Stroke Assessment and early management

By Elizabeth Dempsey

STROKE is a medical emergency requiring hospital assessment to prevent life-threatening, preventable or treatable complications. Stroke is a group of diseases independent of age and gender which are a significant cause of death, disability and loss of quality of life. The impact of stroke is immense: it is the primary cause of disability worldwide; the second most common cause of acquired intellectual disability; the third leading cause of death; and has a significant impact on depression.

The significance of stroke at personal and family level is immeasurable. The medical management and economic costs related to loss of productivity are significant. Loss of lifetime productivity in the younger stroke population is also immense.

Travelling through time from ‘stroke of apoplexy’ as it was known to ‘Cinderella of medicine’, we are now emerging into an era of rapid recognition of stroke as a ‘cerebrovascular event’ – the most preventable of all catastrophic illnesses.

Two key areas that are instrumental to stroke patients’ recovery are stroke units and education. Stroke units consist of dedicated nursing, medical and allied professions located in a distinct place who deliver an organised expert stroke service, reacting to patients’ needs from onset to recovery. Comprehensive assessment of all aspects of stroke are addressed. Close collaboration with multidisciplinary staff is kept to identify rehabilitation goals. Improved recovery, reduced disability and fewer deaths are proven benefits of stroke unit care.

Education is the most effective approach to risk factor modification in stroke. It should be directed to people at risk: patients, families, caregivers, staff and the general public. The outcome of stroke is directly affected by several factors, including: continuous education with recognition of stroke symptoms; the realisation that urgent medical help is needed; and emergency transportation to an adequately equipped hospital.

Early management of acute stroke

Recognition of stroke symptoms begins at community level – numbness, paralysis of face, arm or leg, sudden blurred or decreased vision, difficulty speaking or understanding events, dizziness, loss of balance, co-ordination and sudden severe headache (see Table 1).

The longer treatment is delayed, the less scope there is for benefit from treatment – ‘time is brain’. Acute stroke is a medical emergency requiring the same care as that of a heart attack.

Stroke patients should be transported to the nearest hospital with an available stroke unit or with organised stroke care. Time and date of onset are relevant to interpreting stroke signs accurately. Patient history or an eye witness account is essential. Some patients present with a history of sudden or rapid onset of focal neurological symptoms, while others have stepwise, gradual worsening, or waxing and waning of symptoms. Decreased level of consciousness, headaches, nausea and vomiting can suggest stroke in brainstem, cerebellum or haemorrhagic stroke. The potential for preventable medical or neurological complications suggests that most stroke patients should be admitted to hospital urgently.

Acute hospital management of stroke

The goals of acute stroke treatment are protection of neurons from death by interruption of the ischaemic cascade, thus promoting arterial canalisation. The concept of ischaemic penumbra is fundamental to ischaemic stroke management; a core of infarcted tissue might not be salvageable, however adjacent tissue might be saved if circulation is restored and metabolism is normalised. Diagnostic evaluation to confirm diagnosis of stroke, outruling any other neurological or systemic illness, helps to determine suitability for acute treatment and screen for acute medical or neurological complications of stroke.

The classification of vascular distribution or mechanism of stroke is essential for secondary prevention of recurrent stroke.
Stroke units are a proven non-pharmacological tool to identify atrial fibrillation and to assess cardiac function. The level of anticoagulation should be closely monitored.

A stroke unit should include:
- Compression stockings are advised for all stroke patients.
- Oxygen saturation readings (SaO₂) – supplemental O₂ only given with low readings.
- Neurological status; level of alertness – GCS (Glasgow Coma Scale).
- Stroke severity – NIHSS (National Institute of Health Stroke scale) summarises all stroke related impairments in a single scale for conscious or unconscious patients.
- Physiological parameters – full blood count, erythrocyte sedimentation rate, renal, liver profile, cholesterol, glucose, urinalysis; record temperature – if > 37.5°C, treat with antipyretics.
- Assess for speech and swallowing difficulties – advise nil PO until formal assessment.
- Fluid balance – If supplemental fluids needed, isotonic fluid recommended; accurate recording of urinary output; avoid urinary catheter if possible.

Neurological status, physiological parameters, fluid balance, glycaemic control and coagulation are essential for acute stroke management and halting progression of neurological deficit. Clinical assessment is essential and must be rapid and accurate (see Table 2). A CT scan of the brain is essential as infarction cannot be reliably distinguished from haemorrhage without imaging. The CT scan must be completed in less than three hours if thrombolysis treatment is an option. Non-vascular causes of stroke can also be excluded. Doppler ultrasound is needed to assess extracranial/intracranial arteries for stenosis. Cardiac abnormalities are identified with ECG – 20% of cerebral ischaemia is secondary to cardioembolism.

Stroke unit management

The benefit of comprehensive stroke units are unanimous in reducing mortality and morbidity from stroke with positive effects persisting for years. Stroke units are a proven non-pharmacological intervention with positive effect on outcome: 100% effectiveness of stroke units is reported in contrast to thrombolysis. Other interventions. A stroke unit should include:
- A specifically defined area with protected beds.
- Mixed unit of all ages reflecting umbrella nature of stroke.
- Access to dedicated rehabilitation staff and facilities.
- Regular communication/meetings with multidisciplinary team.

The stroke unit in most cases is directed by a physician with a special interest in stroke (neurology, care of the elderly or a combination of both as is the case in the Mater University Hospital). Stroke units do not increase the cost of acute stroke care.

Monitoring of stroke patients

Mortality and poor outcome reduction in stroke patients is associated with higher detection of changes and shorter duration of complications. Frequent assessment of vital and neurological signs in the 24-48 hours post-admission is necessary.

Nursing care after stroke is vital for patients and families. Their 24-hour presence enhances monitoring, co-ordinating and supporting of stroke patients; it also aids communication with the multidisciplinary team on patient feedback and perceptions.

Blood pressure management post-stroke is patient specific, as aggressive treatment of hypertension could be detrimental to reduction of reperfusion in an area of ischaemia, thus expanding the size of infarction. Blood pressure often falls spontaneously particularly when the patient is moved to a quiet area, their bladder emptied, pain is controlled and rest is encouraged. Some situations dictate the need for urgent anti-hypertensive treatment. According to general guidelines for BP management, treatment should be commenced if systolic BP is > 220mmHg and diastolic pressure is > 120mmHg. Most strokes are initially treated with bed rest, but mobilisation should begin as early as advised to lessen complications of pneumonia, deep vein thrombosis, pulmonary embolism and pressure sores. Sustaining nutrition is important as malnutrition interferes with recovery. People who experience stroke of the brain stem, multiple strokes, large hemispheric lesions or depressed consciousness are at greater risk for aspiration. Those who have abnormal gag reflex, impaired voluntary cough, dysphonia or cranial nerve palsies should alert staff to a swallow risk. Intravenous fluids may be needed in the admission phase. Nasogastric feeding may be necessary early in the acute phase for nutrition and medications.

The presence of fever with or after stroke onset should be investigated as pneumonia is a common cause of death post-stroke. Antibiotics are recommended for infectious complications of stroke. Compression stockings are advised for all stroke patients except in concerns of peripheral vascular disease. Monitoring and control of hypoglycaemia and hyperglycaemia is recommended. Strict control of diabetes mellitus is encouraged. Blood pressure in diabetics is advised to be < 130/80mmHg.

Second-line blood analysis includes: activated partial thromboplastin time (APTT), thyroid function and thrombophilia screen. MRI: Magnetic resonance imaging is not an emergency diagnostic test. It provides pertinent assessment of ischaemic penumba, viability and reversibility of damage to ischaemic tissue. The use of intravenous contrast and diffusion weighted imaging assesses cerebral blood volume and cerebral perfusion, permitting identification of salvageable tissue.

Cardiac monitoring: This includes – Holter to identify atrial arrhythmia; trans-thoracic echo (TTE) combined with microbubble test to detect Patent Foramen Ovale (PFO) or atrial septal defect; and trans-oesophageal echo (TOE) to view the left atrium, aortic arch and assess for aneurysm or PFO.

Anticoagulation if necessary should not be prescribed until brain imaging has excluded the possibility of primary haemorrhage. The level of anticoagulation should be closely monitored. A lumbar puncture for cerebrospinal fluid (CSF) analysis is expected if there is a subarachnoid haemorrhage.

The most important acute neurological complications post-stroke are cerebral oedema, raised intracranial pressure (ICP), seizures and haemorrhagic transformation of the infarction. Stroke types distinguish between ischaemia and haemorrhage. Establishing the vascular territory affected is critical for secondary prevention, which will be discussed in next month’s article.

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References on request from nursing@medmedia.ie (quote: Dempsey E. WIN 2006; 14(9): 39-40)