8TH NORTHERN IRELAND STROKE CONFERENCE 2019

11 June 2019

THE FUNDAMENTALS OF ACUTE STROKE NURSING & THE STROKE-SPECIFIC EDUCATION FRAMEWORK
Acute Stroke Care

- Reducing the impact of the initial event
  (protecting the ischaemic penumbra)

- Prevention of secondary brain injury
  (preventing stroke progression)

- Prevention of complications
  (effects of stroke and effects of acute illness)
Clinical Significance

23% Hemicraniectomy
10% Thrombolysis < 4.5 hrs
15.7% FeSS Intervention
23% Hemicraniectomy
15% Stroke Unit
1% Aspirin

NNT
79
18
14
6.4
2
3-7

Middleton et al. 2011
Acute Stroke Care

- Reducing the impact of the initial event
  (protecting the ischaemic penumbra)

- Prevention of secondary brain injury
  (preventing stroke progression)

- Prevention of complications
  (effects of stroke and effects of acute illness)
Clinical Significance

- Aspirin: 1%
- Stroke Unit: 5%
- Thrombolysis < 4.5 hrs: 10%
- FeSS Intervention: 15.7%
- Hemicraniectomy: 23%
- Endovascular Rx (tPA plus thrombectomy): 31%

NNT
- Aspirin: 79
- Stroke Unit: 18
- Thrombolysis < 4.5 hrs: 14
- FeSS Intervention: 6
- Hemicraniectomy: 4
- Endovascular Rx: 2

3-7
Acute Stroke Care

- Reducing the impact of the initial event (protecting the ischaemic penumbra)

- Prevention of secondary brain injury (preventing stroke progression)

- Prevention of complications (effects of stroke and effects of acute illness)
Principles

- Identification of abnormal parameters
- Identification of causes
- Timely corrective action
- All patients all of the time
The SSEF Web-app

In response to the National Stroke Strategy (2007) the UK Stroke Forum developed a training arm with the task of establishing nationally recognised, quality-assured and transferable education programmes in stroke.

The Stroke-Specific Education Framework (SSEF), which covers the whole of the stroke care pathway. The SSEF consists of 16 Elements of Care, based on the quality markers in the National Stroke Strategy and related to the stroke strategies in all four UK countries.

Job Role Profiles
About how to use them to support your training and development

Carer Profile
To show the knowledge and skills of patients and carers may find useful post-stroke

Training Courses
To show the knowledge and skills that patients and carers may find useful post stroke

Staffing Guide
That allows you to estimate the number of staff needed for a stroke service

Your Profile
Match your skill to the SSEF
Identify gaps in your knowledge
Find courses fill your skills
16 Elements of Care

The SSEF Framework

Filter by Element:
- E1: Awareness raising
- E2: Managing risk
- E3: Information
- E4: User involvement
- E5: Assessment (TIA)
- E6: Treatment (TIA)
- E7: Urgent response
- E8: Assessment (stroke)
- E9: Treatment (stroke)
- E10: Specialist rehabilitation
- E11: End-of-life care
- E12: Seamless transfer of care
- E13: Long-term care
- E14: Review
- E15: Participation in community
- E16: Return to work

On this page you can see the individual items contained within each of the 16 Elements of Care listed below. Clicking on the Element name in the list will take you to the items. This information has been extracted from the SSEF document, which can be accessed through links.
1. Professional capabilities; as outlined in the 4 pillars, and mapped to the

2. Elements of Stroke Care; mirroring the SSEF
Stroke-Specific Education Framework: Element 9 - Treatment

e9k_2:
Neurological and physiological effects of stroke, monitoring, and the timeframe of changes, during and after a stroke

e9k_3:
The need for early mobilisation and positioning

e9k_4:
Assessing swallowing and managing of dysphagia

e9k_5:
Alternative methods of feeding, hydration and drug administration for patients with dysphagia
Stroke-Specific Education Framework: Element 9 - Treatment

**e9k_7:**
The effects of stopping ongoing drug treatment because of swallowing problems

**e9k_8:**
Symptoms and effects of malnourishment

**e9k_9:**
The importance and methods of oral hygiene

**e9k_10:**
The importance of avoiding catheters, as well as managing retention and promoting continence
Principles

- Early Detection
- Identification of possible causes
- Timely corrective action

- Only detected if the patients are being frequently or continuously monitored!
Neurological Assessment

- 1 in 7 have reduced LOC in first few days
- May reflect stroke impact and/or be sign of deterioration/complication
- Skillful use of NIHSS
- CHANGE in individual items
- Physiological cause?
Continuous vs intermittent physiological monitoring

- Continuous monitoring associated with a significant reduction in death and disability

- Current evidence not entirely reliable (size of studies, variable definitions of abnormal parameters)

- Further research needed

(Ciccone et al 2013)
Stroke Deterioration and Progression (SP): worsening which persists!

**Potentially irreversible**
- Clot progression
- Herniation
- Mass effect
- Biochemical ischaemic effects

**Potentially reversible**
(Visible)
- Arrhythmias
- Electrolyte abnormalities
- Glucose abnormalities
- Hypotension
- Hypoxia
- Hyperthermia
### Atrial Fibrillation (AF)

**Risk of SP (%) is increased in patients with AF**

<table>
<thead>
<tr>
<th></th>
<th>no AF</th>
<th>AF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24%</td>
<td>35%</td>
</tr>
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</table>

$p=0.02$

**Excess risk of SP especially in older patients**

<table>
<thead>
<tr>
<th></th>
<th>no AF</th>
<th>AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 75 years</td>
<td>19%</td>
<td>24%</td>
</tr>
<tr>
<td>≥ 75 years</td>
<td>32%</td>
<td>41%</td>
</tr>
</tbody>
</table>

(Birschel et al 2004)
Heart Rate and SP

Excess SP risk with bradycardia and tachycardia
Excess SP risk independent of AF

(Birschel et al 2004)
Initial Heart Rate

Excess risk of SP with bradycardia and tachycardia (particularly Older Patients)

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>&lt;50</th>
<th>50-100</th>
<th>&gt;100</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 75 years</td>
<td>0%</td>
<td>18%</td>
<td>46%</td>
</tr>
<tr>
<td>&gt; 75 years</td>
<td>86%</td>
<td>30%</td>
<td>74%</td>
</tr>
</tbody>
</table>

(Birschel et al 2004)
Heart Rate and Rhythm

- Cardiovascular stability = maintaining perfusion
- Usual range 50-80 bpm
- Detection of AF
- Monitoring - intermittent vs continuous
- Check apex beat plus pulse
Pyrexia

- Pyrexia seen in 40-60%
- Contributes to secondary brain injury?
- Associated with worse outcomes
  - larger infarct volume
  - higher rates of mortality
  - greater disability and dependence
- Heightened inflammatory response - leading to cerebral oedema and neuronal death
Pyrexia

• 1.2 - 1.5 odds increase for death (meta-analysis
  \textit{(Hajat et al. 2000; Greer et al. 2008)}

Every 1 degree C rise:

• 2.2 odds increase for ‘poor outcome’
  \textit{(Reith et al. 1996)}

• 2.1 odds increase for death
  \textit{(Wang et al. 2000)}

• 9.2 relative risk increase for Stroke Progression
  \textit{(Davalos et al. 1997)}
Cooling therapy
Effects of pharmacological and physical strategies to reduce body or brain temperature in acute stroke

- 5 pharmacological & 3 physical cooling trials

- No effect of temperature lowering in reducing:
  - risk of death or dependency (OR 0.9)
  - death (OR 0.9)

- Both interventions were associated with a non-significant increase in the occurrence of infections

(Hertog et al., 2009)
Body temperature

- Usually tympanic
- Usual range 36-37.5
- Timely recognition of infection - 1:5 chest, 1:4 UTI
- Raised temperature associated with worse outcome
- Regular paracetamol
Hypoxia after stroke

Early deterioration

381 consecutive patients with acute stroke

- Oxygen saturation <90 doubles risk of early deterioration

(Silva et al. 2001)
# Oxygen saturation

<table>
<thead>
<tr>
<th></th>
<th>Acute Stroke</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=100</td>
<td>N=85</td>
</tr>
<tr>
<td>Age (years)</td>
<td>74 sd 8</td>
<td>72 sd 8</td>
</tr>
<tr>
<td>Awake SpO2 (mean)</td>
<td>94.5 sd 1.7 %***</td>
<td>95.8 sd 1.7 %</td>
</tr>
<tr>
<td>Mean nocturnal SpO2</td>
<td>93.5 sd 1.9 %**</td>
<td>94.3 sd 1.9 %</td>
</tr>
<tr>
<td>Lowest nocturnal SpO2</td>
<td>82.5 sd 6.4 %*</td>
<td>84.6 sd 7.8 %</td>
</tr>
</tbody>
</table>

Results are given as means, *p<0.05, **p<0.01, ***p<0.001

(Roffe et al. 2003)

Slide courtesy of SOS study
Unexpected nocturnal hypoxia

Time spent with an oxygen saturation <90% at night:

- 52% more than 5 minutes
- 23% more than 30 minutes
- 15% more than 1 hour

(Roffe et al. 2003)
Stroke Oxygen Supplementation Study

- 8003 patients recruited

- No difference at 90 days in:
  - modified Rankin
  - Survival

- Oxygen supplementation in unselected stroke patients does not improve outcome

(Roffe et al. 2014)
Maintain O2 sats greater than 95% - routine O2 not indicated

Marker for complications - pneumonia, sepsis, PE

Usual range 14-20

Be aware of abnormal breathing patterns
Quality in Acute Care (QASC)

- > 37.5°C in 20-50% patients\(^1\)
- Up to 68% become hyperglycaemic\(^2\)
- 37-78% experience dysphagia\(^3\)
- All result in increased morbidity and mortality and enlarged infarct size

1 Azzimondi et al. Stroke. 1995
2 Scott et al. Stroke. 1999
3 Martino et al. Stroke. 2005
Other supportive care
DVT Prevention

Graduated Compression

Intermittent Pneumatic Compression

CLOTS Trials Collaboration 2009;
Dennis et al. 2015
IPC is feasible and safe

IPC is an effective form of VTE prophylaxis
NNT = 28 for proximal DVT

It improves overall survival
NNT~ 43 for death in 30 days

Effective in ischaemic & haemorrhagic stroke
AVERT - the bottom line?

What did the research find?

The early results from this large phase 3 trial have indicated that contrary to expectation, the higher dose, very early out of bed mobilisation protocol was associated with a reduction in the likelihood of a favourable outcome for patients 3 months after their stroke.

Stroke Association (2015)
Early Mobilisation trials - Network meta-analysis
TTFM (time to first mobilisation) groups

<table>
<thead>
<tr>
<th>TTFM group</th>
<th>Odds ratio (95% CI) of a poor outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 hours</td>
<td>6.61 [1.36; 32.09]</td>
</tr>
<tr>
<td>18 hours</td>
<td>1.07 [0.53; 2.19]</td>
</tr>
<tr>
<td>24 hours</td>
<td>1.00</td>
</tr>
<tr>
<td>&gt;30 hours</td>
<td>2.74 [1.18; 6.37]</td>
</tr>
<tr>
<td>&gt;48 hours</td>
<td>1.29 [0.50; 3.37]</td>
</tr>
</tbody>
</table>

Poorer outcome (dead or disabled at 3 months)

Cochrane review (update in progress)
Early Mobilisation trials - Network meta-analysis
TTFM (time to first mobilisation) groups

<table>
<thead>
<tr>
<th>TTFM group</th>
<th>Odds ratio (95% CI) of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 hours</td>
<td>4.17 [0.57; 30.68]</td>
</tr>
<tr>
<td>18 hours</td>
<td>1.27 [0.92; 1.76]</td>
</tr>
<tr>
<td><strong>24 hours</strong></td>
<td>1.00</td>
</tr>
<tr>
<td>&gt;36 hours</td>
<td>0.96 [0.32; 2.92]</td>
</tr>
<tr>
<td>&gt;48 hours</td>
<td>1.41 [0.41; 4.82]</td>
</tr>
</tbody>
</table>

Poorer outcome (dead at 3 months)

Cochrane review (update in progress)
Early mobilisation after stroke

1. Very early (<24 hours) higher dose out of bed activity protocol reduced the odds of favourable outcome
2. Exploratory analysis suggests no TTFM was better than 24 hours
3. Guideline advice seems appropriate at present: “Patients with difficulty moving early after stroke who are medically stable should be offered frequent, short daily mobilisations typically beginning between 24 and 48 hours of stroke onset”
4. Work in progress!
Swallowing difficulties

- Estimated to affect 8% (590 million) of the world’s population (Cichero et al, 2017)
- 11-50% have persisting dysphagia at 6 months (Smithard et al, 1995; Mann et al, 2000)
Why should we do something about it

Early identification and management:
- Risk of malnutrition (Carrion et al, 2017)
- Pneumonia (Bray et al, 2017)
- Respiratory infection (Dogett et al, 2001)
- Poor wound healing and immune response (Carrau & Murray, 1998)
- Increased anxiety, depression & fear of choking (Costa Bandeira et al, 2008)
- Extended hospital stay (Low et al, 2001)
- Discharge into institutional care (NCGC, 2011)
- Poor individual outcome (Middleton et al, 2011)
- Airway obstruction (Turkington et al, 2002)
- Mortality (Ingleman et al, 2011)
- Costs (Katzan et al, 2017)
What should we do?

- National guidelines (Clinical Guidelines for Stroke)
- Professional Guidelines (Interprofessional Dysphagia Framework, DH, RCN, RCSLT, RCP)
National Swallowing Guidelines

• 4.16.1A : People with acute stroke should have their swallowing screened, using a validated screening tool, by a trained healthcare professional within four hours of arrival at hospital and before being given any oral food, fluid or medication.

• 4.16.1B : Until a safe swallowing method is established, people with swallowing difficulty after acute stroke should:
  > be immediately considered for alternative fluids;
  > have a comprehensive specialist assessment of their swallowing;
  > be considered for nasogastric tube feeding within 24 hours;
  > be referred to a dietitian for specialist nutritional assessment, advice and monitoring;
  > receive adequate hydration, nutrition and medication by alternative means.
The association between delays in screening for and assessing dysphagia after acute stroke, and the risk of stroke-associated pneumonia
Bray B. D. et al., on behalf of the SSNAP Collaboration.
J Neurol Neurosurg Psychiatry 2016;0:1–6

• Delays in dysphagia screening were associated with a 1% increase in stroke associated pneumonia

• Reducing delays in screening for dysphagia in acute stroke should be a focus of quality improvement in stroke care

Swallow screen delay

Multivariable model including level of consciousness. NIHSS, NIH Stroke Scale; SALT, speech and language therapist; SAP, stroke-associated pneumonia.
Professional Guidelines: FOUNDATION (Updated 2019: Level 4)

- Individual need and support required
- Communication, capacity and consent
- Environment
- Level of alertness
- Cognition
- Behavioural, cultural and psychological issues
- Medical and neurological state
- Screening, assessment of swallowing
- Outcome and onward referral
- Ethical and legal issues
- Audit, research, policy and service delivery
Acute signs of aspiration easy to identify

- Coughing/delayed
- Throat clearing/delayed
- Wet /gurgly voice
- Short of breath when swallowing
- Sweating
- Facial colour changes
- Eyes watering
- Frequent unexplained chest infections / pneumonia
- Weight loss
- Impacts on motivation to eat/ drink / appetite
Considerations with Dysphagia

• Difficulty chewing/swallowing food and/or fluid
• Food/fluid falls out of mouth
• Food is left in the mouth after eating
• Poor oral hygiene
• Meals and drinks take a long time to eat/drink
• Client holds food/drink in the mouth and does not swallow
• Weight loss
• Frequent, unexplained chest infections

• Behaviour change around mealtimes
Interventions to improve nutrition

• Oral supplements

No trial evidence to support: ROUTINE use of supplements (protein/energy) in acute stroke patients who are able to take food by mouth

Supplements may benefit (e.g. reduce pressure sores) in those with signs of malnutrition

(Geeganage et al, 2012)
Interventions to improve nutrition

- Early nasogastric tube feeding

  Inconclusive: Starting tube feeding early after stroke may reduce death

  (Geeganage et al, 2012)
Interventions to improve hydration

• Parenteral fluids

• Enteral fluids

No evidence: best volume, duration, or mode of delivery for people with acute stroke.

(Visvanathan et al 2015)
# Key messages

<table>
<thead>
<tr>
<th>What we know:</th>
<th>Areas for development:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring important to achieve better outcomes</td>
<td>Still developing evidence base for specific interventions</td>
</tr>
<tr>
<td>Nurse led protocols improve outcomes</td>
<td>Methods for better/earlier detection of complications e.g. Chest infection</td>
</tr>
<tr>
<td>Timely identification and action is critical</td>
<td>More research on specifics of applying these principles</td>
</tr>
</tbody>
</table>
What makes it possible?

- Numbers of stroke specialist nurses?
History & Assessment
Investigations
Neurological Monitoring
Physiological Monitoring
Dysphagia Screening
Weight, Food, and Fluids
Medication and VTE
Rehab (mobilisation, pressure care, toileting, goal setting)
Personal care (including oral care)
Communication - professionals
Communication - patient and carer
Breaks
Other
We need more stroke specialist nurses, more evidence, and more time!

Thank you and any questions?