Meeting the nutritional needs of patients with severe dysphagia following a stroke: an interdisciplinary approach

By Nathalie Rodrigue, Robert Côté, Connie Kirsch, Chantal Germain, Céline Couturier, and Roxanne Fraser

Abstract
Dysphagia is a common problem with individuals who have experienced a stroke. The interdisciplinary stroke team noted delays in clinical decision-making, or in implementing plans for patients with severe dysphagia requiring an alternative method to oral feeding, such as enteral feeding via Dobhoff (naso-jejunal) or PEG (percutaneous endoscopic gastrostomy) tubes, occurred because protocols had not been established. This resulted in undernourishment, which in turn contributed to clinical problems, such as infections and confusion, which delayed rehabilitation and contributed to excess disability.

The goal of the project was to improve quality of care and quality of life for stroke patients experiencing swallowing problems by creating a dysphagia management decision-making process. The project began with a retrospective chart review of 91 cases over a period of six months to describe the population characteristics, dysphagia frequency, stroke and dysphagia severity, and delays encountered with decision-making regarding dysphagia management. A literature search was conducted, and experts in the field were consulted to provide current knowledge prior to beginning the project.

Using descriptive statistics, dysphagia was present in 44% of the stroke population and 69% had mild to moderate stroke severity deficit. Delays were found in the decision to insert a PEG (mean 10 days) and the time between decision and PEG insertion (mean 12 days).

Critical periods were examined in order to speed up the process of decision-making and intervention. This resulted in the creation of a decision-making algorithm based on stroke and dysphagia severity that will be tested during winter 2002.

Introduction
According to the Heart and Stroke Foundation of Quebec (2000), stroke is the fourth leading cause of death in Canada, the leading cause of adult neurological disability, and the leading cause of transfer from a hospital to long-term care. Each year there are about 50,000 new strokes, and close to 300,000 stroke survivors with an average hospital stay of 37 days. By the year 2006, the incidence of stroke is expected to increase by 32%, and by the year 2021 the number could jump to an alarming 68%. Stroke survivors may have to cope with several stroke-related deficits such as hemiplegia, aphasia, and dysphagia.

The focus of this paper will be on dysphagia management and will outline the common clinical challenges regarding feeding stroke patients with severe dysphagia. A clinical project was developed to determine delays in feeding dysphagic patients adequately, and to find ways to improve the quality of care. This resulted in the creation of a dysphagia management decision-making algorithm based on stroke and dysphagia severity.

Dysphagia: A common clinical challenge
Dysphagia is a common challenge following a stroke, between 27% and 50% of patients will suffer from it (Bath, Bath & Smithard, 2000). Dysphagia can be defined as the absence of normal gag reflex or the inability to swallow liquids without choking, or both (Norton, Homer-Ward, Donnelly, Long & Holmes, 1996). Dysphagic stroke patients are predisposed to a higher risk of aspiration pneumonia and increased potential for dehydration and malnutrition (Scolapio, Romano, Meschia, 1996). Dysphagia can be a determining factor in the creation of a dysphagia management decision-making algorithm based on stroke and dysphagia severity.

Résumé: Intervention auprès des patients souffrant de dysphagie et de malnutrition, suite à un accident vasculaire cérébral.
La dysphagie est un problème courant chez les patients souffrant d’un accident vasculaire cérébral (AVC). L’équipe multidisciplinaire traitant l’AVC a décelé des délais de temps entre la prise de décision et la mise en application des soins adaptés aux besoins des patients avec dysphagie sévère nécessitant une forme alternative de nutrition par tube gastrique telle que le système de gavage « Dobhoff » (tubulure nasale) ou « PEG » (gastrostomie percutanée). Ceci est relié principalement au fait qu’il n’y a pas de protocole établi à cet effet en pratique clinique. En conséquence, un état de malnutrition se développe, accompagné de complications comme les infections et la confusion, causant un délai dans la réadaptation et laissant une incapacité plus importante.

Le but du projet était de promouvoir une amélioration des soins et de la qualité de vie des patients souffrant de dysphagie, suite à un accident vasculaire cérébral. Le projet a débuté par une étude rétrospective de dossiers de quatre-vingt onze patients durant une période de six mois. On a pu ainsi reconnaître certaines caractéristiques réservées à ce groupe de patients comme la fréquence et le degré de sévérité de la dysphagie, la sévérité de l’accident vasculaire et les délais encourus durant le processus de décision et d’intervention. Avant le début du projet, on a effectué une revue des publications et on a consulté des experts dans le domaine pour compléter notre base de connaissances.

Utilisant des statistiques descriptives, la dysphagie est présente chez quarante-quatre pour cent des patients ayant subi un accident vasculaire cérébral. De plus, soixante-neuf pour cent des patients présentent des incapacités légères ou modérées à la suite de l’AVC. On a constaté des délais de temps entre la prise de décision (environ dix jours) et le moment de l’insertion du système « PEG » (environ douze jours).

Ces étapes importantes ont été analysées dans le but d’accélérer le processus de prise de décision de l’intervention. Cette étude a permis de créer un algorithme basé sur la gravité de l’AVC et de la dysphagie, qui sera testé au cours de l’hiver 2002.
Our interdisciplinary stroke team has noted delays in making decisions and in implementing feeding plans for patients with severe dysphagia requiring an alternative method to oral feeding, such as enteral feeding via Dobhoff tube (nasoj-jejunum) or PEG (percutaneous endoscopic gastrostomy) tubes. This has resulted in undernourishment, which in turn contributed to clinical problems, such as confusion, infections and sub-optimal response to rehabilitation. Furthermore, patients with a Dobhoff tube often need to be restrained, which can affect their self-esteem and rehabilitation efforts. Also, patients’ acceptance and transfer to rehabilitation centres or long-term care facilities are compromised by severe dysphagia.

Faced with these problems, the objective of the stroke team was to examine critical periods in which they could intervene to accelerate the decision-making process and care-plan implementation in order to develop intervention strategies that were likely to improve the quality of care for these patients and decrease their morbidity. The clinical setting stroke team members consist of neurologists, internists, nurses, clinical nurse specialist, clinical nurse educator, occupational therapists, speech language pathologists, physiotherapists, social workers and clinical nutritionists. The stroke program is designed to provide care for patients with ischemic strokes and intracerebral bleeds. The stroke team assesses stroke patients within 48 hours, and rehabilitation and discharge planning are done on a regular basis. In order to standardize stroke care, guidelines from the Stroke Treatment Education Program (STEP) (Heart and Stroke Foundation of Quebec, 2000) are in the process of being implemented by the stroke team. The STEP describes four categories of stroke severity. These are: 1) minimal impact stroke (mild deficits, discharge home or with outpatient rehabilitation is expected); 2) stroke with rehabilitation potential (mild to moderate deficits, discharge to a rehabilitation centre is expected); 3) stroke with limited rehabilitation potential (severe deficits, might go to rehabilitation centre and/or long-term care) and; 4) catastrophic stroke (severe deficits, not expected to survive).

The program proposes a set of guidelines and evidence-based interventions for each category.

In our setting, on a Monday-to-Friday basis, occupational therapists (OT) perform the bedside swallowing assessment within 24 hours. However, no validated scale is used to evaluate dysphagia patients who are then prescribed a normal diet, a modified diet, or enteral feeding. Patients requiring enteral feeding would first get a Dobhoff, which is inserted by trained nurses.

Neuroscience nurses are involved in dysphagia screening prior to OT assessment and in following OT dysphagia recommendations. Dysphagia screening includes mainly the assessment of the following: wet voice, coughing, pocketing food, drooling and facial asymmetry (Travers, 1999). Nurses also perform baseline dysphagia-related assessment such as weekly measurements of weight, vital signs including body temperature, intake and output, and food consumption (Travers). Nurses have a major role in reducing dysphagia complications (proper diet, good positioning, assessing level of consciousness, keeping feeding tubes flowing freely, etc.), and in teaching patients, families, and other staff members. Neuroscience nurses on the unit use the Glasgow Coma Scale (GCS) to determine the level of consciousness for comatose patients and the Canadian Neurological Scale (CNS) to assess stroke severity and to monitor neurological status.

In summary, the stroke team members are not satisfied with how the nutritional needs of dysphagic patients are currently met. No objective data are available to explain how long it takes to make decisions and to implement plans to adequately feed stroke patients. The team demonstrated a strong interest in conducting a clinical study to determine reasons for delays and to closely evaluate our clinical practice, especially regarding timing for PEG insertion, and to develop a tool that would guide our decision-making process.

**Goals of this study**

1. Improve the quality of care by having a decision-making process based on available data:
   - Reduce delays in feeding patients adequately
   - Reduce delays for PEG insertion
   - Reduce delays in transfers to rehabilitation centres or long-term care facilities
   - Reduce other medical complications (malnutrition, confusion, etc.)

2. Improve response to rehabilitation measures and improve the quality of life of stroke patients.

**Review of the literature**

Only articles that emphasized PEGs were selected for this review. Bath, Bath, and Smithard (2000) noted that further research is needed to assess how and when stroke patients with dysphagia should be fed. According to their review, about one-half of dysphagic patients either die or recover their swallowing spontaneously within the first 14 days of stroke onset, leaving half with swallowing deficits that can significantly impair function, recovery, and quality of life. Although there is a lack of empirical evidence, they concluded that PEG feeding might improve outcome and nutrition, as compared with nasogastric tube (NG) feeding.

Reviewers from the Cochrane review referred to Barer’s study in 1989 to conclude that half of the patients either die or recover from their swallowing deficits. Barer attested that although dysphagia itself is not responsible for much excess mortality in acute stroke, it might induce complications that hamper functional recovery, and is associated with poor outcome. He mentioned that older patients were more inclined to have swallowing problems and that mortality was higher among older stroke patients with dysphagia. A relationship was found between dysphagia and stroke severity and that death can be expected with more extensive stroke.

Norton and others (1996) conducted a randomized prospective study to compare PEG and NG feeding after acute stroke causing dysphagia. Fourteen days after an acute stroke, a total of 30 patients with persisting dysphagia were randomized into two feeding groups: 16 to PEG feeding and 14 to NG feeding. The patients exhibited persistent dysphagia, dense hemiplegia, and decreased level of consciousness at time of entry into the study, all of which reflected a severe stroke. The Barthel activities of daily living index (range 0-20) was used to assess disability after a stroke and was used as an indication as to the amount of care a patient was likely to require. The mortality with PEG feeding was significantly lower at six weeks, 12% compared with 57% in the NG group. All PEG-fed patients received the total prescribed feed, whereas 71% of the NG-fed patients lost at least one day’s feed, representing 22% of their total prescribed feed. The mean albumin concentration increased 3
g/l with PEG feeding and decreased by almost 10 g/l in NG-fed patients. Finally, patients fed with PEG tube are more likely to be discharged earlier from hospital. Their results indicated that early PEG tube feeding is greatly superior to NG tube feeding and should be the nutritional treatment of choice for patients with acute stroke involving dysphagia.

The aim of the study by Scolapio and colleagues (2000) was to determine clinical predictors of long-term enteral feeding following a stroke. Patients with non-hemorrhagic stroke, mild oropharyngeal dysphagia, limited co-morbidities, or very young patients, may also need nutritional support but may be best served with temporary NG tubes. According to these authors, PEG feeding has an advantage over NG feeding for patients requiring long-term (> four weeks) nutritional support. They studied 32 acute stroke patients, mean age 71.3 years. The PEGs were placed at a mean of 8.4 days post-stroke (range 1-26 days). At four months, 18 (56%) patients had died with a PEG in place, nine had a PEG for more than four weeks, and none of the deaths were directly related to complications of the enteral feeding. Furthermore, in their experience, nursing homes accept patients who are fed via PEG more readily than those fed via the NG tube. This has also been our experience.

Abuksis and others (2000) assessed the outcome of PEG tube placement performed in their institution for all inpatients and outpatients. The assessment was based on morbidity, mortality, and long-term survival. They reviewed the medical records of 114 patients hospitalized with various acute illnesses who underwent PEG insertion at their institution over a two-year period. They concluded that patients hospitalized with acute illnesses are at high risk for serious adverse effects after PEG insertion and that the procedure should be avoided. However, the 114 patients who underwent a PEG insertion did not have the same characteristics as that of a stroke population, only 30% of the 114 patients had a stroke, and a high percentage presented with dementia or other mental abnormalities. Only 31.3% had an indication of dysphagia for PEG insertion. In their experience, the patients referred for PEG procedures were old, frail, demented, and often had a poor prognosis.

The literature was reviewed to find guidelines to help the stroke team with its decision-making process. Rabeneck, McCullough, and Wray (1997) observed that there were no explicit guidelines for PEG in order to guide clinical decision-making. The clinical question was: “What is it the physician seeks to achieve by placing a PEG tube in a patient?” The answer was to benefit the patient. They defined “benefits” as the potential of the intervention to have a positive effect on a physiological parameter. For PEG tubes, that benefit is improved nutritional status. A decision-making algorithm for PEG tube placement was proposed with four clinical categories: 1) anorexia-cachexia syndrome, 2) permanent vegetative state, 3) dysphagia without complications and, 4) dysphagia with complications. For each category, clinical guidelines are defined regarding PEG insertion or not, taking into account ethical considerations. Rosner (1997) criticized the algorithm as being too simple. He does not entirely agree with the way Rabeneck and colleagues defined their clinical categories. Appropriate guidelines were not found in the literature to assist the stroke team regarding PEG decisions.

There is a consensus in the literature about the advantages and disadvantages of the PEG and NG tube. Scolapio and colleagues (2000) reported the benefits of a PEG, including lack of nasal irritation, less likely to become displaced, more acceptable to most patients, and more likely to meet their nutrient needs than NG tubes. NG tubes are more likely to be displaced or clogged by medications, which often results in a decreased intake of daily-prescribed nutrients and medications. Problems associated with NG tubes are well-recognized, notably the inadvertent removal of the tube with an inherent risk of pulmonary aspiration (Norton et al., 1996). Frequent unintentional removal of the nasogastric tube leads to a discontinuation of nutritional intake, of which the amount of feed lost to the patient is often underestimated. Even though the authors are referring to NG tubes, our clinical experience demonstrates the same outcome with Dobhoff tubes. The advantages of PEG feeding include achievement of full caloric goal rates, earlier discharge date, improved response to physiotherapy, lower mortality rates, improved survival rates, as well as weight gain. The complications of PEG feeding include aspiration pneumonia, migration of tube, leakage, clogged/blocked tubes, peritonitis, local infection, and retention/discomfort.

There are two ongoing research projects looking at timing for PEG, nutritional status and outcome after stroke. The PEGASUS study, started in 1995, seeks to clarify the “grey zone” of clinical uncertainty about timing of gastrostomy insertion between different clinicians. The second study, FOOD, started in 1996, examines different feeding aspects, one of which is: “Does early initiation of tube feeding (NG or PEG) increase the proportion of patients surviving without severe disability?” The results of these two studies have yet to be published.

Method

A retrospective chart review was conducted on 91 consecutive patients with a diagnosis of stroke, discharged from April to October 2000, to determine the frequency of dysphagia, delays encountered regarding the decision-making process in our institution, stroke and dysphagia severity, and population characteristics. The clinical nurse specialist and assistant nurse manager conducted the chart review after the approval of the medical record ethics committee.

A data collection tool was developed to obtain descriptive data such as: patient’s characteristics (age, gender...), length of stay, type of diet decided by the OT assessment, numbers of Dobhoff insertions, delays for PEG insertion, and discharge disposition. Because OT did not use any scale to assess dysphagia, dysphagia severity was obtained via the type of diet prescribed following the OT assessment (normal diet, modified type of diet, or enteral feeding). Information using two different assessment scales was also collected. Although the Glasgow Coma Scale (GCS) is a scale to assess level of consciousness, it is often used to assess stroke severity in some of our clinical settings. The major parameters assessed with the GCS are: eye opening, motor, and speech. The scores range from three to 15, and a score of less than seven is considered a state of coma (Teasdale & Jennett, 1974). The Canadian Neurological Scale (CNS), a reliable and valid scale, is used to assess stroke severity (Côté, Battista, Wolfson, Boucher, Adam & Hachinski, 1989). It was created to monitor mental and motor function, and internal consistency was established using Cronbach’s alpha (α = 0.792) (Côté et al., 1989). The CNS permits the assessment of level of consciousness, orientation, language/speech and motor function or response in stroke patients. The scores range from a minimum of 1.5, meaning severe deficit, to a maximum of 11.5, referring to no deficits. Although the CNS scale does not directly assess dysphagia, it was found by Barer (1989) that swallowing was closely related to speech (expressive and receptive) and function in the facial muscles, which are all assessed with the CNS scale. Scores from both of these two scales were acquired for each stroke patient at admission.
Results of the chart audit
Our results show an average of 10 days (range: 4 - 17) from the patient admission until the stroke team made a decision that the patient required a PEG. During the 10-day period, stroke patients with severe dysphagia are managed with a Dobhoff. In addition, our results demonstrated that it takes an average of 12 days (range: 1 - 27) to PEG insertion after the decision has been made. The delay could be attributed to the lack of time, intervention space, and prioritization of stroke patients to get a PEG inserted by the specialists. Again during that time, patients are managed with Dobhoffs that are regularly checked with chest x-ray to verify their position. The average number of Dobhoff insertions per patient was five (range: 1 - 12) attributed to most patients pulling them out and the average chest x-rays done per patient was five (range: 1 - 16).

Our results showed that 44% of our stroke population had dysphagia. The average age of patients with dysphagia was 78 years compared with 72 years among the non-dysphagic population. Female patients accounted for more than 57% (n: 23) of the patients with dysphagia. Ischemic stroke was present in 85% of dysphagic cases, the remaining 15% being intracerebral bleed. The average length of stay for the dysphagic group was 29 days compared with 16 days in patients without dysphagia. Fewer dysphagic patients were discharged home and more of them were transferred to long-term care (LTC) or died compared with stroke patients without dysphagia (see Table One).

Figure One demonstrates the distribution of stroke severity in our population using the Canadian Neurological Scale. The categories of mild, moderate and severe were established with the cut-off point based on the literature and our own experience with the 91 cases reviewed. The graph illustrates that 31% of the 91 stroke patients presented with severe stroke deficits. It is possible to say that the patients were fairly evenly distributed across the three categories.

Table Two and Figure Two illustrate dysphagia frequency and the types of diet patients were put on at admission following OT evaluation. Of the 44% of patients presenting with dysphagia, 35% needed enteral feeding (Dobhoff or PEG) and 65% required a modified type of diet. Modified diet refers to pureed, soft mechanical or regular texture for the solid food and thickening agent TA #1 or TA #2, or regular liquid for liquids. OT decides which type of food texture or liquid is appropriate and secure for patients.

Figure Three and Table Three show the levels of stroke severity using the two clinical scales GCS and CNS. As
stroke severity increases with the CNS so does dysphagia severity. This trend is less clear with the GCS. Although it is well known in neuroscience that the GCS is not an appropriate tool to assess stroke severity, it was judged pertinent to illustrate this to staff working in neuroscience settings who are using GCS as their only measurement tool to assess stroke patients.

Discussion
The aim of this clinical study was to find ways to improve quality of care by reducing delays in different areas, and to improve the quality of life of stroke patients. Critical periods and patient characteristics were examined, such as delays involved with insertion of a PEG, the proportion of stroke population presenting with dysphagia, and stroke and dysphagia severity. The mean delay for the decision-making for inserting a PEG was 10 days and the mean delay for the insertion was 12 days after the decision was made. It also appears that the more severe the stroke deficits are, the more severe is the dysphagia, which was expected, based on the literature. Bath and colleagues (2000) specified that within the first 14 days of stroke onset, half of the patients will either die or recover spontaneously from dysphagia. Based on this review, our mean of 10 days delay for decision-making could allow time for some of these outcomes to occur. Nonetheless, there could be improvement in the way we decide who would benefit from a PEG and in reducing the time delays for PEG insertion.

As predicted, compared with the CNS, the GCS did not correlate very well with dysphagia and did not enhance the decision-making process. In contrast, the CNS scores correlated very well with the severity of dysphagia in all stroke patients. Wong and Chua’s (2001) results demonstrated that the CNS has a higher inter-rater reliability and internal consistency than the GCS. According to their findings with 150 acute stroke patients, the Cronbach’s alpha results were \( \alpha = 0.88 \) for the CNS and \( \alpha < 0.47 \) for the GCS for detecting neurological deterioration. These authors concluded that the CNS is a more clinically relevant and reproducible tool for the neurological monitoring of acute stroke patients.

Based on our own experience, we developed an algorithm to help us better manage dysphagia. This algorithm uses stroke and dysphagia severity to determine the optimal feeding strategy. However, another consideration, other than stroke and dysphagia severity, is that our stroke team can only refer stroke patients with severe dysphagia to rehabilitation centres and LTC facilities if they have a PEG. Therefore, this was a factor in our decision-making as well.

Table Three: Stroke and dysphagia severity

<table>
<thead>
<tr>
<th>Dysphagia</th>
<th>GCS</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>CNS</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>No dysphagia</td>
<td>14.2</td>
<td>2.1</td>
<td>6</td>
<td>15</td>
<td>15</td>
<td>8.8</td>
<td>2.5</td>
<td>1.5</td>
<td>11.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Modified Diet</td>
<td>13.8</td>
<td>1.7</td>
<td>9</td>
<td>15</td>
<td>15</td>
<td>6.8</td>
<td>2.9</td>
<td>2</td>
<td>11.5</td>
<td>6</td>
</tr>
<tr>
<td>Dobhoff</td>
<td>10.6</td>
<td>3.0</td>
<td>8</td>
<td>15</td>
<td>10</td>
<td>4.4</td>
<td>2.2</td>
<td>2</td>
<td>7.5</td>
<td>4.75</td>
</tr>
<tr>
<td>PEG</td>
<td>11.3</td>
<td>2.3</td>
<td>8</td>
<td>14</td>
<td>11</td>
<td>4</td>
<td>1.0</td>
<td>3</td>
<td>5.5</td>
<td>4</td>
</tr>
<tr>
<td>Total/average</td>
<td>12.5</td>
<td></td>
<td>8</td>
<td>14</td>
<td>11</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Algorithm

The decision-making algorithm was developed using the CNS, stroke categories from STEP, and the Dysphagia Outcome and Severity Scale (DOSS) (O’Neil, Purdy, Falk, & Gallo, 1999). The team chose the DOSS because it is a validated scale with reliability of 86-100% across all levels, and it has the same format as the Functional Independent Measure (FIM), a popular stroke assessment scale. Reliability has shown to be high along with high internal consistency with a Cronbach’s value of $\alpha = 0.93$ (Ottenbacher, Hsu, Granger, & Fielder, 1996). The dysphagia scale has seven levels of severity with level 1 being severe dysphagia and level 7 normal swallowing. The stroke patients requiring a PEG will fall under level of severity 1 or 2.

The algorithm is visually presented in Figure Four and can be described as follows: the rows from left to right reflect the increases in stroke and dysphagia severity. The first boxes of the column demonstrate the stroke severity with the CNS scores and then the STEP categories. The third row shows the dysphagia severity. Finally, the last row illustrates the corresponding type of feeding. Patients in the column with CNS score $< 4.5$ and dysphagia level 1-2 will need careful assessment. Patients falling under “stroke with limited rehabilitation potential” category will require enteral feeding via PEG because they will be discharged to a rehabilitation centre or LTC facility. Before a consultation for PEG insertion is made, a delay of 10 to 14 days is allowed to monitor patients’ dysphagia outcome. In the meantime, patients’ nutritional needs will be managed with a Dobhoff tube. Patients under the “catastrophic stroke” category will not require a PEG due to their poor prognosis. End-of-life decisions are discussed with the family and patients will be managed with a Dobhoff tube, an intravenous catheter, or will be kept NPO according to family and team decision.

Although the decision-making algorithm has yet to be tested with our stroke population, we can still identify some limitations. Clinical judgment by stroke team members will be the only way to decide between the two divisions of dysphagia levels 1 and 2. Obviously, some patients would not fit into the proposed

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**Figure Four: Decision-making algorithm**

**Legend Dysphagia Severity:**

- Level 7 Normal in all situations
- Level 6 Within functional limit / modified independence
- Level 5 Mild dysphagia
- Level 4 Mild-moderate dysphagia
- Level 3 Moderate dysphagia
- Level 2 Moderately severe dysphagia
- Level 1 Severe dysphagia

**Legend CNS Stroke Severity**:  
Range from 1.5 (severe deficits) to 11.5 (normal)  
$> 9.0$ Mild deficits  
(representing an independent lifestyle)  
6.0 to 9.0 Moderate deficits (restricted lifestyle)  
$< 6.0$ Severe deficits (totally dependent lifestyle)

$^*$ Cut-off point based on the literature and our own experience, $n = 91$.  

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CNS score $> 6.5$

- Minimal impact stroke
- Dysphagia level 6-7
  - Regular diet

CNS score $> 4.5$ and $< 6.5$

- Stroke with good rehabilitation potential
- Dysphagia level 3-4-5
  - Modified diet  
    (pureed, soft mechanical, regular texture) and/or TA*  
    #1, TA #2, regular liquid and/or Dobhoff feeding  
    (feeding insufficient)  
  * TA = thickening agent

CNS score $< 4.5$

- Stroke with limited rehabilitation potential
- Dysphagia level 1-2
  - Enteral feeding  
    1. Dobhoff  
    2. PEG consultation (10-14 days)  
    3. PEG insertion $< 72$ hours

Catastrophic stroke DNR status_____

- Family and team decision  
  (Dobhoff, IV, NPO)
Dysphagia is a common complication with stroke patients and can lead to complications such as malnutrition and aspiration pneumonia. Our results demonstrated that 44% of stroke patients were suffering from dysphagia. Dysphagia and malnutrition are associated with increased mortality, increased length of hospital stay, poor stroke outcome, and possibly impaired recovery. Neuroscience nurses can have a huge impact in preventing dysphagia-related complications.

This clinical project allowed the stroke team to examine critical periods in order to speed up the process of decision-making and intervention. Although there is no existing evidence concerning the ideal time to start feeding stroke patients, improvement can definitely be made to improve the quality of care and life of stroke patients and their families. Stroke team members are very optimistic that the decision-making algorithm will enhance their interventions. This will be validated with a prospective study starting in January 2002.

Conclusion

Dysphagia is a common complication with stroke patients and can lead to complications such as malnutrition and aspiration pneumonia. Our results demonstrated that 44% of stroke patients were suffering from dysphagia. Dysphagia and malnutrition are associated with increased mortality, increased length of hospital stay, poor stroke outcome, and possibly impaired recovery. Neuroscience nurses can have a huge impact in preventing dysphagia-related complications.

This clinical project allowed the stroke team to examine critical periods in order to speed up the process of decision-making and intervention. Although there is no existing evidence concerning the ideal time to start feeding stroke patients, improvement can definitely be made to improve the quality of care and life of stroke patients and their families. Stroke team members are very optimistic that the decision-making algorithm will enhance their interventions. This will be validated with a prospective study starting in January 2002.

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