Perfusion-angiography study CT Reading form

CT image interpretation form

PATIENT ID:

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

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

READER ID:

TYPE OF SCAN: (tick all that apply)	**CT Plain:** ☐	**CTP:** ☐	**CTA:** ☐
TYPE OF PERFUSION AVAILABLE:	**MTT:** ☐	**CBV:** ☐	**TMAX:** ☐
	CBF: ☐	**TTP:** ☐	**Other:** ☐

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

		Y	N	
1.	Are all the scan sequences completely normal?	☐	☐	*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 signs of ischaemic change in the main lesions (if more than one recent lesion). (**see examples**)

	Y	N	N/A
a) Loss of grey/white matter cortex definition.	☐	☐	☐
b) Loss of basal ganglia outline.	☐	☐	
c) Hypodensity present (i.e. more than in a or b so that the lesion appears less dense than white matter).	☐	☐	

Perfusion-angiography study CT Reading form

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

	⇑ or ⇓	N	<20%<CT	Same as CT	>20%>CT
CBFr	☐	☐	☐	☐	☐
CBVr	☐	☐	☐	☐	☐
MTTr	☐	☐	☐	☐	☐
TTPr	☐	☐	☐	☐	☐
ATFr	☐	☐	☐	☐	☐
FWHMr	☐	☐	☐	☐	☐
PTFr	☐	☐	☐	☐	☐
Cmaxr	☐	☐	☐	☐	☐
CBFq	☐	☐	☐	☐	☐
CBVq	☐	☐	☐	☐	☐
MTTq	☐	☐	☐	☐	☐
Tmaxq	☐	☐	☐	☐	☐
Raw data	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

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

    1°
    [ ]

    a) site (enter most appropriate code in box)

    M   =MCA* = any lesion in the MCA territory
    AS =Infarct of up to half of ACA territory

    2°
    [ ]

    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

    MCA sub-territory codes
    1=small cortical infarct
    2=basal ganglia infarct (>2x2x2cm)
    3= infarct of white matter 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 whole of peripheral MCA territory
    7=6+infarct of lateral part of basal ganglia
    8=infarct of whole of MCA territory

    1°
    [ ]

    2°
    [ ]

    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

    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)
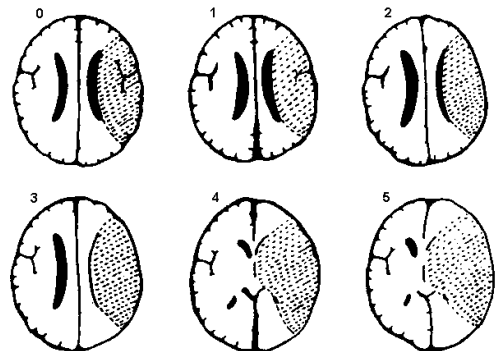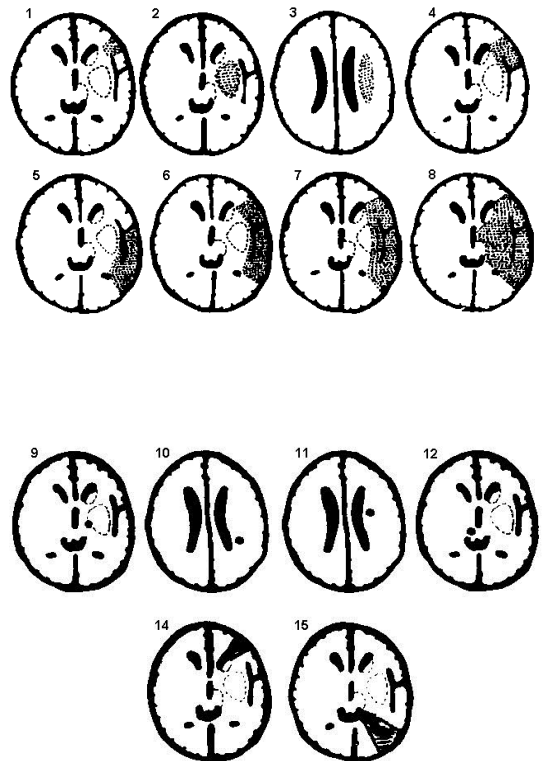
    c) degree of mass effect on plain CT

    1°
    [ ]

    Mass effect grading
    0=no swelling
    1=effacement of the sulci overlying the infarct

    2°
    [ ]

    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
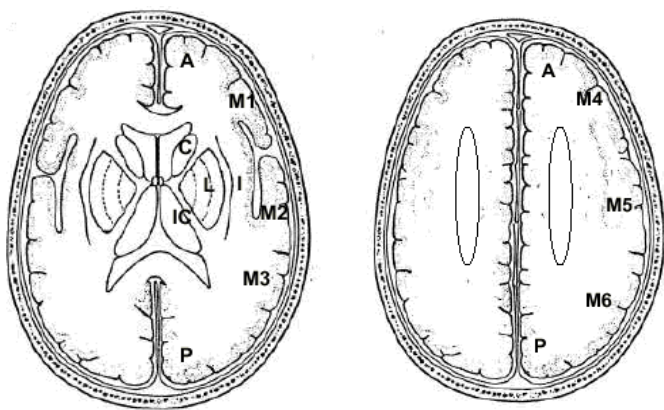   6=5+effacement of the basal cisterns

6. **ASPECT Score lesion:**

Perfusion-angiography study CT Reading form

Please enter 'U' for unscoreable areas*, '0' for normal areas, '1' for ⇓flow areas, '2' for ⇑ flow areas

	Plain CT		CBFr	CBVr	MTTr	TTPr
	Swelling	**Hypoattenuation**				
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 on CTP
Diagrams and score taken from Lancet 2000;355:1670-1674
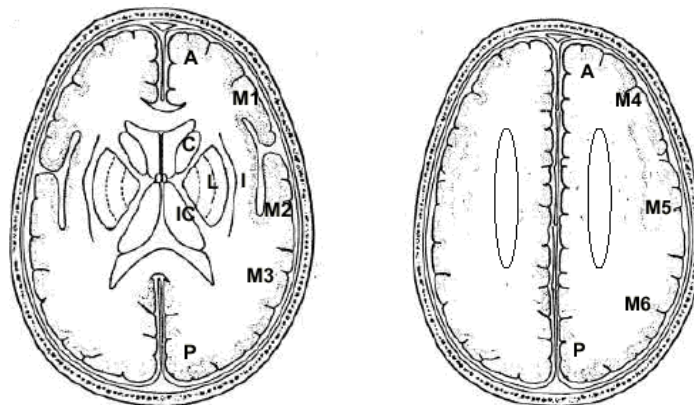

6 continued – additional PWI parameter scores

6. ASPECT Score lesion:

Please enter 'U' for unscoreable areas*, '0' for normal areas, '1' for ⇓flow areas, '2' for ⇑ flow areas

	ATFr	FWHMr	PTFr	Cmaxr	CBFq	CBVq	MTTq	Tmaxq	Raw data
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 on CTP
Diagrams and score taken from Lancet 2000;355:1670-1674

7. CT hyperattenuated/Abnormal Vessel Sign

Perfusion-angiography study CT Reading form

	Y	N
a) Is there a hyperattenuated artery on plain CT	☐	☐

	Y	N
b) Is there an abnormal/occluded artery on CTA?	☐	☐

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) BA
7) VA	8) 1+2+3
9) 1+2	10) 2+3
11) 6+7	12) other

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

a) TICI score for abnormal artery: ☐

TIMI: NEJM 1985;312:932-6
TICI: Stroke 203;34:e109
Reviewed in Stroke 2005;36:2400-3

| Grade	Criteria on arteriography
0	No flow/patency
1	Minimal flow/patency
2a	Partial flow/patency of <50% of expected territory
2b	Partial flow/patency of >50% of expected territory
3	Complete flow/patency

b) Score for abnormal artery ☐

Grade	Criteria on arteriography
0	No patency
1	Minimal patency – some contrast penetrates obstruction but no/minimal enters distal artery
2	Patency of <50% of the lumen and some filling of branches of the affected artery
3	Patency of >50% of the lumen and filling of most branches of the affected artery
4	Complete patency – normal artery

c) Clot Burden Score ☐

AJNR 2009;30:525-31
(Fig 1)
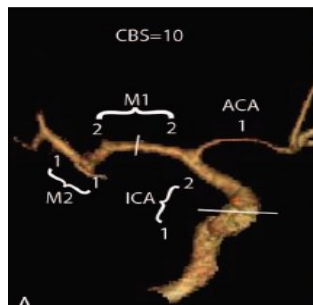
From a total score for normal arteries of 10, two points are subtracted for thrombus found on CTA in the supraclinoid ICA and each of the proximal and distal halves of the MCA trunk. One point is subtracted for thrombus found in the infraclinoid ICA and A1 segment and for each affected M2 branch.

In occluded ICA/MCA ONLY:

d) Score for Collateral Status ☐

Brain 2009;132:2231-2238
(Fig 2)
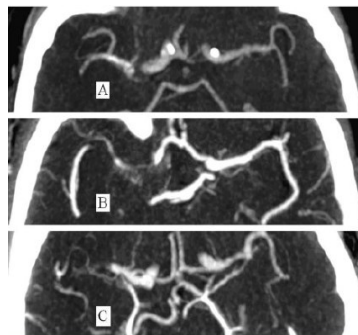
A 'Good' = the entire MCA distal to the occluded segment reconstituted with contrast.
B "Moderate" = if some of the MCA branches reconstituted within the Sylvian fissure.
C "Poor" = if only the distal superficial MCA branches reconstituted with contrast.

Figures in 8 c and d were extracted from the respective citations.

9.   Haemorrhagic Changes *

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) :

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.):

	Y	N	Order	<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 ☐
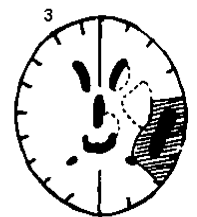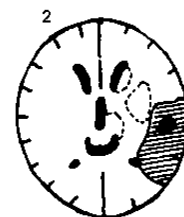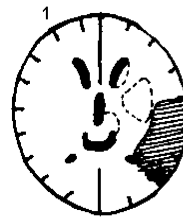
Haematoma with no or only slight mass effect

Haematoma with definite mass effect compressing

11. **Reduction in brain tissue volume**

Is there any reduction in brain tissue volume?

Y ☐   N ☐   *If No go to Q.13*

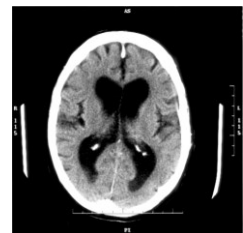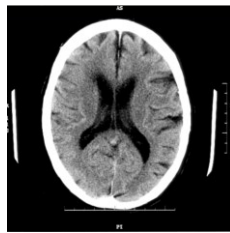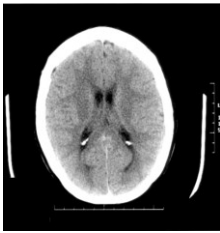**12.** Classify atrophy (see examples and pick nearest likeness):

Central

None ☐   Mod ☐   Severe ☐

CENTRAL reduction in brain tissue volume

None   **Modest**   **Severe**

Cortical

None ☐   Mod ☐   Severe ☐

CORTICAL reduction in brain tissue

None   **Modest**   **Severe**
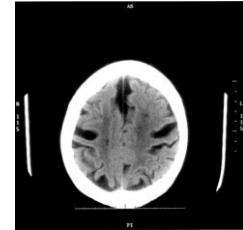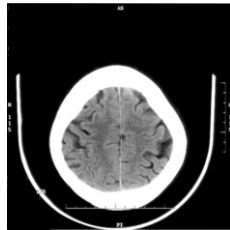
Approach validated in Eur Radiol 2008;19:177-183

PERIVENTRICULAR LUCENCIES

		Y	N

13. Are there any periventricular lucencies? ☐ ☐ *If No go to Q.15*

14. Classify extent of white matter lucency

Anterior lucencies | Ant. & Post lucencies | Posterior lucencies

a. Anterior white matter
0= no lucency
1= lucency restricted to region adjoining ventricles
2= lucency covering entire region from lateral ventricle to cortex

0,1,2
☐

b. Posterior white matter
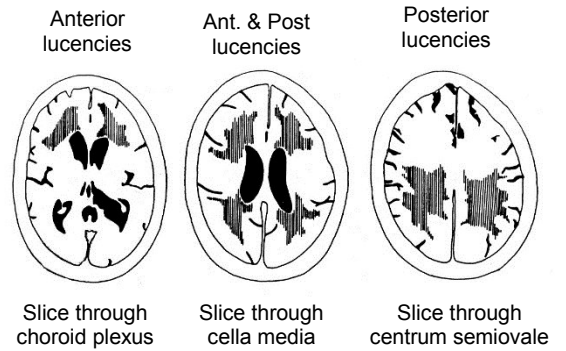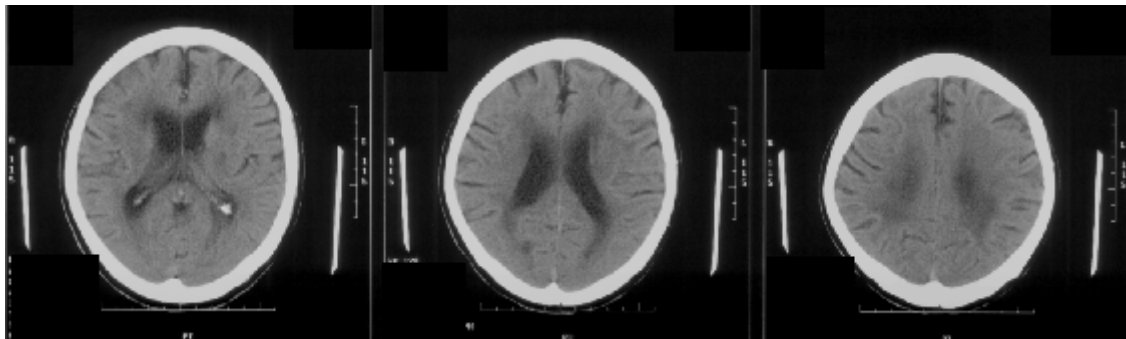0= no lucency
1= lucency restricted to region adjoining ventricles
2= lucency covering entire region from lateral ventricle to cortex

0,1,2
☐

Slice through choroid plexus | Slice through cella media | Slice through centrum semiovale

(diagram from van Swieten et al. JNNP 1990;53:1080-1083)

AWM = 1   PWM = 0

AWM = 2   PWM = 1

Perfusion-angiography study CT Reading form

OLD VASCULAR LESIONS

		Y	N
15.	Are there any old vascular lesions?	☐	☐	*If No go to Q.17*

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	☐	☐

NON-STROKE LESIONS

		Y	N
17.	Is there a non-stroke lesion, which could have accounted for the patient's stroke syndrome?	☐	☐	*If No go to Q.19*

18. Classify non-stroke lesion:

		Y	N
a)	cerebral tumour	☐	☐
b)	encephalitis	☐	☐
c)	cerebral abscess	☐	☐
d)	other (e.g. contusion)	☐	☐	**Specify Other:**

19. COMMENT: