risk of aspiration pneumonia.

A REVIEW OF THE RELATIONSHIP BETWEEN DYSPHAGIA AND MALNUTRITION FOLLOWING STROKE

Norine C. Foley, RD, MSc¹, Ruth E. Martin, PhD², Katherine L. Salter, BA³ and Robert W. Teasell, MD¹,³

<table>
<thead>
<tr>
<th>Group by Onset Time</th>
<th>Study name</th>
<th>Statistics for each study</th>
<th>Odds ratio and 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Odds ratio</td>
<td>Lower limit</td>
</tr>
<tr>
<td>Acute</td>
<td>Davales 1998</td>
<td>8.093</td>
<td>2.488</td>
</tr>
<tr>
<td>Acute</td>
<td>FOOD 2003</td>
<td>1.138</td>
<td>0.960</td>
</tr>
<tr>
<td>Acute</td>
<td>Martineau 2005</td>
<td>5.263</td>
<td>1.461</td>
</tr>
<tr>
<td>Acute</td>
<td>Crary 2006</td>
<td>1.138</td>
<td>0.408</td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td>2.401</td>
<td>0.916</td>
</tr>
<tr>
<td>Rehab</td>
<td>Poels 2008</td>
<td>2.000</td>
<td>0.452</td>
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<tr>
<td>Rehab</td>
<td>Chai 2009</td>
<td>9.178</td>
<td>0.954</td>
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<tr>
<td>Rehab</td>
<td>Finestone 1995</td>
<td>1.875</td>
<td>0.531</td>
</tr>
<tr>
<td>Rehab</td>
<td></td>
<td>2.445</td>
<td>1.008</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>2.425</td>
<td>1.264</td>
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</tbody>
</table>

Fig. 1. Pooled analysis of the association between dysphagia and malnutrition following stroke. CI: confidence interval.
Malnutrition – hospital costs

Reilly J et al. *JPEN* 1988

- Pneumonia: Malnutrition risk = 7.902, Good nutritional status = 4.979
- GI surgery: Malnutrition risk = 18.896, Good nutritional status = 11.174
- Complications: Malnutrition risk = 26.359, Good nutritional status = 6.858
Stroke survivors NPO

Swallowing team screening for dysphagia

NEGATIVE

Eat or be fed normally

Monitoring by any dysphagia team member

POSITIVE

SLP assessment of swallow

Low risk

Monitoring by SLP

High Risk

Nutritional Assessment By a Dietitian

Heart and Stroke Foundation, 2006
Nutritional management for stroke patients

Nil by mouth
- Enteral tube feeding

High risk of malnutrition and dysphagia
- Texture modified diet. Thickeners, pre-thickened ONS
- Enteral tube feeding

High risk of malnutrition (No dysphagia)
- Dietary advice and ONS

Low/medium risk of malnutrition
- Dietary assessment. Optimize access to food

Regular Screening and monitoring
Provision of food

- Only if it is considered safe for the patient (SLT)
- In the correct texture
  - Dysphagia Diet Descriptors (BDA, 2011)
  - International Dysphagia Diet Standardization Initiative (2015)
## Liquid and solid food consistency for Dysphagia diets

<table>
<thead>
<tr>
<th>Solid</th>
<th>Liquid</th>
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</thead>
<tbody>
<tr>
<td>Dysphagia pureed</td>
<td>Spoon thick</td>
</tr>
<tr>
<td>Dysphagia mechanically altered</td>
<td>Nectar like</td>
</tr>
<tr>
<td>Dysphagia advanced</td>
<td>Honey thick</td>
</tr>
</tbody>
</table>

Special commercially available thickeners
- Without changing taste/colour
- Change texture of drinks
# National Dysphagia Diet

<table>
<thead>
<tr>
<th>Diet</th>
<th>Allowed foods</th>
<th>Not suitable foods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dysphagia Level 1 Pureed</strong></td>
<td>Pureed foods that do not require chewing and bolus formation</td>
<td>Beverages, dry bread and cereals, oat, biscuits, meat in pieces or minced, fruits, cottage cheese, cheese, rice, vegetables and whole potatoes</td>
</tr>
<tr>
<td><strong>Dysphagia level 2 Mechanically altered</strong></td>
<td>Soft foods that easily form a bolus</td>
<td>Bread and cereals with nuts, cake, fresh or dried fruits, meat in pieces, vegetables with fibres, legumes</td>
</tr>
<tr>
<td><strong>Dysphagia level 3</strong></td>
<td>Normal soft foods, apart from sticky and hard</td>
<td>Bread and hard cereals, biscuits, hard fruits, hard meat, unpeeled fruits and vegetables, nuts</td>
</tr>
</tbody>
</table>
International Dysphagia Diet Standardisation Initiative (2015)
IDDSI Flow Test

1. Get a stopwatch and some 10ml slip-tip syringes. Remove the plunger from a syringe & discard.

2. Cover the nozzle of the syringe with your finger, making a seal.

3. Fill the syringe up to the 10ml line with fluid - it's recommended to use another syringe to do this.

4. Remove your finger from the nozzle end at the same time as starting the stopwatch.

5. At 10 seconds, replace your finger over the nozzle, stopping the liquid flowing.

IDDSI Level classifications based on liquid remaining after 10 seconds:

Level 0: All liquid has flowed through syringe.
Level 1: There is between 1 and 4ml remaining.
Level 2: There is between 4 and 8ml remaining.
Level 3: There is more than 8ml remaining, but some liquid still flows through.
Level 4: If no liquid flows at all, the category is Level 4 or above.

Level 4 can also be easily identified without a syringe test: Material holds its own shape; small peaks remain on the surface. Too thick to be drunk from a cup or a straw, should be taken with a spoon. A full spoonful must drop off a spoon if turned sideways; a very gentle flick may be necessary but the material should not be firm, nor sticky.
Mealtime Tips

• Glasses on, hearing aids in
• Dentures in, unless very poor fitting (e.g. muscle tone/weight loss makes them “slide around”)
• In general, TV & radio off, normal table if possible
• Prescribed, adapted equipment/utensils available at every meal
• Feed when alert
• Ensure mouth is empty between spoonfuls
• Feed at eye level, not standing over the person
• Facilitate independence as much as possible
**Special Considerations during meals**

- **Neglect:** unless told otherwise...
  - Put plate, cup, utensils on “good” side
  - Approach and speak to them on the “good” side
- **Hemiplegia (muscle weakening, usually on 1 side)**
  - Ensure tray is in reach
- **Language changes (aphasia)**
  - Short, clear directions
  - Use ‘do’ rather than ‘don’t’ statements
  - Talking louder doesn’t help!
- **Attention/Orientation Challenges**
  - Say their name & get eye contact before giving directions
  - State what meal it is and what is available

Homonymous Hemianopsia and Visual Neglect

Modified from Hoeman SP: Rehabilitation nursing, ed 2, St. Louis, 1995, Mosby.

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Dysphagia, Nutrition, and Hydration in Ischemic Stroke Patients at Admission and Discharge from Acute Care

Michael A. Crary · Jamie L. Humphrey · Giselle Carnaby-Mann · Raam Sambandam · Leslie Miller · Scott Silliman

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Fig. 1  Change in nutritional status (prealbumin). Adequate prealbumin level is >15 mg/dL. Dotted line represents the cutoff point (15 mg/dL) to dichotomize nutritional status

Fig. 2  Change in hydration (Bun/Cr ratio). Dotted line represents the cutoff point (15:1) to dichotomize hydration status
The Dehydration Problem

- Many patients are on medications that increase the risk of dehydration.
- Altered thirst perception.
- Cognitive and communication deficits and difficulty in either requesting water or initiating drinking fluids.
- Difficulty in swallowing/ Dislike of thickened liquids.
- Dependent on others to offer fluids.
The Dehydration Problem

“oral intake of thickened fluids are hugely inadequate...required the use of supplemental enteral and parenteral fluids.”


“Fluid intake declined over the 21 day period...pts on thickened liquid diets failed to meet their fluid requirements.”

Dehydration

- Can lead to multiple morbidities and even mortality.

<table>
<thead>
<tr>
<th>Short-term</th>
<th>Long-term</th>
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<tbody>
<tr>
<td>UTIs</td>
<td>Coronary heart disease</td>
</tr>
<tr>
<td>Pressure sores</td>
<td>Falls</td>
</tr>
<tr>
<td>Constipation</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Thrombosis</td>
</tr>
<tr>
<td>Disorientation</td>
<td>Cerebral infarct</td>
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</tbody>
</table>
Nutritional needs

• Individualized protein needs (taking into account co-morbidities)
  ▫ Usually 1.0 – 1.5 g/kg

• Sufficient energy intake
  ▫ Acutely
    • Former studies suggested stroke as a hypermetabolic clinical condition
    • Recent studies suggest that BEE in acute phase and after 10-15 days remain unchanged
    • Stress factor of 10-12% if we use equations to calculate needs
  ▫ Long-term energy needs depend on the level of mobilization of the patients
    • Usually lower due to lower physical activity

• Hydration
Nutritional management for stroke patients

- **Nil by mouth**
  - Enteral tube feeding

- **High risk of malnutrition and dysphagia**
  - Texture modified diet. Thickeners, pre-thickened ONS
  - Enteral tube feeding

- **High risk of malnutrition (No dysphagia)**
  - Dietary advice and ONS

- **Low/medium risk of malnutrition**
  - Dietary assessment. Optimize access to food

Regular Screening and monitoring
Algorithm for provision of nutritional support

Is the patient malnourished?

No

Does the patient’s disease cause nutritional impairment?

No

The risk of EN and PN would outweigh the benefits; encourage oral food intake (with or without oral nutritional supplements)

Yes

Would the use of specialized nutrition support improve patient outcome or quality of life?

No

Evaluate nutritional needs, choose mode of delivery, and start specialized nutrition support

Yes

Gut functional, patient able to safely swallow and comply: provide food and oral nutritional supplements

Gut functional, but patient unable to safely swallow: provide EN

For short-term EN (≤ four weeks), use nasoenteric tubes

For long-term EN (> four weeks), use percutaneous enteric tubes

Short term

May use peripheral venous access for short time (< two weeks) or as a bridge to central line

Needed for weeks

Use subclavian vein or peripherally inserted central catheter

Needed for months/years

Use tunneled external catheter or subcutaneous infusion ports
Examples of Enteral Access

Feeding Routes Through The Nose
(or alternatively may be oral)

1. Nasogastric
2. Nasoduodenal
3. Nasojejunal

Gastrostomy Options*
- Percutaneous Endoscopic Gastrostomy (PEG)
- Percutaneous Radiologic Gastrostomy (PRG)
- Percutaneous Endoscopic Jejunostomy (PEJ)
- Percutaneous Radiologic Jejunostomy (PRJ)
- Percutaneous Endoscopic Gastrojejunostomy (PEG/J)
- Button
- Surgically placed Gastrostomy

Jejunostomy

*Gastrostomy and jejunostomy tubes may be placed endoscopically, radiologically, or surgically.
Summing up... Nutrition interventions to prevent malnutrition in stroke patients

- All patients should be screened for malnutrition at the time of admission and weekly thereafter.
- Stroke patients should also have their hydration assessed on admission, reviewed regularly and managed so that normal hydration is maintained.
- People unable to take adequate nutrition and fluids orally should receive tube feeding with a nasogastric tube within 24 hours of admission and be referred for detailed nutritional assessment, individualised advice and monitoring.

Summing up... Nutrition interventions to prevent malnutrition in stroke patients

- People with dysphagia should be given food, fluids and medications modified in a form that can be swallowed without aspiration.

- Nutrition support should be initiated for people with stroke who are at risk of malnutrition. This may include oral nutritional supplements (ONS), specialist dietary advice and/or enteral tube feeding (ETF).

Quality of Life

• Long-term orders for thickened liquids or tube feedings without an option for water or ice chips denies a very primitive and basic drive to refresh the senses.

• When recommending an altered diet, clinicians always consider the patient’s quality of life.
  ▫ It can be a challenge to balance this with safety, hydration and nutrition needs.

• Ensure palatable diet, presented in a way to promote nutritional intake
Thank you for your attention!