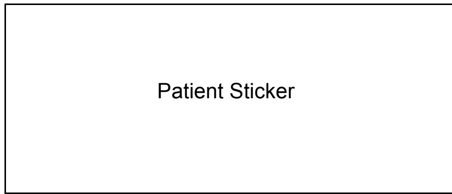
CORK UNIVERSITY HOSPITAL ACUTE STROKE ASSESSMENT



TIME IS BRAIN – ACT FAST

(Insert this document into patient's notes)

FAST

		Yes	No
FACE	Smile - Is one side drooping?		
ARMS	Raise both arms – is one side weak?		
SPEECH	Answer questions – is speech slurred or words jumbled?		
TIME	Did symptoms start suddenly and within the last 4.5 hours?		

ROSIER

	YES	NO
Has there been loss of consciousness or syncope?	Y (-1) □	N (0) □
Has there been seizure activity?	Y (-1) □	N (0) □
Is there a NEW ACUTE onset of any of the following?		
I. Asymmetric facial weakness	Y (+1) □	N (0) □
II. Asymmetric arm weakness	Y (+1) □	N (0) □
III. Asymmetric leg weakness	Y (+1) □	N (0) □
IV. Speech disturbance	Y (+1) □	N (0) □
V. Visual field defect	Y (+1) □	N (0) □
Total Score _____ (-2 to +5) Stroke is likely if total scores are > 0 The stroke registrar on call (see Staff Directory Neurology / Geriatrics on call) should be contacted if onset of symptoms was within the past 4.5 hours and symptoms are still present.		

Date: ______________________________

Time of onset of neurologic symptoms: ______________________________

Time of arrival at Emergency Department (ED): ______________________________

If you suspect acute stroke, Rosier score is between1-5 and the onset of symptoms was within in the last 4.5 hours, don't delay:

- Contact registrar on call for stroke □
- Inform ED Registrar □
- ED registrar to request urgent CT head (code stroke) □
- 2 IV cannulas □
  (One must be green (18 gauge) to facilitate perfusion scanning)
- Bloods (FBC, U&E, coagulation, group and hold, glucose, troponin) □
- ECG □

Agreed by Departments of Geriatric Medicine, Neurology and Emergency Medicine. Prepared by Dr Carmel Curran, Dr. Paul Gallagher and Dr. Simon Cronin.
Valid from 01.07.2012. Review 01.02.2013

Cork University Hospital Stroke Thrombolysis Checklist

Patient Addressograph

REMEMBER! ***TIME IS BRAIN***. The aim is to administer thrombolysis, if appropriate, *as soon as safely feasible,* not just before the time window expires

This checklist should be completed and filed in the medical notes of all stroke patients considered for intravenous thrombolysis with alteplase (rt-PA).

Date ______________________________

Time of symptom onset ______________________________

Time of arrival ______________________________

Time of assessment ______________________________

Time of head CT ______________________________

Capillary glucose ______________________________ (*If < 3.5 treat and reassess once glucose normal)*

Premorbid Rankin _____/6 *(See Modified Rankin Scale)*

Initial NIHSS _____/42 Time:___________ *(See attached NIHSS sheet. Use long form if unsure on scoring)*

Patient weight ______________________________

Exclusion criteria Yes ☐ No ☐ *(See contraindication sheet)*

2 IV cannulas Yes ☐ No ☐ *(Ideally at least one green)*

Bloods sent Yes ☐ No ☐ *(FBC, U&E, Coag, Group & hold - It is NOT essential to wait for results unless on warfarin or abnormal coagulation or low platelets suspected)*

ECG Yes ☐ No ☐

Relevant stroke consultant informed Yes ☐ No ☐

CT Brain result ____

____

Risks and benefits explained Yes ☐ No ☐ *(See patient information sheet)*

Patient consent Yes ☐ No ☐ *(Verbal acceptable)*

If consent not possible is thrombolysis judged to be in the best interests of the patient?

Yes ☐ No ☐

Reason for not offering thrombolytic therapy: ____

Final check

Is a neurological deficit still present? NIHSS ____/42

BP <180/90mmHg Yes ☐ No ☐

Still within time window Yes ☐ No ☐

Consultant agreement Yes ☐ No ☐

Administration of Alteplase

0.9mg/kg (maximum dose 90mg).

Give 10% as bolus over 2 min then 90% by infusion over 60 min as per infusion protocol.

Time of alteplase bolus ________________________

Time of start of infusion ________________________

Post thrombolysis NIHSS (2 hours) ________________________

Registrar (Print Name)__________________ Bleep ______________ Date____________________ MCRN__________________

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	Exclusion Criteria*	YES	NO
1.	Extremely severe stroke (National Institute of Health Stroke Score (NIHSS) >25)		
2.	Minor neurological deficit (NIHSS ≤ 4) (except isolated homonymous hemianopia, isolated aphasias and ‘cortical hand’ where thrombolysis SHOULD be strongly considered)		
3.	Symptoms completely resolved before start of infusion (remember “rapidly improving symptoms” may not resolve completely and may return)		
4.	Unconscious patient – however consider thrombolysis if basilar artery thrombosis confirmed		
5.	Fixed head or eye deviation.		
6.	Pre- stroke Rankin > 3. Life expectancy less than one year from another cause		
7.	Seizure at onset of stroke (relative – proceed to perfusion scan for confirmation if stroke suspected)		
8.	Symptoms suggestive of subarachnoid haemorrhage, even if the CT scan is normal.		
9.	Infective endocarditis or acute pericarditis		
10.	Recent (< 10 days) traumatic external heart massage		
11.	Recent (< 10 days) puncture of a non-compressible blood vessel (e.g. subclavian or jugular vein puncture, arterial puncture, or lumbar puncture within 7 days). 24 hrs may suffice if min trauma from arterial puncture		
12.	Trauma with internal injuries, surgery or visceral biopsy within previous 4 weeks.		
13.	Serious head trauma or C.N.S surgery within the previous 3 months.		
14.	Any history of central nervous system damage (i.e. neoplasm, aneurysm, intracranial or spinal surgery)		
15.	Pregnancy, or childbirth within the previous 4 weeks.		
16.	Colitis, oesophageal varices, active peptic ulcer disease		
17.	Abdominal aortic aneurysm		
18.	Proliferative diabetic retinopathy		
19.	Acute pancreatitis		
20.	Severe liver disease, incl. hepatic failure, cirrhosis, portal hypertension, oesophageal varices and active hepatitis		
21.	Blood Glucose <3.5 mmols/l or >22 mmols/l		
22.	Hereditary or acquired bleeding disorder		
23.	Current uncontrolled hypertension (systolic > 180mmHg or diastolic > 105mmHg)		
24.	Recent severe or dangerous bleeding		
25.	Known history of or suspected intracranial haemorrhage		
26.	Platelet count <100 x 10^9 / l		
27.	Haematocrit <25%		
28.	Current anticoagulant therapy (excepting INR<1.4 whilst on warfarin)		
29.	Administration of heparin within the previous 48 hours and or an elevated thromboplastin time		
30.	Previous stroke within 1 month (in EMEA licence but is a relative contraindication)		
31.	Caution if history of migraine and typical headache at onset of symptom onset		
32.	Peritoneal dialysis or haemodialysis		
32.	Neoplasm with increased bleeding risk		

	CT Exclusion criteria	**YES**	**NO**
1.	High density lesion consistent with intracranial haemorrhage		
2.	Hypodensity in >1/3 M.C.A. territory or equivalent (difficulty with reproducibility and reliability – patients with seemingly hypodense areas were included in the NINDS trial within 3 hours)		
3.	Extensive CT changes of evolving infarction or mass effect on CT		

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Modified Rankin Scale

0 No symptoms at all

1 No significant disability despite symptoms; able to carry out all usual duties and activities

2 Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance

3 Moderate disability; requiring some help, but able to walk without assistance

4 Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance

5 Severe disability; bedridden, incontinent and requiring constant nursing care and attention

6 Dead

Acute Ischaemic Stroke Care

Schedule of observations from admission

1. Pulse, BP, Oxygen Saturations, Temperature and Glasgow Coma Scale.

ALL Strokes:	every 15 minutes for first hour every hour for 4 hours every 4 hours for 24 hours
POST rt-PA:	every 15 minutes for first hour every 30 minutes x 6 hours every hour x 17 hours.

2. Capillary glucose: Measure on admission and
   - 4 hourly if abnormal or diabetic
   - 12 hourly if normal and non-diabetic
3. ECG: Continuous for 24 hours.

General Management Post Stroke

- Bed rest for 24 hours (may not be essential if patient very stable)
- Pulse oximetry - maintain O2 saturations above 95%
- Maintain normal temperature. Paracetamol if temp > 37.5 C
- Blood Glucose: maintain blood glucose < 10 mmol/l using IV insulin if necessary
- No arterial punctures, IM injections, NG tubes or central lines for 24 hours
- No urinary catheters for at least 1 hour after infusion ended
- Avoid suctioning whenever possible, caution giving mouthcare
- Repeat CT head at 24-36 hours
- No Aspirin, Clopidogrel, Dipyridamole or anticoagulant (heparin, low molecular weight heparin or warfarin) for 24 hours post thrombolysis until repeat CT performed
- Hydration / Nutrition
- Falls prevention and pressure area care
- Admission policy
  - 1a if possible for all stroke patients > 65
  - Admission to 1a obs or CCU post thrombolysis
  - To remain in resus post thrombolysis until appropriate ward bed available

Indications for urgent repeat CT Scan

- New acute headache or worsening severity of headache
- Acute hypertension
- Nausea and vomiting
- Agitation
- Seizure
- Neurological deterioration is classified as significant if there is:
  - A deterioration of > 2 points on the Glasgow Coma Score
  - A drop in the NIHSS > 4 points
  - any potential motor signs on the opposite side to the patient's initial presenting weakness.

STOP the rt-PA infusion IF:

- Anaphylaxis.
- BP systolic <100mmHg
- BP systolic rises to >180/105 mmHg and is sustained after 5 minutes despite treatment, or associated with neurological deterioration of any sort
- Major systemic bleeding
- Neurological deterioration of 2 points on GCS eye/motor scale.
- Seizure – repeat CT and restart infusion if no haemorrhage

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Acute Ischaemic Stroke Adverse Events Guide

1. Haemorrhage

May occur with or without thrombolysis. rt-PA is rapidly cleared from the plasma. Fibrinogen is depleted in the first few hours (<40% at 4 hours) but is back to 80% of normal level by 24 hours. Bleeding after 36 hours is rarely due to rt-PA.

Symptomatic Intracranial Haemorrhage Suspect if:

- Headache
- Nausea and vomiting
- Fall in GCS
- New focal neurological signs or acute hypertension

Action:

- Immediately discontinue rt-PA infusion if still running
- Call for immediate medical review.
- Full Medical and Neurological reassessment with documentation of new neurological deficit
- Check fibrinogen (if thrombolysed), PT, APTT, FBC, group and save
- Arrange urgent CT head scan
- Inform relevant consultant on call for stroke.

If Bleed Confirmed:

- Discuss with consultant on call for stroke (+/-Consultant Haematologist on-call and Neurosurgery if appropriate).
- If thrombolysed consider treatment with:
- Fibrinogen 3-4 grams IV (aim for fibrinogen levels > 1.5 g/L); 4 grams of fibrinogen will elevate plasma fibrinogen by 1g/L.
- ***Or*** fresh frozen plasma 15mls/Kg; 1300 mls of FFP is equivalent to approx. 3 grams of fibrinogen.
- Platelets 2 pools (for platelet dysfunction and not thrombocytopaenia, as rt-PA can impair platelet function.)

Extracerebral Bleeding Post Thrombolysis

- Immediately discontinue rt-PA infusion if still infusing
- Perform full set of observations
- Administer Oxygen 15 litres via non re-breathing mask
- Raise foot of bed if BP < 100 mmHg systolic.
- Immediate medical review
  - ABC; Assess for shock
  - Use mechanical compression of haemorrhage wherever possible.
  - Two large IV canullae FBC, U+E, PT, APTT, fibrinogen, group and crossmatch
  - Transfuse as necessary
  - Involve surgical team for haemostasis if appropriate

2. Anaphylaxis during thrombolysis

Suspect if:

- Rapid fall in BP
- Urticarial rash (rapidly developing, red, blanching, often slightly raised i.e. wheals)
- Angiooedema, swelling of tongue or around mouth / lips, new wheezing or breathlessness.

Action:

- Immediately discontinue rt-PA infusion if still running
- Assess and protect Airway
- Immediate medical review
- Adrenaline
- Risk of muscle haematoma with IM injections but Adrenaline IV should only be given by experienced specialists**.**
- IV volume replacement
- Hydrocortisone 200 mgs stat
- Chlorpheniramine 10 mg IV

Orolingual Angioedema

- Oral-lingual oedema can be potentially life threatening but is usually mild and transient and rarely causes airway compromise unlike anaphylaxis.
- If there are no other signs of angioedema or anaphylaxis it would be reasonable to continue the rt-PA infusion

3. Any Unexpected Fall in GCS or Increased Drowsiness

- Immediately check and document Pulse, temperature, BP, O2 saturations, capillary glucose
- Ask for medical review
- Consider intracereberal haemorrhage, seizure, sepsis, dehydration, drug reaction, cardiac failure, dysrhythmia, MI, DVT/PE, metabolic derangement, urinary retention etc.

4. Hypoxia (O2 Saturation <95%)

- Check airway, reposition and suction only if clearly necessary.
- Give O2 by mask or nasal cannulae and titrate to achieve saturations >95%
- If persistent and/or needing >24% O2, ask for medical review
- Consider aspiration, pulmonary oedema, PE etc

5. Pyrexia

- Cooling measures
- Give paracetamol 1g if >37.5 C.
- Ask for medical review if persists or >38C
- Septic screen

6. Rapid fall in BP to <100 systolic

- Ensure accurate reading (caution in AF - Check manually if in any doubt
- Raise foot of bed
- Administer 24% O2 even if normal saturations
- Medical review
- Consider drug effects and may need IV 0.9% saline or colloid
- Consider pressor agents.
- A drop in blood pressure will reduce flow to the penumbral regions. Aim for MAP > 130 mmHg in hypertensive patients and 110 in normotensive patients in the first 24 hours.

7. Rise in Blood Pressure

- **Aim to keep BP less than 220 mmHg systolic or 120 mmHg diastolic in all patients with stroke**
- **Aim for a BP of < 180/105 for patients who are receiving or have received thrombolysis**
- Repeat and monitor every 15 minutes
- Check if any underlying cause such as distress, pain, urinary retention.
- If persists on 2 occasions, ask for medical review.
- Labetalol – give IV in 2mg doses rechecking BP after each dose initially. 10mg can be given IV over 1-2 mins. May repeat or double every 10 mins to max of 300 mg; or give initial dose then infusion at 2-8 mg/min
- **OR** Nicardipine or isosorbide dinitrate are alternative options
- Aim for only 10-15% reduction in BP.
- **DO NOT use rapid acting calcium antagonists or short acting ACE inhibitors such as captopril**

8. Abnormal Capillary Glucose

- <3.5 give glucose orally (50-100mls Lucozade)
- IV dextrose 50% if unable to give orally
- 3.5 - 4 check again in 10 minutes
- >10 medical review. Need to consider insulin infusion

9. Abnormal Heart Rate/Rhythm

- <50 or >120,
- New irregular pulse.
- Perform immediate12 lead ECG and ask for medical review.

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Alteplase dose calculation sheet

Body Weight (Stones)	Body Weight (Kg)	**Total rTpa Dose (mg)**	10% Bolus (ml)	90% IV Infusion (ml/hr)	No. of 50mg rt-PA vials needed
6st 4	40	**36**	4	32	1
6st 8	42	**38**	4	34	1
7st	44	**40**	4	36	1
7st 3	46	**41**	4	37	1
7st 7	48	**43**	4	39	1
7st 12	50	**45**	5	40	1
8st 2	52	**47**	5	42	1
8st 6	54	**49**	5	44	1
8st 12	56	**50**	5	45	2
9st 1	58	**52**	5	47	2
9st 6	60	**54**	5	49	2
9st 10	62	**56**	6	50	2
10st	64	**58**	6	52	2
10st 5	66	**59**	6	53	2
10st 9	68	**61**	6	55	2
11st	70	**63**	6	57	2
11st 4	72	**65**	6	59	2
11st 9	74	**67**	7	60	2
12st	76	**68**	7	61	2
12st 3	78	**70**	7	63	2
12st 8	80	**72**	7	65	2
12st 12	82	**74**	7	67	2
13st 3	84	**76**	8	68	2
13st 7	86	**77**	8	69	2
13st 12	88	**79**	8	71	2
14st	90	**81**	8	73	2
14st 6	92	**83**	8	75	2
14st 11	94	**85**	8	77	2
15st 2	96	**86**	9	77	2
15st 7	98	**88**	9	79	2
15st 10	100	**90**	9	81	2

1. Total dose: 0.9mg/kg. **MAXIMUM DOSE IS 90 MG (**See weight/dose chart above)
2. Administration of Alteplase should be sanctioned by the relevant physician on call for stroke.
3. 10% of total dose given as an I.V push over 2 minutes.
4. Give remaining 90% of dose I.V over 60 minutes via infusion pump.

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NIHSS		On arrival Time____	Pre –lysis Time____	At 2 hours Time____	At 24 hours Time____
1a. Level of Consciousness	0 = Alert; keenly responsive. 1 = Not alert; but arousable by minor stimulation to obey, answer, or respond. 2 = Not alert; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped). 3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.	_____	_____	_____	_____
1b. LOC Questions	0 = Answers both questions correctly. 1 = Answers one question correctly. 2 = Answers neither question correctly.	_____	_____	_____	_____
1c. LOC Commands	0 = Performs both tasks correctly. 1 = Performs one task correctly. 2 = Performs neither task correctly.	_____	_____	_____	_____
2. Best Gaze	0 = Normal. 1 = Partial gaze palsy; gaze is abnormal in one or both eyes, but forced deviation or total gaze paresis is not present. 2 = Forced deviation, or total gaze paresis not overcome by the oculocephalic maneuver.	_____	_____	_____	_____
3. Visual	0 = No visual loss. 1 = Partial hemianopia. 2 = Complete hemianopia. 3 = Bilateral hemianopia (blind including cortical blindness).	_____	_____	_____	_____
4. Facial Palsy	0 = Normal symmetrical movements. 1 = Minor paralysis (flattened nasolabial fold, asymmetry on smiling). 2 = Partial paralysis (total or near-total paralysis of lower face). 3 = Complete paralysis of one or both sides (absence of facial movement in the upper and lower face).	_____	_____	_____	_____
5. Motor Arm	0 = No drift; limb holds 90 (or 45) degrees for 10 sec 1 = Drift; limb holds 90 (or 45) degrees, but drifts down before 10 sec; does not hit bed. 2 = Some effort against gravity; limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity. 3 = No effort against gravity; limb falls. 4 = No movement. UN = Amputation or joint fusion, explain: 5a. Left Arm 5b. Right Arm	 _____ _____	 _____ _____	 _____ _____	 _____ _____

		On arrival Time____	Pre –lysis Time____	At 2 hours Time____	At 24 hours Time____
6. Motor Leg	0 = No drift; leg holds 30-degree position for full 5 seconds. 1 = Drift; leg falls by the end of the 5-second period but does not hit bed. 2 = Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity. 3 = No effort against gravity; leg falls to bed immediately. 4 = No movement. UN = Amputation or joint fusion, explain: ________________ 6a. Left Leg 6b. Right Leg	_____ _____	_____ _____	_____ _____	_____ _____
7. Limb Ataxia	0 = Absent. 1 = Present in one limb. 2 = Present in two limbs. UN = Amputation or joint fusion, explain: ________________	_____	_____	_____	_____
8. Sensory	0 = Normal; no sensory loss. 1 = Mild-to-moderate sensory loss 2 = Severe to total sensory loss	_____	_____	_____	_____
9. Best Language	0 = No aphasia; normal. 1 = Mild-to-moderate aphasia 2 = Severe aphasia 3 = Mute, global aphasia; no usable speech or auditory comprehension.	_____	_____	_____	_____
10. Dysarthria	0 = Normal. 1 = Mild-to-moderate dysarthria 2 = Severe dysarthria UN = Intubated or other physical barrier, explain:______________________________	_____	_____	_____	_____
11. Extinction and Inattention (formerly Neglect)	0 = No abnormality. 1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities. 2 = Profound hemi-inattention or extinction to more than one modality; does not recognize own hand or orients to only one side of space.	_____	_____	_____	_____
NIHSS total score					

*References for alterations in exclusion criteria.

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