CLINICAL PRACTICE GUIDELINES

Management of Stroke

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Introduction of Guidelines

What are clinical guidelines?

Clinical guidelines are systematically developed statements for practitioners and patients about appropriate health care for specific clinical circumstances. Clinical guidelines are usually developed under the auspices of a medical association or government agency by a panel of experts, and are based on a thorough review of scientific studies on the topic being addressed.

In the USA, the National Guideline Clearinghouse maintains a catalog of high quality guidelines published by various organizations (mostly professional physician organizations). In the United Kingdom, clinical practice guidelines are published primarily by the National Institute for Health and Clinical Excellence (NICE).

Objectives of developing guidelines

While textbooks provide information on all aspects of the condition, journal articles mainly concentrate on particular aspect of the entity. The aim of guidelines is to provide recommendations based on best available evidence and to give concensus statements for areas where evidence is lacking.

Additionally clinical guidelines help to standardize medical care, to raise quality of care, and to achieve the best balance between cost and effectiveness in a given setting.

Uses of guidelines

Clinical guidelines briefly identify, summarize and evaluate the best evidence and available current data about prevention, diagnosis, prognosis, therapy, risk/benefit and cost/effectiveness. Then they define the most important questions related to clinical practice and identify all possible decision options and their outcomes.

While guidelines provide useful information to the clinician they are not rigid rules and do not cover certain aspects of patient care such as courtesy, making notes, second opinions, referrals and managing associated illnesses.

Scope of stroke guidelines in Sri Lanka

These guidelines cover the management of strokes and TIA in adults. It includes assessment, investigation, immediate management and secondary prevention. It also includes management of complications, discharge planning and rehabilitation.
The management recommendations in this guideline has followed the grading given below:

1. Introduction

1.1 Introduction

Stroke is defined as rapid onset of focal (or global) cerebral dysfunction lasting 24 hours or more, or leading to death, with no apparent cause other than vascular in aetiology. When symptoms last less than 24 hours, it is defined as a transient ischaemic attack (TIA).

1.2 Epidemiology

Stroke is a subgroup of cardiovascular disease affecting the vasculature of the brain. It is the third leading cause of death, after ischaemic heart disease and cancer, and accounts for about 5.5 million deaths annually. It is also the leading cause of adult disability worldwide. It is predicted that the number of stroke deaths will increase annually owing to the ageing population. According to WHO figures, developing countries will experience more than three quarters of all stroke deaths worldwide.

Approximately one fourth of the people who suffer a stroke die, and of the survivors, about one third remain disabled. This causes a great burden on the health care systems with far reaching consequences, especially in the developing countries with limited resources. This calls for initiative measures aimed at prevention (primary and secondary) and treatment of stroke and its complications.

1.3 Stroke subtypes

Pathologically, stroke is subdivided into ischaemic stroke (80%), intracerebral haemorrhage (15%) and subarachnoid haemorrhage (5%).

Clinically, ischaemic stroke is classified into total anterior circulation syndrome (TACS), partial anterior circulation syndrome (PACS), lacunar syndrome (LACS) and posterior circulation syndrome (POCS). (Ref)

1.4 Risk factors for stroke

1.4.1 Non-modifiable risk factors

Age, ethnicity, gender and familial or genetic factors are non-modifiable risk factors. Men are at a higher risk for stroke in most age groups.

1.4.2 Modifiable risk factors

Well documented, common modifiable risk factors are hypertension, smoking, diabetes, and heart disease.

Others include lipid abnormalities, insulin resistance, obesity, physical inactivity, excessive alcohol consumption, hormone replacement therapy, hormonal contraceptives and stress.

1.5 Aetiology

The vast group of clinical entities that cause stroke can be classified as follows;

- **Large artery atherothrombotic disease**
- **Small vessel disease (lacunar)**
- **Cardioembolism (acute myocardial infarction, atrial fibrillation, valvular heart disease etc.)**
- **Non-atherosclerotic vasculopathies (vasculitis, arterial dissection, hypercoagulable states etc.)**

1.6 Outcome

Fifty percent of patients with an acute ischaemic stroke have coronary artery disease and carry a risk of non fatal myocardial infarction of 1-2% per year over the next few years. The risk of recurrence of stroke is about 10% in the first year, and 5-10% per year over the next five years. Mortality is about 10% per year, with nearly 50% dead within five years. Fifty percent of survivors have depression.

2. Service Provision

The effective management of stroke depends upon a well organized service that can respond to the particular needs of an individual patient. Organization of stroke services should be developed at every level: primary, secondary and tertiary care services, and at provincial and national level.

2.1 Specialist stroke services in hospitals

2.1.1 Organization of stroke care

Recommendations·
All strokes should ideally be admitted under the care of a stroke team for acute care and rehabilitation (A)

- Stroke services should have the following facilities.
    1. A geographically identified stroke unit for inpatient care (A)
    2. Trained multidisciplinary team in stroke care and rehabilitation that should meet once a week to discuss plan of management (B)
    3. Educational programmes for staff, patients, and carers (B)
    4. Access to brain and vascular imaging services (B)

- A specialist clinic for the rapid assessment of TIA and minor stroke (B)

- Community based rehabilitation services to facilitate early supported discharge (A)

- Access to services supplying orthotics, specialist seating, and assistive devices (B)

2.1.2 Specialist stroke team

Effective stroke rehabilitation needs the coordinated contribution of a wide range of professionals. The precise composition and number of such a team will vary according to the size of the unit and its objectives.

Recommendations

The multidisciplinary team should include

1. Specialist physician
2. Nursing staff
3. Physiotherapist
4. Occupational therapist
5. Speech and language therapist
6. Nutritionist
7. Social worker
8. Counsellor

2.1.3 Services for management of acute stroke: hospital or home?

The evidence suggests that all patients with stroke benefit from being managed in specialized stroke units in hospitals and that those managed at home do less well.

Recommendation

- Patients should be admitted to hospital for initial care and treatment (A)

2.2 Stroke services for younger people

A significant number of strokes occur in younger people whose medical and social needs are different. Their rehabilitation requires special attention to work prospects and bringing up children.

Recommendations

- Rehabilitation team should address the physical, psychological and social needs of younger patients with stroke (C)

2.3 Patient, families and carers

2.3.1 Patient, family and carer education

Stroke is a family illness requiring practical, emotional, social, and financial support to cope with its immediate and long term problems. The stroke team should discuss the management with patient family and carers and provide necessary information by using printed and other health education material formulated locally or by the state sector.

Recommendations

- Information should be freely available in all three languages on stroke and its manifestations including specific disabilities and secondary prevention (A)

- Education programmes should be arranged for patients with disability and their carers to assist them in adapting to their new role (B)
- Stroke services should recognize the stress on carers associated with the patient's disability including urinary and faecal incontinence (B)
- Carers should be involved in planning and decision making of long term management and rehabilitation (A)

2.4 Organization of and approaches to rehabilitation

Objective measurement of function is mandatory for rehabilitation. It is important to train the staff in use of a chosen scale for disability. Barthel index (Annexure I) and modified Rankin Scale (Table II) are simple and could be recommended to use by all in the stroke team.

2.4.1 Goal-setting

One of the characteristics of rehabilitation is the setting of goals. This refers to the identification of, and agreement on a target which the patient and the team

will work over a specified period of time.

Recommendations

- Goals should be meaningful and challenging but achievable (B), and there should be both short- and long-term goals (D)
- Goal setting should involve the patient (B), and the family if possible

2.4.2 Approach to rehabilitation

The rehabilitation approach should aim to improve or modify the activities of daily living. It is important for all team members to implement a consistent approach. Practice of functional activities (task specific training) has shown to improve outcome. (ref)

Recommendations

- All members of the health care team should work together with the patient, carer and family using common goals (B)
- A current therapeutic approach to movement re-education should be used to improve function (A)
- Patients should practice functional skills and activities repeatedly (A)
- The team should promote the practice of skills gained in therapy into the patient's daily routine in a consistent manner (A)
- All team members should be taught safe and appropriate ways of moving and handling of patients (C)
- All clinicians should be involved in audit of stroke care and use the results to plan service improvements (B)

3. Acute Management of Stroke

3.1 Diagnosis and investigations

Effective early management of acute stroke and transient ischaemic attack (TIA) including amaurosis fugax can reduce morbidity and mortality, thus saving lives and reducing dependency.

3.1.1 Investigation and management of patients with transient ischaemic attack

The risk of developing a stroke after a hemispheric transient ischaemic attack is maximal in the first 48 hours.

Recommendations

- Patients with a TIA or a non disabling stroke should be assessed and investigated in a specialist clinic as soon as possible preferably within a week (B)
- Patients with more than one TIA within in a week should be admitted and investigated immediately (B)
- Vascular risk factors like hypertension, diabetes mellitus and hyperlipidaemia should be treated appropriately (A) (refer relevant SLMA guidelines)
- Patients with significant carotid stenosis (70-99%) should be referred for endarterectomy/ stenting (A)

3.1.2. Investigation of acute stroke

The diagnosis of stroke should be made with the help of a carefully taken history, examination and investigations.

Recommendations

- The diagnosis should be reviewed by a specialist physician (B)
- The initial examination should document the localization of the likely affected cerebral area (C)

3.1.2.1 Brain imaging

CT brain distinguishes an ischaemic stroke from an intracranial haemorrhage, and also identifies non vascular lesions. However, normal CT brain does not exclude the diagnosis of an ischaemic stroke.

Recommendations

- CT brain should be performed as soon as possible in all, within 24 hours at the most, wherever possible (B)
- CT brain should be done as a matter of urgency if the patient has (B)

  1. been taking anticoagulant treatment
  2. a known bleeding tendency
  3. a depressed level of consciousness
  4. unexplained progressive or fluctuating symptoms
  5. papilloedema, neck stiffness or fever
  6. severe headache at onset
  7. an indication for thrombolysis or early anticoagulation

- Further imaging may be needed to identify complications like hydrocephalus and haemorrhagic transformation if clinically warranted (B)

- If diagnosis is uncertain MRI brain should be considered. MRI is particularly helpful to identify brainstem or cerebellar infarctions

3.1.2.2 Other investigations

Judicious use of investigations are required to identify the causes and for the management of stroke.

Recommendations

a) Basic tests that are useful include

1. Full blood count
2. Blood glucose
3. Lipid profile
4. ECG
5. Chest radiograph
6. Serum electrolytes
7. CRP, ESR
8. Hepatic and renal profile
9. INR, APTT
10. VDRL

b) Special tests (where appropriate)

1. Carotid Doppler study
2. Transthoracic and transoesophageal echocardiogram
3. Thrombophilic screen
4. Anticardiolipin antibodies
5. Serum Homocysteine
6. Vasculitis screen

3.2 Immediate interventions for stroke

Stroke is considered a medical emergency. Active management in the early hours after a stroke, salvage some of the ischaemic brain from infarction.

3.2.1 Initial screening and monitoring

Recommendations

a) Vital parameters that needs to be monitored includes- Conscious level, pulse, blood pressure, pupils, temperature,
blood glucose, oxygen saturation and hydration (D)

b) The patient should be assessed for
1. Risk of aspiration (B)
2. Degree of weakness and mobility (C)
3. Risk of developing pressure sores / deep vein thrombosis (C)
4. Bladder and bowel status

3.2.2 General management

Recommendations

- Blood glucose, arterial oxygen saturation, hydration and temperature should be maintained within normal limits. Infection must be actively managed. (B)
- Acute blood pressure reduction should be attempted only when there is a risk of complications from hypertension e.g. hypertensive encephalopathy, heart failure, acute myocardial infarction, aortic dissection, acute renal failure or when planning thrombolysis. Extremely elevated blood pressure (220/120) will need to be lowered (B)
- Patient should be mobilized as soon as possible to prevent complications such as aspiration, bed sores, deep vein thrombosis or pulmonary embolism (B)
- Secondary prevention should be commenced early to minimise risk of stroke recurrence

3.3 Management of acute ischaemic stroke

3.3.1 Thrombolysis

a) Thrombolysis improves the outcome in ischaemic stroke by restoring the perfusion to the ischaemic penumbra. It is recommended only in centres where

the NINDS protocol could be strictly followed. Thrombolytic therapy is feasible in a tertiary hospital set up in Sri Lanka.

Recommendations

a) Inclusion criteria for thrombolysis with rtPA

1. Age between 18 – 80 years
2. clearly defined symptom onset
3. Measurable deficit
4. Lesser than 180 mins for initiaton of iv rtPA

b) Exclusion criteria for thrombolysis with rtPA

1. Rapid improvement or minor symptoms
2. Stroke or head trauma within last three months
3. Major surgery within last 14 days
4. History of intra cerebral haemorrhage
5. Systolic BP >185 or diastolic BP >110 mm Hg at the time of treatment initiation
6. Suspected sub arachnoid haemorrhage despite normal CT
7. Gastro intestinal or Urinary tract bleeding within last 21 days
8. Arterial puncture at non compressible site within last 7 days
9. Seizures at onset of stroke
10. Use of heparin within 48 hrs and an elevated partial thromboplastin time
11. Prothrombin time >15 seconds, platelet count <100,000/µl, glucose <50 or >400 mg/dl

c) Dosage and Administration

The recombinant tissue plasminogen activator (rt-PA, alteplase, Actilyse®) is administrated as an intravenous infusion: 0.9 mg/kg (maximum rt-PA dose 90 mg), 10% given as bolus during 1 minute, remaining given as infusion over 1 hour. Treatment must be started within 3 hours after symptom onset. The treatment has to be performed in accordance with contraindications, precautions and warnings as described in the inclusion and exclusion criteria and the SPC provided by the manufacture

b) **Anti-thrombotic treatment**

Recommendations

- Aspirin 300mg should be administered as soon as the clinical diagnosis of ischaemic stroke is made. Thereafter aspirin (75-300mg/day) should be continued indefinitely for ischaemic strokes (A)

- Anticoagulation (warfarin/ heparin) is not indicated for the routine treatment of acute ischaemic stroke, including progressive stroke. The benefits of early anticoagulation seem to be offset by the increased risks of haemorrhagic complications (A)

3.3.2 Other drug treatment

None of the drugs used for the purpose of neuroprotection or for the reduction of cerebral oedema are presently recommended for the management of acute ischaemic stroke.

3.4 Management of specific diagnoses

3.4.1 Management of intracerebral haemorrhage (ICH)

3.4.1.1 Investigation and medical management

65% of ICH occur in basal ganglia and thalamic region while 15% are in the brainstem, 10% in cerebral white matter (lobar) and 10% in the cerebellum. The deep haemorrhages are usually due to rupture of milliary aneurysms in the thalamostriate vessels associated with hypertension and usually doesn't need angiographic evaluation. Lobar haemorrhages are more likely to be associated with a structural abnormality or alcohol consumption and may need further angiographic evaluation.

Recommendations

- Maintain mean arterial pressure (MAP = DBP + 1/3 pulse pressure) should be maintained < 130mmHg as higher pressures can lead to growth of the ICH
- Check PT, PTT, platelet count and correct when necessary. Maintain platelet count above 75,000/ mm3
- Prophylactic use of anticonvulsants is controversial
- Raised ICP can be treated with Intravenous mannitol
- Steroids are not recommended
- Antiplatelet drugs and anticoagulants should be withdrawn immediately
- If the patient is on warfarin, the coagulopathy should be corrected with Vitamin K and FFP/ cryoprecipitate immediately
- Re-commencement of anticoagulation could be considered after 1-2 weeks depending on the indication

- Intubation and ventilation may be required in comatose patients
- Consider angiography if
    1. non- hypertensive
    2. less than 45yrs
    3. lobar or intra ventricular haemorrhage (A)

3.4.1.2 Surgical Management

Most ICH patients should be managed medically. Clot volume in ICH carries a prognostic significance and can be measured volumetrically.

Recommendations for neuro-surgical referral

- Lesions with marked mass effect, oedema and midline shift
- Lesions where symptoms appear to be due to increased ICP or mass effect than to destruction of brain tissue due to the ICH
- Moderate size ICH (10-30cc Volume) with mass effect
- (Surgery is not indicated if; <10cc – too small for ICH evacuation; >30cc – poor outcome with ICH evacuation; >85cc or diameter >5.5cm ICH is usually unsalvageable with surgery)
- Rapid deterioration while on observation
- Cerebellar Haemorrhages: (C)
- Patients with GCS <13 with an ICH of > 4cm may need evacuation
  (Patients with absent brainstem reflexes and flaccid quadriplegia are usually unsalvageable)

3.4.2 Management of Subarachnoid Haemorrhage (SAH)

SAH should be suspected in patients presenting with sudden-onset, severe headache with or without associated alteration in consciousness. (B) Following recommendations address diagnosis and treatment of SAH aimed at prevention of rebleeding and secondary complications such as cerebral ischaemia caused by vasospasm or hydrocephalus.

3.4.2.1 Diagnosis of SAH

Recommendations

- CT scan brain should be undertaken immediately in patients with impaired level of consciousness and within 12 hours in all patients. (MRI scan should not be used to diagnose SAH (D)

- If a CT scanner is not available, patients with impaired level of consciousness needs to be transferred immediately to a neurosurgical center with such facility. Conscious patients without lateralizing signs or increased intracranial pressure should have a lumbar puncture to exclude SAH.
- In patients with negative or equivocal CT scan, a lumbar puncture should be performed to detect uniformly blood stained CSF. Xanthochromia may be evident 12 hours after the onset of SAH. Spectrophotometry could be used to detect small amounts of xanthochromia (B)

3.4.2.2 Management of SAH

Recommendations

- General measures
  1. Maintain adequate hydration, ventilation and analgesia, e.g. codeine phosphate (D) Avoid morphine and pethidine
2. Oral/IV Nimodipine 60mg four hourly should be given to relieve cerebral vasospasm (A)
3. Antifibinolytic agents (A) and steroids (D) should not be given

- All patients should be monitored for the development of treatable complications, especially hydrocephalus, cerebral ischaemia, electrolyte imbalance and hypotension (D)
- Patients with residual disability should be referred for rehabilitation (B)
- All surviving patients should be advised on secondary prevention, especially on treatment for hypertension and the need to stop smoking (A)
- Patients with a family history (one of the first degree relative with SAH or polycystic kidney disease) should be advised on the risk of SAH and the necessity for screening of family members. (B)

- All patients with SAH should be discussed immediately with the casualty neurosurgeon / registrar before transferring the patient to the neurosurgical unit (D)

- Imaging of cerebral vessels should be undertaken at the Neurosurgical Unit and surgery or embolisation performed according to the facilities available (A)

3.4.3 Management of cerebral venous thrombosis(CVT)

Occlusion of cerebreal venous sinuses may present as a stroke syndrome. It should be considered in patients with a prothrombotic tendency (during pregnancy or puperium), in those with intra cranial or nasal sinus and ear infections, dehydration and disseminated malignancy. ICH may occur and areas of infarction frequently show haemorrhagic changes.

Recommendations

a) MRI should be performed with MRV where venous thrombosis need to be excluded and has not been demonstrated on CT (D)
b) Cases with suspected CVT should be commenced on heparin (B)

3.5 Secondary prevention

Following a TIA the risk of getting a stroke is as high as 20% within the first month. (ref) Patients after acute ischaemic stroke or TIA carry a 10% risk of getting a further stroke within the first year and a 5% risk per year subsequently. They also have an increased risk of myocardial infarction and other major vascular events.

Recommendation

- An individualized strategy for secondary prevention should be implemented immediately after a stroke/ TIA

3.5.1 Lifestyle modification

3.5.1.1 Tobacco use

Tobacco use is an independent modifiable risk factor stroke. It is an important cause for young stroke in Sri Lanka. Cessation is known to reduce risk of a further stroke by 50%.

Recommendation

- Stop using tobacco (smoking cigarette, cigars, beedi, pipe, chewing and sniffing)

3.5.1.2 Exercise

Regular moderate exercise benefits the patient by maintaining body weight, blood pressure, serum cholesterol and glucose tolerance.

Recommendation

- Physically capable and medically cleared patients should do exercise of moderate intensity, at least 30 minutes per day, on most days of the week. E.g. brisk walking, jogging, cycling and other aerobics

3.5.1.3 Diet and weight

A low salt, low saturated fat, high fruit and vegetable diet rich in fiber is recommended. Individuals with an elevated body mass index [weight (kg) / height 2(m)] should take a weight reducing diet. BMI less than 23 is recommended.

Recommendations

- A healthy diet which contains at least five daily servings of fruits and vegetables and low in saturated fat is recommended (B)
- In high risk patients, step II diet of American Heart Association (< 7% of total calories from saturated fat and a cholesterol intake < 200 mg/day) is recommended (B)
- In any weight reduction strategy step I diet (< 10% of total calories from saturated fat and cholesterol intake < 300 mg/day) is recommended (B)
- Over weight individuals should reduce their weight to ideal standards which in turn will help to control the co-morbid conditions. BMI less than 23 kg/m2 is recommended(B)
- Advice should be given to the patient and the family to stop excessive drinking or provide formal alcohol cessation programme (D)

3.5.2 Blood pressure

Recommendations

- Patients with high blood pressure persisting for more than one week should be treated. The optimal blood pressure treatment goal is 140 / 85 mmHg. For patients with diabetes mellitus or chronic renal insufficiency, target BP is 130/80 mmHg (A).
- Thiazide diuretic or an ACE inhibitor or preferably combination of both should be used unless there are contraindications.

3.5.3 Anti-thrombotic treatment

Recommendations

- Patients with ischemic stroke should receive aspirin 75- 300 mg daily (A). A combination of aspirin and dipyridamole MR 200 mg bid has been shown to be superior to aspirin alone. Where there is aspirin intolerance clopidogrel 75 mg daily may be used. Combination of aspirin and clopidogrel is not recommended for secondary prevention of stroke.
- Anticoagulation should be started in patients with persistent or paroxysmal atrial fibrillation (valvular or non valvular), or other major source of cardiac embolism, unless contraindicated (A).
- Anticoagulation should not be started until brain imaging has excluded hemorrhage, and usually not until 14 days after the onset of an ischaemic stroke. (A).

3.5.4 Anti-lipid agents

Recommendation

- Statin should be given to all patients with ischaemic stroke/ TIA with a total cholesterol of >135 mg/ dl (3.5 mmol/L) unless contraindicated. (40% reduction in LDL cholesterol levels is advisable).

3.5.5 Carotid stenosis

Patients with a carotid territory stroke /TIA but without

severe disability should be considered for carotid endarterectomy. (A) Carotid endartectomy should only be undertaken by an experienced specialist surgeon working in a specialized centre (B). Carotid angioplasty or stenting are other alternative options.

Recommendations

- Carotid duplex ultrasound should be performed on all being considered for endarterectomy. Significant stenosis should be further confirmed by magnetic resonance angiography (MRA) or with a second ultrasound (B).
- Carotid endarterectomy should be considered where carotid stenosis of symptomatic carotid is measured 70% - 99% (A)
- Carotid endartectomy should be performed as soon as a patient is fit for surgery, preferably within 2 weeks of stroke / TIA (D)

3.6 Multidisciplinary assessment and referral for rehabilitation

Stroke rehabilitation should begin during the acute hospitalization as soon as the diagnosis of stroke is established and life threatening problems are under control. Effective rehabilitation improves functional outcome.

Recommendations

- All patients should be referred to a locally formulated rehabilitation team as soon as possible after admission.
- A multidisciplinary assessment using a formal protocol should be performed. This should include assessment of the following areas within the time frame specified (see Annexure - 2 for standard assessment tools)

Assessment area
On admission

1. Dysphagia (administered by an appropriately-trained person)

2. Needs in relation to positioning, moving and handling
3. Risk of developing pressure sores
4. Bladder and bowel status

Within 5 days

1. Nutritional status
2. Problems with communication
3. Self care / other activities of daily living
4. Cognitive impairment

3.7 Management of dysphagia and nutrition

Dysphagia, is common in patients with stroke. It is important to note that patients may still be at risk of aspiration even in the absence of symptoms.

Recommendations

- Enteral feeding tubes should be considered where patients are unable to maintain adequate nutrition and hydration orally.
- Patients with dysphagia and/or risk of aspiration should receive advice from speech therapist on safety to swallow and consistency of diet and fluids.
- Enteral feeding should be kept under review and the tube be removed when no longer required.

- Every patient with nutritional problems (including dysphagia requiring food of modified consistency) should be referred to a dietitian.

- All patients with persistent dysphagia should be further evaluated with video fluoroscopy or flexible endoscopy.

3.8 Prevention of complications

3.8.1 Positioning and handling

Recommendation

- Staff should position patients to minimize the risk of complications such as aspiration, respiratory

complications, shoulder pain, contractures and pressure sores. (further information under rehabilitation)

3.8.2 Venous thromboembolism

Venous thromboembolism often occurs within the first week of a stroke.

Recommendations

- Compression stockings should be applied in patients with weak or paralysed legs (once the peripheral circulation, sensation and the state of the skin have been assessed).
- Early mobilisation and optimal hydration should be ensured from the outset.
- Prophylactic anticoagulation should not be used routinely.

3.9 Bladder and bowel management

Management of both bladder and bowel problems are an essential part of rehabilitation as they can seriously hamper progress in other areas.

Recommendations

- Indwelling urinary catheters should be used only after alternative methods ofanagement have been considered.
- Incontinent patients should not be discharged until the caretaker is adequately trained to handle such patients.
- Further tests (urodynamics, anorectal physiology tests) should be considered when incontinence persists.

4. Rehabilitation

Rehabilitation should commence from the onset of stroke and may need to continue for a very long time. It needs to be considered at all levels including the hospital, home and the community.

4.1 Psychological impairment

Psychological impairment needs attention since it would interfere with rehabilitation. Depression, which is not uncommon after a stroke, could present with crying, feeling miserable, lack of motivation, loss of appetite and reduced social activities. Feeling of fear, anxiety and worry could present as breathlessness, palpitations and trembling. Pharmacotherapy and psychotherapy could be used to manage these co-existing situations.

Recommendations

- Patient should be given information, advice, and the opportunity to talk about the impact of illness upon their lives (B)
- Patient should be observed for depression and anxiety
- Patients with severe, persistent or trouble some tearfulness should be given antidepressant drugs while mild symptoms could be observed without treatment
- Antidepressants should be continued for at least six months if a good response has been achieved (D)
- Antidepressant drugs should not be used prophylactically for depression (A)
- Patient's psychological and social needs should be assessed (C)

- Patients with marked anxiety should be offered psychological therapy or be considered for antidepressants or benzodiazepines
- Mood disorders with persistent distress should be managed in collaboration with a psychiatrist (D)

4.2 Cognitive impairment

Stroke can disrupt a wide range of cognitive processes that could confuse and distress the patient and carers. They include neglect, dyspraxia, difficulties in attention, memory and executive functioning. These disabilities may adversely affect rehabilitation and activities of daily living.

Recommendations

- The cognitive impairment should be taken into consideration when planning and delivering treatment.

- The nature of the cognitive impairment, its impact on rehabilitation and activities of daily living should be explained to the stroke team, carers and the patient as early as possible.

4.2.1 Spatial awareness (neglect / inattention)

Right hemisphere strokes may affect a person's awareness of space around and the space occupied by the body. They may not be fully aware of their left arm or fail to attend to things that are positioned in space on their left.

Recommendation

- Patients with lack of spatial awareness should be offered nursing and therapy sessions (eg: for shoulder pain, postural control, feeding) with modifications to draw attention to the impaired side (D)

4.2.2 Memory

Memory impairment may cause difficulties in learning new information or skills, or remembering and retrieving learnt information.

Recommendation

- Facilitate engaging in rehabilitation actively, as this may improve episodic memory (A)
- Use techniques that capitalize on preserved abilities such as visualization (showing pictures) for verbalization, at nursing and therapy sessions
- Teach compensatory techniques to reduce their disabilities, such as using notebooks, diaries, electronic organizer and alarms

4.2.3 Attention

Impairment of attention may affect other unimpaired processes and is mostly seen in the first few weeks after

the right hemisphere stroke.

Recommendation

- Patients who appear easily distracted or unable to concentrate, require careful planning of nursing and therapy sessions to minimize the attentional demands placed on them, eg: they need to work for short periods, take rest breaks, and avoid distractions etc.

4.3 Communication: aphasia, dysarthria, articulatory dyspraxia and cognitive communication disorders (communication impairment due to non dominant hemisphere disorders)

The dominant hemisphere strokes can particularly affect communication in varying ways. They could be confusing and distressing for patients and carers. They include impaired language skills (aphasia or dysphasia) leading to difficulties in generating or understanding words, reading and /or writing.

Occasionally language impairment resulting in communication problems could be a consequence of non- dominant hemisphere strokes. Dysarthria (impaired motor speech production) and articulatory dyspraxia (impaired planning and execution of motor speech) can occur in stroke of either hemispheres. Accurate diagnosis of language disorder is essential to guide and inform the team, patient and the family.

Recommendations

- All with impaired communication should be assessed by a speech and language therapist using a reliable and valid method (B)
- The staff and relatives should be informed and trained by the therapist about communication techniques appropriate to the disability (A)
- Achievable goals should be identified, and selected patients should be offered appropriate therapy techniques (C)
- Patients with severe communication disability but with reasonable cognition and language

should be assessed and provided with appropriate communication aids (D)
- Information on locally made aids can be obtained from the speech therapist.

4.4 Motor impairment

4.4.1 Improving motor control: conventional treatment

See also section 2 – service organisation

The primary goal in stroke rehabilitation is to increase physical independence and reduce mortality.

Recommendations
- Patients should be assessed by a physiotherapist within 72 hours of admission (C)
- A physiotherapist with experience in managing neurodisability should coordinate therapy (C) (Refer Section 2.1)
- Focus of rehabilitation should be mainly on improvement of arm function and gait (A)
- A task-specific approach should be used for improving specific functions such as reaching for objects and increasing walking speed (B)

4.4.2 Improving motor control : strength and aerobic training

Resisted exercise (i.e. resisting the action of the weak muscle) improves the strength of the muscle though the functional benefit is uncertain.

Recommendations
- Resisted exercise should be considered to improve muscle strength in targeted muscles. (A)
- Patients should participate in long term aerobic activity (cardiovascular training) (A)

4.4.3 Improving motor control : Orthotics (including splinting and casting)

Orthotics have both biomechanical and tone-reducing effects.

Recommendations

- Ankle-foot orthoses (preferably individually fitted) should be considered for foot drop to improve walking ability (B)
- Serial casting should be considered to prevent or reverse contractures and reduce spasticity (B)

4.4.4 Management of spasticity

Spasticity may lead to secondary complications such as muscle and joint contractures and should be treated if it is interfering with the patient's functions and rehabilitation. Antispastic drugs and botulinum toxin in conjunction with physiotherapy are used for reducing tone and /or increasing the range of joint motion. (A)

4.4.5 Constraint-induced movement therapy

Constraint induced movement therapy (CIT) involves restricting the use of the non-stroke upper limb while at the same time encouraging active use of the stroke-affected upper limb.

4.4.6 Sensory impairment and pain

4.4.6.1 Sensory disturbance: controlling pain after stroke

Stroke patients may experience pain of several types, which is often not recognised and poorly treated. Most of the pain is mechanical (arising from reduced mobility and osteoarthritis) and a minority is due to central post-stroke pain.

Recommendations

- Patients with musculoskeletal pain should be prescribed appropriate analgesics where non-pharmacological treatments are ineffective (D)
  - Central post-stroke pain
  - Neuropathic pain may respond to tricyclic antidepressants (e.g. amitriptyline) or anticonvulsants (e.g. carbamazepine, gabapentin) (A)
  - Patients with intractable pain should be referred to a specialist pain service (D)

- All stroke patients should be inquired about pain and should be subjected to a full clinical diagnosis, including a referral to an appropriate specialist if needed and treated appropriately (D)
- Patients with musculoskeletal pain should be assessed by a physiotherapist for potential alleviation through exercise, passive movement, better seating or other procedure (D)

4.4.7 Shoulder pain

Shoulder pain in the affected arm is commonly associated with severe disability. It is not related to shoulder subluxation and there is no benefit from shoulder strapping or intra-articular steroid injections.

Recommendations

a) The following interventions to prevent shoulder pain should be considered ;
   1. Education of staff and carers about correct handling of the hemiplegic arm such as avoiding pulling by the affected arm (B)
   2. Correct positioning as in figure 1 (B)

b) For established shoulder pain, treatment should :
   1. Start with simple interventions, e.g. NSAIDs analgesia (C)
   2. Coordinate with the physiotherapists

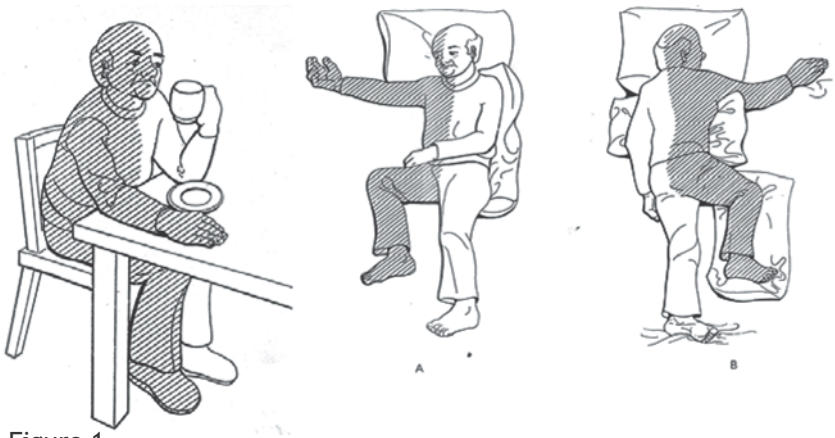


Figure 1

4.4.8 Functional rehabilitation interventions (occupational therapy)

See also section 4.5.1

Occupational therapy helps disabled stroke patients adapt to their impairments which include the teaching of new skills, the provision of information, the use of aids or appliances and environmental modification.

4.4.8.1 Activities of daily living.

Stroke rehabilitation aims, to increase independence and ability in all activities of daily living (ADL), such as personal (e.g. dressing, feeding) domestic (e.g. cooking,) community related (e.g. shopping) occupation/ education and recreation.

Recommendations

- Patients with impaired ADL should be referred for occupational therapy assessment on admission. (A)
- Patients should be offered advice and opportunities to practice personal, domestic, community, leisure activities and employment. (D)

4.4.8.2. Equipment and adaptations (personal and environment)

Equipment and adaptations alleviate the impact of a stroke-related impairment

Simple aids can greatly increase independence, for example the use of a walking stick or adapted cutlery. Structural changes in the environment (E.g. Adapting the toilet) will also help the residual disability.

Recommendations

- Patients should be assessed on an individual basis by the occupational therapist to determine whether equipment or adaptations can increase safety or independence. (A)
- Patients should be supplied with aids, adaptations and equipment with training for their safe use . (A)

4.5 Transfer to community

4.5.1 Discharge planning

Discharge planning refers to any process that formally involves the stroke team or service in transferring responsibility from the hospital stroke rehabilitation team to the community based rehabilitation service. We highly recommend the availability of a community based rehabilitation service to transfer this responsibility.

Recommendations

- Before discharge

1. Ensure that the patients and families are prepared and involved in plans for discharge (D)
2. Medical officer of health of the area should ideally be informed
3. All necessary equipment are in place (D)
4. Any continuing treatment, and out patient/ home /community based rehabilitation and follow up should be arranged. (A)

- Early hospital discharge (before the end of acute rehabilitation) should only be undertaken if the patient is able to transfer safely from bed to chair. (A)

4.5.2 Long-term management and further rehabilitation

This period starts soon after discharger from the hospital or, for some, once the out patients rehabilitation programme has been completed.

Continuing long term rehabilitation is usually rejected when requested; on the grounds that no further benefit can occur. However continuous decline of function seen in some can be reversed by further rehabilitation input which may also prevent hospital readmission.

Recommendations

- Any patient with residual functional disability at 6 months or later should be reassessed for further targeted rehabilitation (A).
- Patients with persisting impairments who have not been admitted to, should be seen by a rehabilitation team that includes an occupational therapist

- Independence should be encouraged.
- As patients become more active, consideration should be given to withdrawal of physical and psychological support, cessation of therapy and withdrawal of personal care support. (D)

4.5.3 Social function

After discharge the patient and family lose the social, emotional and practical support offered by an inpatient service. Therefore the information and advice regarding the available resources for this purpose provided by the government and voluntary organisations should be arranged before discharge.

Recommendations

- Health professionals should ensure that patients and their families have information about government and voluntary organisations offering services specific for psycho-social needs. (D)

- Patients who used to drive before their stroke must be assessed for cognitive, motor and visual functions for safe driving and advised accordingly.
- Patients who wish to drive should be assessed for ;
  1. Any absolute contraindication –
  2. Their cognitive ability to drive safely
  3. Their motor ability to control a car
  4. Their need for any adaptations (D)

(Sri Lankan guidelines will be available in due course)

Annexure I

Table I Barthel Index

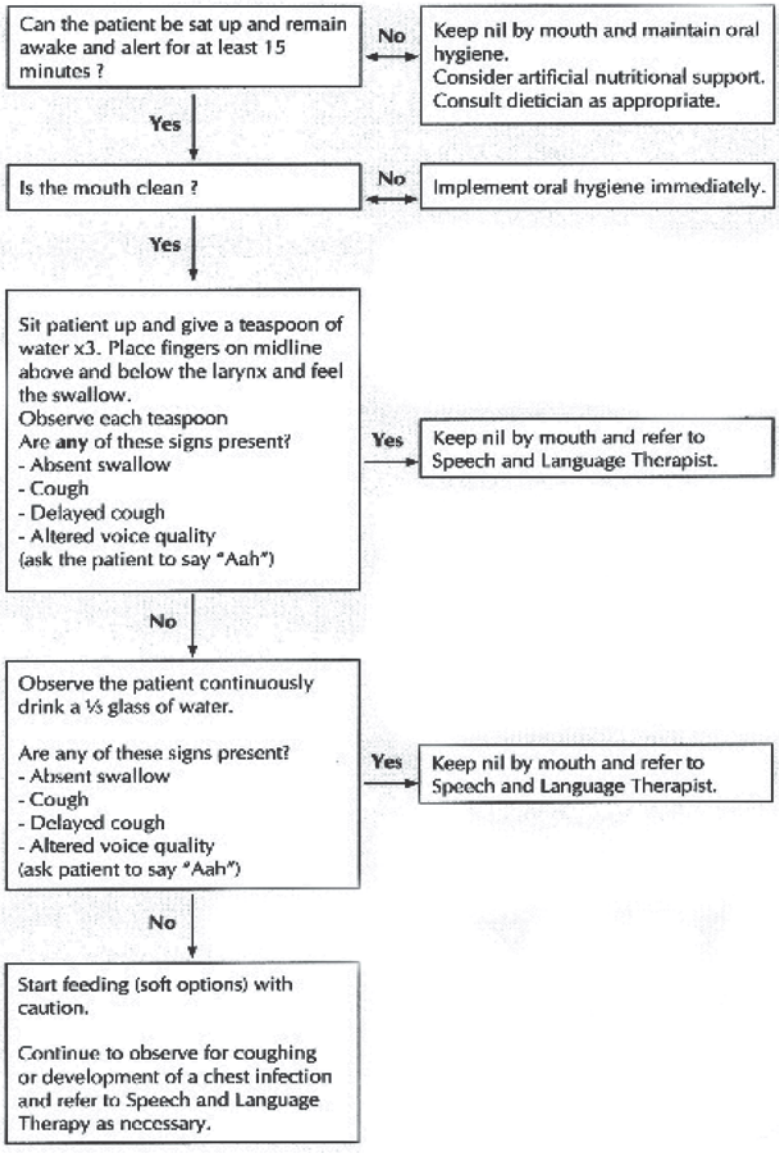
FEEDING	
Dependent	0
Needs help	1
Independent with aids	2
BOWELS	
Incontinent	0
Occasional accident	1
Continent	2
BLADDER	
Incontinent/catheter	0
Occasional accident	1
Continent	2
TRANSFER	
Unable	0
Major help	1
Minor help(side assist/supervision)	2
Independent	3
WALKING	
Unable	0
Independent in wheel chair	1
With help of person	2
Independent	3
TOILET USE	
Dependent	0
needs some help	1
Independent	2
BATHING	
Dependent	0
Independent	1
DRESSING	
Dependent	0
Needs help	1
Independent(including buttons/zips)	2
GROOMING	
Needs help	0
Independent(face/hair/teeth/shaving)	1
STAIRS	
Unable	0
Needs help(physical/verbal)	1
Independent	2
TOTAL	20

Table II Modified Rankin disability scale

Grade	Disability scale
0	No symptoms
1	Minor symptoms that do not interfere with lifestyle.
2	Minor disability; symptoms that lead to some restriction in lifestyle, but do not interfere with patient's capacity to look after themselves.
3	Moderate disability; symptoms that significantly restrict lifestyle; and / or prevent totally independent existence.
4	Moderately severe disability; symptoms that prevent independent existence though not needing constant attention.
5	Severe disability, totally dependent requiring constant attention day and night

Annexure 3

BEDSIDE SCREENING TEST FOR DIFFICULTY IN SWALLOWING



Annexure 3

DVT Risk Factor Assessment Tool

Clinical Setting of Patient: _____ Points. Choose ONE to determine baseline score, choosing the highest category appropriate to the patient. ***(For example, a patient with paralysis who is admitted for minor surgery scores 5 points based on the paralysis, rather than 1 point based on the minor surgery.)***

1 Point
- ☐ Minor Surgery
- ☐ Pregnancy or < 2 months post-partum

2 Points
- ☐ Bedrest > 72 hrs
- ☐ Immobilizing plaster cast
- ☐ Central venous catheter

3 Points
- ☐ Major surgery > 45 minutes (abdominal, thoracic, pelvic, vascular, lower extremity - except total hip/ total knee replacement)

5 Points
- ☐ Total hip/total knee replacement
- ☐ Hip, pelvis, or leg fracture
- ☐ Stroke, paralysis, or spinal cord trauma
- ☐ Multiple trauma

Risk Factors associated with Patient: _____ Points. ***(May choose multiple risk factors.)***

1 Point
- ☐ Age 41 - 59
- ☐ Hx of major surgery within 12 months
- ☐ Myocardial infarction, heart failure, pneumonia, or sepsis
- ☐ Varicose veins
- ☐ Inflammatory bowel disease
- ☐ Obesity
- ☐ Current birth control pills/hormone replacement therapy

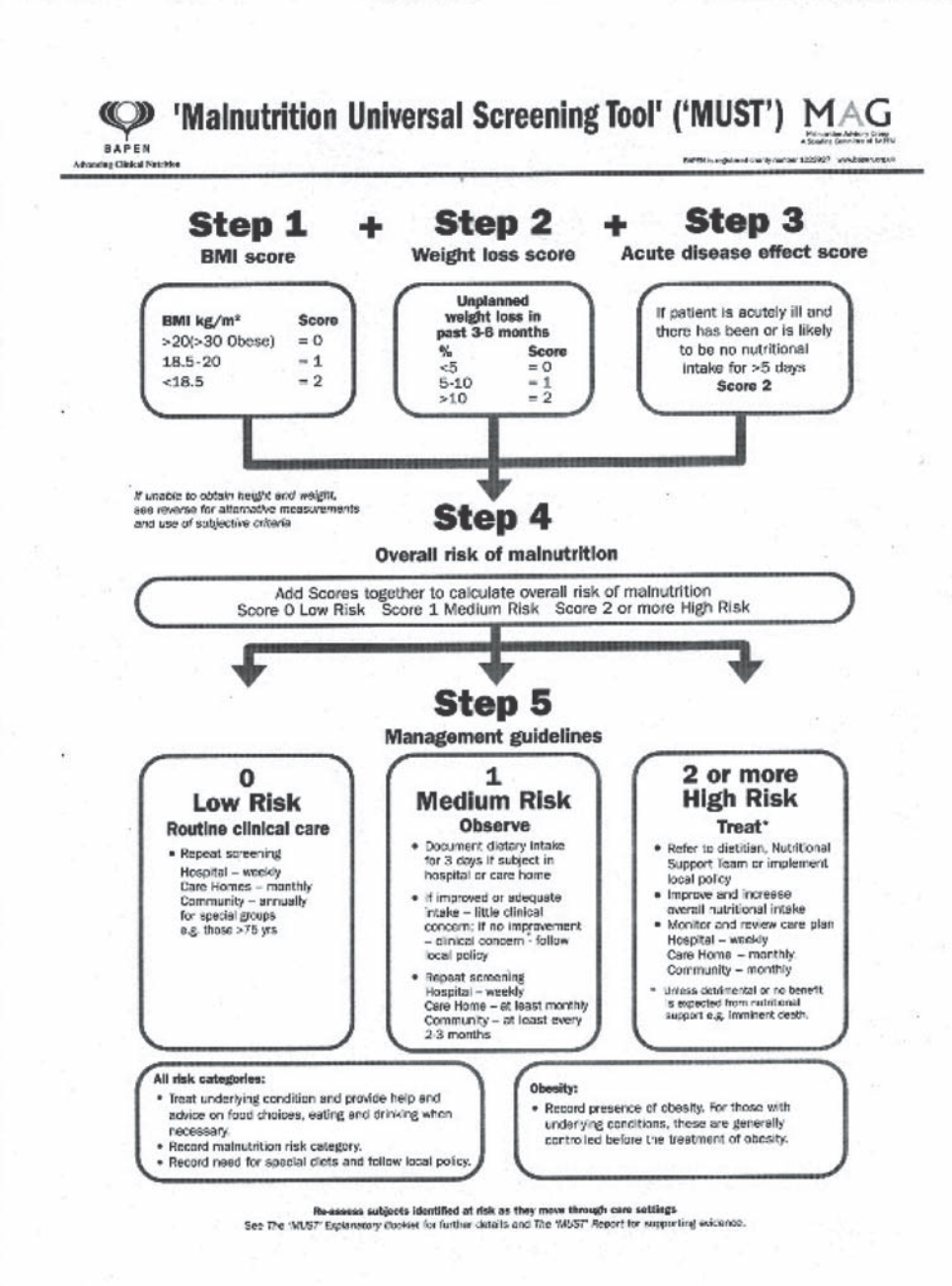
2 Points
- ☐ Age 60 - 69
- ☐ Malignancy

3 Points
- ☐ Age 70 or more
- ☐ History of DVT/PE in the past
- ☐ Inherited hypercoagulable state, i.e., factor V leiden/activated protein C resistance, Anti-thrombin III deficiency, protein C or S deficiency
- ☐ Acquired hypercoagulable states, i.e., lupus anticoagulant, antiphospholipid antibiotics, myeloproliferative disorders, heparin induced thrombocytopenia (HIT)

Determine total risk factor score. Clinical setting + Risk factors = _____ Points.

Recommended Regimens for Each Risk Group			
Low Risk - 1 Point	Moderate Risk - 2 points	High Risk - 3-4 points	Highest Risk - 5 or more points
Early ambulation	Early ambulation and SCD when in bed OR anticoagulation and TEDs	Early ambulation and TEDs and SCD when in bed OR anticoagulation	Early ambulation and TEDs and SCD when in bed and LMWH OR anticoagulation

Annexure 4



'Malnutrition Universal Screening Tool' ('MUST') MAG

BAPEN
Advancing Clinical Nutrition

Step 1 + **Step 2** + **Step 3**

Step 1
BMI score

BMI kg/m²	Score
>20(>30 Obese)	= 0
18.5-20	= 1
<18.5	= 2

Step 2
Weight loss score

Unplanned weight loss in past 3-6 months

%	Score
<5	= 0
5-10	= 1
>10	= 2

Step 3
Acute disease effect score

If patient is acutely ill and there has been or is likely to be no nutritional intake for >5 days
Score 2

If unable to obtain height and weight, see reverse for alternative measurements and use of subjective criteria

Step 4
Overall risk of malnutrition

Add Scores together to calculate overall risk of malnutrition
Score 0 Low Risk Score 1 Medium Risk Score 2 or more High Risk

Step 5
Management guidelines

0
Low Risk
Routine clinical care

- Repeat screening
  Hospital – weekly
  Care Homes – monthly
  Community – annually
  for special groups
  e.g. those >75 yrs

1
Medium Risk
Observe

- Document dietary intake for 3 days if subject in hospital or care home
- If improved or adequate intake – little clinical concern; if no improvement – clinical concern - follow local policy
- Repeat screening
  Hospital – weekly
  Care Home – at least monthly
  Community – at least every 2-3 months

2 or more
High Risk
Treat*

- Refer to dietitian, Nutritional Support Team or implement local policy
- Improve and increase overall nutritional intake
- Monitor and review care plan
  Hospital – weekly
  Care Home – monthly
  Community – monthly

* Unless detrimental or no benefit is expected from nutritional support e.g. imminent death.

All risk categories:

- Treat underlying condition and provide help and advice on food choices, eating and drinking when necessary.
- Record malnutrition risk category.
- Record need for special diets and follow local policy.

Obesity:

- Record presence of obesity. For those with underlying conditions, these are generally controlled before the treatment of obesity.

Re-assess subjects identified at risk as they move through care settings
See The 'MUST' Explanatory Booklet for further details and The 'MUST' Report for supporting evidence.

Annexure 5

WATERLOW PRESSURE ULCER PREVENTION/TREATMENT POLICY

RING SCORES IN TABLE, ADD TOTAL. MORE THAN 1 SCORE/CATEGORY CAN BE USED

BUILD/WEIGHT FOR HEIGHT		SKIN TYPE VISUAL RISK AREAS		SEX AGE	
AVERAGE		HEALTHY	0	MALE	1
BMI = 20-24.9	0	TISSUE PAPER	1	FEMALE	2
ABOVE AVERAGE		DRY	1	14 - 49	1
BMI = 25-29.9	1	OEDEMATOUS	1	50 - 64	2
OBESE		CLAMMY, PYREXIA	1	65 - 74	3
BMI > 30	2	DISCOLOURED			
BELOW AVERAGE		GRADE 1	2	75 - 80	4
BMI < 20	3	BROKEN/SPOTS			
BMI=Wt(Kg)/Ht (m)^2		GRADE 2-4	3	81 +	5

MALNUTRITION SCREENING TOOL (MST) (Nutrition Vol.15, No.6 1999 - Australia		
A - HAS PATIENT LOST WEIGHT RECENTLY	B - WEIGHT LOSS SCORE	
YES - GO TO B	0.5 - 5kg	= 1
NO - GO TO C	5 - 10kg	= 2
UNSURE - GO TO C AND SCORE 2	10 - 15kg	= 3
	> 15kg	= 4
	unsure	= 2
C - PATIENT EATING POORLY OR LACK OF APPETITE 'NO' = 0; 'YES' SCORE = 1	NUTRITION SCORE If > 2 refer for nutrition assessment / intervention	

CONTINENCE		MOBILITY	
COMPLETE/ CATHETERISED	0	FULLY	0
URINE INCONT.	1	RESTLESS/FIDGETY	1
FAECAL INCONT.	2	APATHETIC	2
URINARY + FAECAL INCONTINENCE	3	RESTRICTED BEDBOUND e.g. TRACTION	3
		CHAIRBOUND e.g. WHEELCHAIR	4

SPECIAL RISKS			
TISSUE MALNUTRITION		NEUROLOGICAL DEFICIT	
TERMINAL CACHEXIA	8	DIABETES, MS, CVA	4-6
MULTIPLE ORGAN FAILURE	8	MOTOR/SENSORY PARAPLEGIA (MAX OF 6)	4-6
SINGLE ORGAN FAILURE (RESP, RENAL, CARDIAC,)	5	MAJOR SURGERY or TRAUMA	
PERIPHERAL VASCULAR DISEASE	5	ORTHOPAEDIC/SPINAL	5
ANAEMIA (Hb < 8)	2	ON TABLE > 2 HR#	5
SMOKING	1	ON TABLE > 6 HR#	8
MEDICATION - CYTOTOXICS, LONG TERM/HIGH DOSE STEROIDS, ANTI-INFLAMMATORY MAX OF 4			

SCORE	
10+ AT RISK	
15+ HIGH RISK	
20+ VERY HIGH RISK	

Scores can be discounted after 48 hours provided patient is recovering normally