Acute Ischaemic Stroke
Perfusion and Angiography Studies

MR image interpretation form

PATIENT ID:

DATE OF READING: **DATE OF SCAN:**

SCAN QUALITY: Good ☐ Moderate ☐ Poor ☐ **Comment:** ☐

READER ID:

TYPE OF SCAN: (tick all the apply) **Diffusion:** ☐ **Perfusion:** ☐ **MRA:** ☐

GRE/T2*: ☐ **T2/FLAIR:** ☐

TYPE OF PERFUSION AVAILABLE: **MTT:** ☐ **CBV:** ☐ **TMAX:** ☐

CBF: ☐ **TTP:** ☐ **Other:** ☐

Please tick Yes or No. Please do not leave blanks. Thank you.

1. Are all the scan sequences completely normal? **Y** ☐ **N** ☐ ***If YES stop here***

2. **Ischaemic Changes**

Is there any sign of acute ischaemic change on any sequence? If in doubt as to whether acute or old, code as acute. **Y** ☐ **N** ☐ ***If No go to Q.7***

3. Which side of the brain shows ischaemic change? **R** ☐ **L** ☐ ***Tick R and L if both***

4. Classify ischaemic change on DWI, T2/FLAIR.

	Y	**N**
a) Faint hyperintensity on DWI but no lesion visible on T2/FLAIR.	☐	☐
b) Bright hyperintensity on DWI but no/pale lesion visible on T2/FLAIR.	☐	☐
c) Lesion clearly visible on T2/FLAIR as well as on DWI.	☐	☐

d) PWI lesion visible.
(tick one box for each row that applies). The 20% refers to volume.

	N	<20%<DWI	Same as DWI	>20%>DWI
CBF	☐	☐	☐	☐
CBV	☐	☐	☐	☐
MTT	☐	☐	☐	☐
Raw data	☐	☐	☐	☐
TTP	☐	☐	☐	☐
Tmax	☐	☐	☐	☐
ATF	☐	☐	☐	☐
Other (blank to fill in parameters) _____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐

5. Classify site and size of ischaemic lesion on DWI **(see examples)**

a) site (enter most appropriate code in box)

1° ☐

2° ☐

M =MCA* = any lesion in the MCA territory
AS =Infarct of up to half of ACA territory
AL =Infarct of more than half of ACA territory
PS =Infarct of up to half of PCA territory
PL =Infarct of more than half of PCA territory
MAS=M+AS*
MAL=M+AL*
MPS=M+PS*
MPL=M+PL*
MAP=Infarct of whole MCA, ACA and PCA territories
L =Lacune*
B =Borderzone*
C =Cerebellum*
S =Brainstem*
CS =Cerebellum and brainstem

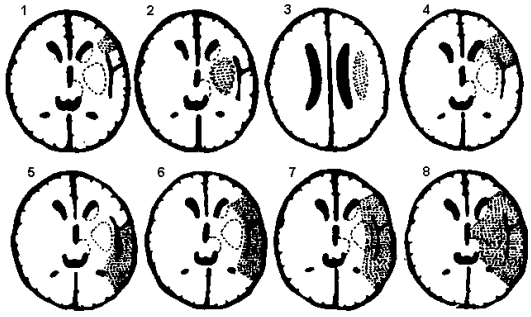
* code sub-territory sites in b

b) sub-territory sites

1° ☐

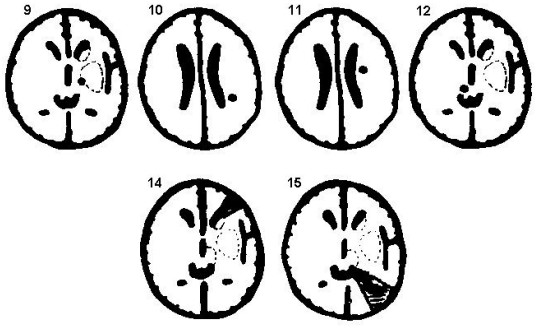
2° ☐

MCA sub-territory codes
1=small cortical infarct
2=basal ganglia infarct (>2x2x2cm) - striatocapsular
3=striatocapsular infarct lateral to the lateral ventricle (>2x2x2cm)
4=infarct of anterior half of peripheral MCA territory – a=not involving and b=involving part of basal ganglia
5=infarct of the posterior half of peripheral MCA territory – a= not involving and b=involving part of basal ganglia
6=infarct of the most or whole of peripheral MCA territory not including basal ganglia
7=6+infarct of lateral part of basal ganglia
8=infarct of whole of MCA territory



Diagrams © J Wardlaw, University of Edinburgh

Lacunar/Borderzone sub-territory codes
9=lacune in internal capsule/lentiform
10=lacune in internal border zone
11=lacune in centrum semiovale
12=lacune in thalamus
13=lacune in brainstem, inc. pons (not shown)
14=anterior (mainly) border zone
15=posterior (mainly) border zone



Diagrams © J Wardlaw, University of Edinburgh

Cerebellum sub-territory codes
16=small cortical (not shown)
17=<1/2 hemisphere (medium) (not shown)
18=>1/2 hemisphere (not shown)

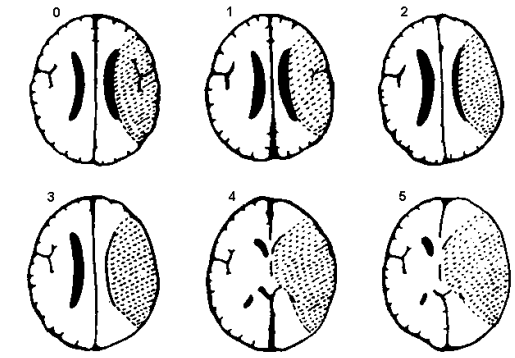
Brainstem sub-territory codes
11=small, i.e.<1/2 medulla (not shown)
12=extensive, i.e. pons + medulla (not shown)

c) degree of mass effect on DWI/T2/FLAIR

1° ☐

2° ☐

Mass effect grading
0=no swelling
1=effacement of the sulci overlying the infarct
2=1+minor effacement of adjacent lateral ventricle
3=1+complete effacement of lateral ventricle
4=1+effacement of the lateral and third ventricle
5=4+shift of the midline away from the side of the ventricle
6=5+effacement of the basal cisterns



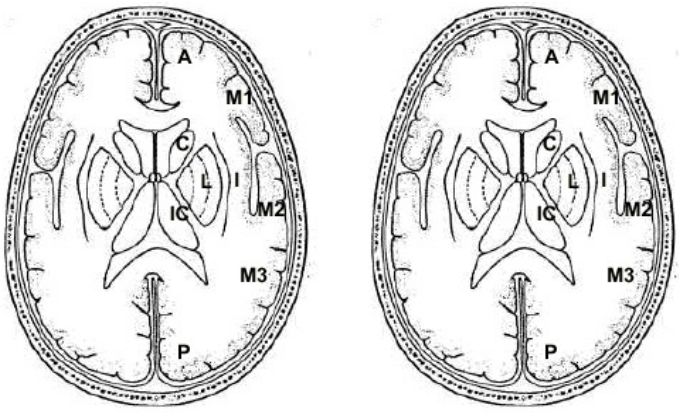
Diagrams © J Wardlaw, University of Edinburgh

6. ASPECT Score lesion:

Please enter '1' for all abnormal areas, '0' for normal areas, 'U' for unscoreable areas*

	DWI		PWI Raw	MTT	CBF	CBV
	Signal	**Swelling**				
N/A	☐	☐	☐	☐	☐	☐
Caudate (C)	☐	☐	☐	☐	☐	☐
Lentiform (L)	☐	☐	☐	☐	☐	☐
Insula (I)	☐	☐	☐	☐	☐	☐
Internal Capsule (IC)	☐	☐	☐	☐	☐	☐
MCA1 (M1)	☐	☐	☐	☐	☐	☐
MCA2 (M2)	☐	☐	☐	☐	☐	☐
MCA3 (M3)	☐	☐	☐	☐	☐	☐
MCA4 (M4)	☐	☐	☐	☐	☐	☐
MCA5 (M5)	☐	☐	☐	☐	☐	☐
MCA6 (M6)	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐
P	☐	☐	☐	☐	☐	☐

***'unscoreable' = areas not included**



Diagrams and score taken from
Lancet 2000;355:1670-1674

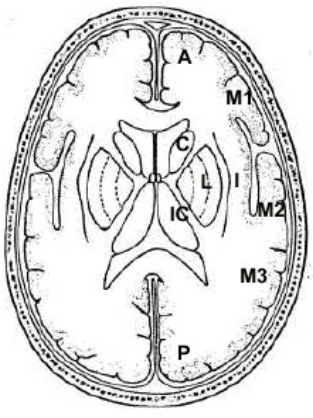
6 continued

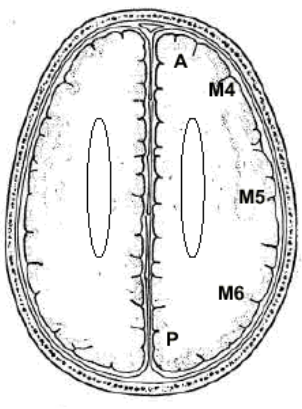
6. ASPECT Score lesion:

Please enter '1' for all abnormal areas, '0' for normal areas, 'U' for unscoreable areas*

	TTP	**Tmax**	**ATF**	**Other:**	**Other:**
N/A	☐	☐	☐	☐	☐
Caudate (C)	☐	☐	☐	☐	☐
Lentiform (L)	☐	☐	☐	☐	☐
Insula (I)	☐	☐	☐	☐	☐
Internal Capsule (IC)	☐	☐	☐	☐	☐
MCA1 (M1)	☐	☐	☐	☐	☐
MCA2 (M2)	☐	☐	☐	☐	☐
MCA3 (M3)	☐	☐	☐	☐	☐
MCA4 (M4)	☐	☐	☐	☐	☐
MCA5 (M5)	☐	☐	☐	☐	☐
MCA6 (M6)	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐
P	☐	☐	☐	☐	☐

***'unscoreable' = areas not included**





Diagrams and score taken from Lancet 2000;355:1670-1674

7. Hyperintense/Abnormal Vessel Sign

	Y	N
a) Is there a hyperintense artery (i.e. acutely occluded) on FLAIR/T2/T2* (absent flow void/ hyperintense)	☐	☐
b) Is there an occluded artery on MRA?	☐	☐

.

c) Name abnormal artery. If 'Y' to either a) or b), indicate which artery(ies). List most important (largest) abnormal artery first (1) and least important (smallest) last (3) if more than one.

1. ☐

2. ☐

3. ☐

1) ICA
2) MCA main stem
3) MCA Sylvian branch
4) PCA
5) ACA
6) 1+2+3
7) 1+2
8) 2+3

8. If abnormal artery on MRA, indicate the degree of obstruction:

a) TIMI score for abnormal artery: ☐

NEJM 1985;312:932-6

Grade	Criteria on arteriography
0	No flow/patency
1	Minimal flow/patency
2	Partial flow/patency
3	Complete flow/patency

b) MORI score for abnormal artery ☐

Stroke 1988;19:802-812

Grade	Criteria on arteriography
0	No flow/patency
1	Minimal flow/patency
2	Flow/patency of less than 50% of the territory of the occluded artery
3	Flow/patency of more than 50% of the territory of the occluded artery
4	Complete flow/patency

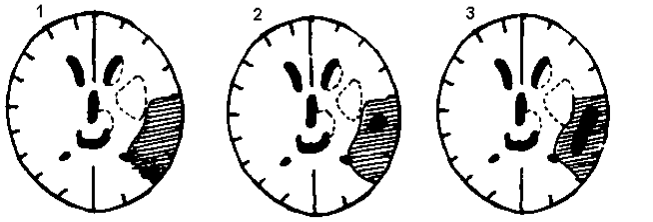
9. Haemorrhagic Changes On GRE/T2*

Is there any haemorrhage anywhere? Y ☐ N ☐ *If No go to Q.11*

10. Classify haemorrhage (if more than one haemorrhage, tick all present – indicate order of significance) :

	Y	N	Order (insert 1 (most important), 2, 3 (least important) to indicate your estimate of the order of clinical importance)	Size of Haematoma (tick box for max diam.): <3cm	3-5cm	5-8cm	>8cm
a) petechial haemorrhage (example 1 or 2 below)	☐	☐	☐				
b) significant haemorrhagic transformation of infarct (i.e. underlying infarct still visible) (example 3 below)	☐	☐	☐	☐	☐	☐	☐
c) parenchymal haematoma (i.e. no infarct visible)	☐	☐	☐	☐	☐	☐	☐
d) parenchymal haematoma clearly remote from infarct	☐	☐	☐	☐	☐	☐	☐
e) subdural haematoma	☐	☐	☐	☐	☐	☐	☐
f) subarachnoid haemorrhage	☐	☐	☐				
g) extradural haemorrhage	☐	☐	☐	☐	☐	☐	☐

i) In your opinion, is the haemorrhage a major component of the infarct which is likely to have worsened mass effect or involved more brain in the damage present and so worsened symptoms, or if remote from the infarct, likely to have contributed significantly to the burden of brain damage? Y ☐ N ☐



Haematoma with no or only slight mass effect

Haematoma with definite mass effect compressing

Diagrams and score taken from Lancet 2000;355:1670-1674

j) Are there any microhaemorrhages? Y ☐ N ☐

If yes, number of microhaemorrhages: ☐

11. Reduction in brain tissue volume on T2/FLAIR

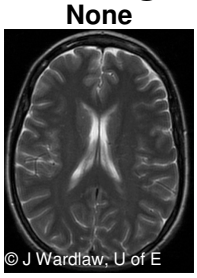
Is there any reduction in brain tissue volume? **Y** ☐ **N** ☐ ***If No go to Q.13***

12. Classify atrophy (see examples and pick nearest likeness):

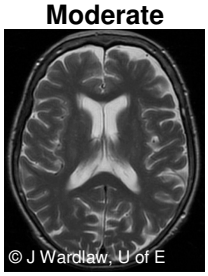
Central **None** ☐ **Mod** ☐ **Severe** ☐

CENTRAL reduction in brain tissue volume

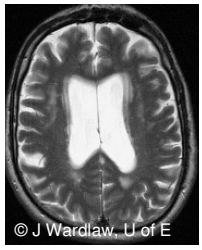
None



Moderate



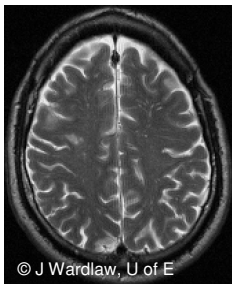
Severe



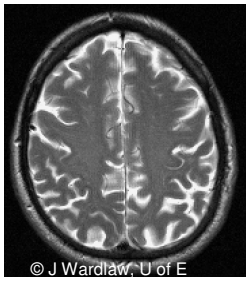
Cortical **None** ☐ **Mod** ☐ **Severe** ☐

CORTICAL reduction in brain tissue

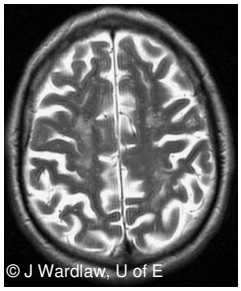
None



Moderate



Severe



13. Periventricular Hyperintensities

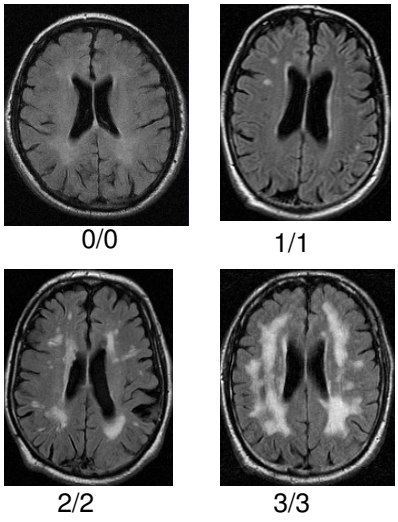
	Y	N
Are there any periventricular hyperintensities?	☐	☐

14. Classify extent of white matter hyperintensity

Fazekas et al (1987) MR signal abnormalities at 1.5T in Alzheimer's disease and normal aging. AJNR, 8:421-426.

a) Periventricular white matter **0,1,2,3** ☐

b) Deep white matter **0,1,2,3** ☐



0/0 1/1 2/2 3/3

PVH/DWMH ratings

Images © J Wardlaw, U of Edinburgh

15. Old Vascular Lesions

	Y	N
Are there any old vascular lesions?	☐	☐

16. Classify old vascular lesion(s):

	Y	N
a) old cortical infarct(s)	☐	☐
b) old striatocapsular infarct(s)	☐	☐
c) old borderzone infarct(s)	☐	☐
d) old lacunar infarct(s)	☐	☐
e) old brainstem/cerebellar infarct(s)	☐	☐
f) probable old haemorrhage	☐	☐

17. Is there a non-stroke lesion which could have accounted for the patient's stroke syndrome?

	Y	N
	☐	☐

18. Classify non-stroke lesion:

	Y	N
a) cerebral tumour	☐	☐
b) encephalitis	☐	☐
c) cerebral abscess	☐	☐
g) other (e.g.	☐	☐

Specify Other:

19. COMMENT: