Vascular

Last Updated: October 12, 2021

Barthel Index			
Activity performance score in stroke victims			
Activity	**Scores (0, 5, 10, 15)**		
Feeding	0 = Unable	5 = Needs help cutting, spreading butter, etc., or required modified diet	-	-
Bathing	0 = Dependent	5 = Independent (or in shower)	-	-
Grooming	0 = Needs help with personal care	5 = Independent face/hair/teeth/shaving (implements provided)	-	-
Dressing	0 = Dependent	5 = Needs help but can do about half unaided	10 = Independent (including buttons, zips, laces, etc.)	-
Bowels	0 = Incontinent (or needs enemas)	5 = Occasional accident	10 = Continent	-
Bladder	0 = Incontinent, or catheterized and unable to manage alone	5 = Occasional accident	10 = Continent	-
Toilet Use	0 = Dependent	5 = Needs some help, but can do something alone	10 = Independent (on and off, dressing, wiping)	-

Stairs	0 = Unable	5 = Needs help (verbal, physical, carrying aid)	10 = Independent	-
Transfers (bed to chair and back)	0 = Unable, no sitting balance	5 = Major help (one or two people, physical), can sit	10 = Minor help (verbal or physical)	15 = Independent
Mobility (on level surface)	0 = Immobile or <50 yards	5 = Wheelchair independent, including corners, >50 yards	10 = Walks with help of one person (verbal or physical) >50 yards	15 = Independent (but may use any aid) >50 yards

Fischer Scale
Classify severity of SAH on CT scan, predictive for vasospasm

Group 1	No blood detected
Group 2	Diffuse or vertical layers <1mm thick without clots
Group 3	Localized clots and/or vertical layers >1mm thick
Group 4	Intracerebral or intraventricular clot (with or without SAH)

Modified Fischer Scale
Modified classification for severity of SAH on CT scan, predictive for vasospasm

Group 1	Focal or diffuse thin SAH, no IVH
Group 2	Focal or diffuse thin SAH, with IVH
Group 3	Thick SAH, no IVH
Group 4	Thick SAH, with IVH

Hunt & Hess Grading Scale

Classify severity of SAH, predictive for survival

Grade 1	Asymptomatic, minimal headache, slight nuchal rigidity
Grade 2	Moderate to severe headache, nuchal rigidity, no neurologic deficit except cranial nerve palsy
Grade 3	Drowsiness, minimal neurologic deficit
Grade 4	Stupor, moderate-severe hemiparesis, possible early decerebrate rigidity, vegetative disturbances
Grade 5	Coma, decerebrate rigidity

Intracerebral Hemorrhage Score
30-day mortality predictor for ICH

	0	+1	+2
GCS	13-15	5-12	3-4
Age	<80 years	>=80 years	-
ICH Volume	$<30cm^3$	$>=30cm^3$	-
Intraventricular hemorrhage	No	Yes	-
Infratentorial origin of ICH	No	Yes	-

ICH Score 0 = no mortality
ICH Score 1 = 13%
ICH Score 2 = 26%
ICH Score 3 = 72%
ICH Score 4 = 97%
ICH Score 5 = 100%
ICH Score 6 = 100%

Intraventricular Hemorrhage Score
Estimate of IVH volume, predictor of mortality

	0	1	2	3
Right & Left Lateral Ventricle	No blood	<1/3 full	1/3 to 2/3 full	>2/3 full
3rd & 4th Ventricle	No blood	Any blood	-	-
Hydrocephalus	No	Yes	-	-
Calculation	IVH score = 3 x (RLV + LLV + Hydrocephalus) + III + IV			

Modified Rankin Scale
Scale for assessment of functional status after stroke

Score	Description
0	No symptoms
1	No significant disability – has symptoms, able to carry out usual activities
2	Slight disability – unable to carry out all previous activities
3	Moderate disability – requires help, able to walk without assistance
4	Moderately severe disability – unable to walk or attend to bodies needs without assistance
5	Severe disability – bedridden, incontinent, needs constant nursing care
6	Dead

National Institutes of Health Stroke Scale
Quantification of stroke severity

1. Level of Consciousness

1A (LOC)

0 = Alert, keenly responsive	1 = Not alert, arouses to minor stimulation	2 = Not alert, requires repeated stimulation to arouse	3 = Response with only reflexes or totally unresponsive	-

1B (LOC Questions - request current month and age)

0 = Answers both questions right	1 = Answers one question correct, or dysarthric/intubated	2 = Answers neither question correctly, or aphasic	-	-

1C (LOC Commands - blink eyes & squeeze hands)

0 = Performs both tasks correctly	1 = Performs one task correctly	2 = Performs neither task correctly	-	-

2. Best Gaze (Test horizontal eye movements)

0 = Normal	1 = Partial gaze palsy	2 = Forced deviation	-	-

3. Visual (Visual fields tested by confrontation)

0 = No visual loss	1 = Partial hemianopia	2 = Complete hemianopia	3 = Bilateral hemianopia (including cortical blindness)	-

4. Facial Palsy (Show teeth, raise eyebrows, close eyes)

0 = Normal	1 = Minor paralysis (flattened nasolabial folds, asymmetry on smile)	2 = Some effort against gravity, cannot maintain 90º (or 45º), drifts down to bed	

5. Motor Arm (Extend the arms (palms down) 90º (if sitting) or 45º (if supine))
5A = Left Arm; 5B = Right Arm
UN = Amputation or joint fusion, explain why untestable

0 = No drift, held for full 10	1 = Drift down before 10 seconds, but not hitting bed or	2 = Some effort against gravity, cannot maintain	3 = No effort against gravity, limb falls	4 = No movement

seconds	support	90º (or 45º), drifts down to bed		

6. Motor Leg (Hold leg at 30 º while supine)
6A = Left Leg; 6B = Left Leg
UN = Amputation or joint fusion, explain why untestable

0 = No drift, held for full 5 seconds	1 = Drift down before 5 seconds, but not hitting bed	2 = Some effort against gravity, but leg falls to bed by 5 seconds	3 = No effort against gravity, leg falls	4 = No movement

7. Limb Ataxia (Bilateral finger-nose-finger, heel-shin tests)
UN = Amputation or joint fusion, explain why untestable

0 = Absent	1 = Present in one limb	2 = Present in two limbs	-	-

8. Sensory (Sensation or grimace to pinprick when tested or withdraw from noxious stimuli in obtunded or aphasic patient)

0 = Normal, no sensory loss	1 = Mild-to-moderate sensory loss, less sharp or is dull in affected side, or loss of superficial pain but aware of touch)	2 = Severe or total sensory loss, not aware of being touched in face, arm, and leg	-	-

9. Best Language

0 = No aphasia, normal	1 = Mild-to-moderate aphasia, obvious loss of fluency or comprehension, without limitation on ideas expressed or form of expression. Reduced speech and/or comprehension	2 = Severe aphasia, all communication is fragmentary expression, great need for inference, questioning, and guessing by listener. Examiner	3 = Mute, global aphasia, no usable speech or auditory comprehension	-

	however makes conversation about materials difficult	carries conversation.		

10. Dysarthria
UN = Intubated or physical barrier

0 = Normal	1 = Mild-to-moderate dysarthria, slurs at least some words but at worst continues to be understood	2 = Severe dysarthria, such slurring of speech that it is unintelligible in the absence of or out of proportion to any dysphasia, or is mute/anarthric	-	-

11. Extinction and Inattention

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	-	-

Pollock-Flickinger Score
AVM grading scale to predict patient outcomes from radiosurgery

AVM Score	<=1.00	1.01 – 1.50	1.51 – 2.00	>2.00
Chance (%) of excellent outcome (95% CI)	89 (79-	70 (59-79)	64 (51-75)	46 (33-60)

	94)			
Chance (%) of modified Rankin Scale decline (95% CI)	0 (0-8)	13 (7-22)	20 (12-32)	36 (24-50)

AVM Score = (0.1)(volume, cc) + (0.02)(age, years) + (0.5)(location, see below)
Frontal, temporal, parietal, occipital, intraventricular, corpus callosum, cerebellar = 0
Basal ganglia, thalamus, brainstem = 1

Spetzler-Martin Arteriovenous Malformation Grading System
AVM grading scale predictive of operative outcome (Grades 1 – 6)

	0	1	2	3
Size of Nidus	-	Small (<3cm)	Medium (3-6cm)	Large (>6cm)
Eloquence of Adjacent Brain	Non-eloquent	Eloquent	-	-
	• Eloquent = sensorimotor, language, visual cortex, hypothalamus, thalamus, brain stem, cerebellar nuclei, or adjacent regions • Non-eloquent = frontal lobe, temporal lobe, cerebellar hemispheres			
Venous Drainage	Superficial only	Deep	-	-

Summation of scores (range 1-5) = Grade (falls into 1 of 6 grades)
Note: Grade 6 = inoperable

Spetzler-Ponce Classification
AVM classification tier guiding treatment and predictive of outcome

Class	Spetzler-Martin Grade	Management	Negative outcome rate (%)

			(95% CI)
A	1, 2	Microsurgical resection	8 (6-10)
B	3	Multimodality treatment	18 (15-22)
C	4, 5	No treatment except recurrent hemorrhages, progressive neurologic deficits, steal-related symptoms, and AVM-related aneurysms	32 (27-38)

Stroke Management Timeline

Time (Hours from symptom onset)	IV tPA	IA tPA (Consider after IV tPA failure)	Mechanical Embolectomy (Consider after IV tPA failure)	
1	✓	✓	✓	
2	✓	✓	✓	
3	✓	✓	✓	
4	✓	✓	✓	
5	Up to 4.5hr	✓	✓	
6	-	✓	✓	Verify perfusion prior to procedure
7	-	-	✓	
8	-	-	✓	
>9	-	-	-	

WFNS Subarachnoid Hemorrhage Grading Scale
Classification scale for severity of SAH predictive of outcomes

Grade	GCS	Focal Motor Deficit
1	15	-
2	14 – 13	-

3	14 – 13	+
4	12 – 7	+/-
5	6 – 3	+/-