

Stroke Units Improving the Outcome of Patients with a Cerebrovascular Event

a report by

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The development of stroke units has significantly changed the outcome of stroke patients – one-year mortality has decreased by 23%. The hospital stay has been reduced by six days on average and five out of 100 patients become more independent at home, while four more survive and one less needs to be transferred to a nursing home.¹

The goals of a stroke unit are to improve stroke outcome and diagnostic accuracy, facilitate the introduction of new treatments, be an optimal setting for acute trials, reduce the length of hospitalisation and allow early discharge.²

A stroke unit must be part of an integrated healthcare programme with the possibility of urgent transport and arrival time of the patients to a hospital that has a 24-hour emergency department (ED) and a stroke team.

Public awareness of alarming stroke signs have to be promoted by general practitioners (GPs), by leaflets, by press conferences and by advertisements on television. Strokes need to be recognised as an emergency.³

This article will only deal with some practical recommendations for improving patient care in the stroke unit. For medical stroke management the recommendations of the European Stroke Initiative (EUSI) should be followed.⁴

Emergency Needs for Stroke Patients⁵

A multidisciplinary stroke team must be led by an experienced neurologist – the quick triage consultation of stroke patients in the ED reduces inefficiencies and delays. This increases the proportion of patients eligible for acute stroke treatment, such as thrombolysis.

Computed tomography (CT) of the brain and laboratory services must be available 24 hours a day. It must be possible to perform Doppler ultrasound, magnetic resonance imaging (MRI) and conventional angiography within three hours. Neurosurgical facilities must be present. A majority of stroke patients can be admitted to the stroke unit after the initial screening. Only 10% have to be admitted to an intensive care unit (ICU) for life-threatening strokes.

Organisation of a Stroke Unit⁶

A stroke unit is only useful when at least 200 patients are admitted on a yearly basis. It should consist of at least four beds, each equipped with non-invasive computed assisted monitoring for cardiac arrhythmia detection, arterial blood pressure assessment and oxygen saturation measurements.

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2. Indredavik B, Fjaertoft H, Ekeberg G, Loge A D, Mørch B, "Benefit of an extended stroke unit service with early discharge. A randomised controlled trial", Stroke (2000);31: pp. 2,989–2,994.
3. Adams H P, Jr, Brott T G, Crowell R M et al., "Guidelines for the management of patients with acute ischemic stroke. A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association", Stroke (1994);25: pp. 1,901–1,914.
4. Hacke W, Kaste M, Bogousslavsky J et al., "European Stroke Initiative Executive Committee and the EUSI Writing Committee, European Stroke Initiative Recommendations for Stroke Management – update 2003", Cerebrovasc Dis (2003);16: pp. 311–317.
5. Gratina P, Greenberg L, Pasteur W, Grotta J C, "Current emergency department management of stroke in Houston, Texas", Stroke (1995);26: pp. 409–414.
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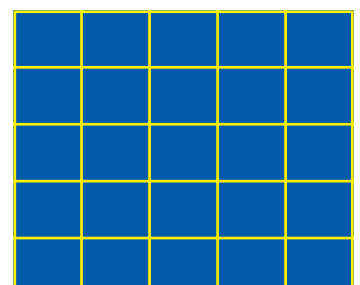
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Connecting the central computer screen to the station of the cardiac monitoring unit is an additional safety measure. In case of alarm, this allows the cardiologist on duty to immediately control the electrocardiogram (ECG) parameters and give urgent therapeutic instructions.

The stroke team should consist of a full-time neurologist (also in charge of patients leaving the unit) on average after 24 to 72 hours of monitoring. A consultant stroke rehabilitation physician should also evaluate each patient admitted to the unit in 24 hours.

Per four stroke beds two nurses are required in the early morning, two in the afternoon and one during the night in an eight-hour rotation system. The physiotherapist, the occupational therapist and the speech therapist should be involved as soon as possible to start early rehabilitation. The social assistant must start planning the discharge modalities

skin necrosis prevention. The monitoring of vital parameters such as oxygen arterial saturation, breathing, aerosols and aspiration are mandatory. Blood pressure and ECG changes should be continuously followed-up. Glycaemia must be checked four times a day during 48 hours in diabetic patients or for patients with high glycaemia on admission. Temperature must be measured twice daily in order to check the possibility of infection, which would need to be treated as soon as possible. Pain control, supervision of the catheter site and education to autonomy and emotional self-control are necessary.

The swallowing function should be tested by drinking through a straw used as a pipette or sucking a wet piece of cotton. If disturbed, a feeding nasogastric tube should be placed to prevent aspiration pneumonia. If the swallowing difficulties persist for more than 15 days, X-ray videofluoroscopy of the swallowing act with boluses of different consistence

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soon after admission – discharge at home with or without additional support or transfer to a revalidation centre or a nursing home. During a weekly multidisciplinary staff meeting, the files of all patients should be discussed. Training sessions and a discussion of new treatment and care modalities are appropriate at regular time intervals.

Each patient admitted to the unit should have a stroke protocol and checklist including laboratory investigations, medical and nursing procedures, monitoring and therapy applications, neurological rehabilitation programme, family involvement, support and education and discharge planning.

Nursing Care Plan

The nursing care plan should consist of assistance in the activities of daily living, hygiene, mobilisation, control of liquid balance and feeding, mouth care and

must be performed. In cases of persistent life-threatening swallowing disturbances, a transcutaneous gastrostomy should be performed.

Bladder function must be controlled four times a day with a bladder scan during the first 48 hours. A residue of more than 400cc needs intermittent catheterisation of the bladder. Permanent catheterisation should be avoided as much as possible in order to prevent urinary infection (UI). If bladder dysfunction persists for a significant amount of time, a suprapubic cystostomy should be performed.

Changes in neurological status must also be followed up regularly using stroke scales. In the author's department, the National Institutes of Health (NIH) stroke scale is only used by the neurologist because it is too complicated and time-consuming for repeated controls by nurses.⁷ The Orgogozo stroke scale is more suitable for that purpose.⁸ If a patient

7. Goldstein L B, Bertels C, Davis J N, "Interrater reliability of the NIH Stroke Scale", Arch Neurol (1989);46: pp 660-662.

8. Orgogozo J M, Capildeo R, "Principes et methodes d'évaluation clinique des traitements à la phase aigue des infarctus cérébraux", Mal Med (1984);1: pp. 240-255.

9. de Haan R, Horn J, Limburg M et al., "A comparison of five stroke scales with measures of disability, handicap and quality of life", Stroke (1993);24: pp. 1,178-1,181.

deteriorates by 10 points or more, the neurologist has to be informed. The disability of the patients on discharge from the hospital is assessed using the modified Rankin scale.⁹

Changes in levels of consciousness also need to be assessed by the nurses. The Glasgow Coma Scale (GCS) is not reliable for stroke patients. Evaluation of verbal responses in aphasic patients can give false results as well as reactions to pain stimuli, performed on the hemiplegic side. The author uses the Reaction Level Scale (RLS), which records every mental reaction to be applied to patients who are aphasic or intubated, or who have a trachea cannula.¹⁰ RLS 1, 2 and 3 are graded according to the speed of verbal answers, eye movements and contact or motor responses to verbal orders. If there is no response, the RLS will be scored from four to eight according to the type of reaction on pain stimulus, similar to that measured on the GCS.

prognosis. Revalidation of language must include training of recognition, speech and reading and writing. Special attention is required for the evaluation of sensory and visual neglect. Patients must be made to use their limbs and visual field on the affected side. Sometimes, immobilisation of the unaffected arm is needed to force patients to practice with the neglected upper limb.

As more than 30% of stroke patients have cognitive impairment, a Mini-Mental State Examination (MMSE) should be performed whenever the condition is suspected. If necessary, further extensive neuropsychological evaluation should be carried out and cognitive and perceptual therapy sessions of 40 minutes should be initiated.

The patient's family should be involved in the revalidation programme, being continuously informed of progresses. This allows further planning concerning

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Early Neurological Rehabilitation

This starts with a good positioning of the patient in bed. Patients should be placed in an upright position with support of the paretic arm and with the legs in a straight position as soon as possible. Later, balance in a sitting position on the edge of the bed should be tested. When possible, the patient should be moved to an adapted chair near his/her bed, with the affected arm placed well forward on a table or pillow and the feet flat on the floor.

Passive mobilisation of the plegic limbs must be started as early as possible, followed by active movements when strength starts to recover. Sufficient balance in the sitting position must be reached before standing exercises (with help) should be started. The next step is walking with support. At least 30 minutes of set exercises should be performed twice a day.

The speech therapist must assist in the evaluation and treatment of dysphagia and aphasia as early as possible. A careful strategy should be drawn up, including an assessment of the short- and long-term

the discharge of the patient at home, to a revalidation centre or a nursing home.

Conclusion

There is now clear evidence that treating acute stroke patients in a stroke unit involving an expert multidisciplinary team reduces stroke mortality and morbidity. All patients with an acute stroke or even a transient ischaemic attack should be taken care of in such facilities, under the direction of a neurologist with special interest and expertise in stroke management. Most patients can be managed in relatively low technology stroke units, but up to 10% may require admission to an ICU. In addition to the treatment of stroke using evidence-based medicine, the introduction of new therapies and clinical trials can be facilitated. Stroke units should also involve close collaboration among expert doctors, nurses and allied health disciplines in a coordinated team approach. ■

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10. Johnstone AJ, Lohlnun JC, Miller JD et al., "A comparison of the Glasgow Coma Scale and the Swedish Reaction Level Scale", *Brain Injury* (1993);7: pp. 501–506.