缺血性脑卒中分型诊断和脑血管定位诊断

缺血性卒中病因和分型诊断

脑卒中

一组疾病共同的临床病理状态

- 多种病因：高血压、动脉硬化、心脏病、糖尿病、动脉炎 ---
- 不同发病机制：栓塞、血栓形成、低血压 ---
- 众多临床征象组合的综合征：受累血管及梗塞的部位

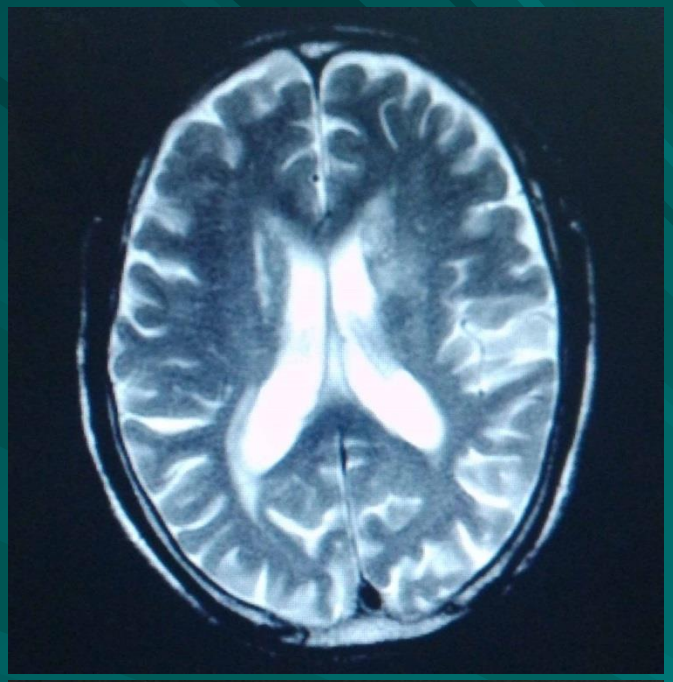
脑卒中

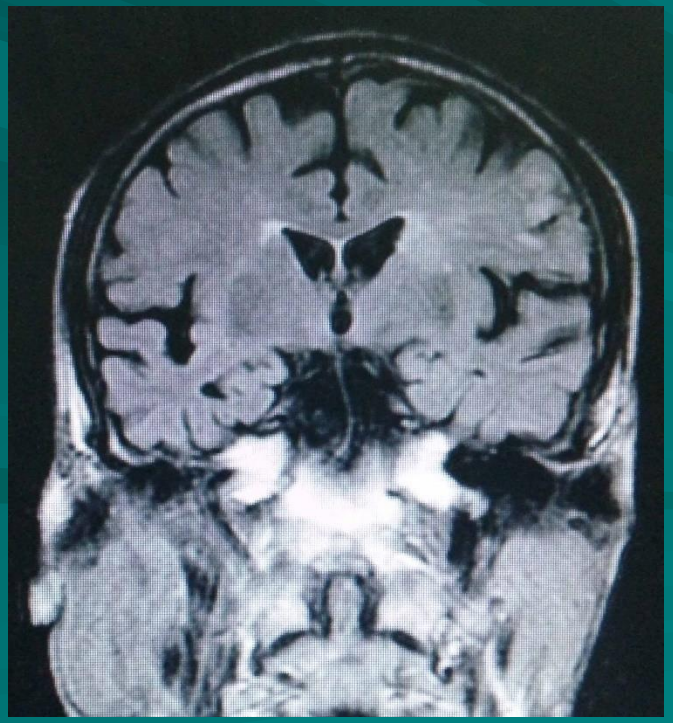
- 梗死灶的差异：部位、大小
- 动态发展的病理损害：不同时期缺血的病变
- 代偿修复的不同：侧支循环、自动调节

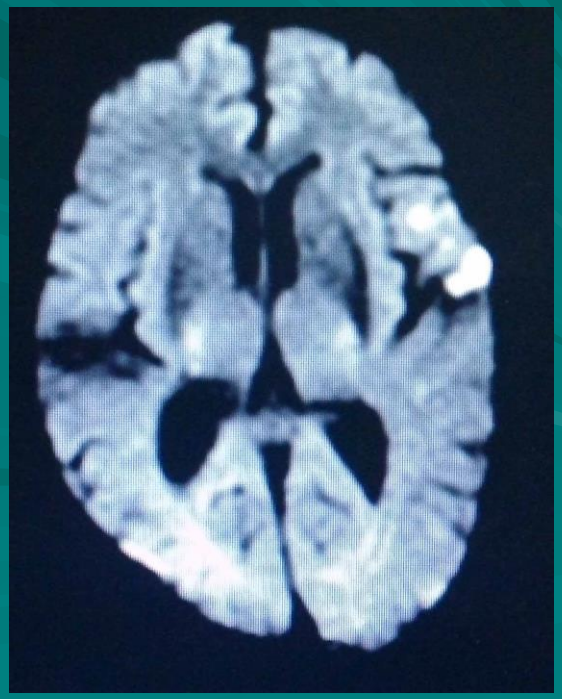
思考题：

36床

脑梗死类型？
病因？







脑卒中的分型

- 已较多应用的分型

社区流调及临床观察：OCSP分型

多中心临床药物试验：

TOAST、LSR分型（病因）

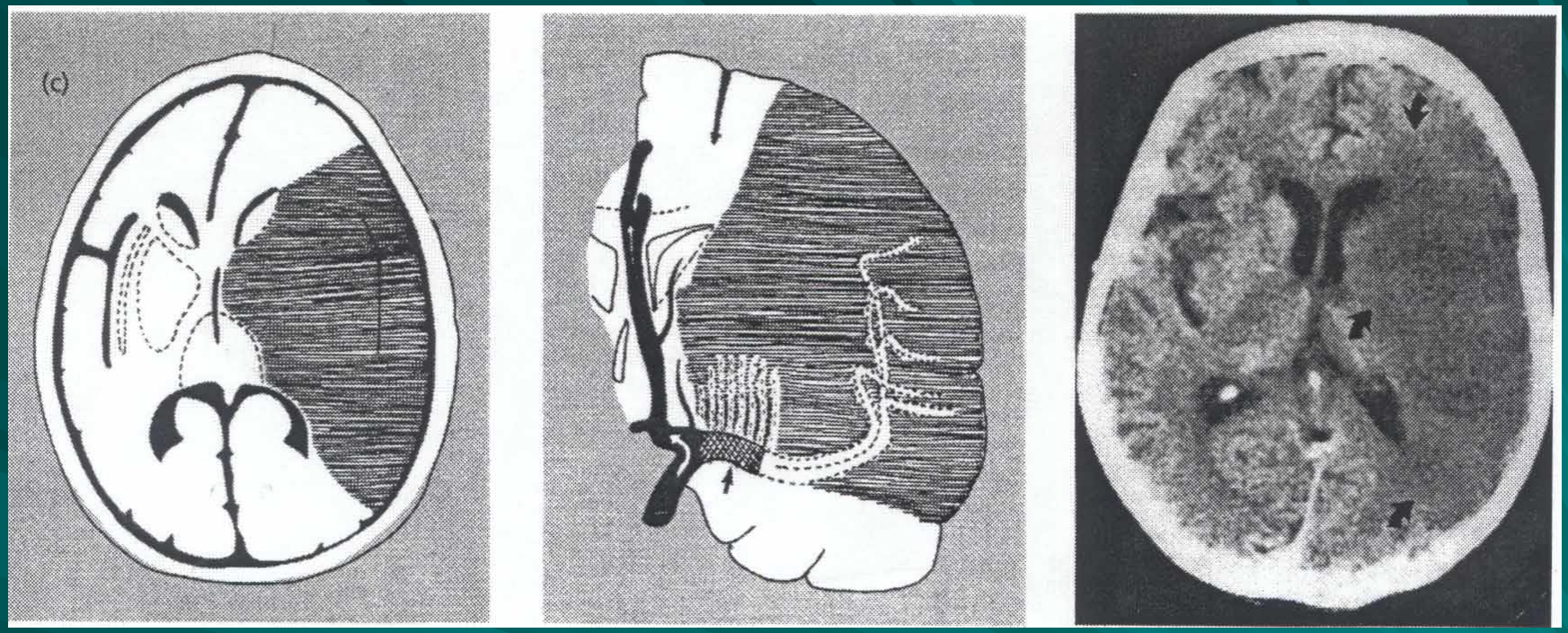
临床诊断（主要病因及机制）：

动脉血栓性、心源性、腔隙性、其他

影像学：CT分型

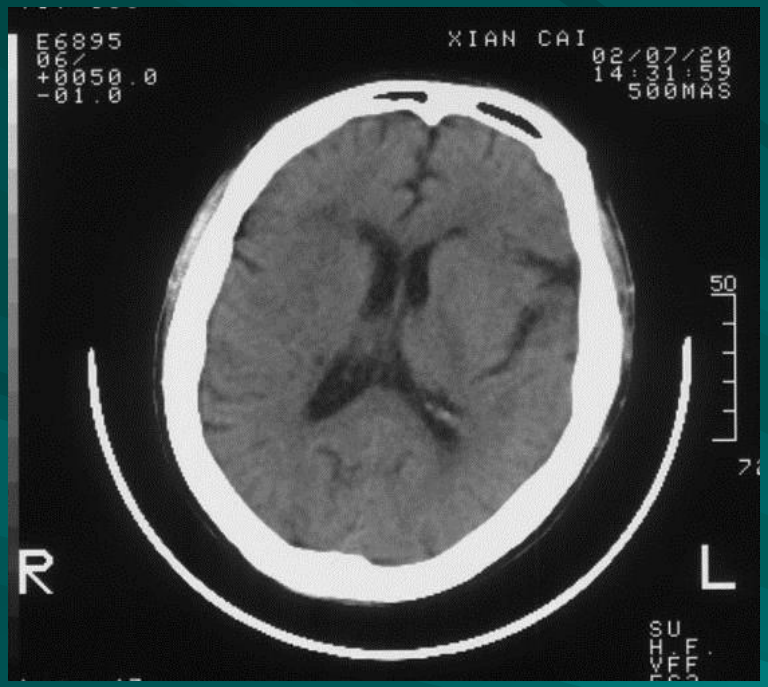
OCSP分型

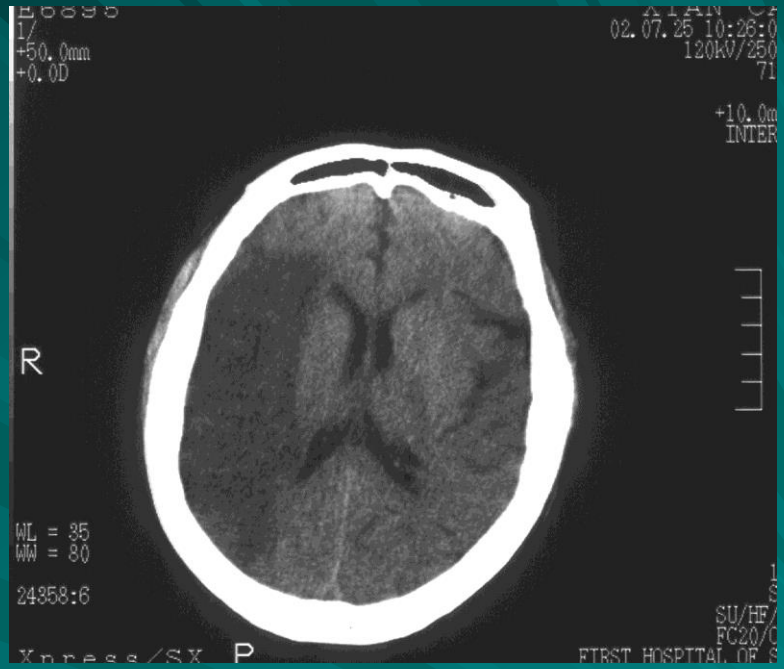
- 依据临床表现迅速分型，提示受累血管及梗塞灶的大小和部位：
  - 完全前循环梗塞（TACI）
  - 部分前循环梗塞（PACI）
  - 腔隙性梗塞（LACI）
  - 后循环梗塞（POCI）



TACI

- 大脑较高级神经活动障碍（意识障碍、失语、失算、空间定向力障碍等）
- 同向偏盲
- 对侧偏身的运动和/或感觉障碍
- 多为**MCA**近段主干，少数颈内动脉虹吸段

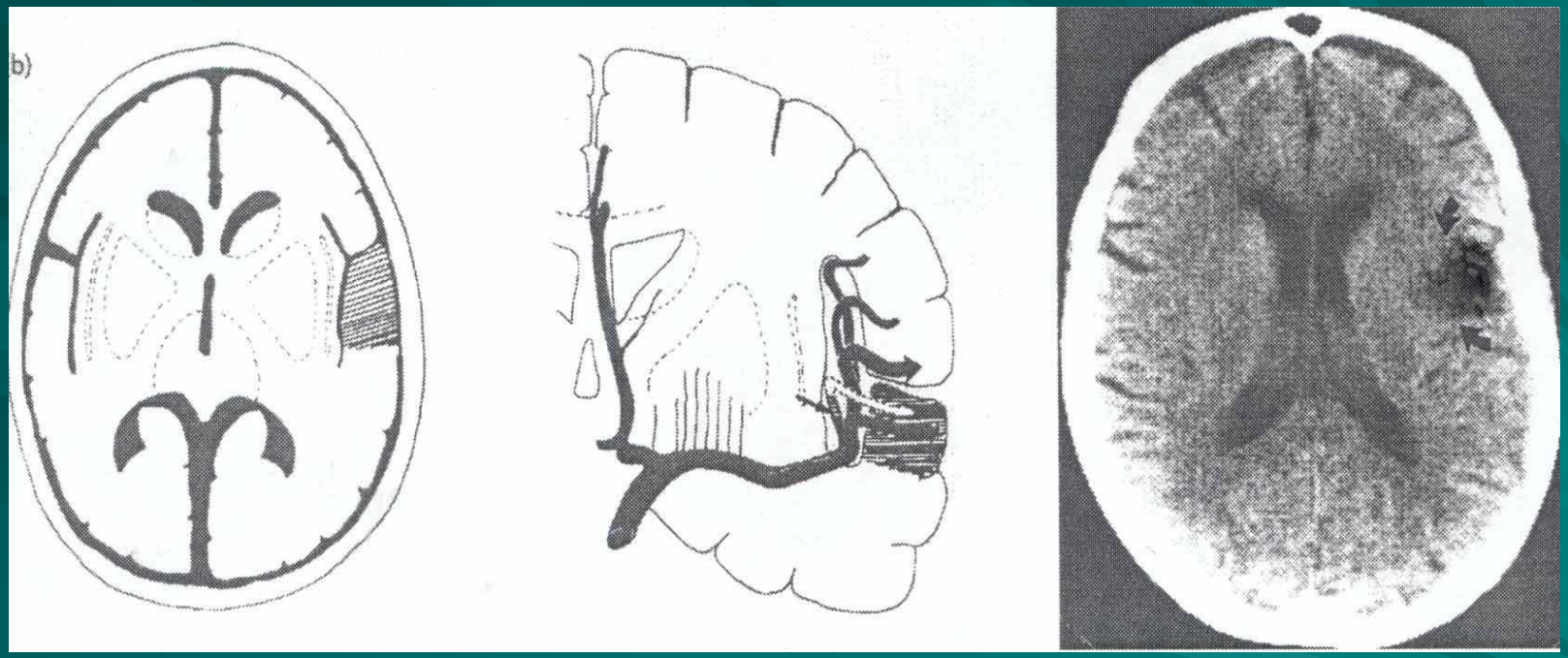




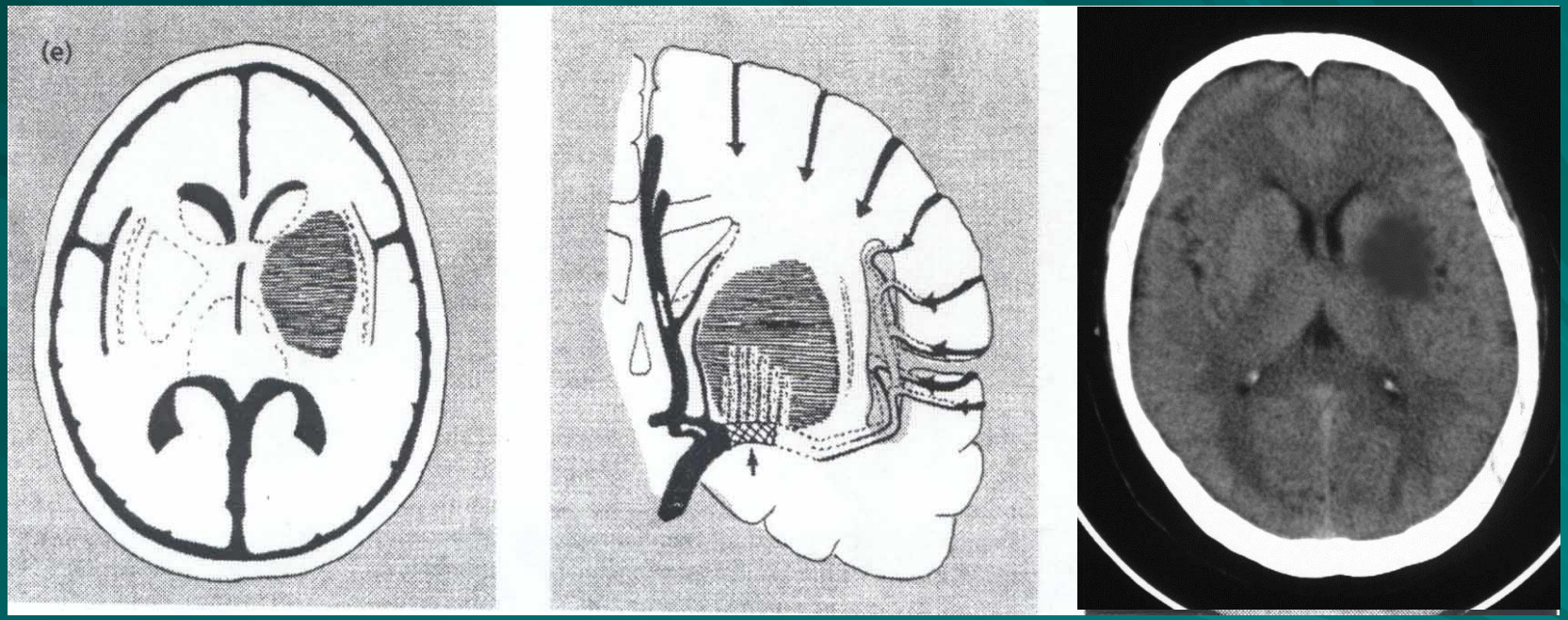
27小时CT

48小时CT

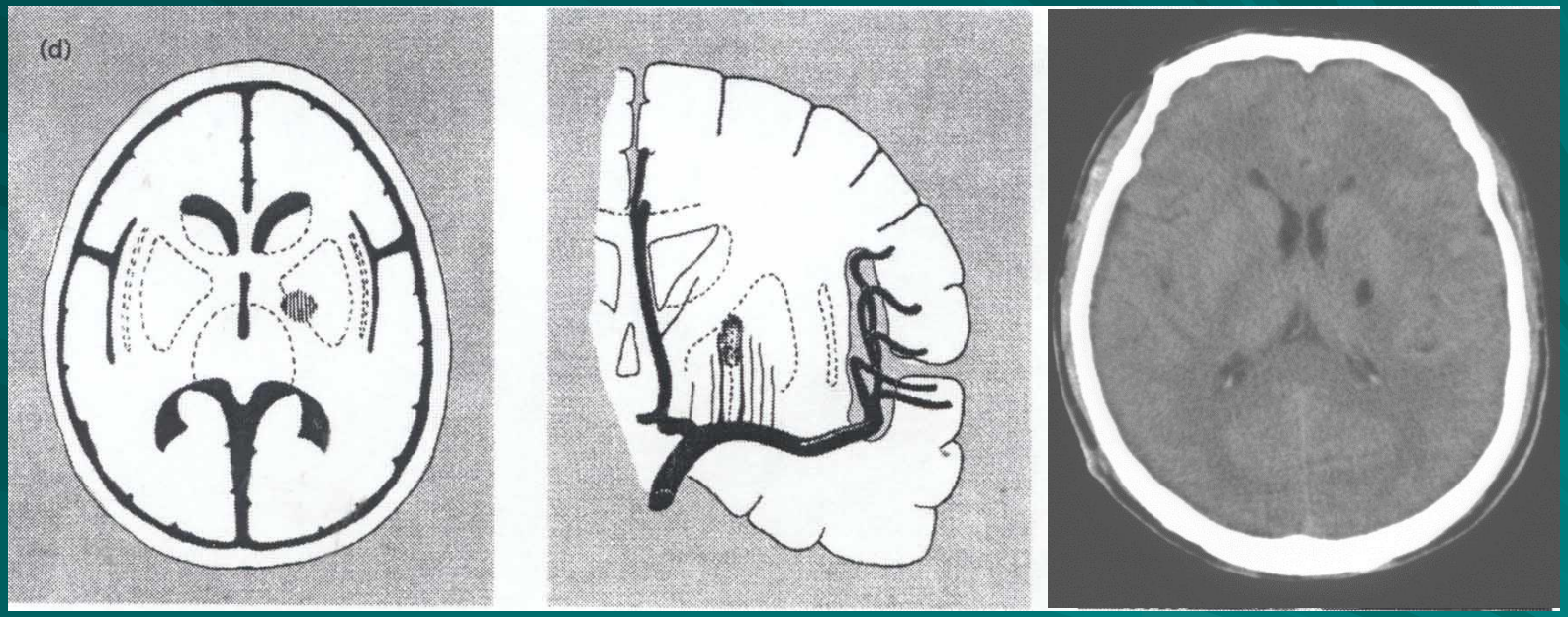
TACI



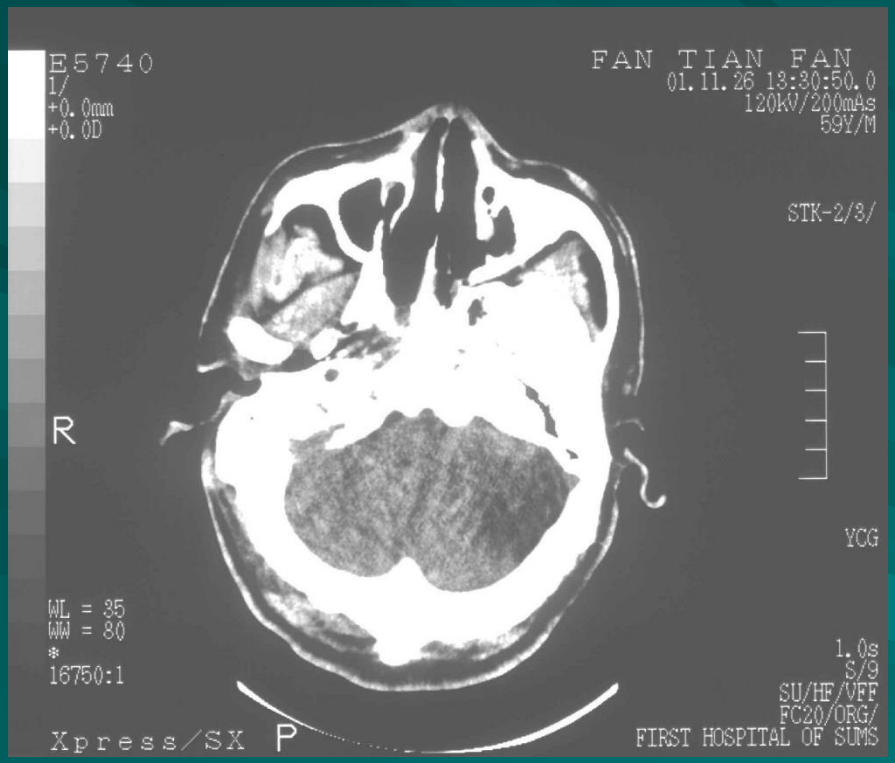
PACI-皮层梗塞

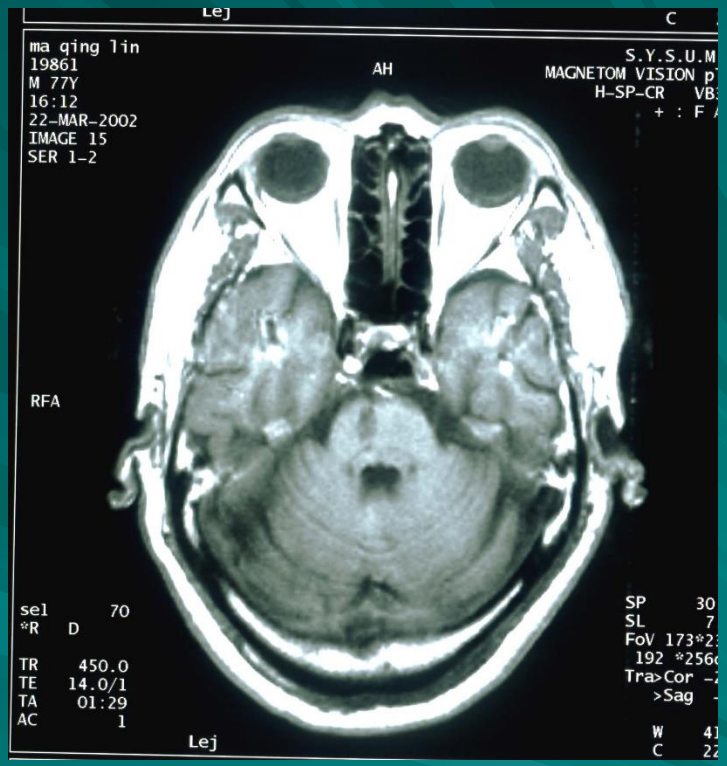


PACI-基底节梗塞

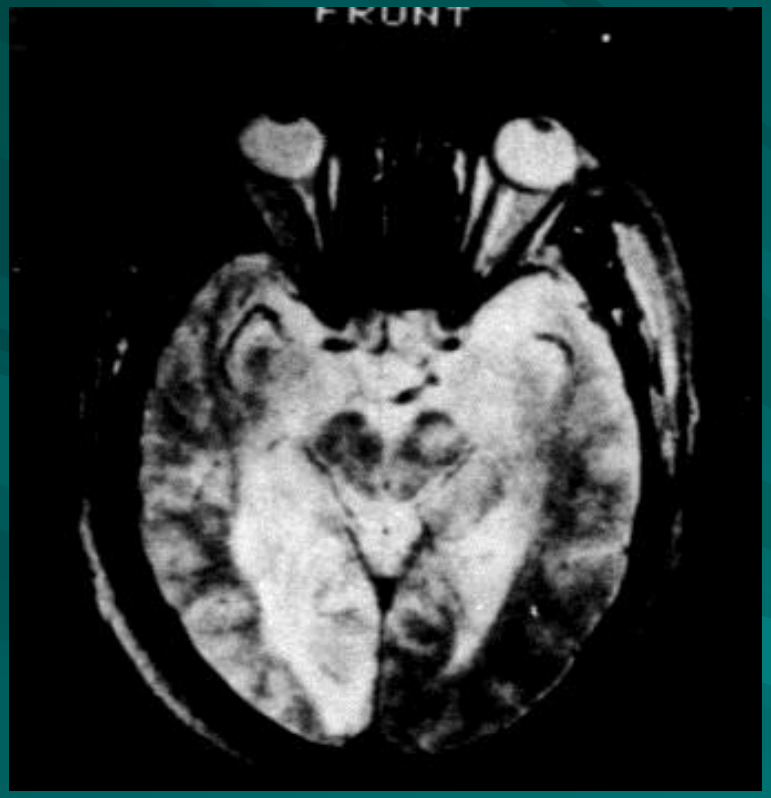


LACI-腔隙性梗塞

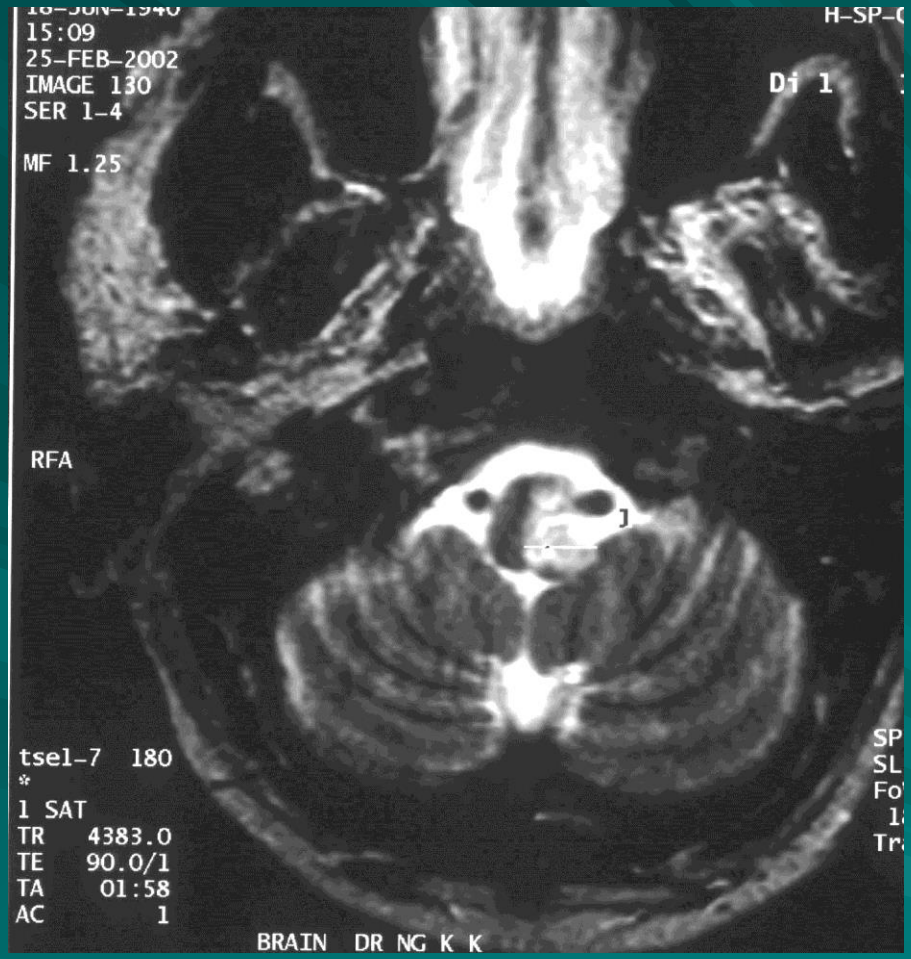




POCI- 小脑　和　脑桥梗塞



POCI--中脑梗塞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25-FEB-2002
IMAGE 130
SER 1-4
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1 SAT
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TA 01:58
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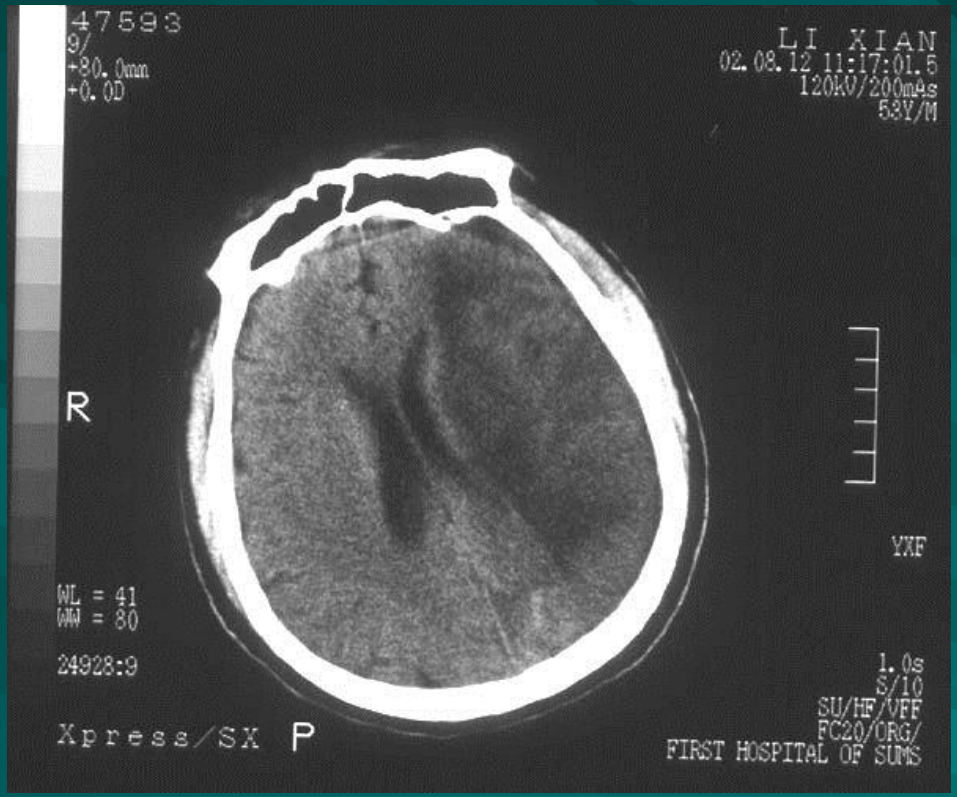
POCI-延髓梗塞

CT分型

- 按解剖部位分为大脑梗塞、小脑梗塞及脑干梗塞，其中大脑梗塞又可分为：
  - **大梗塞**：超过一个脑叶，5cm以上
  - **中梗塞**：小于一个脑叶，3.1 ～ 5cm
  - **小梗塞**：1.6 ～ 3cm
  - **腔隙梗塞**：1.5cm以下
  - **多发性梗塞**：多个中、小及腔隙梗塞


47593
9/
+80.0mm
+0.0D
LI XIAN
02.08.12 11:17:01.5
120kV/200mAs
53Y/M
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WL = 41
WW = 80
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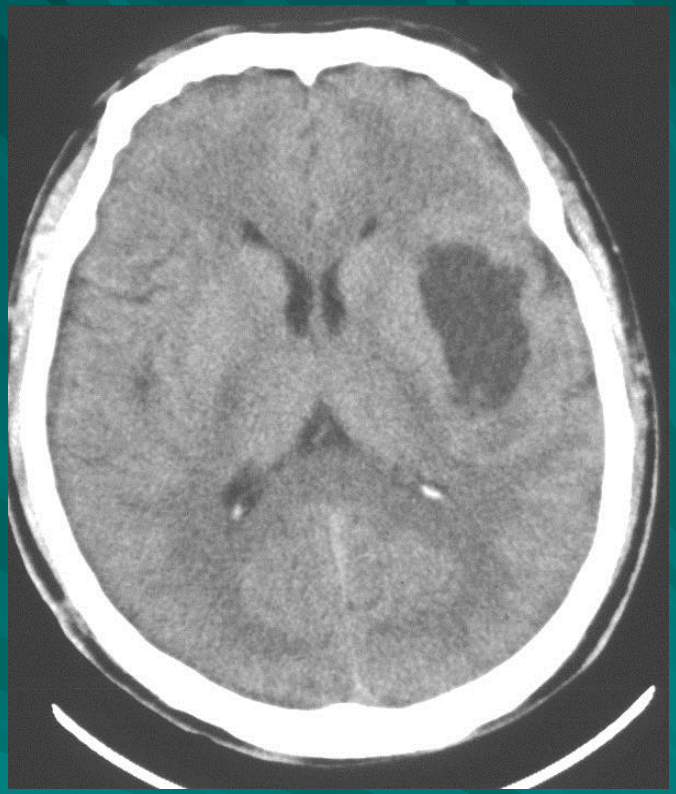
FC20/ORG/
Xpress/SX P
FIRST HOSPITAL OF SUMS

大 梗 塞



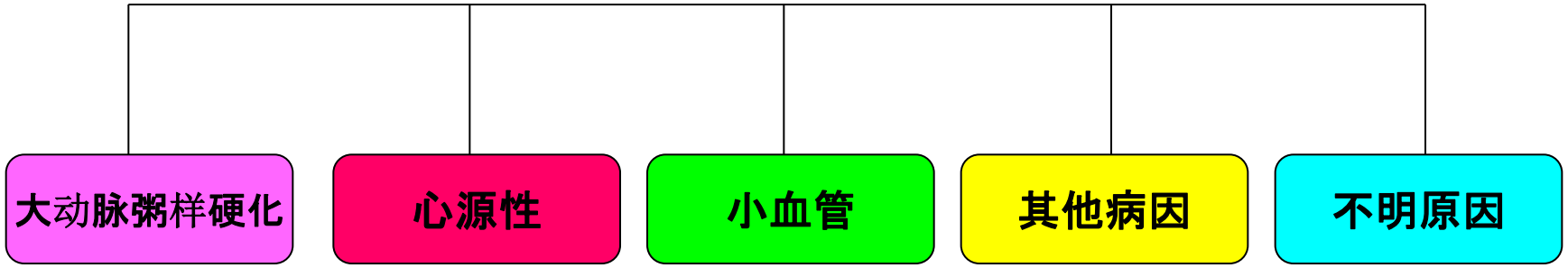
中 梗 塞

小 梗 塞

腔隙性梗塞

多发性梗塞

TOAST-1993年



TOAST分型

心源性脑栓塞（Cardioembolism）

- 多种可以产生心源性栓子的疾病引发的脑栓塞：
  - 卒中发作前4周内的心梗
  - 充血性心力衰竭
  - 冠状动脉狭窄
  - 房颤、房扑、病窦综合征
  - 人工心脏瓣膜
  - 心室壁运动不能和心室壁运动功能减退
  - 心房、心室、主动脉、冠状动脉血栓形成

TOAST分型
大动脉粥样硬化性卒中
（Large-artery atherosclerosis）

- 颈部血管超声

  确认颈内动脉闭塞或狭窄达50%
- 血管造影或MRA

  发现颈动脉、ACA、MCA、PCA 、VA 、BA狭窄达50%

TOAST分型

小动脉卒中（腔隙性脑梗死）

（Small-artery occlusion Lacunar）

- 具备以下三项标准之一即可确诊：
  - 脑部影像与临床标准的腔隙综合征相符，最大径小于1.5cm的病灶
  - 脑部影像没有显示可以解释临床综合征的病灶，但临床表现通常与深部小病灶有关。
  - 影像显示与临床表现相符，但这种表现不是一种典型的腔隙综合征

TOAST分型
其他原因引发的缺血性卒中
（Stroke of other demonstrated etiology）

- 其他明确原因引发的脑梗死
- 动脉壁炎症：结核性、梅毒性、化脓性、钩端螺旋体感染、结缔组织病、变态反应性动脉炎
- 夹层动脉瘤、烟雾病、脱水、感染、无脉症、先天性血管畸形、真红细胞增多症、高凝状态、吸毒等

TOAST分型

原因不明的缺血性卒中

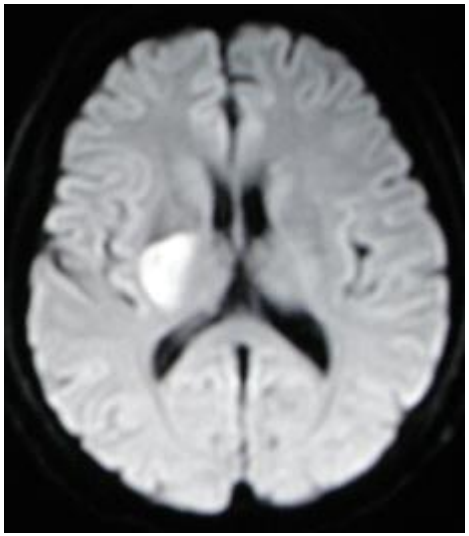
（Stroke of other undemonstrated etiology）

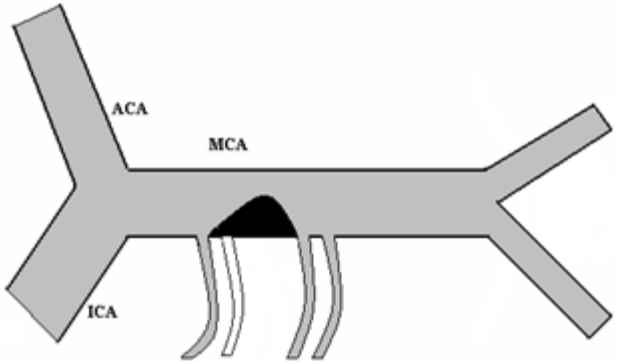
不能归于以上类别的缺血性卒中

a. 2种或更多原因引起；

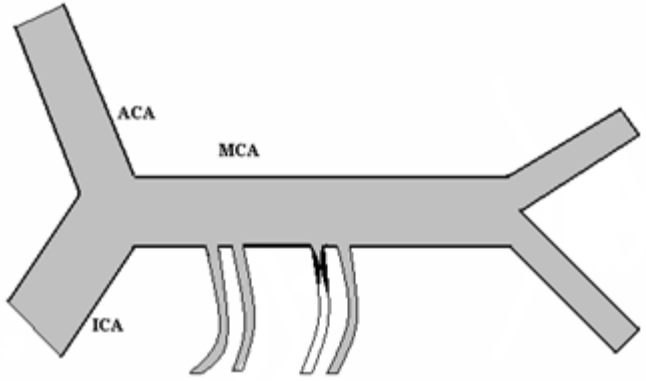
b. 检查结果阴性；

c. 检查不完全。

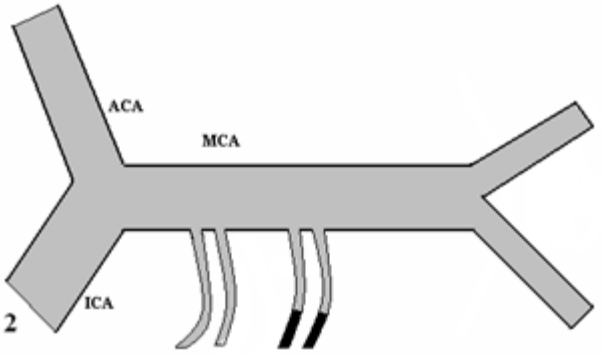




大动脉粥样
硬化延伸



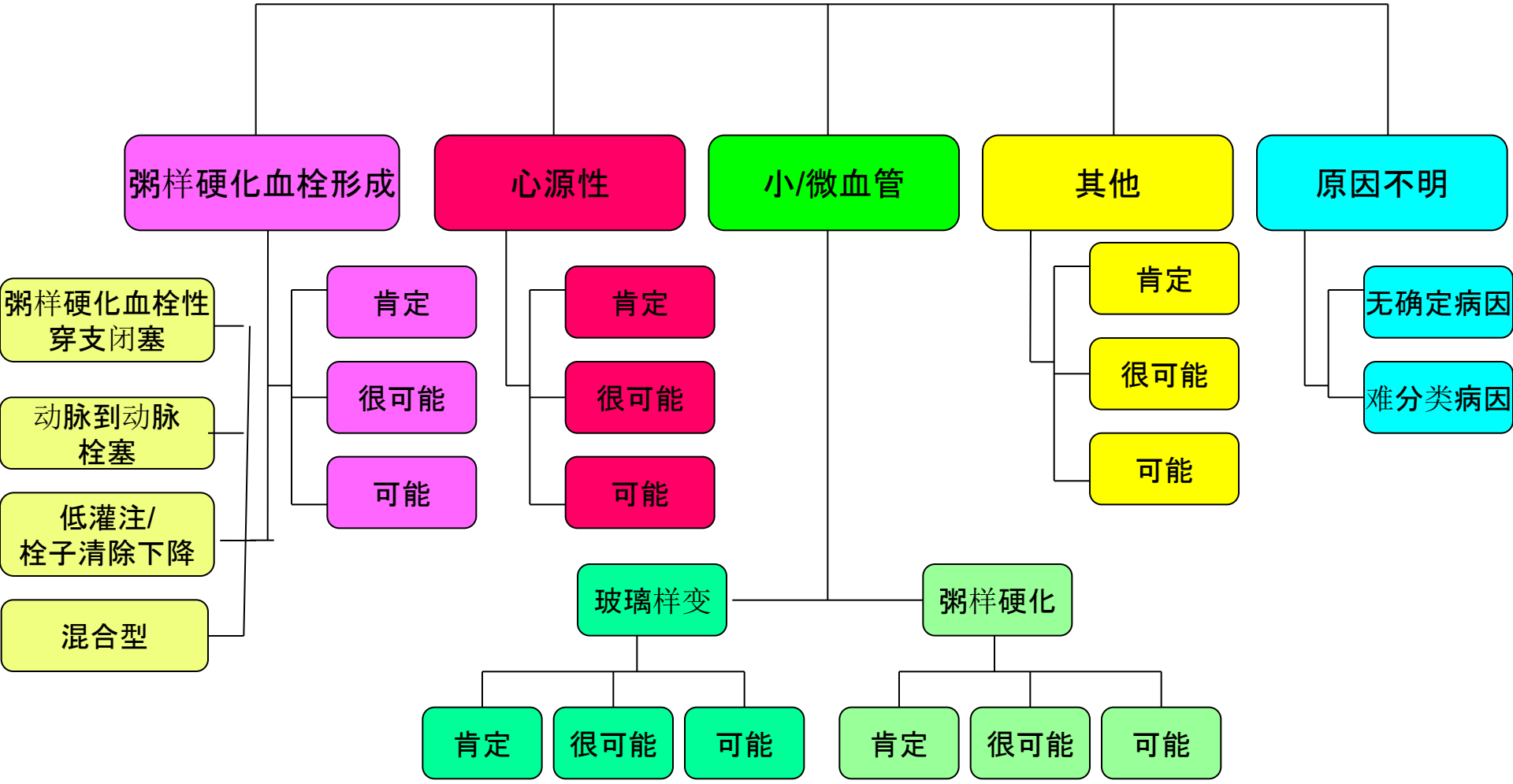
穿支粥样硬化



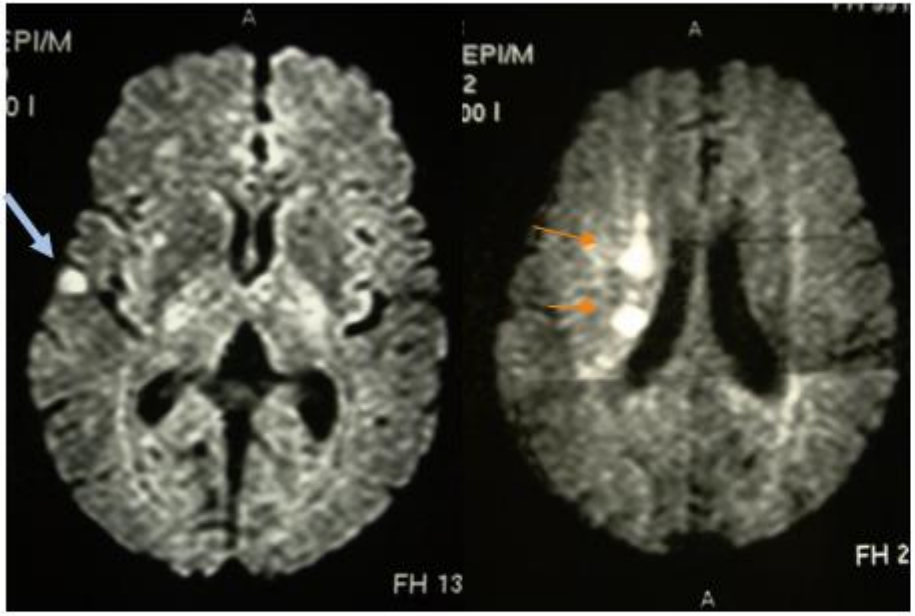
小动脉
玻璃样变

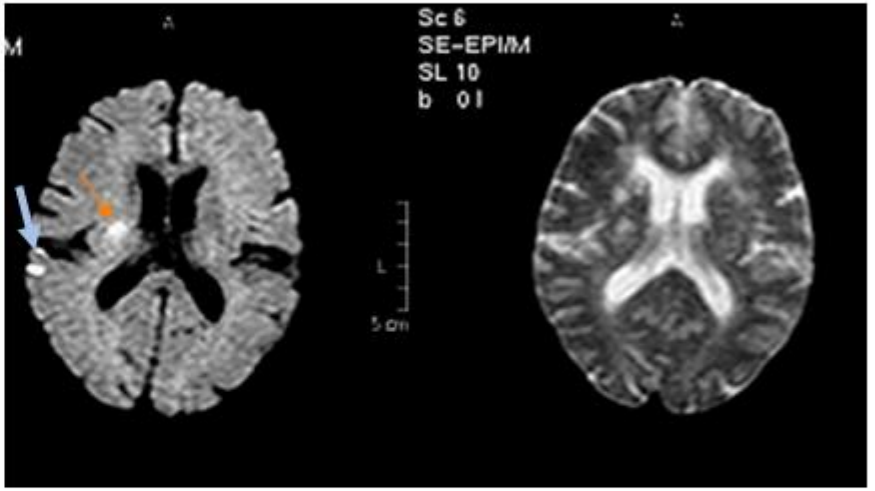
基底节区孤立梗死灶未必一定是小动脉病变引起的“腔梗”

CISS
中国缺血性脑卒中分型



大脑中动脉狭窄病人，皮层微小梗死灶的特点及其代表的意义

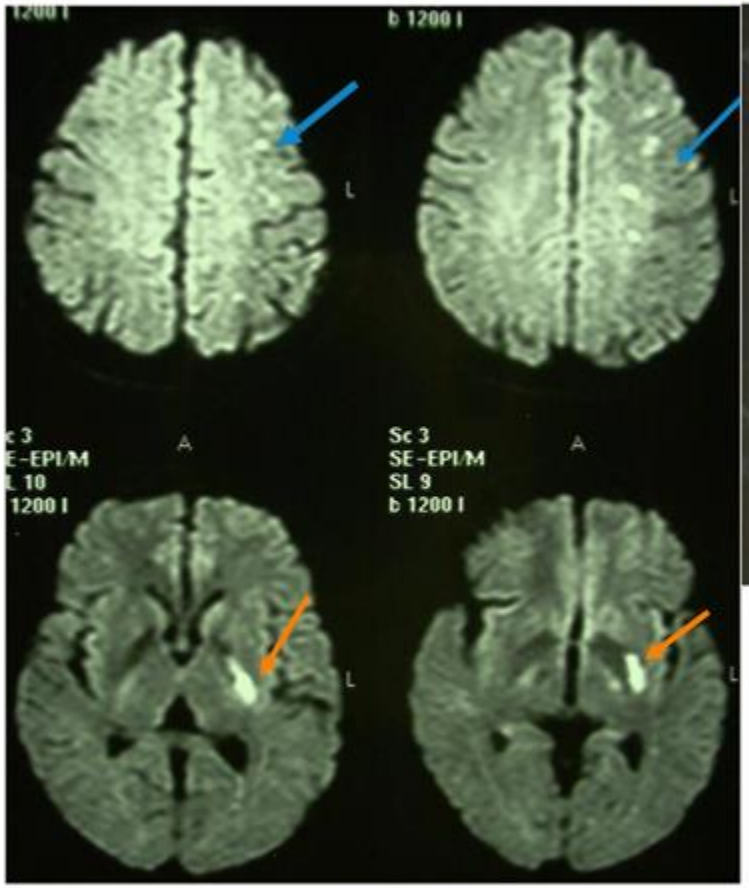


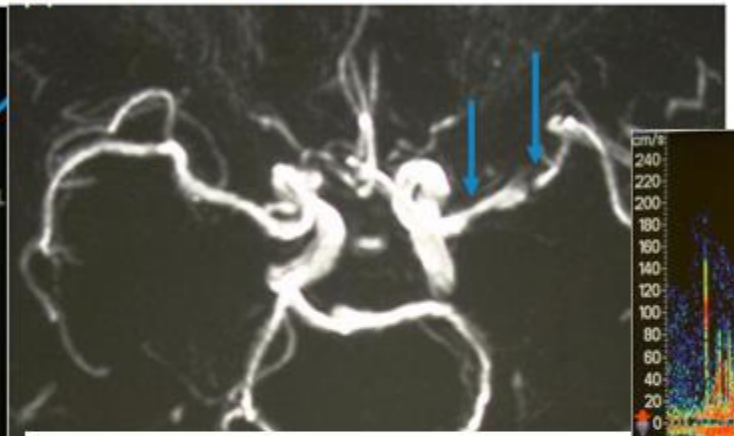


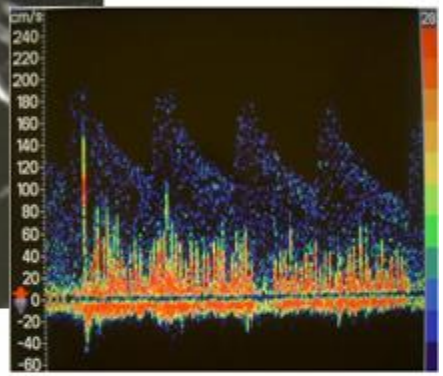
1. 没有孤立存在的皮层梗死
2. **80%** 的皮层梗死有微栓子信号

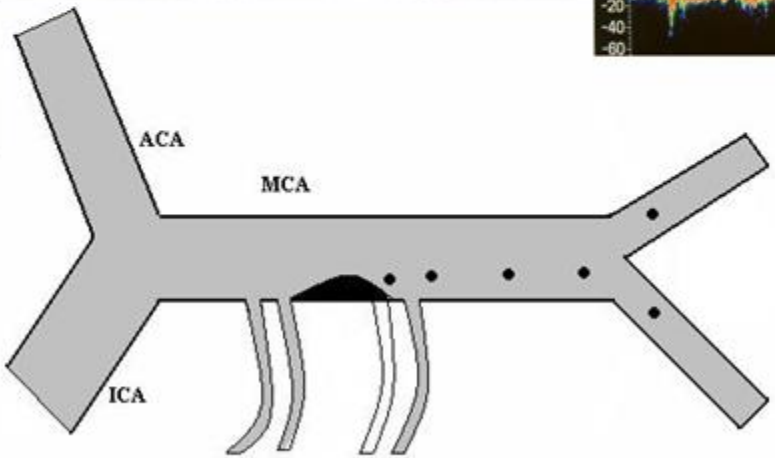
皮层微小梗死灶是：动脉-动脉栓塞的标志

大脑中动脉狭窄，急性多发梗死的特点和意义





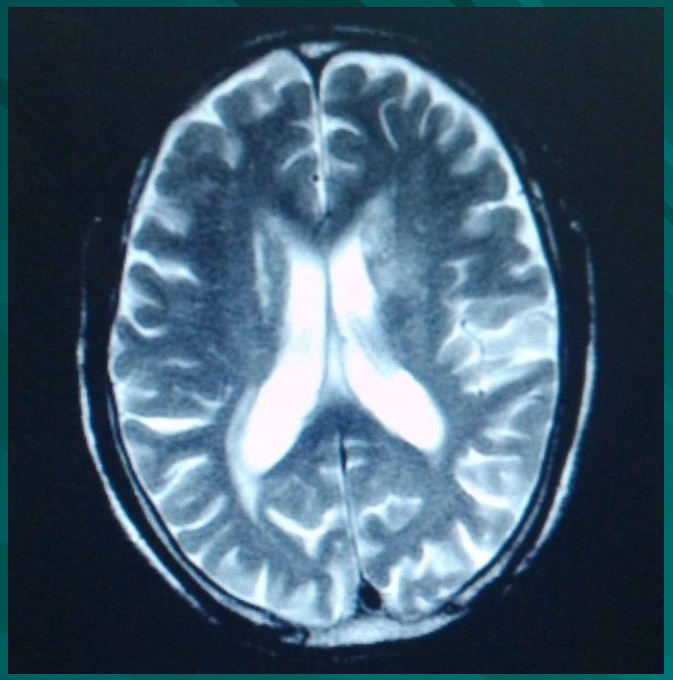


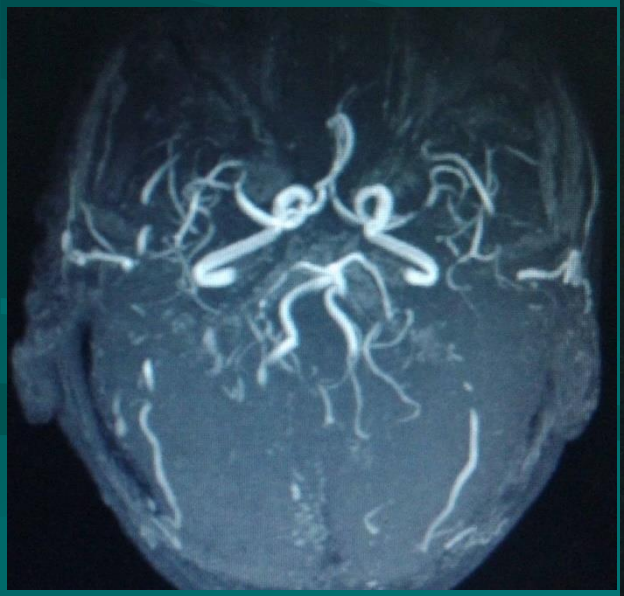


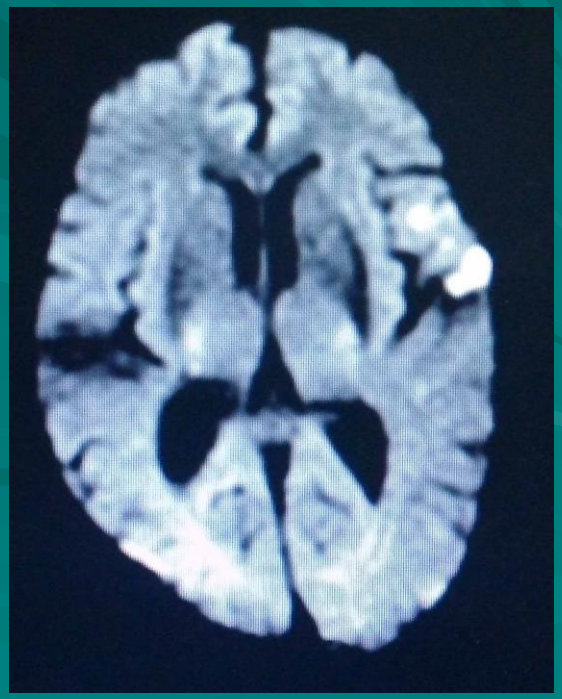
急性多发梗死灶是：动脉-动脉栓塞的标志

36床

脑梗死类型？
病因？







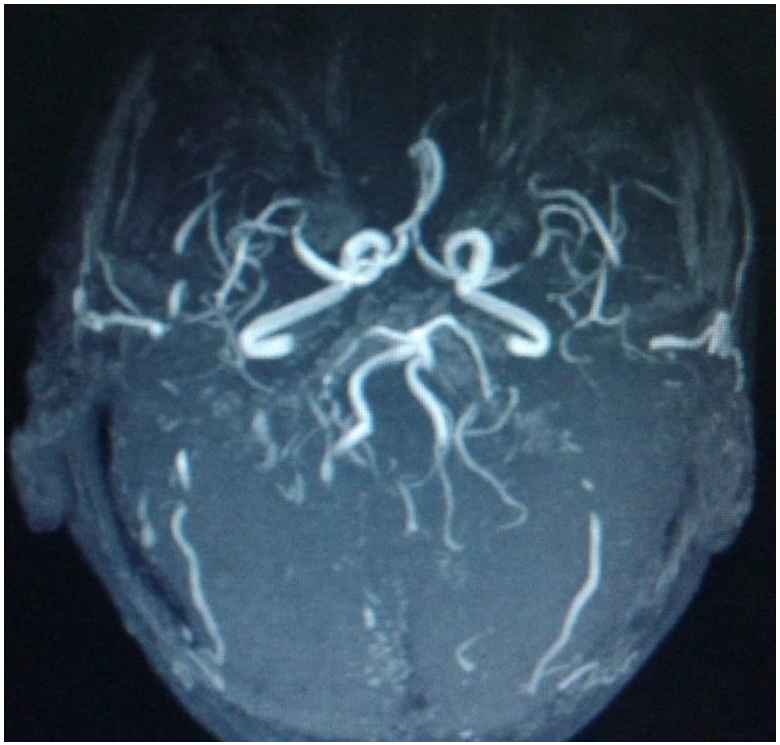
诊断：脑梗死（左侧大脑半球）

OCSP分型：部分前循环梗塞

TOAST分型：大动脉粥样硬化性卒中

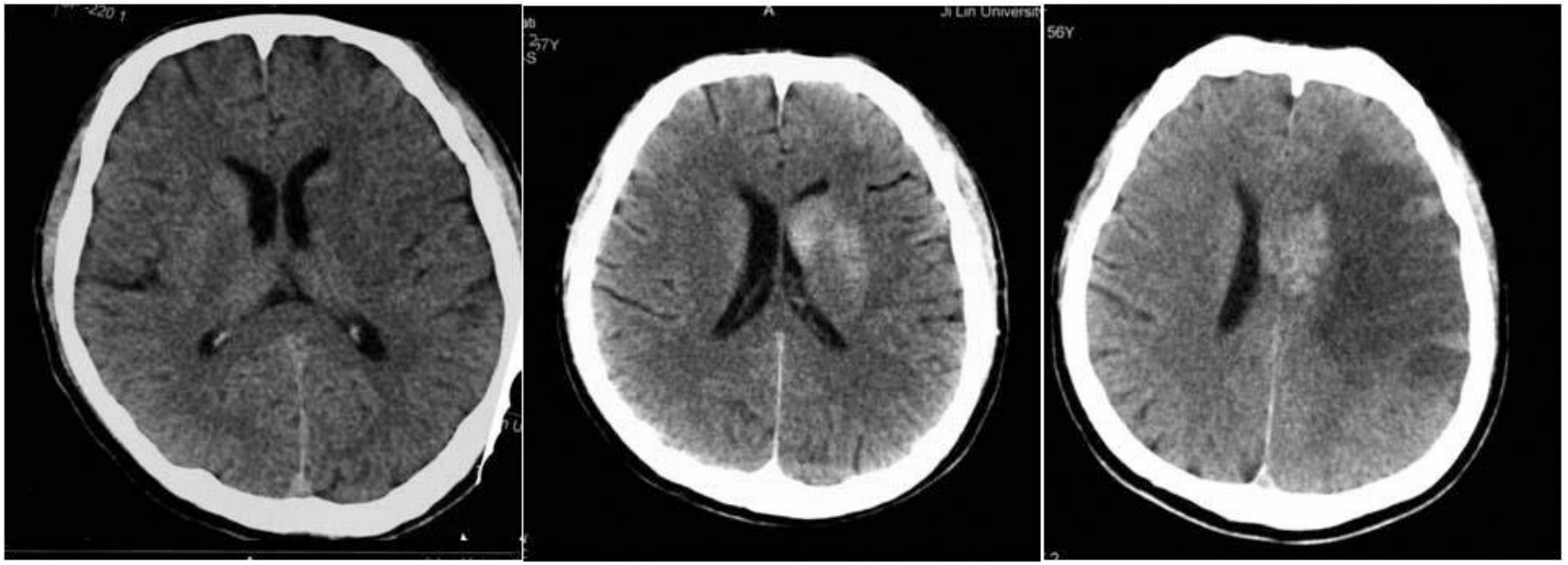
CT分型：多发性梗塞

CISS：动脉-动脉栓塞



什么是脑梗死后出血性转化

- 出血性转化（hemorrhagic transformation，HT）是指急性缺血性卒中（AIS）后，由于缺血区的血管重新恢复血流灌注，导致缺血区内发生自发性出血转变。



1月14日 16:04　　1月14日 22:18　　1月16日 9:15

出血性转化的影像学分类

- 出血性梗死（Hemorrhagic infarction,HI）

  HI-Ⅰ型：梗死灶边缘点状出血

  HI-Ⅱ型：梗死区内较大的融合斑点状出血影，无占位效应

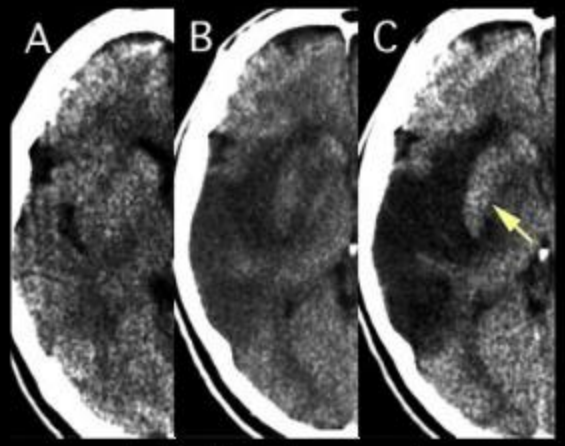
- 脑实质出血（parenchymal hematoma，PH）

  PH-Ⅰ型：血肿不超过梗死区域的30%，轻微占位效应

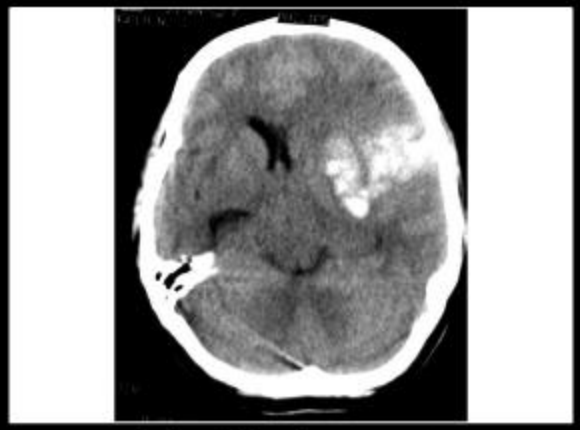
  PH-Ⅱ型：血肿超过了梗死区域的30%，伴有明显的占位效应

欧洲急性卒中合作组（ECASS）

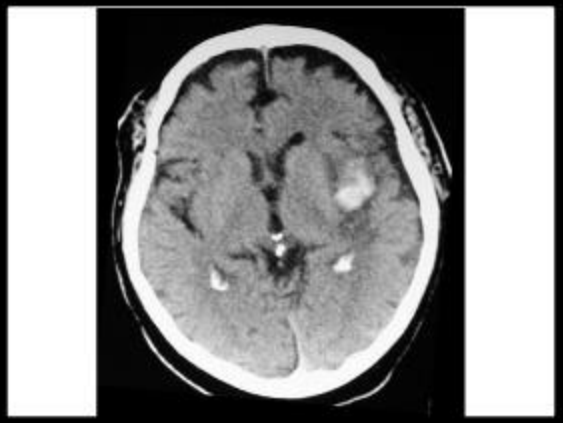
研究显示：仅PH2型与溶栓后24小时病情恶化和3月时死亡呈显著相关



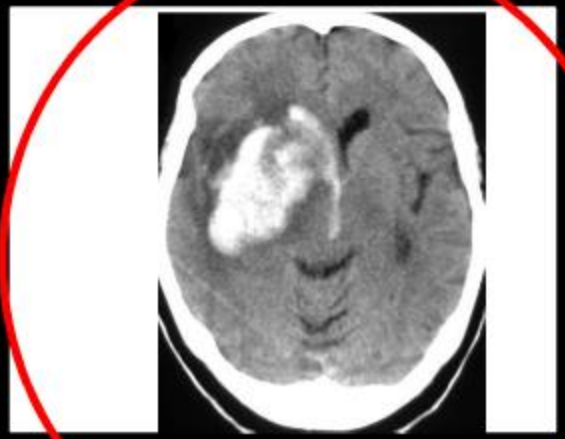
HT* Type 1



HT* Type 2



PH** Type 1



PH** Type2

Courtesy of R. von Kummer, Dresden, Germany.

出血性转化的发生频率和临床后果

- 意大利的前瞻性研究：4个中心，共1125名患者

  1-所有缺血性卒中患者出血性转化率为9%，5.5%为HI，3.2%为PH

  2-发病3个月时的死亡和致残率如下：单纯梗死组为37.9%，HI组为57.4%，PH组为91.7%。提示PH是预后不良的独立相关因子

  3-HT的预测因子包括：心源性或其他原因导致的大面积梗死、高血糖、溶栓治疗，凝血障碍等

1 Stroke 2008; 39: 2249 - 2256.

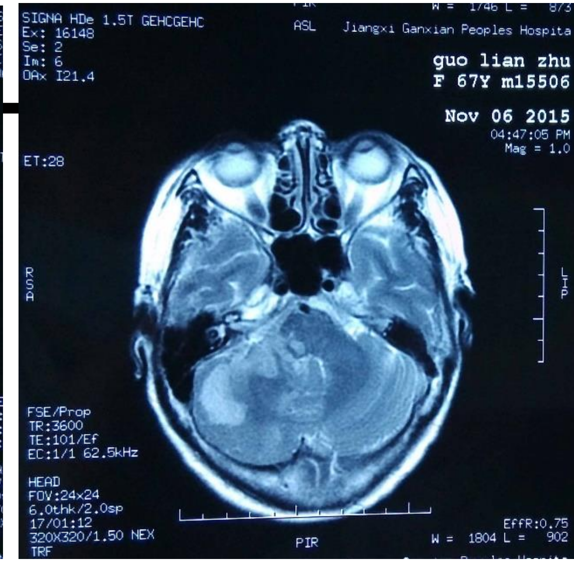
脑血管定位诊断

---------从梗死部位推测供血血管

思考题：定位血管？

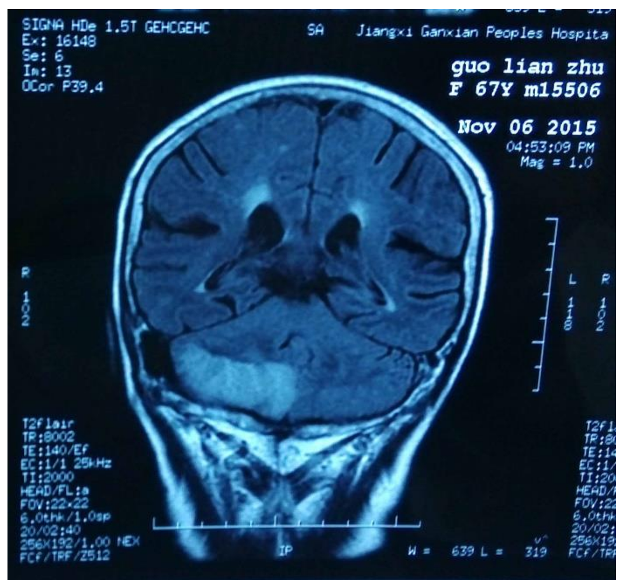
SIGNA HDe 1.5T GEHCGEHC
ASL
Jiangxi Ganxian Peoples Hospita
Ex: 16148
Se: 2
Im: 4
OAx I37.4
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
R
S
A
L
I
P
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
EffR:0.75

SIGNA HDe 1.5T GEHCGEHC
ASL
Jiangxi Ganxian Peoples Hospita
Ex: 16148
Se: 2
Im: 5
OAx I29.4
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
R
S
A
L
I
P
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
TRF
PIR
EffR:0.75
W = 1903 L = 951

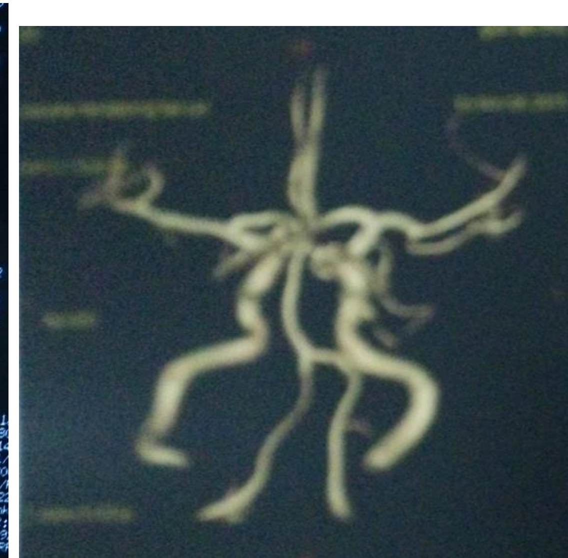


SIGNA HDe 1.5T GEHCGEHC
ASL
Jiangxi Ganxian Peoples Hospita
Ex: 16148
Se: 2
Im: 6
OAx I21.4
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
R
S
A
L
I
P
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
TRF
PIR
EffR:0.75
W = 1804 L = 902

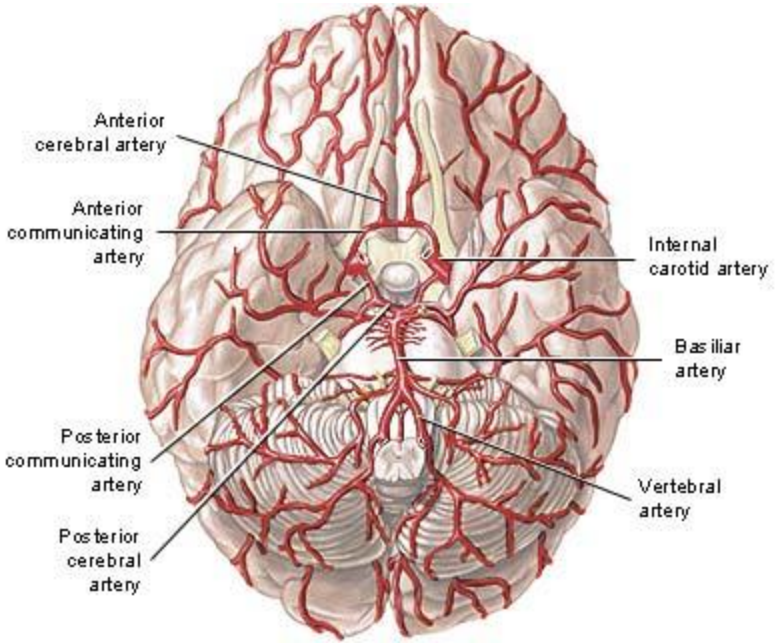
SIGNA HDe 1.5T GEHCGEHC
ASL
Jiangxi Ganxian Peoples Hospita
Ex: 16148
Se: 2
Im: 7
OAx I13.4
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
R
S
A
L
I
P
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
TRF
PIR
EffR:0.75
W = 1743 L = 871
SIGNA HDe 1.5T GEHCGEHC
ASL
Jiangxi Ganxian Peoples Hospita

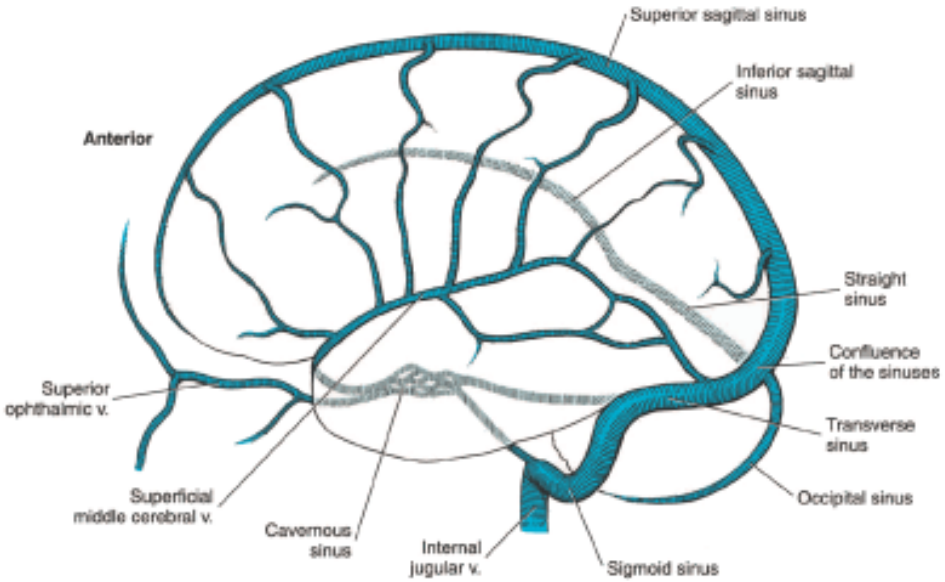


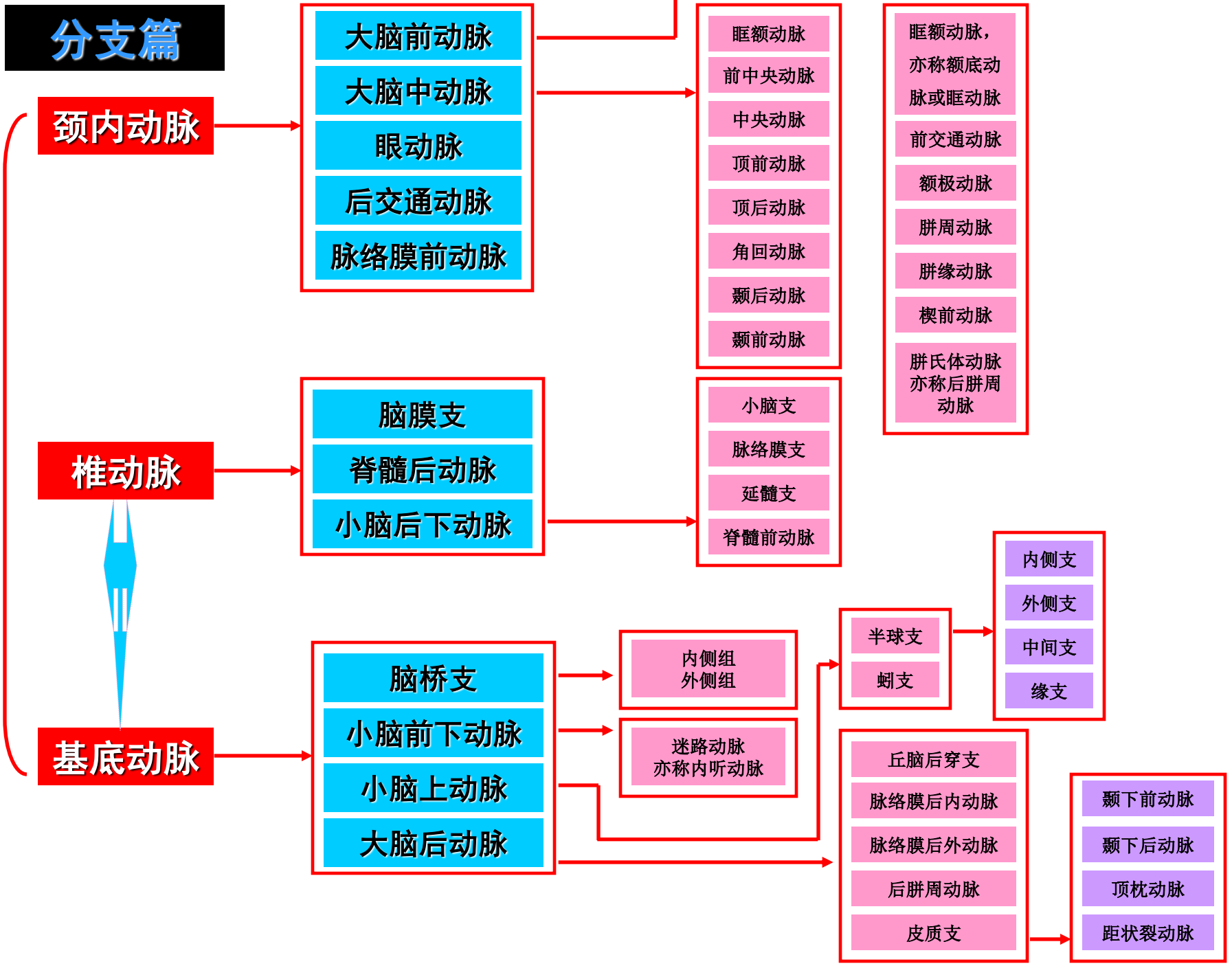
SIGNA HDe 1.5T GEHCGEHC
SA
Jiangxi Ganxian Peoples Hospita
Ex: 16148
Se: 6
Im: 13
OCor P39.4
guo lian zhu
F 67Y m15506
Nov 06 2015
04:53:09 PM
Mag = 1.0
R
L
T2flair
TR:8002
TE:140/Ef
EC:1/1 25kHz
TI:2000
HEAD/FL:a
FOV:22x22
6.0thk/1.0sp
20/02:40
256X192/1.00 NEX
FCF/TRF/ZS12
IP
W = 639 L = 319

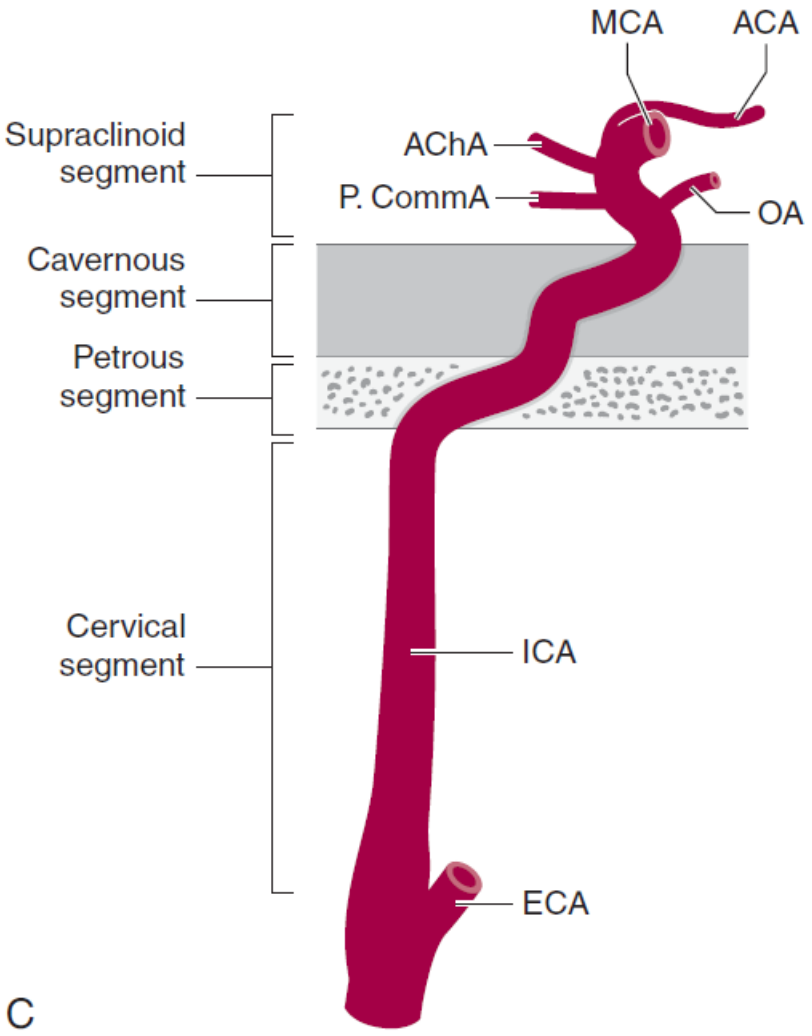


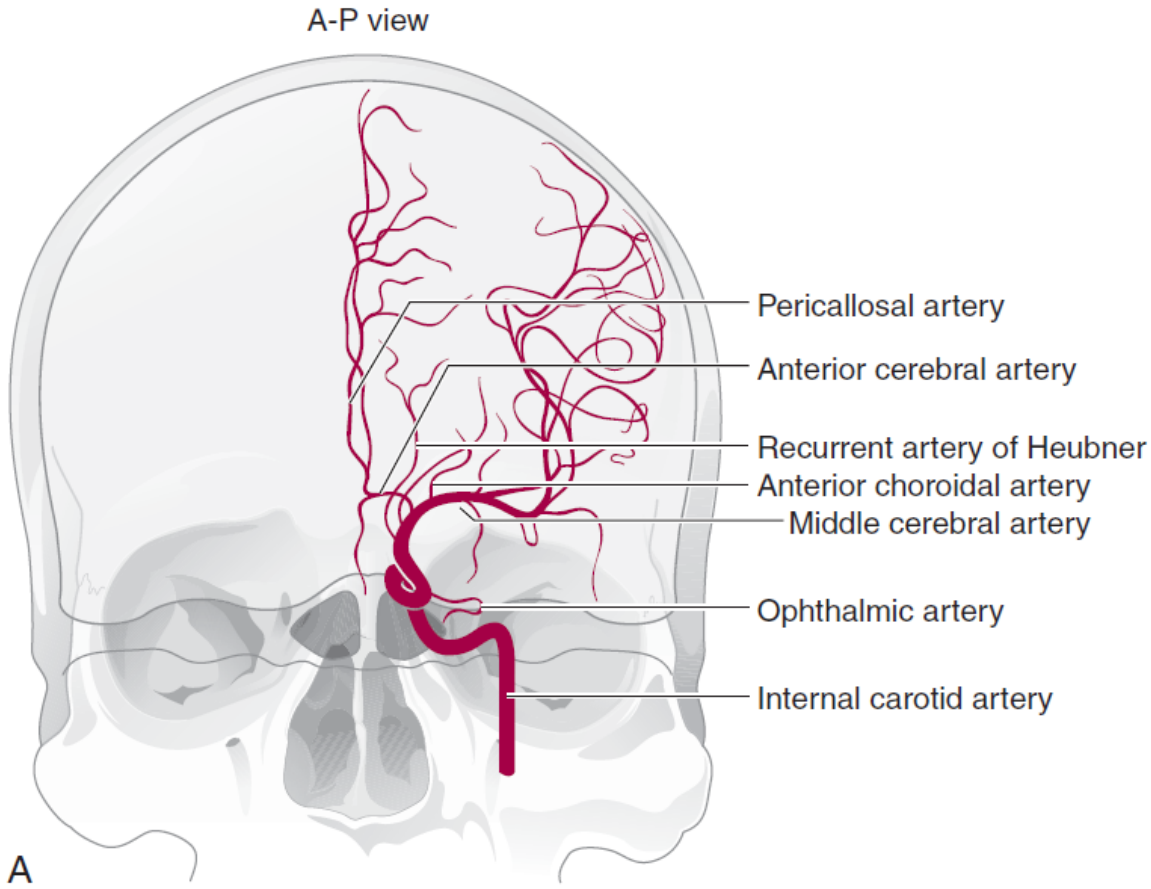
脑动脉分段、分支与图解

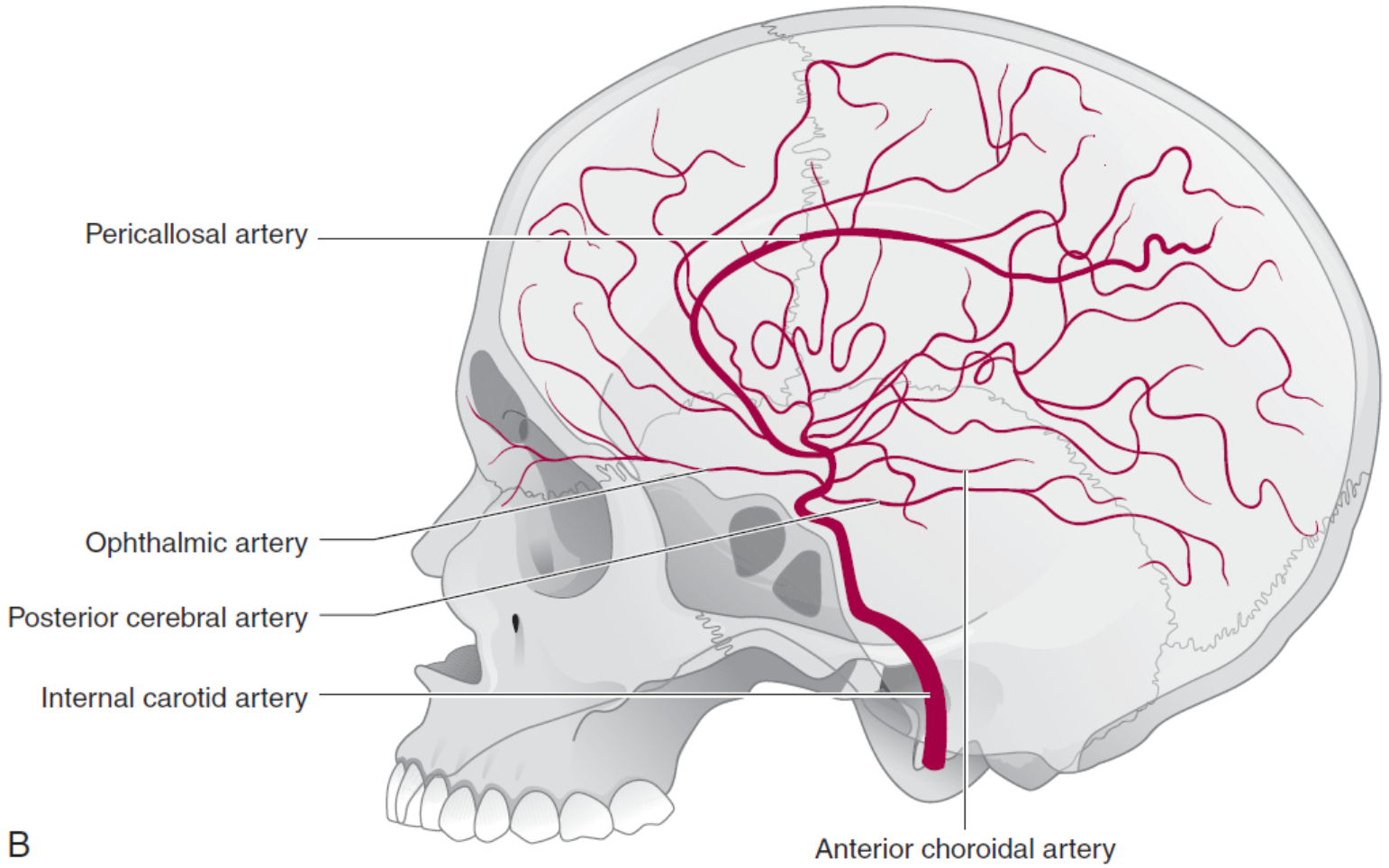

Anterior cerebral artery
Anterior communicating artery
Internal carotid artery
Basiliar artery
Posterior communicating artery
Vertebral artery
Posterior cerebral artery


Superior sagittal sinus
Inferior sagittal sinus
Anterior
Straight sinus
Confluence of the sinuses
Superior ophthalmic v.
Transverse sinus
Occipital sinus
Superficial middle cerebral v.
Cavernous sinus
Internal jugular v.
Sigmoid sinus

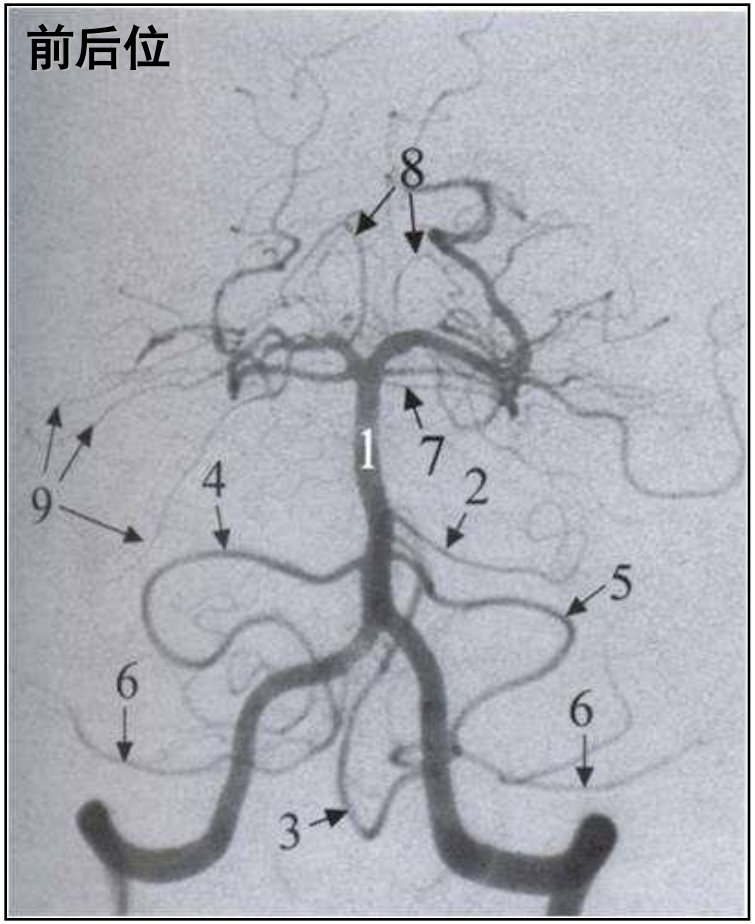

分支篇
颈内动脉
大脑前动脉
大脑中动脉
眼动脉
后交通动脉
脉络膜前动脉
眶额动脉
前中央动脉
中央动脉
顶前动脉
顶后动脉
角回动脉
颞后动脉
颞前动脉
眶额动脉，亦称额底动脉或眶动脉
前交通动脉
额极动脉
胼周动脉
胼缘动脉
楔前动脉
胼氏体动脉亦称后胼周动脉
椎动脉
脑膜支
脊髓后动脉
小脑后下动脉
小脑支
脉络膜支
延髓支
脊髓前动脉
基底动脉
脑桥支
小脑前下动脉
小脑上动脉
大脑后动脉
内侧组
外侧组
迷路动脉
亦称内听动脉
半球支
蚓支
内侧支
外侧支
中间支
缘支
丘脑后穿支
脉络膜后内动脉
脉络膜后外动脉
后胼周动脉
皮质支
颞下前动脉
颞下后动脉
顶枕动脉
距状裂动脉

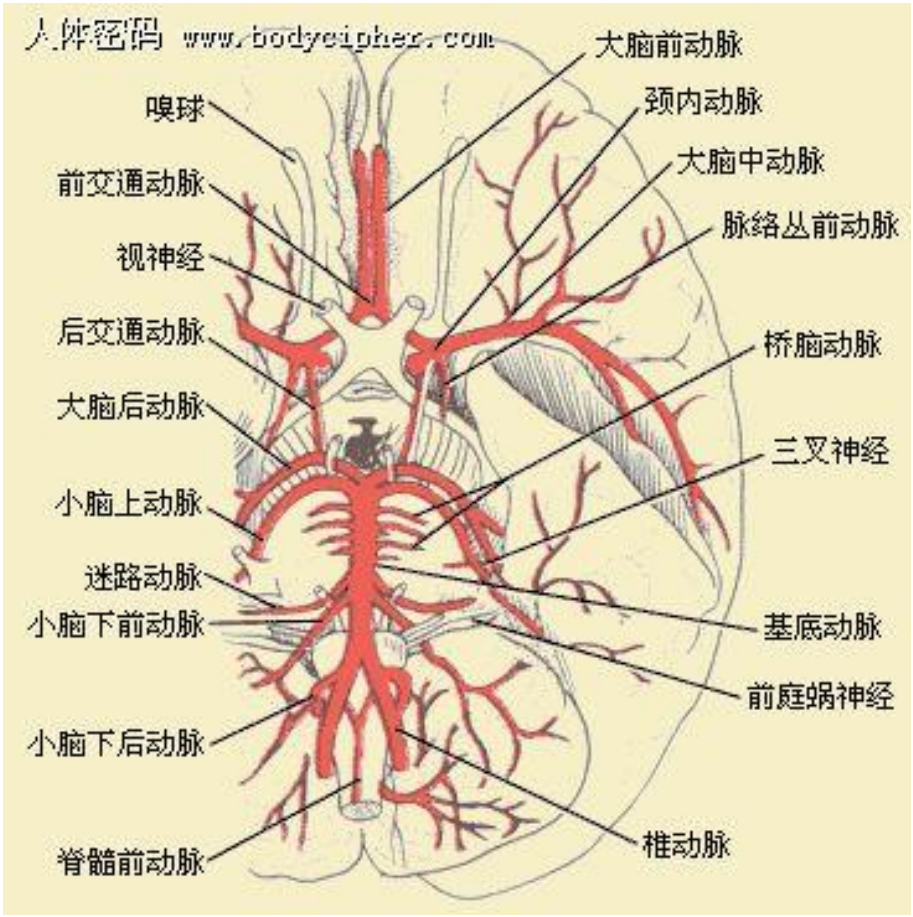

MCA
ACA
Supraclinoid segment
AChA
P. CommA
OA
Cavernous segment
Petrous segment
Cervical segment
ICA
ECA
C


A-P view
Pericallosal artery
Anterior cerebral artery
Recurrent artery of Heubner
Anterior choroidal artery
Middle cerebral artery
Ophthalmic artery
Internal carotid artery
A


Pericallosal artery
Ophthalmic artery
Posterior cerebral artery
Internal carotid artery
Anterior choroidal artery
B

基底动脉（Basilar Artery, BA）

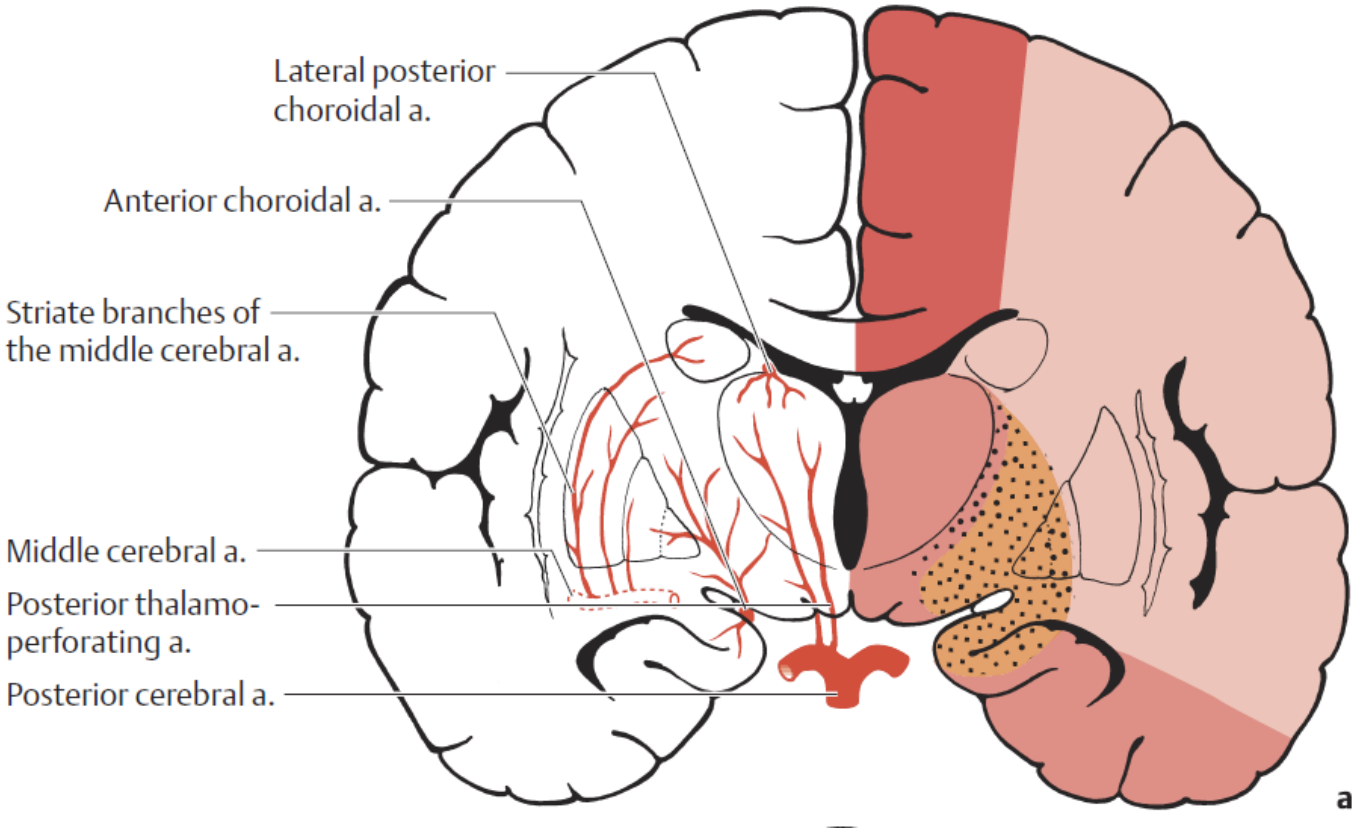


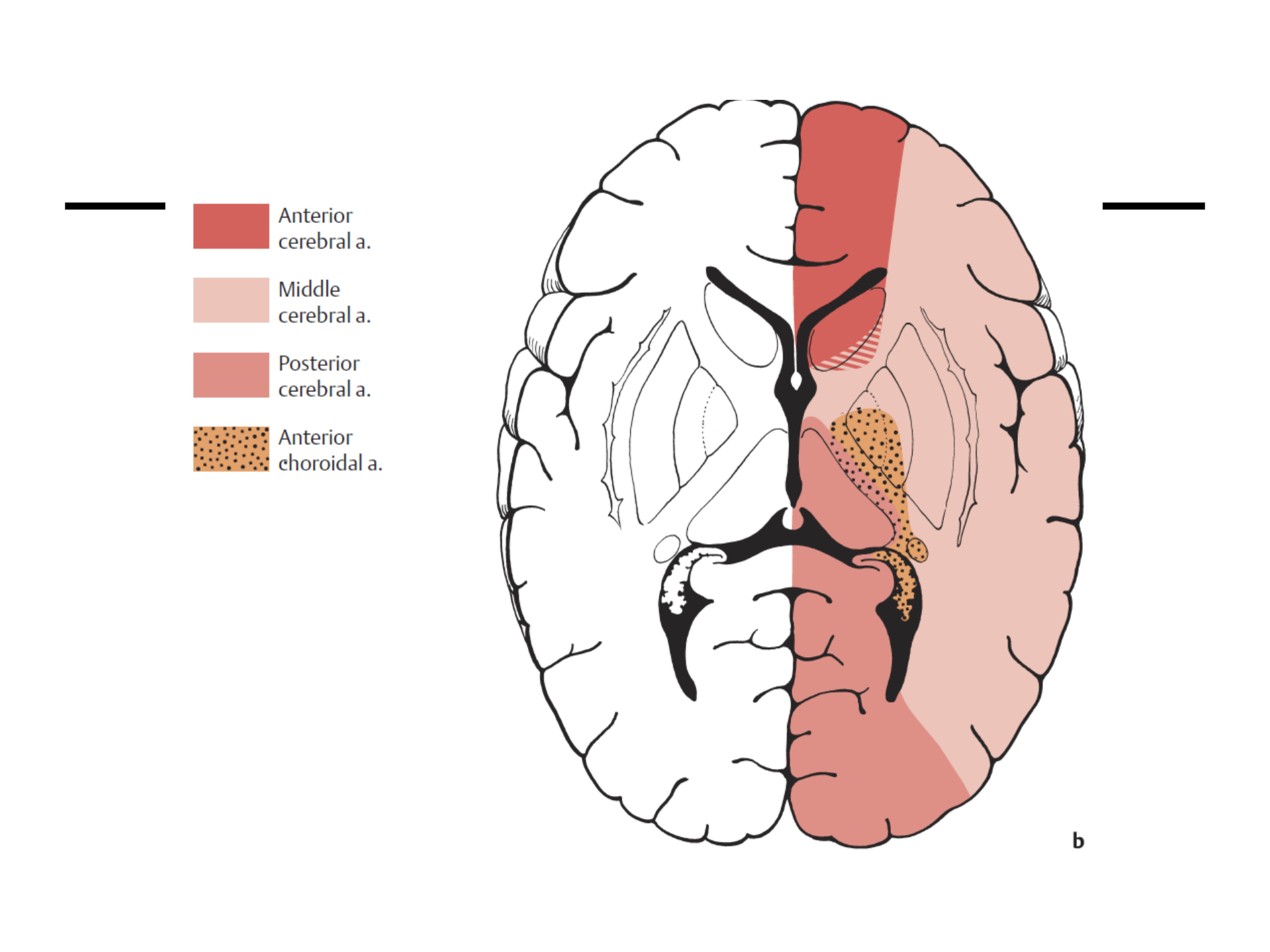


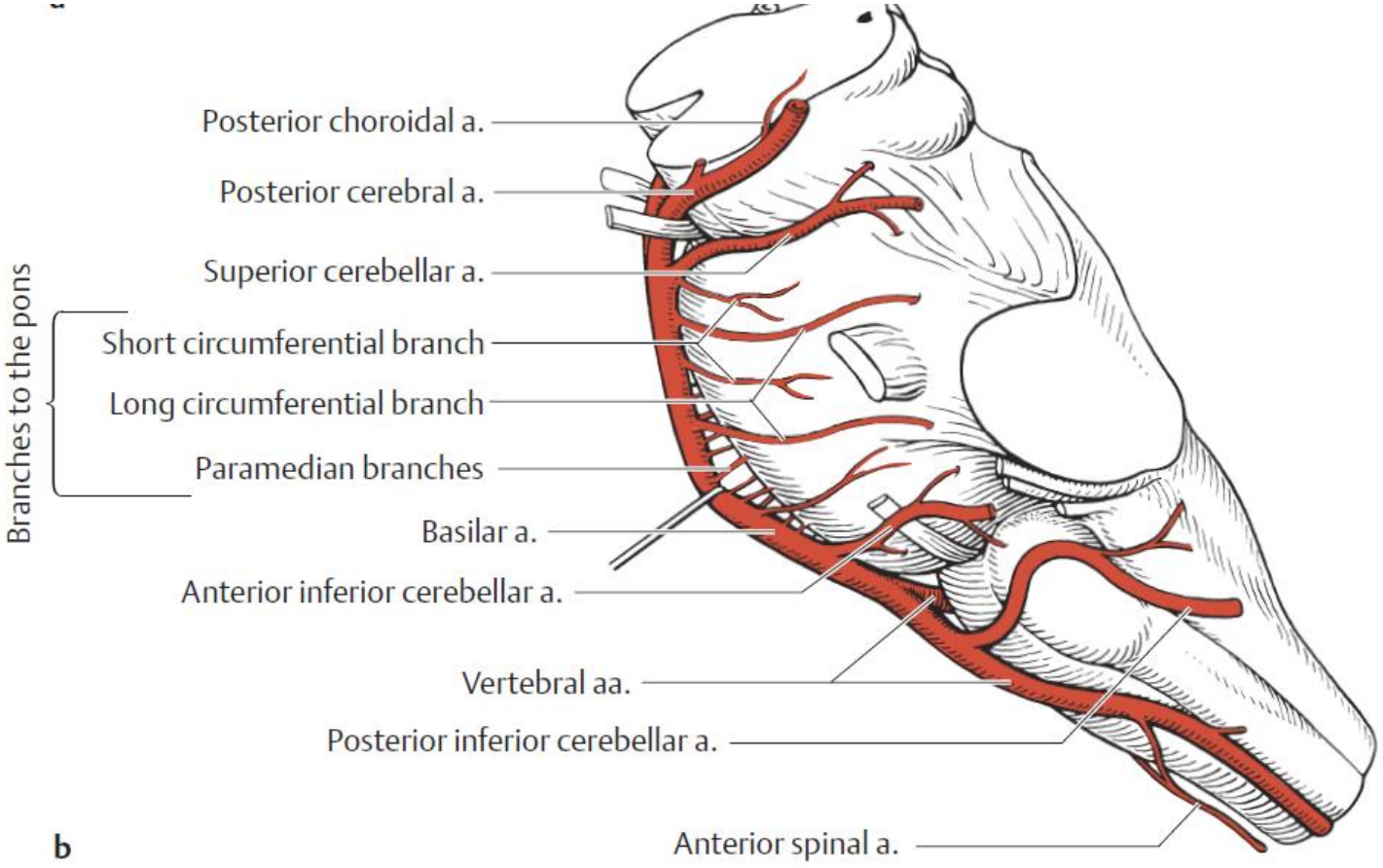
1.基底动脉
2.脑桥动脉
3.左小脑后下动脉（PICA）
4.右AICA-PICA干
5.左小脑前下动脉（AICA）

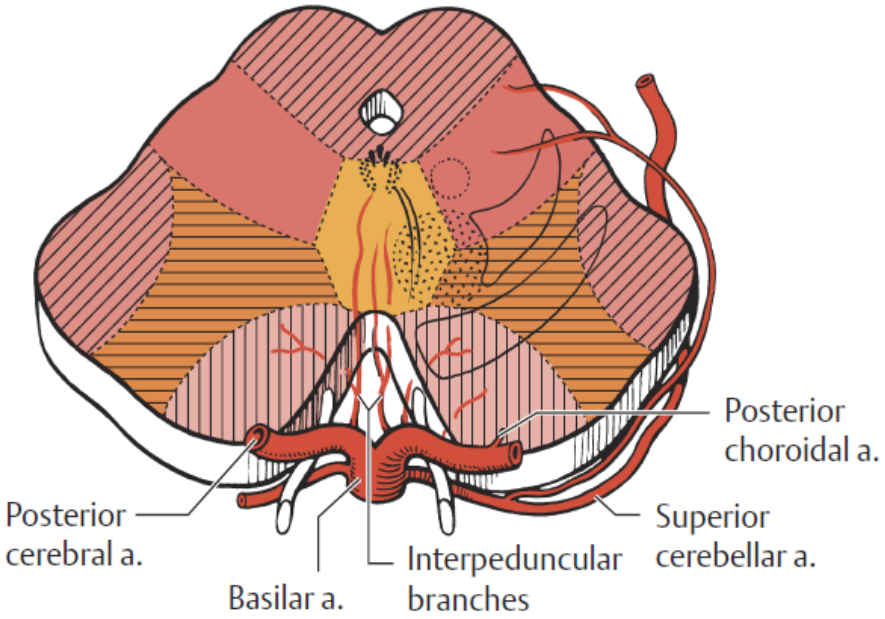
6. PICA半球支
7. 小脑上动脉（SCA）
8. SCA的蚓支
9. 小脑上动脉半球支

脑桥支
小脑前下动脉
小脑上动脉
大脑后动脉


Lateral posterior choroidal a.
Anterior choroidal a.
Striate branches of the middle cerebral a.
Middle cerebral a.
Posterior thalamo-perforating a.
Posterior cerebral a.
a


Anterior cerebral a.
Middle cerebral a.
Posterior cerebral a.
Anterior choroidal a.
b

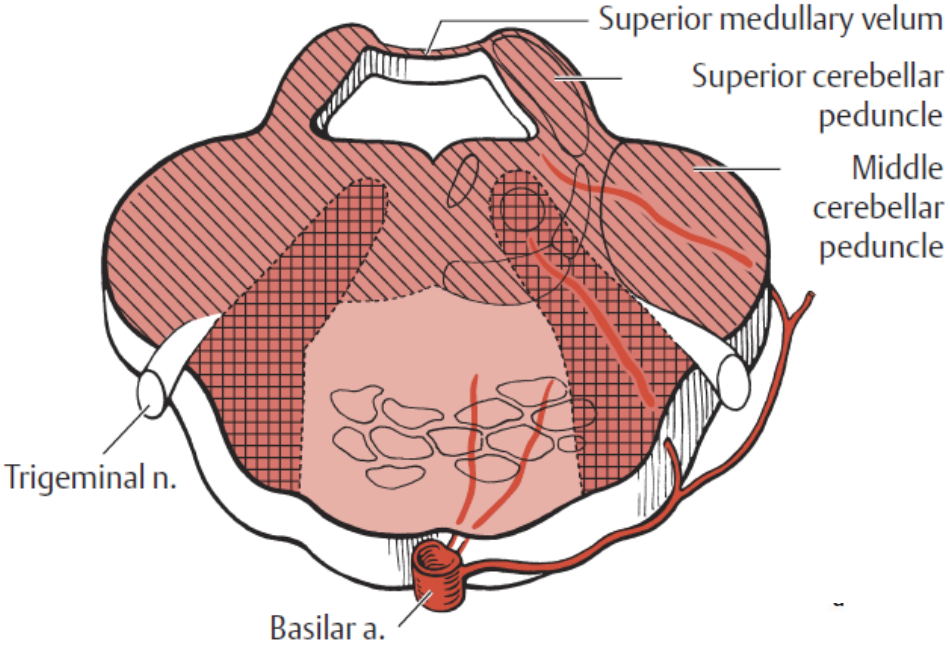

Posterior choroidal a.
Posterior cerebral a.
Superior cerebellar a.
Branches to the pons
Short circumferential branch
Long circumferential branch
Paramedian branches
Basilar a.
Anterior inferior cerebellar a.
Vertebral aa.
Posterior inferior cerebellar a.
Anterior spinal a.
b



a Midbrain

- Superior cerebellar a.
- Posterior cerebral a.
- Posterior choroidal a.
- Interpeduncular branches
- Posterior communicating a.

(After Murphy)



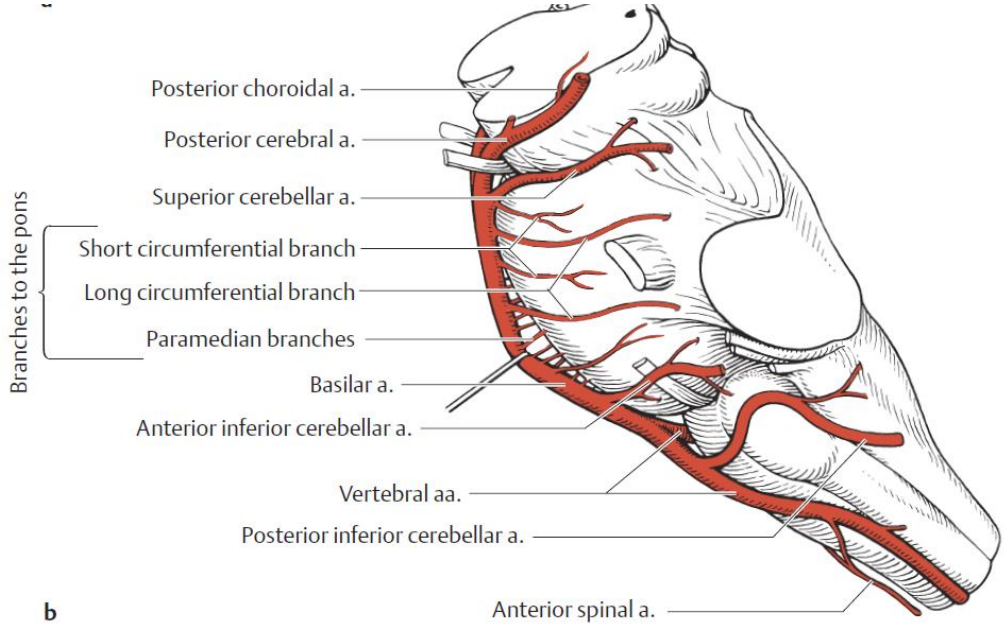
b Pons

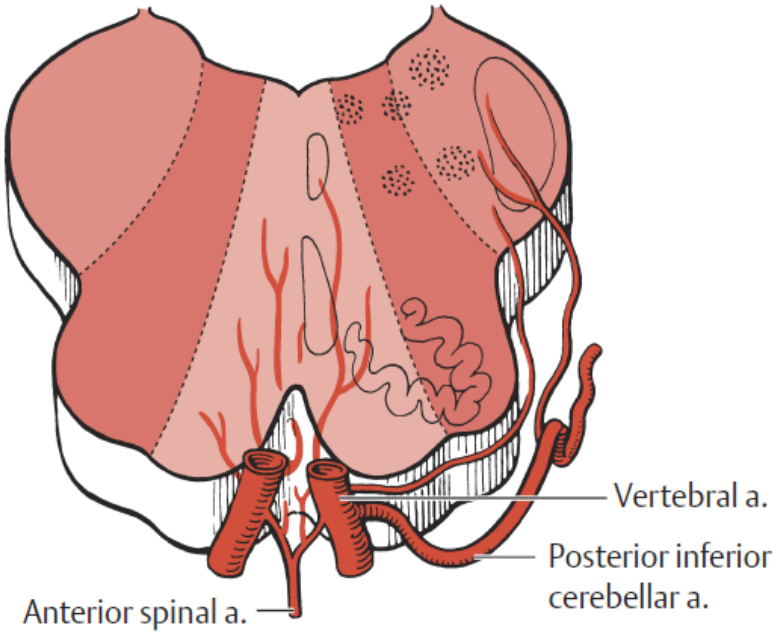
Paramedian branches

Short circumferential branches

Long circumferential branches

(After Foix and Hillemand)





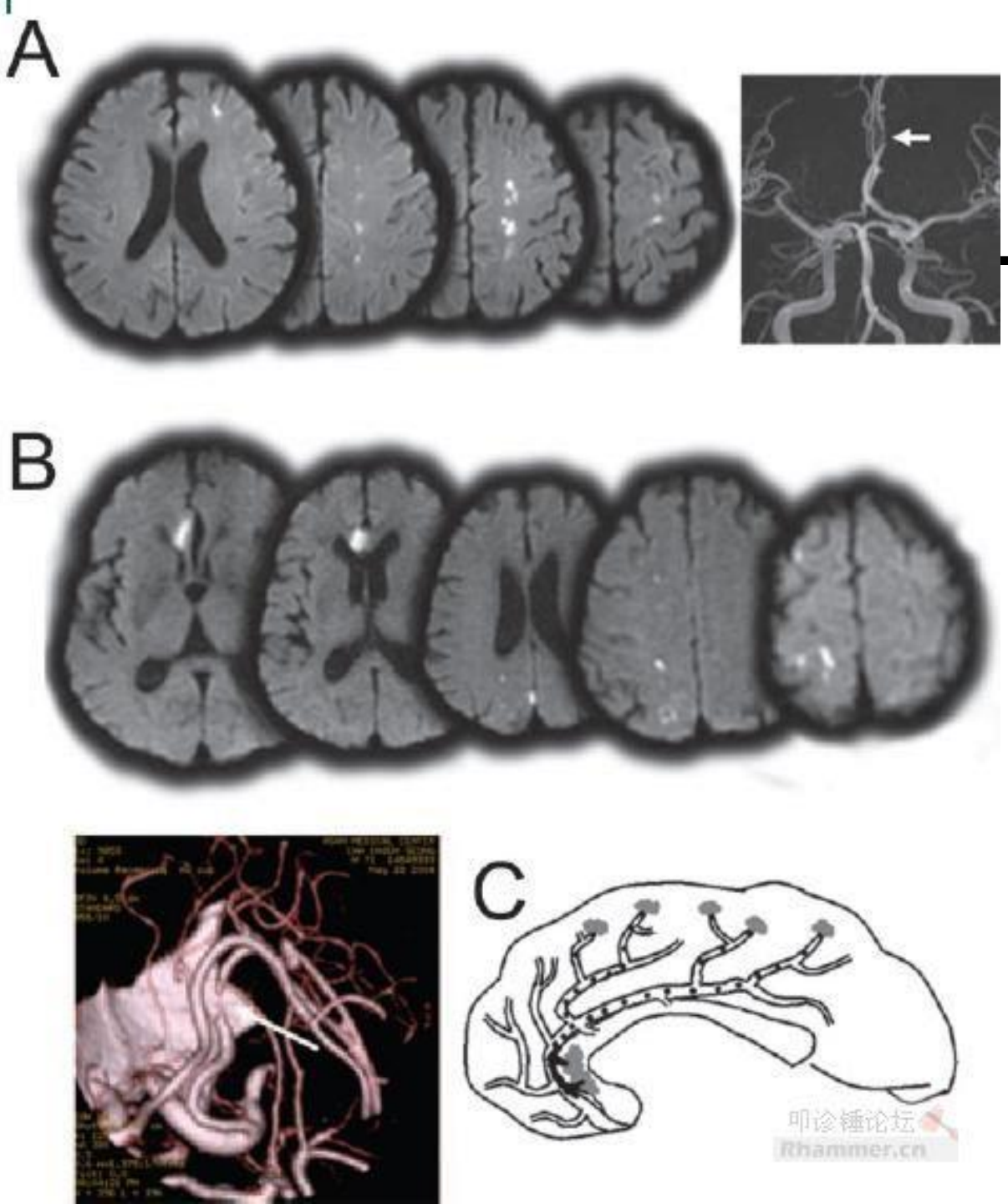
c Medulla

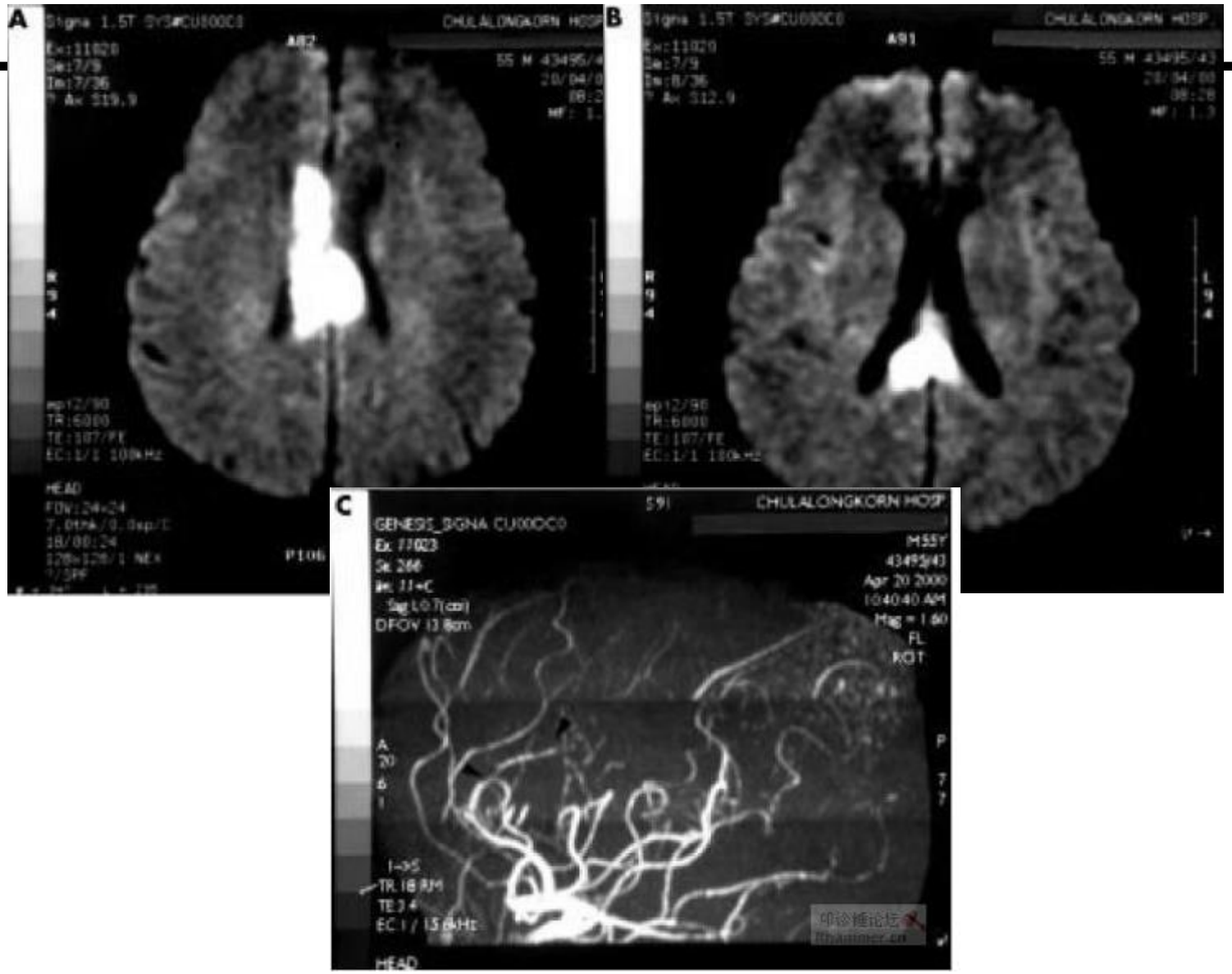
Posterior inferior cerebellar a.

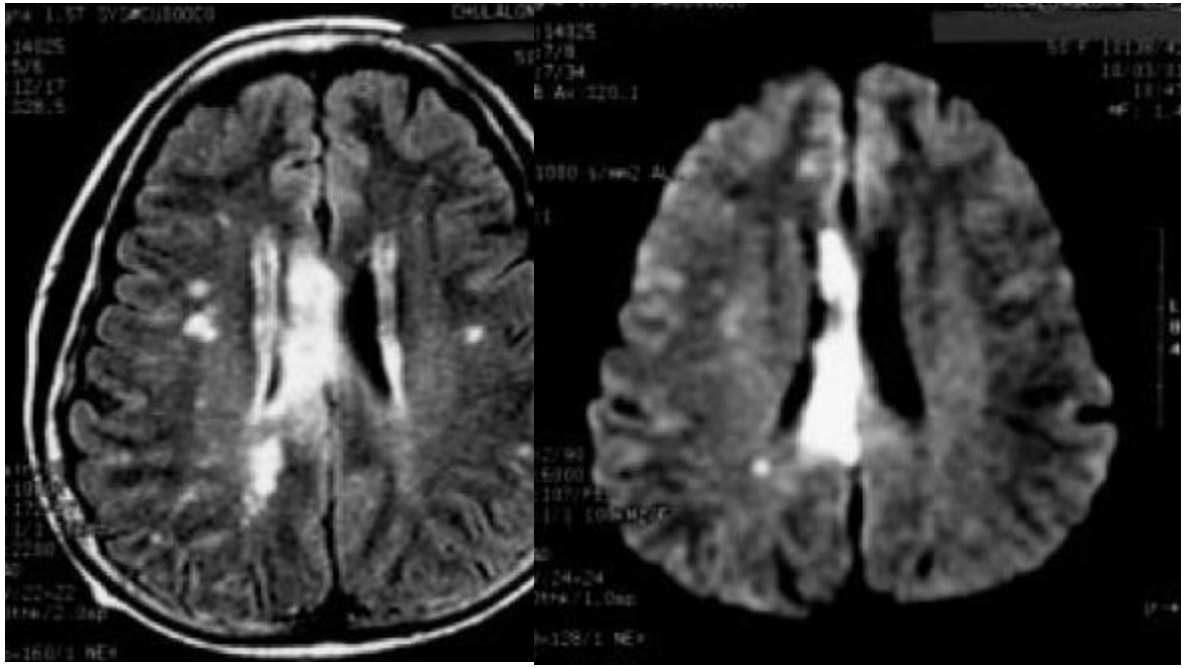
Anterior inferior cerebellar a.

Anterior spinal a. und vertebral paramedian aa.

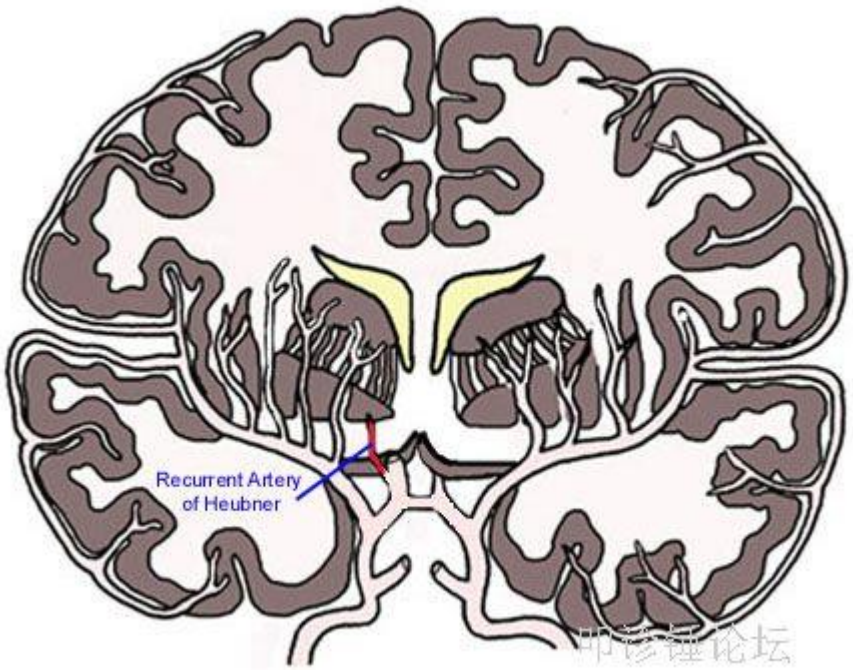
大脑前动脉

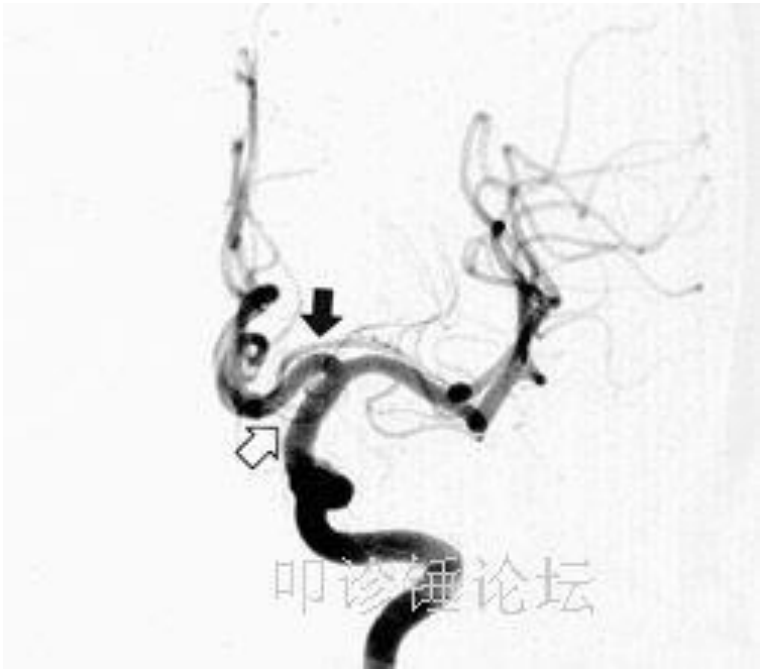

A
B
C

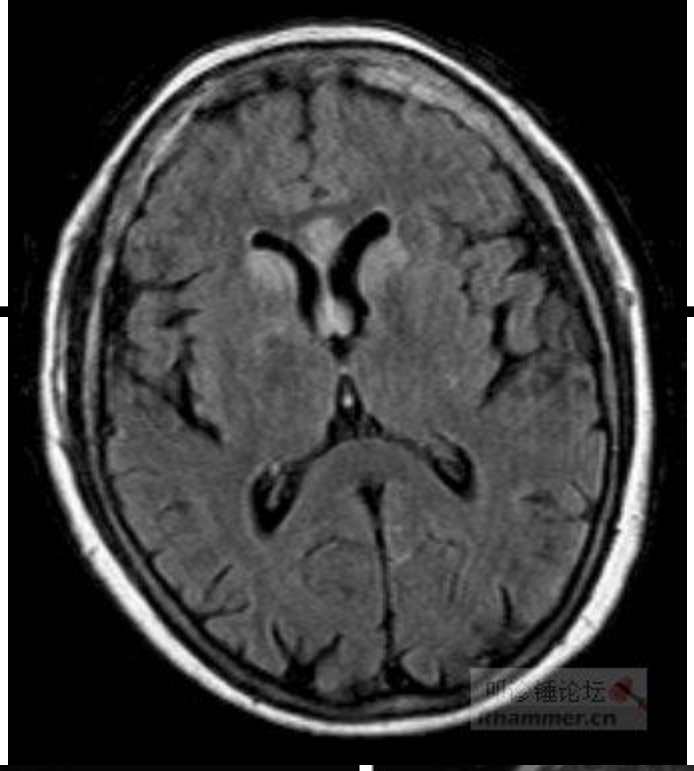

A
B
C
CHULALONGKORN HOSP
GENESIS_SIGNA CU00CC0
HEAD

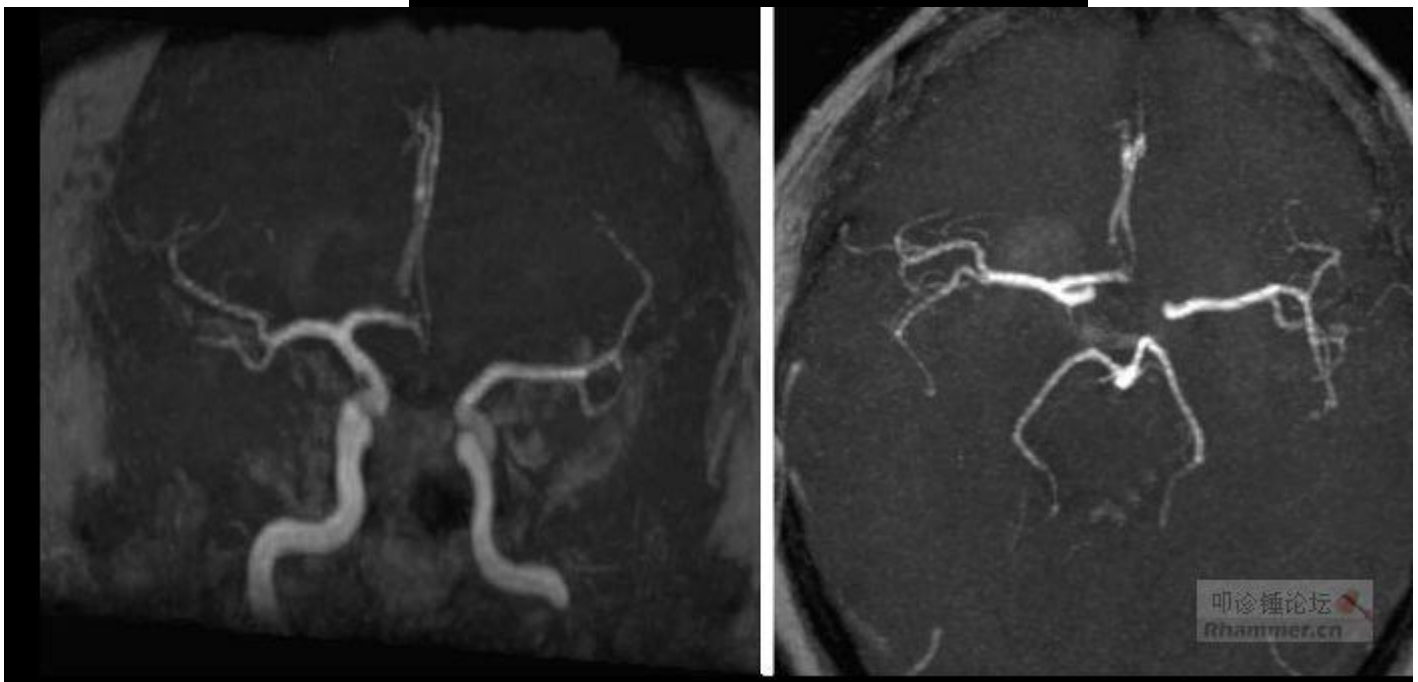


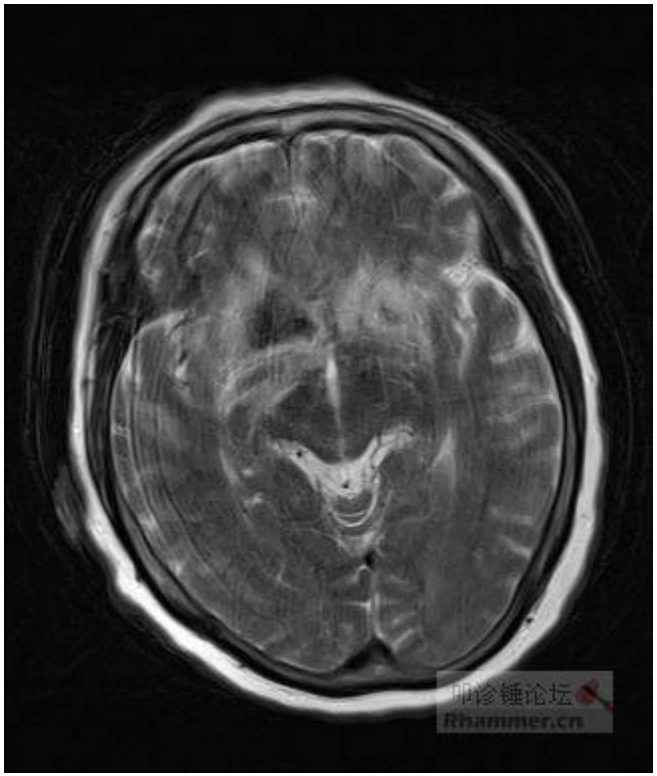
前交通动脉穿支

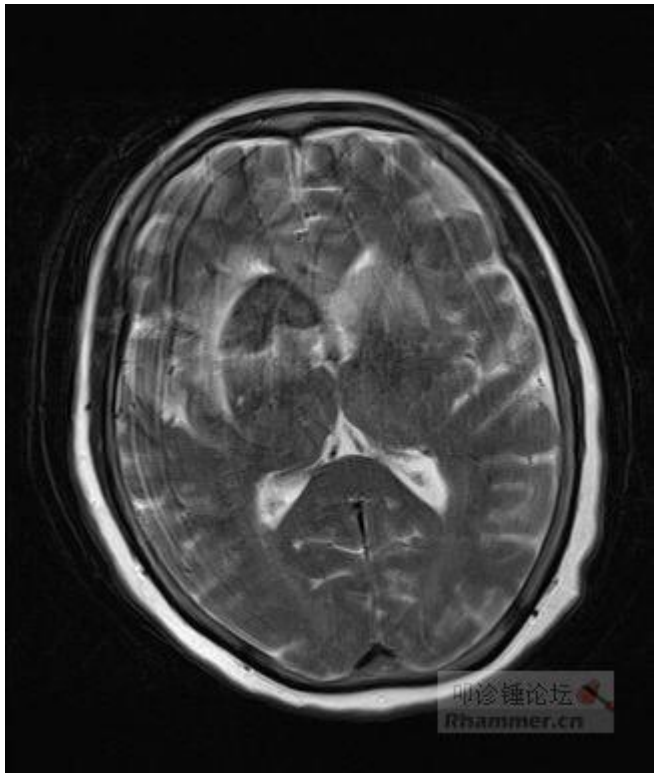

Recurrent Artery
of Heubner




叩诊锤论坛
rhammer.cn

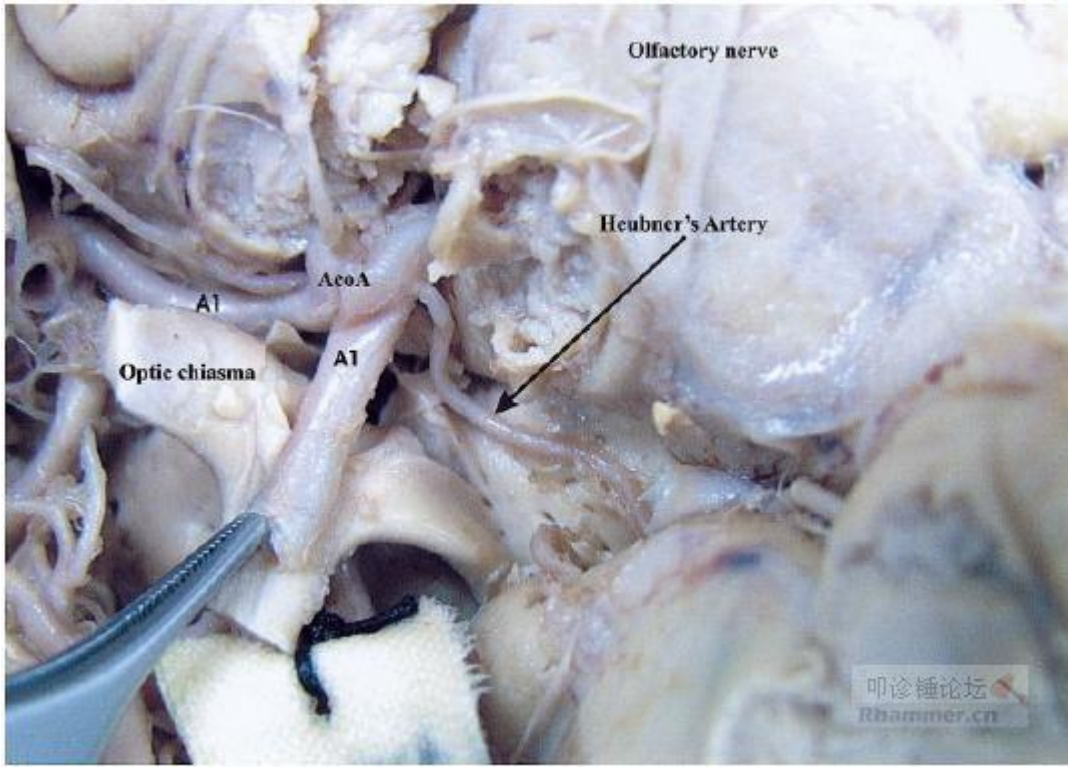

叩诊锤论坛
rhammer.cn

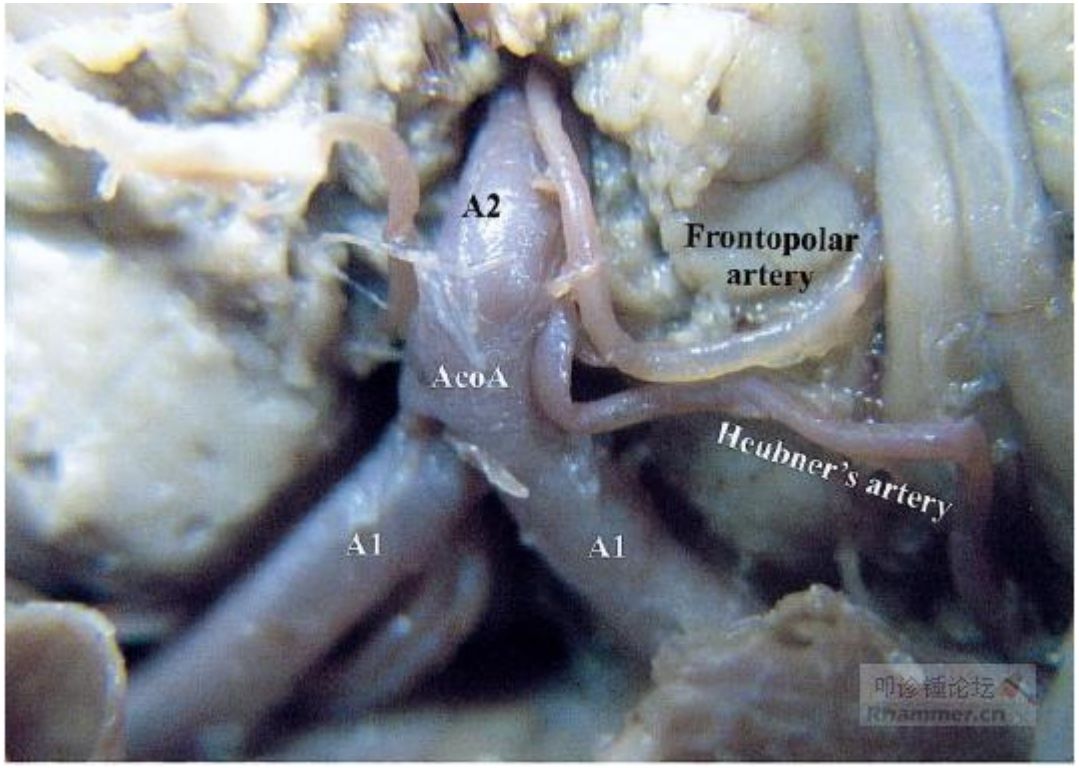

叩诊锤论坛
Rhammer.cn

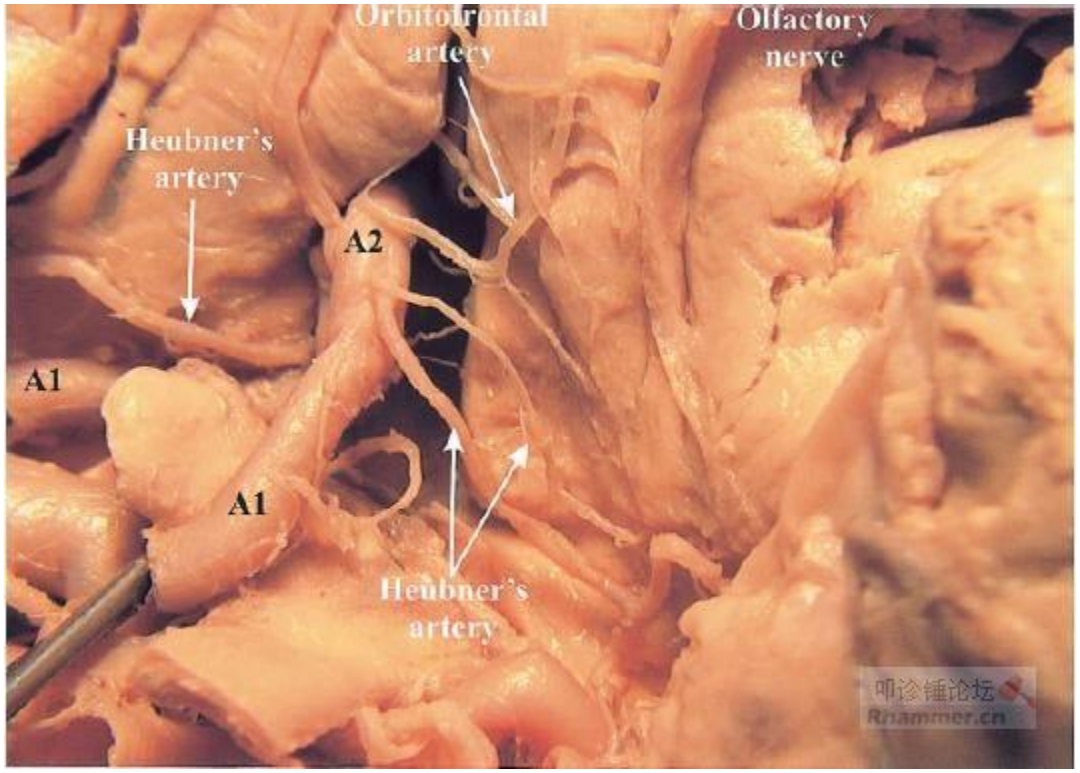

叩诊锤论坛
Rhammer.cn

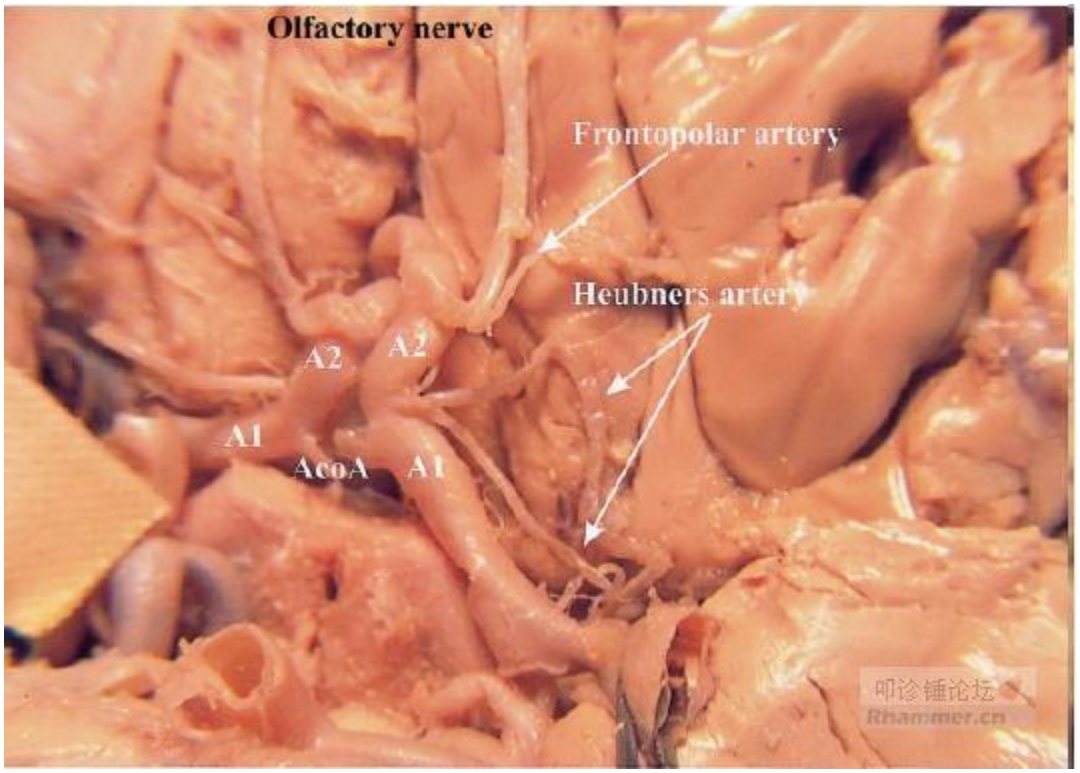

叩诊锤论坛

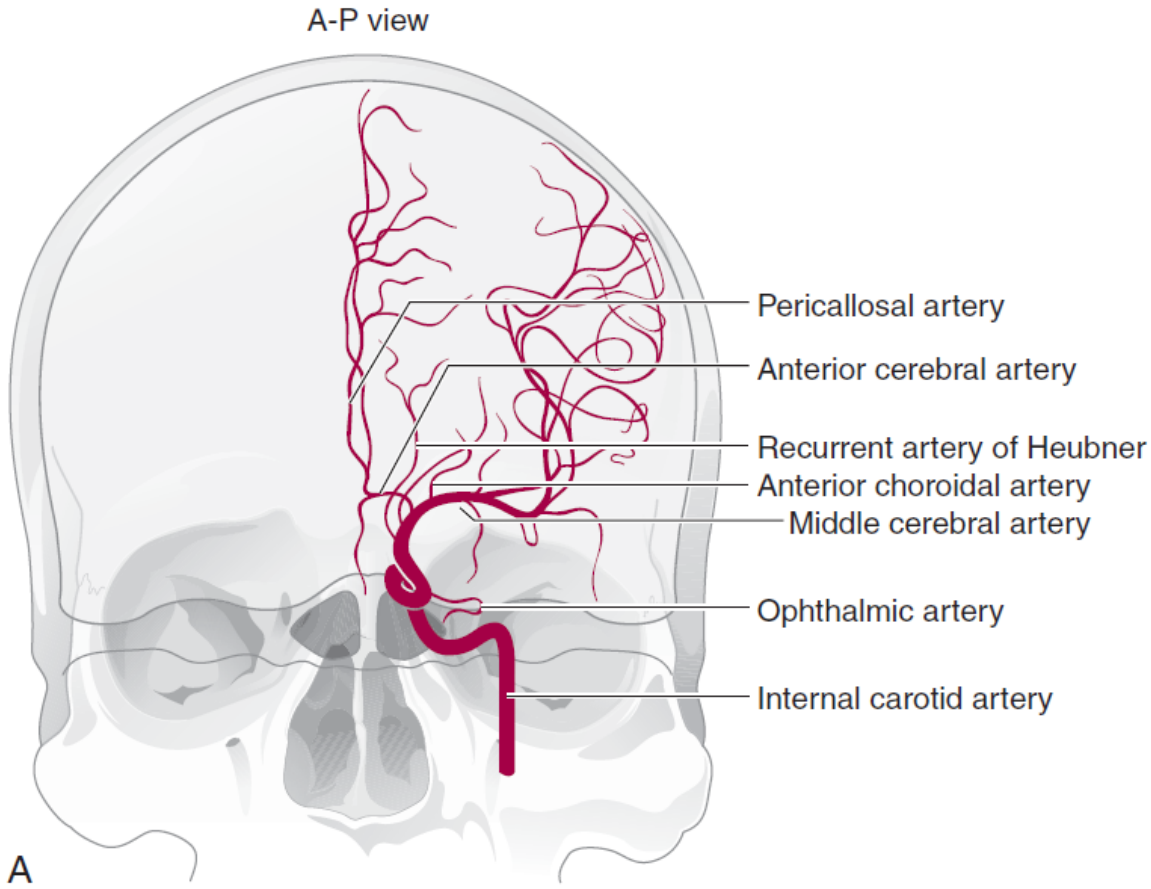
heubner动脉


Olfactory nerve
Heubner's Artery
AcoA
A1
Optic chiasma
A1
叩诊锤论坛
Rhammer.cn

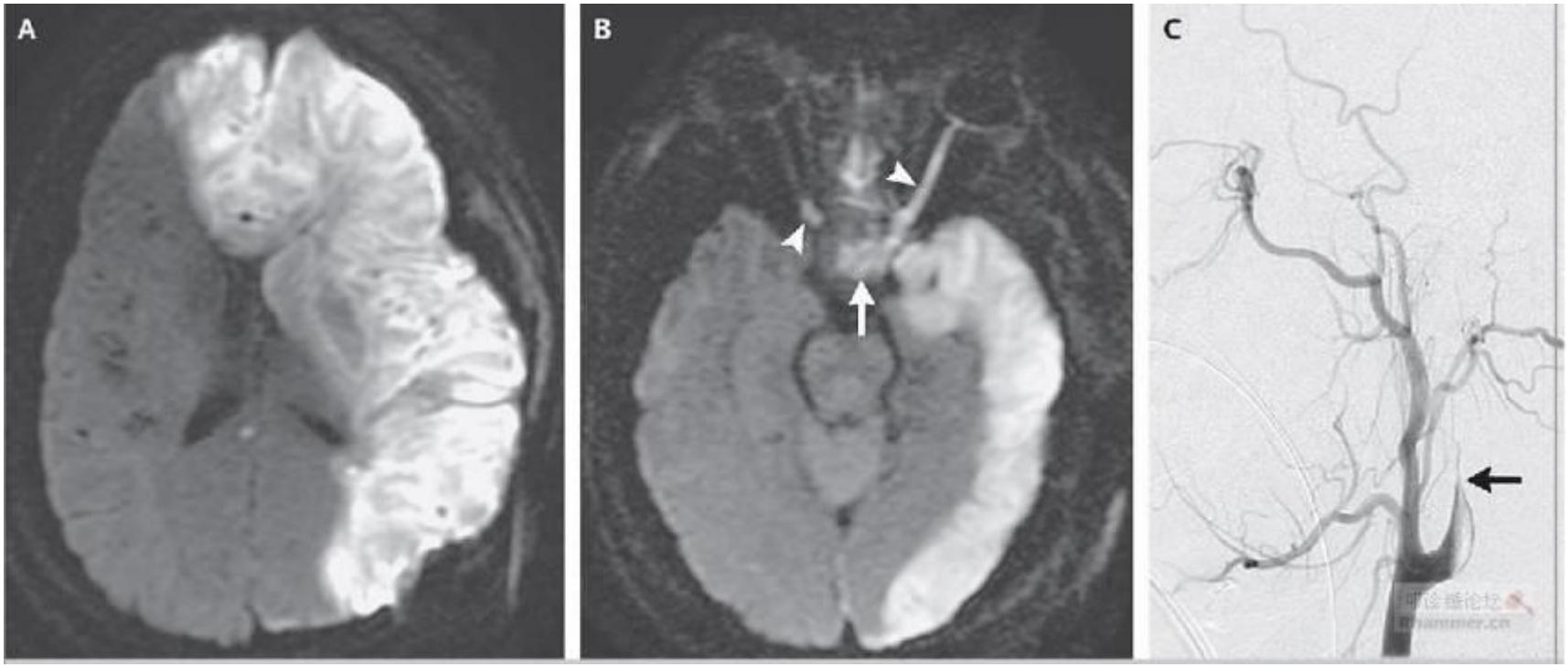

A2
Frontopolar artery
AcoA
Heubner's artery
A1
A1


Orbitofrontal artery
Olfactory nerve
Heubner's artery
A2
A1
A1
Heubner's artery

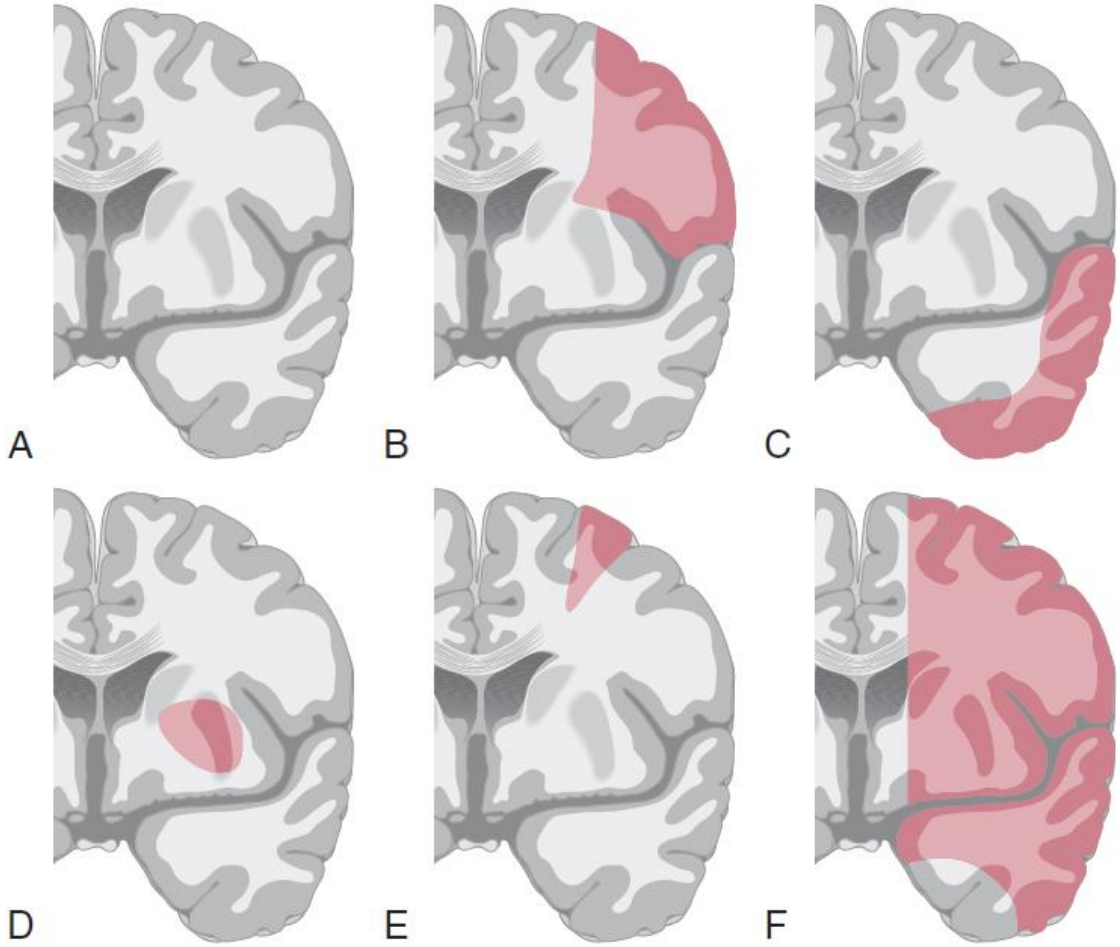

Olfactory nerve
Frontopolar artery
Heubners artery
A2
A2
A1
AcoA
A1


A-P view
Pericallosal artery
Anterior cerebral artery
Recurrent artery of Heubner
Anterior choroidal artery
Middle cerebral artery
Ophthalmic artery
Internal carotid artery
A

视神经和视交叉

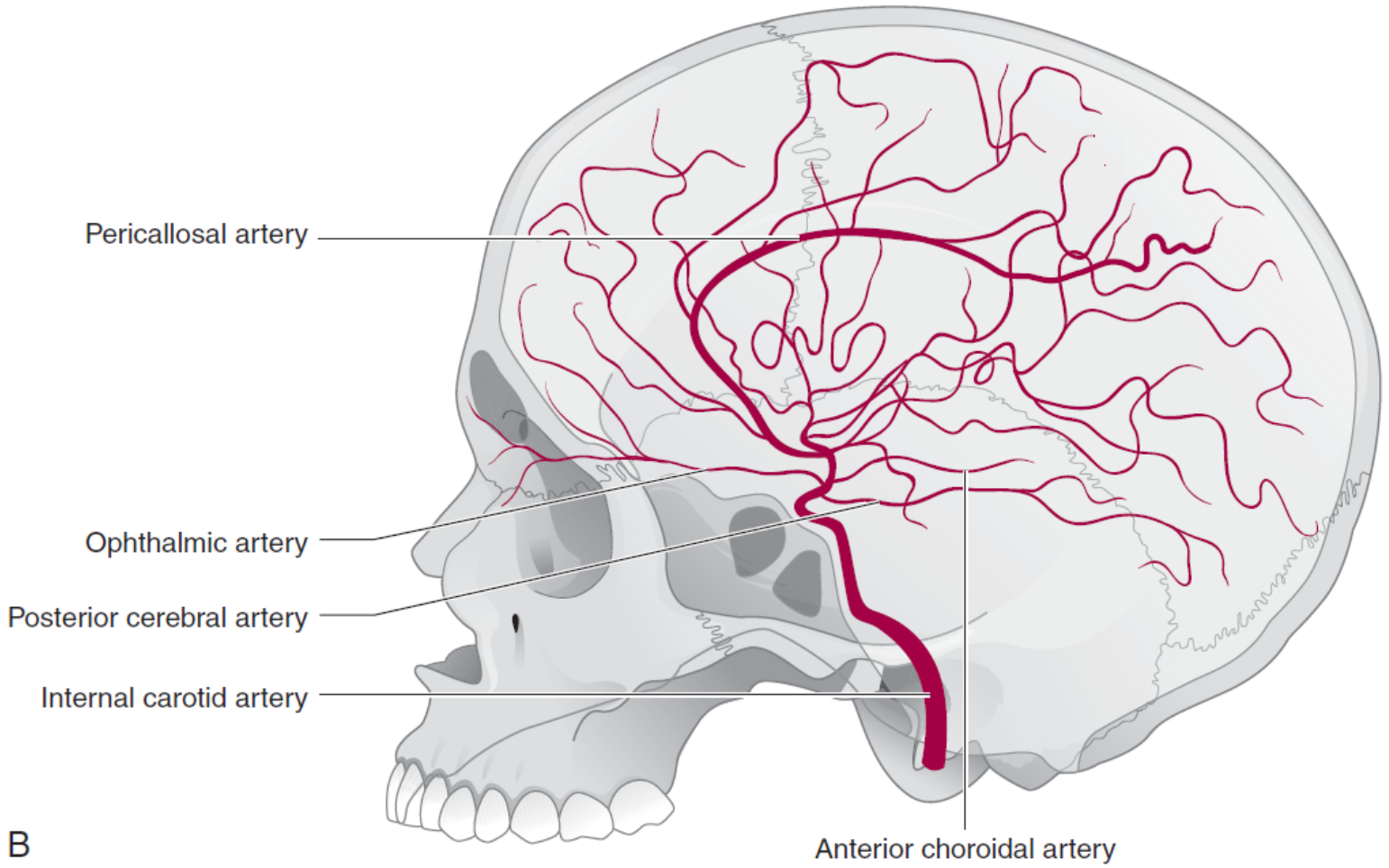


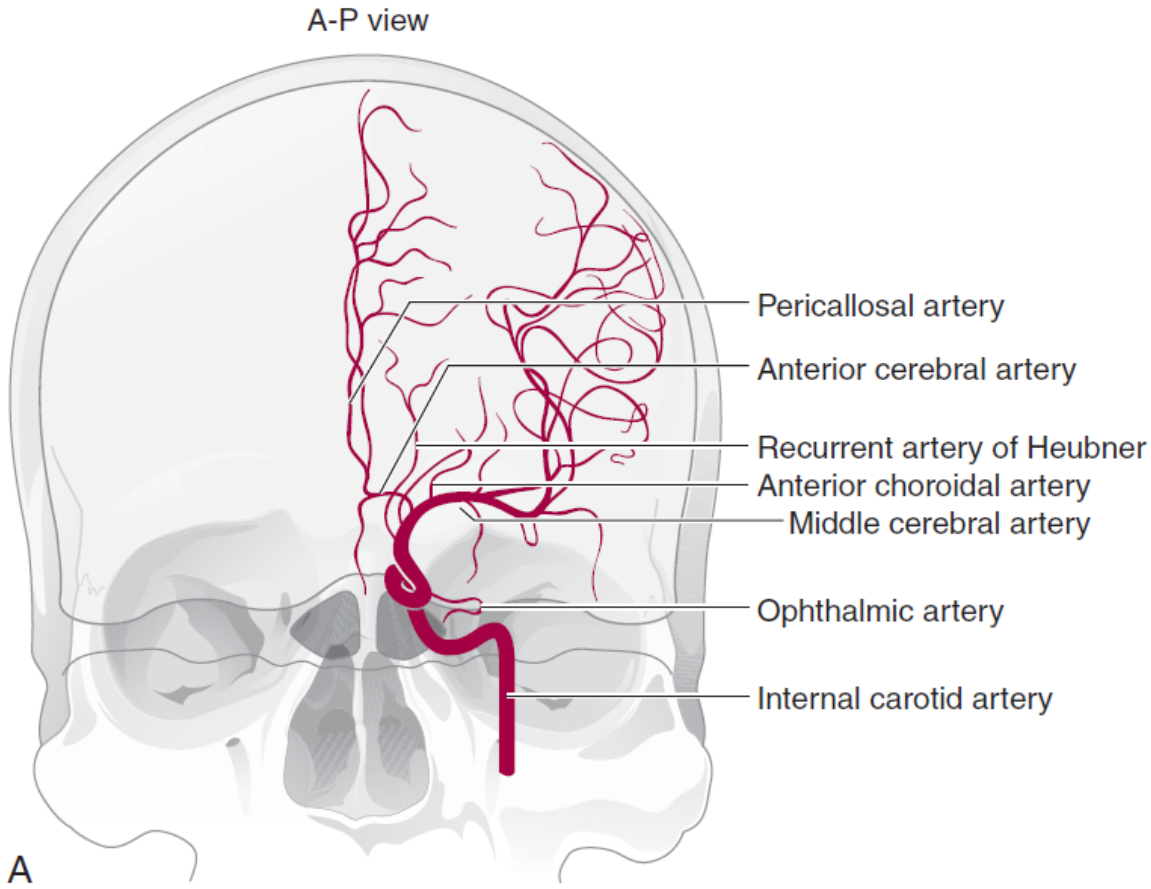
大脑中动脉

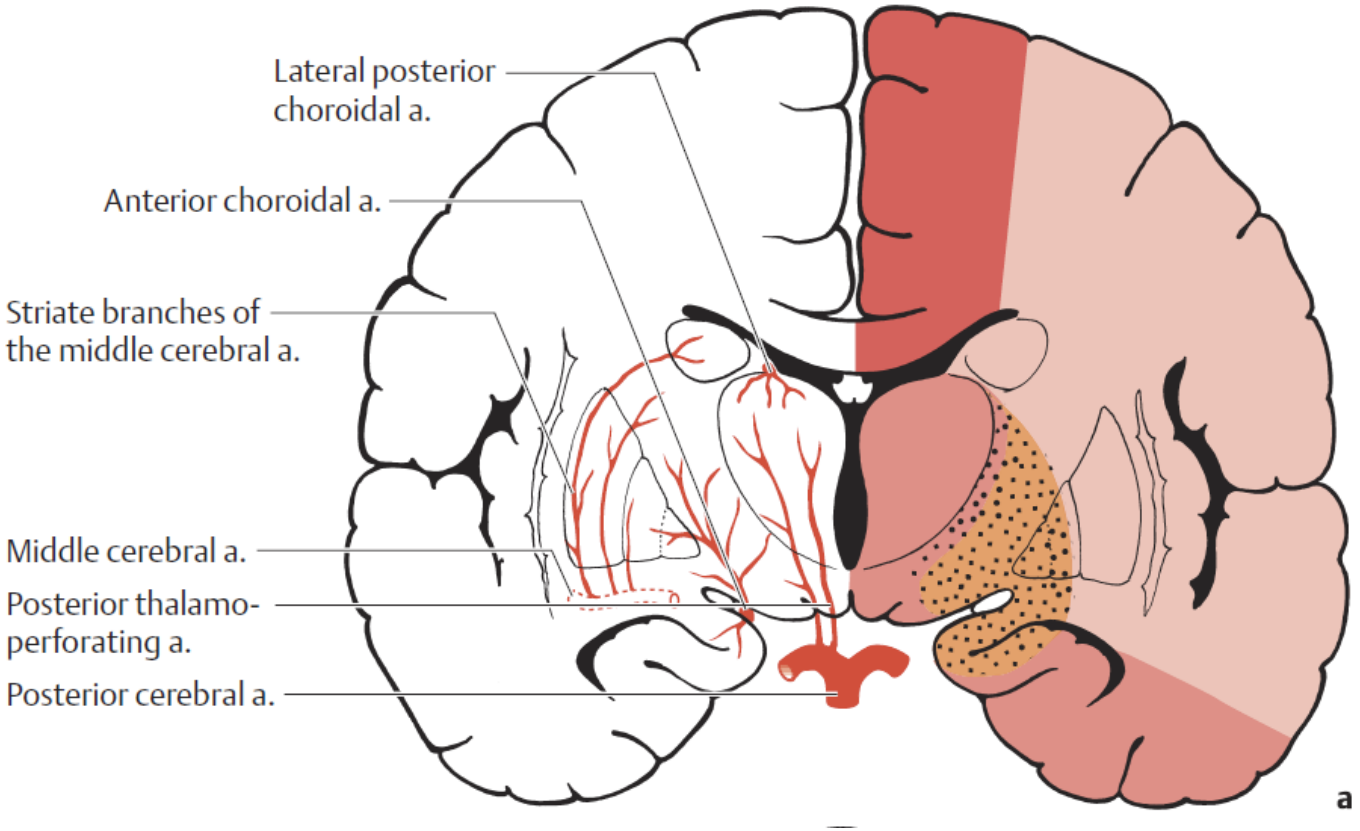

A
B
C
D
E
F

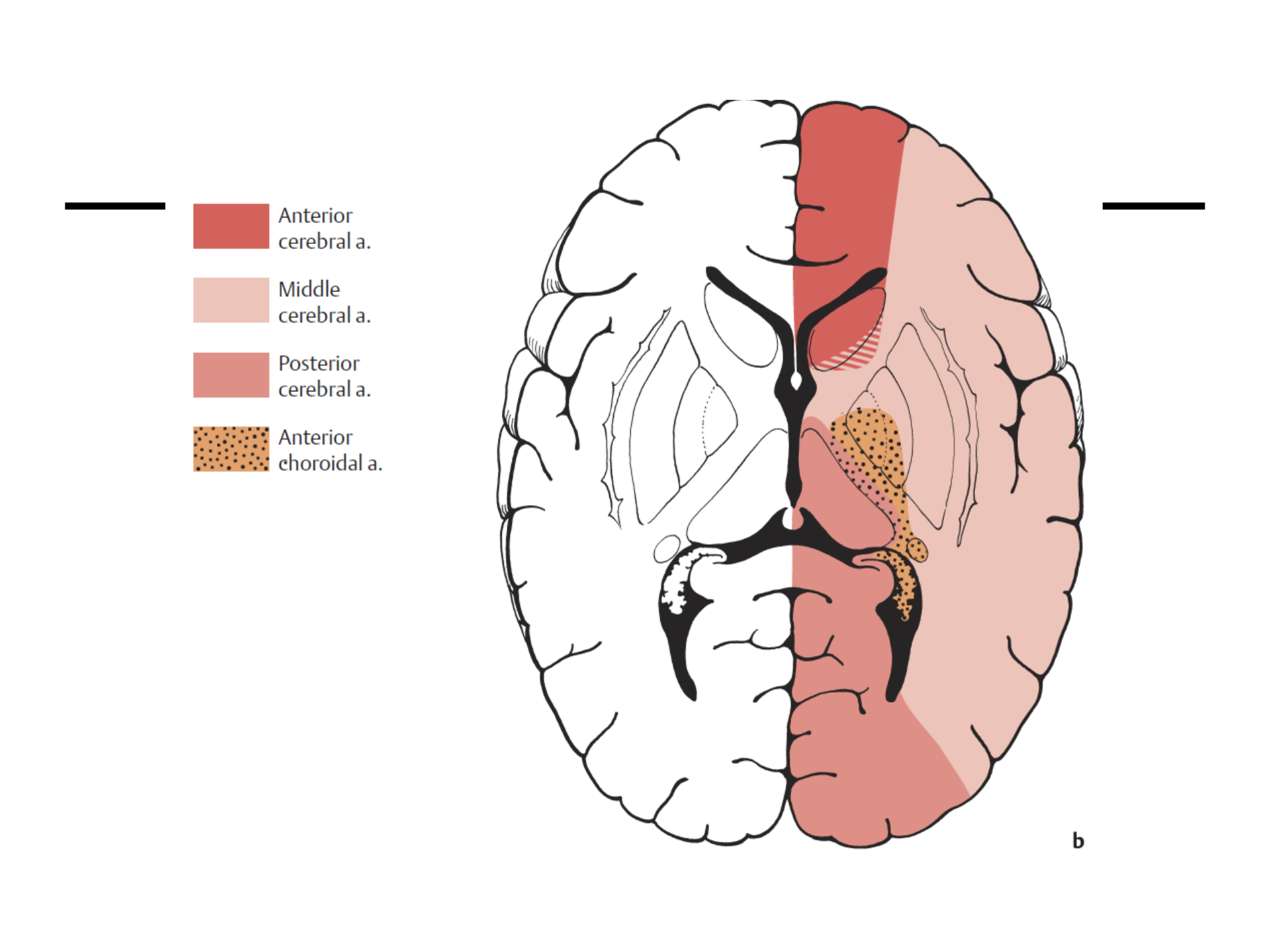

M, 46Y
叩诊锤论坛
Rhammer.cn

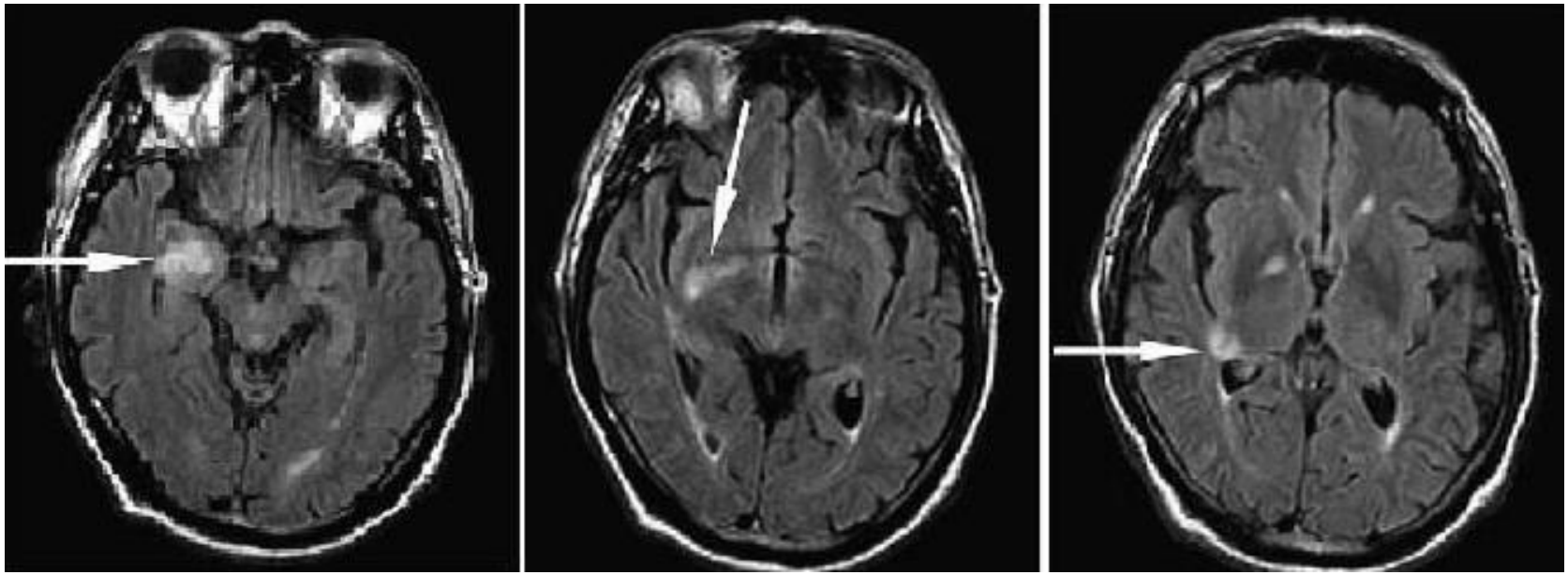
脉络膜前动脉

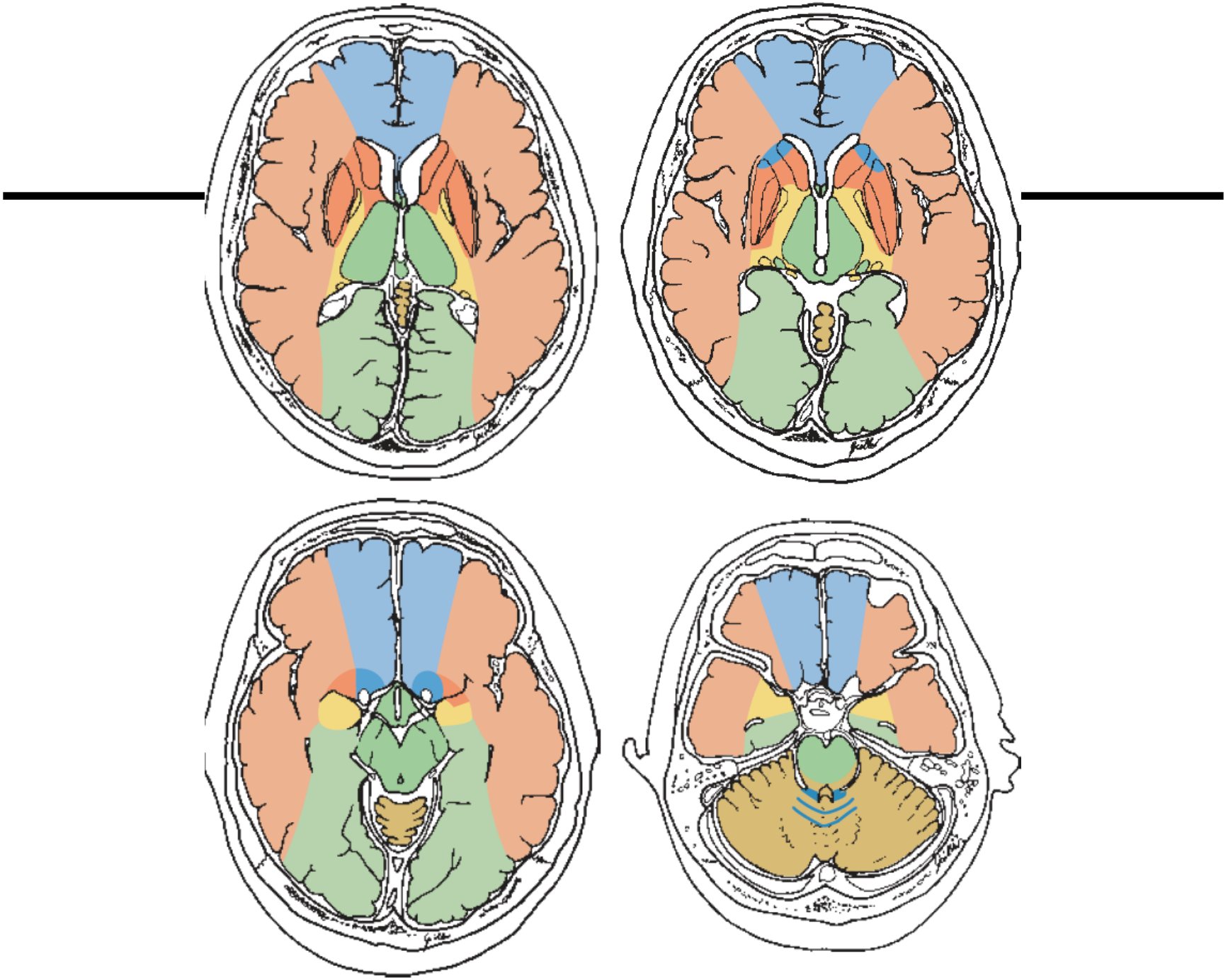

Pericallosal artery
Ophthalmic artery
Posterior cerebral artery
Internal carotid artery
Anterior choroidal artery
B

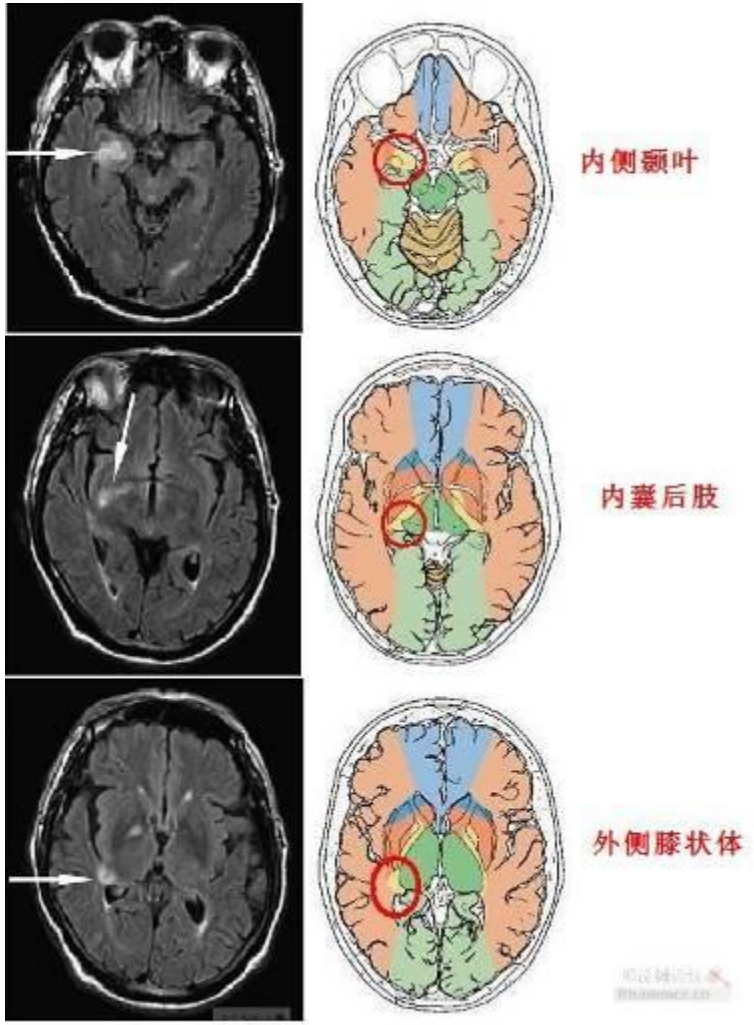

A-P view
Pericallosal artery
Anterior cerebral artery
Recurrent artery of Heubner
Anterior choroidal artery
Middle cerebral artery
Ophthalmic artery
Internal carotid artery
A

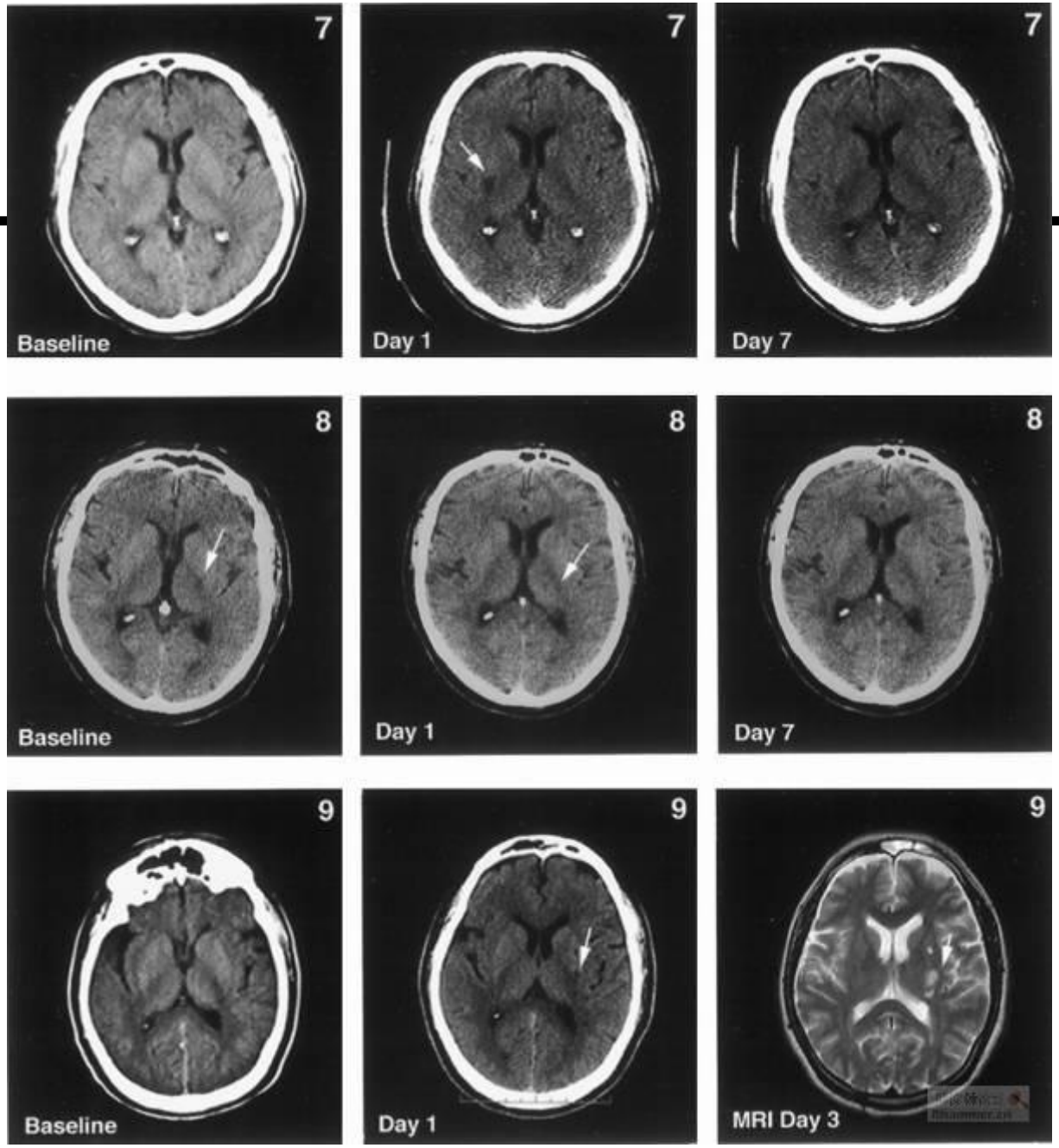

Lateral posterior choroidal a.
Anterior choroidal a.
Striate branches of the middle cerebral a.
Middle cerebral a.
Posterior thalamo-perforating a.
Posterior cerebral a.
a


Anterior cerebral a.
Middle cerebral a.
Posterior cerebral a.
Anterior choroidal a.
b

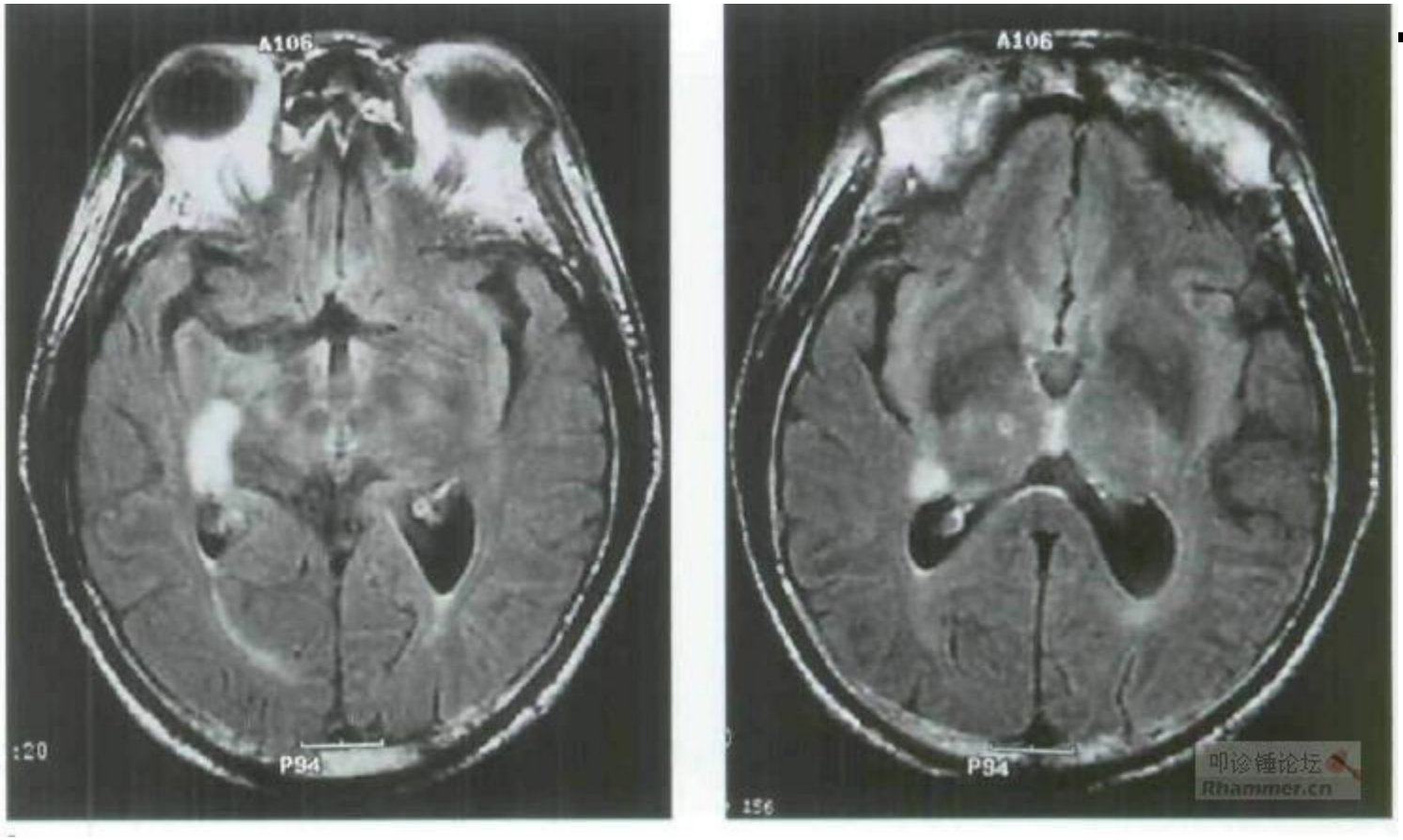




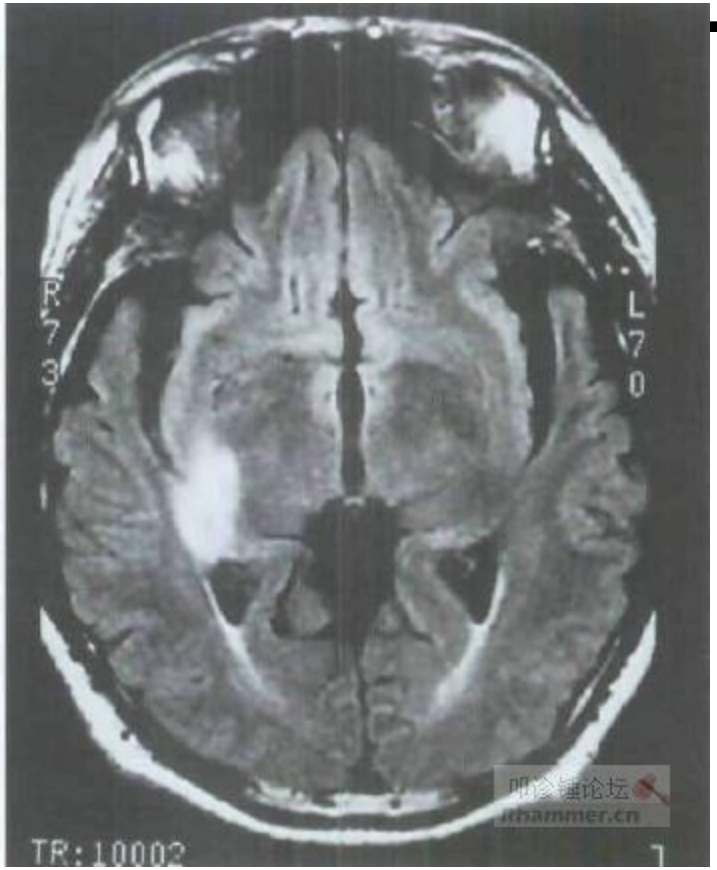

内侧颞叶
内囊后肢
外侧膝状体

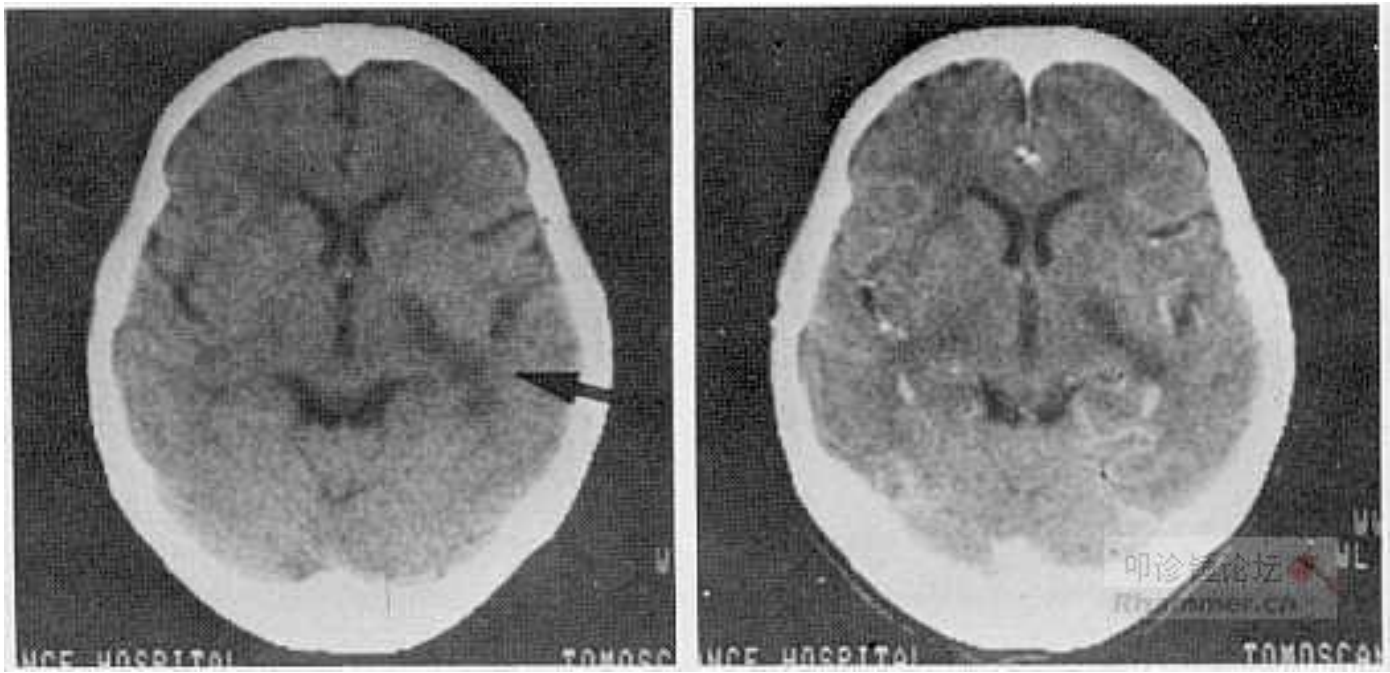

7
Baseline
7
Day 1
7
Day 7
8
Baseline
8
Day 1
8
Day 7
9
Baseline
9
Day 1
9
MRI Day 3

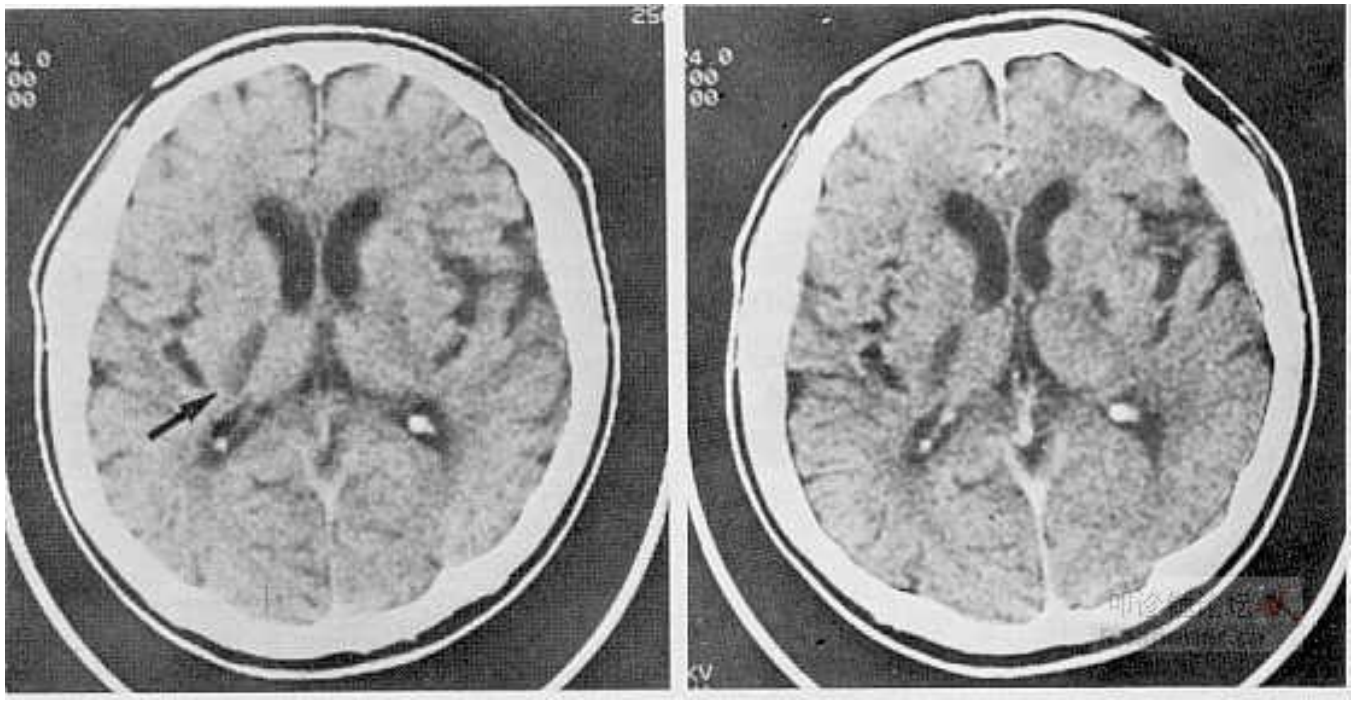
脉络膜前



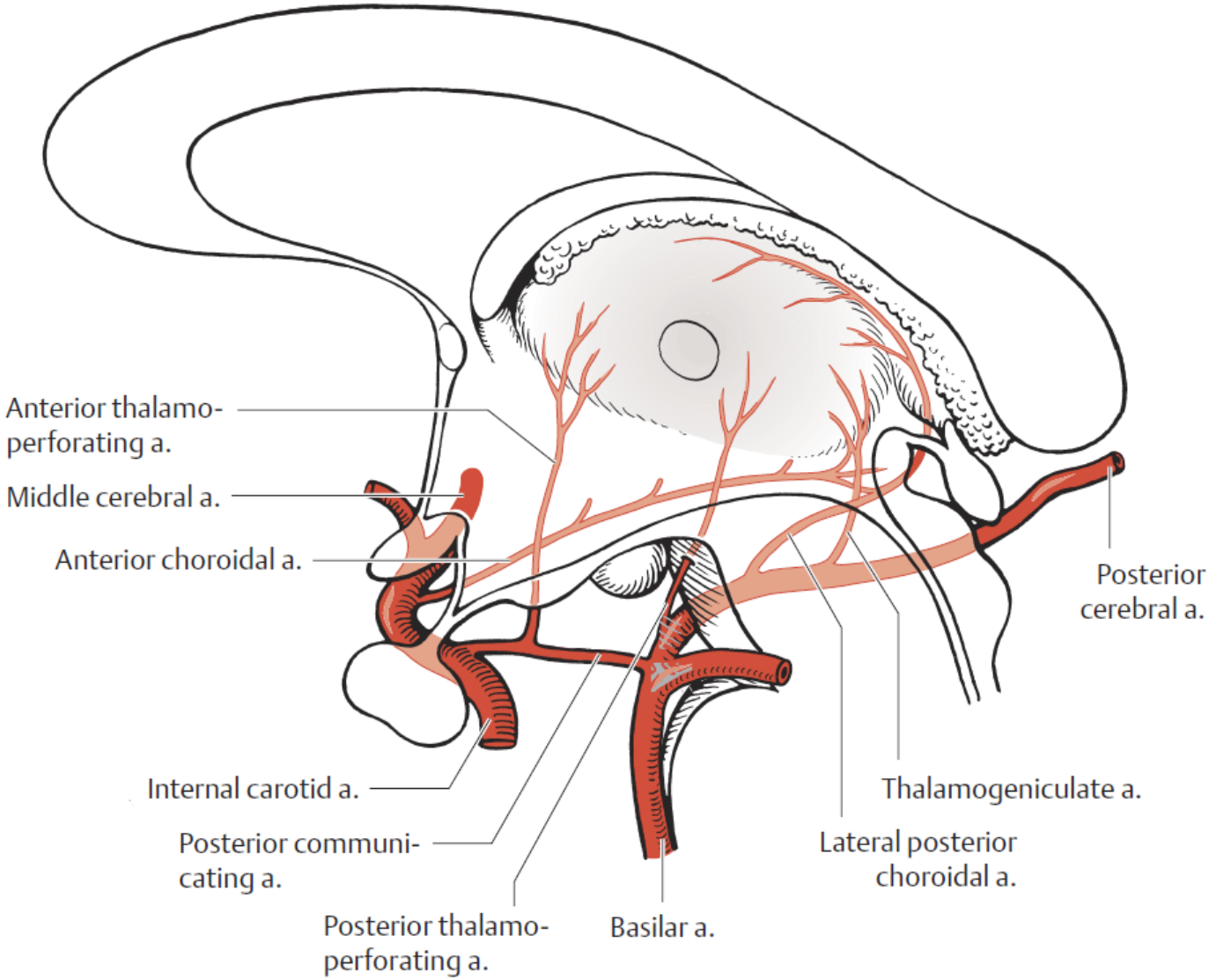
脉络膜前

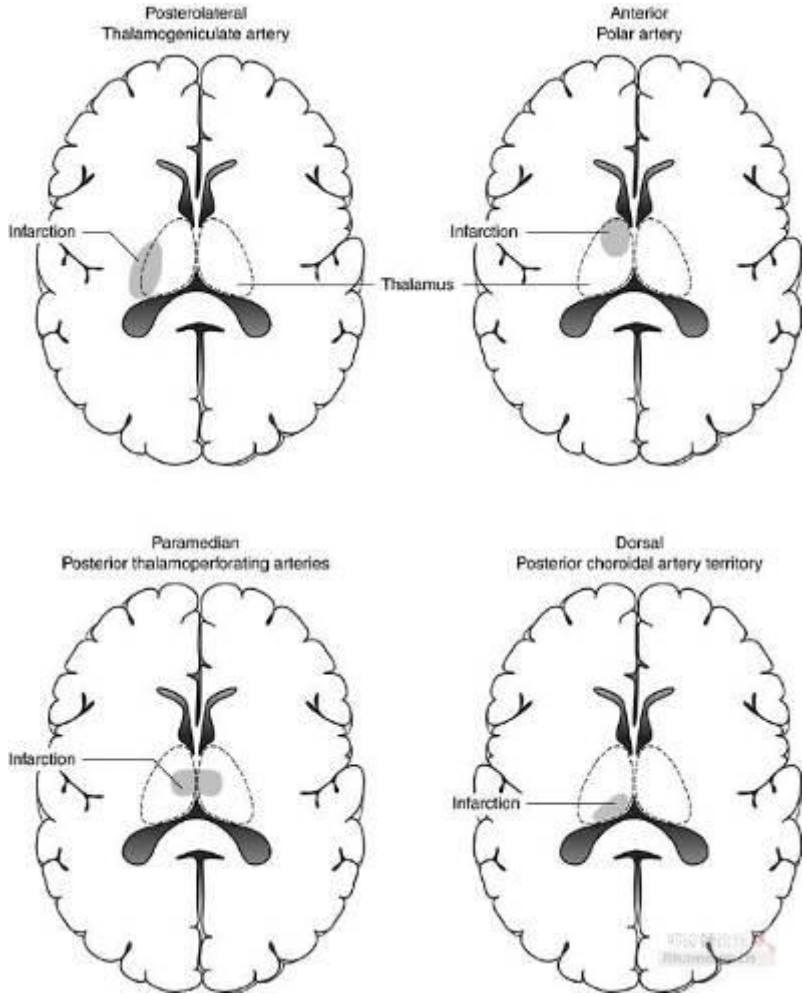


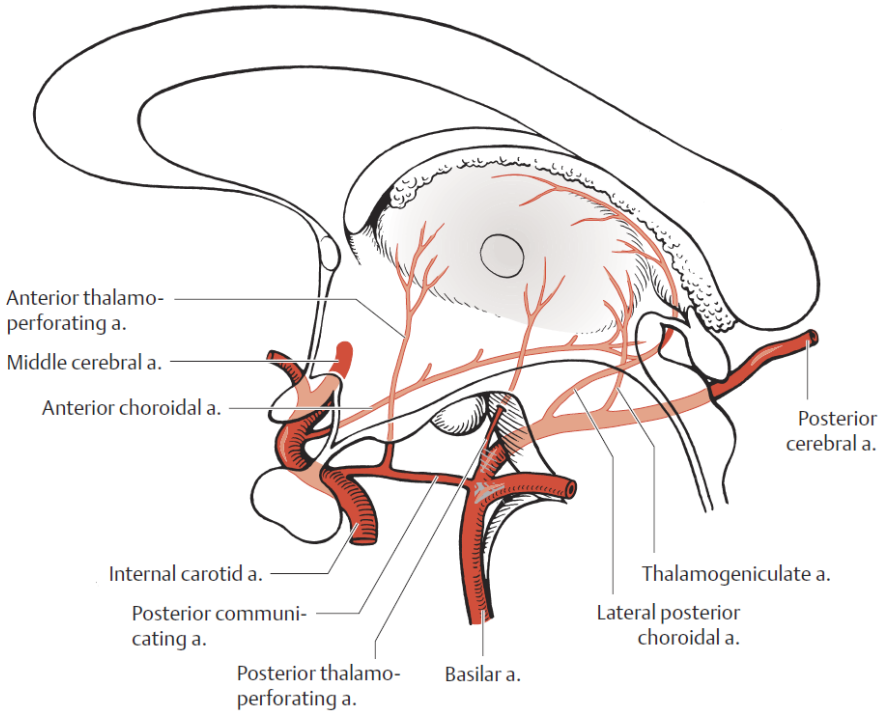


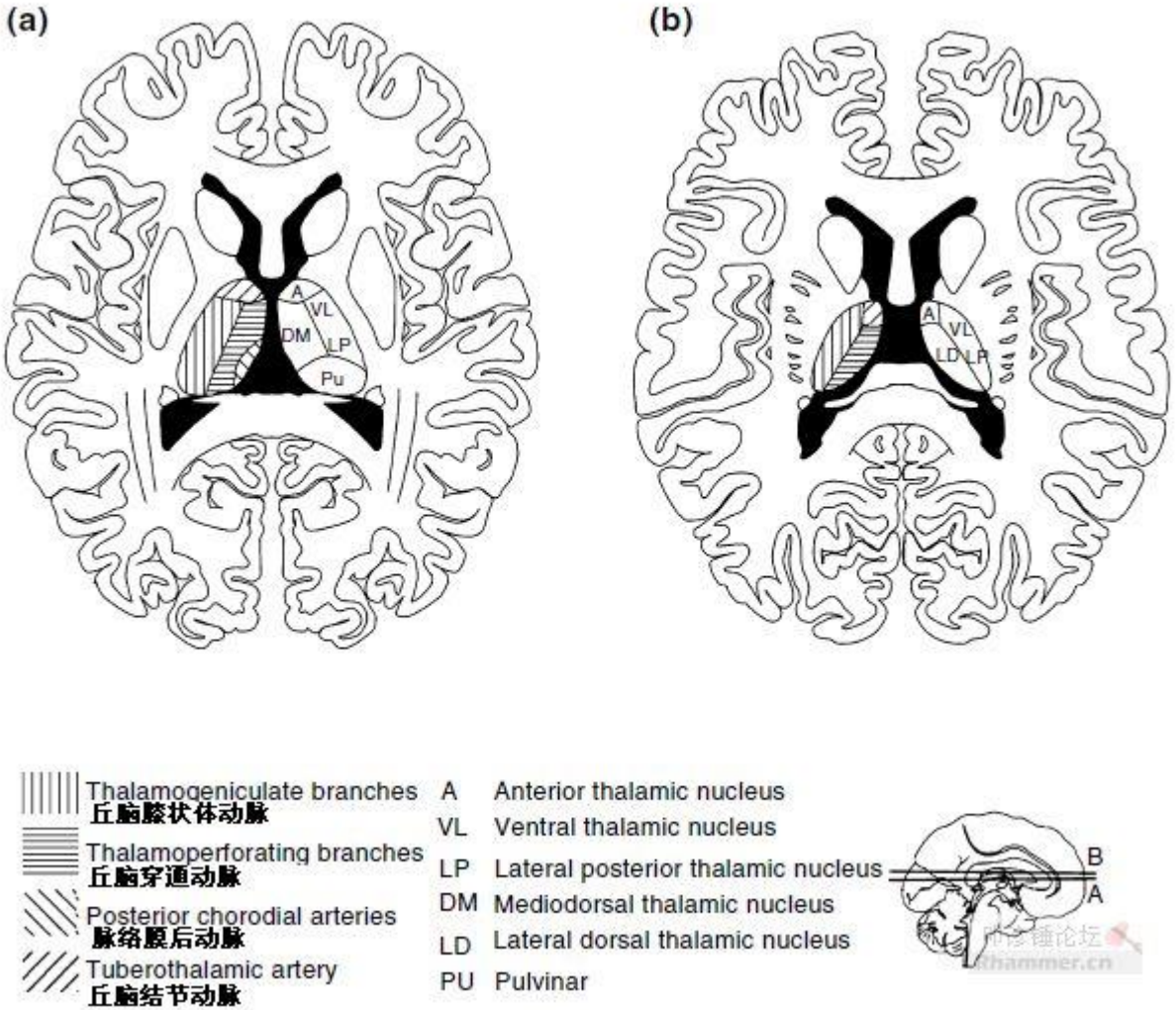


丘脑供血

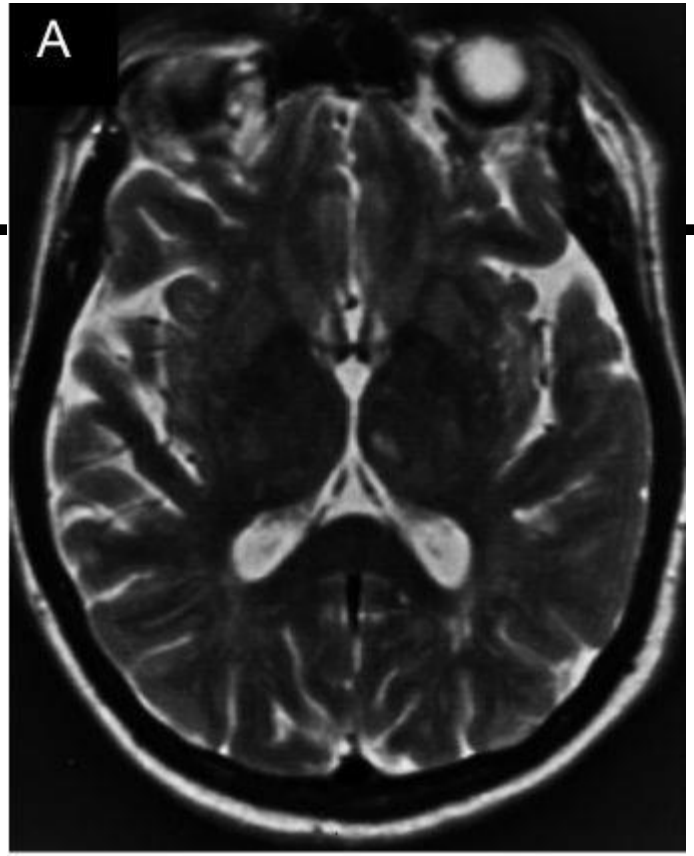

Anterior thalamo-perforating a.
Middle cerebral a.
Anterior choroidal a.
Posterior cerebral a.
Internal carotid a.
Posterior communi-cating a.
Posterior thalamo-perforating a.
Basilar a.
Lateral posterior choroidal a.
Thalamogeniculate a.

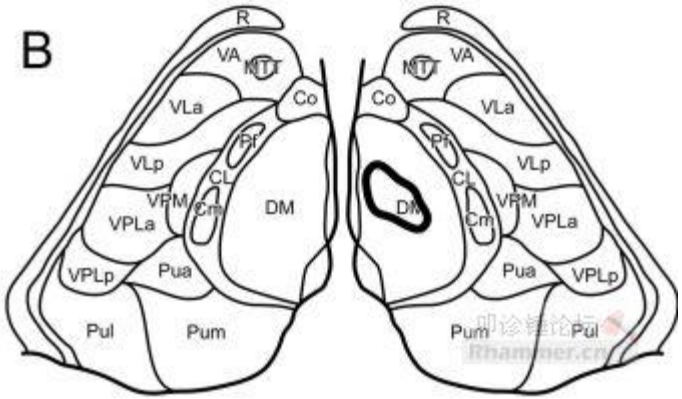

Posterolateral
Thalamogeniculate artery
Anterior
Polar artery
Infarction
Thalamus
Infarction
Paramedian
Posterior thalamoperforating arteries
Dorsal
Posterior choroidal artery territory
Infarction
Infarction

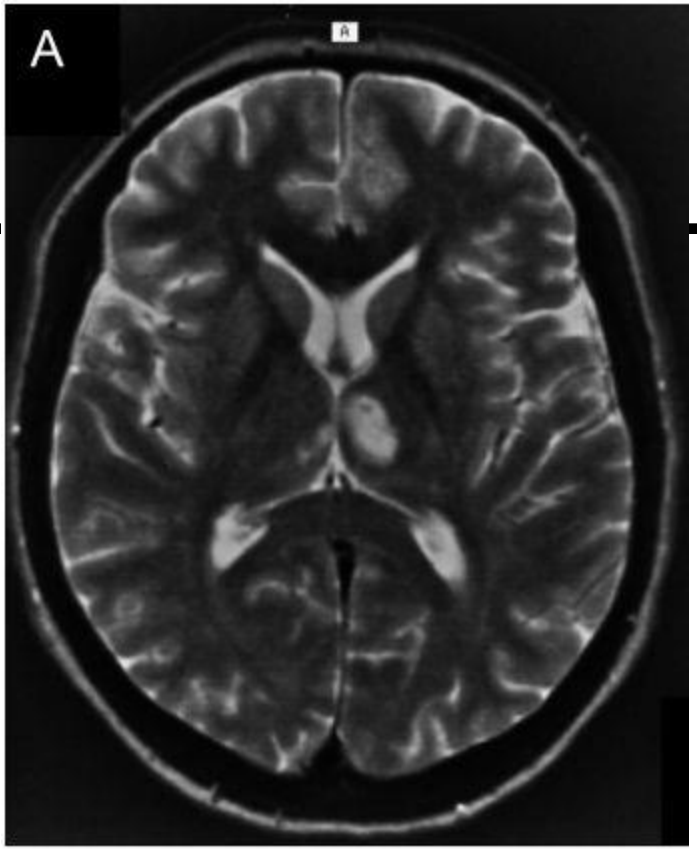

Anterior thalamo-
perforating a.
Middle cerebral a.
Anterior choroidal a.
Posterior
cerebral a.
Internal carotid a.
Thalamogeniculate a.
Posterior communi-
cating a.
Lateral posterior
choroidal a.
Posterior thalamo-
perforating a.
Basilar a.

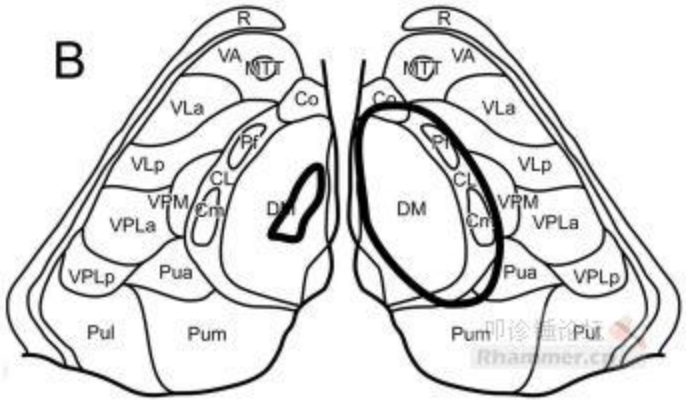

(a)
(b)
A
VL
DM
LP
Pu
A
VL
LD
LP
Thalamogeniculate branches
丘脑膝状体动脉
Thalamoperforating branches
丘脑穿通动脉
Posterior chorodial arteries
脉络膜后动脉
Tuberothalamic artery
丘脑结节动脉
A Anterior thalamic nucleus
VL Ventral thalamic nucleus
LP Lateral posterior thalamic nucleus
DM Mediodorsal thalamic nucleus
LD Lateral dorsal thalamic nucleus
PU Pulvinar
B
A

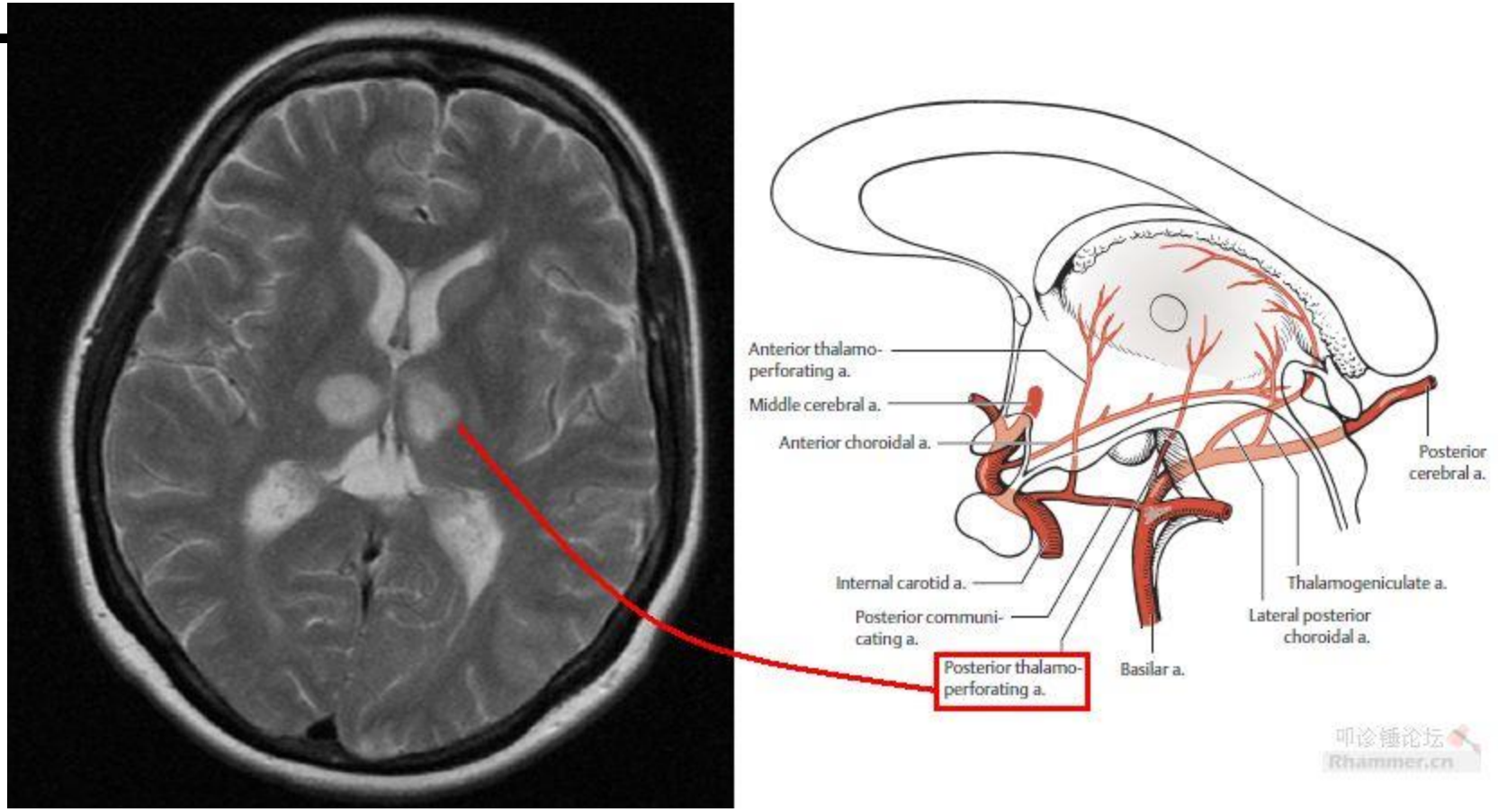
丘脑穿通

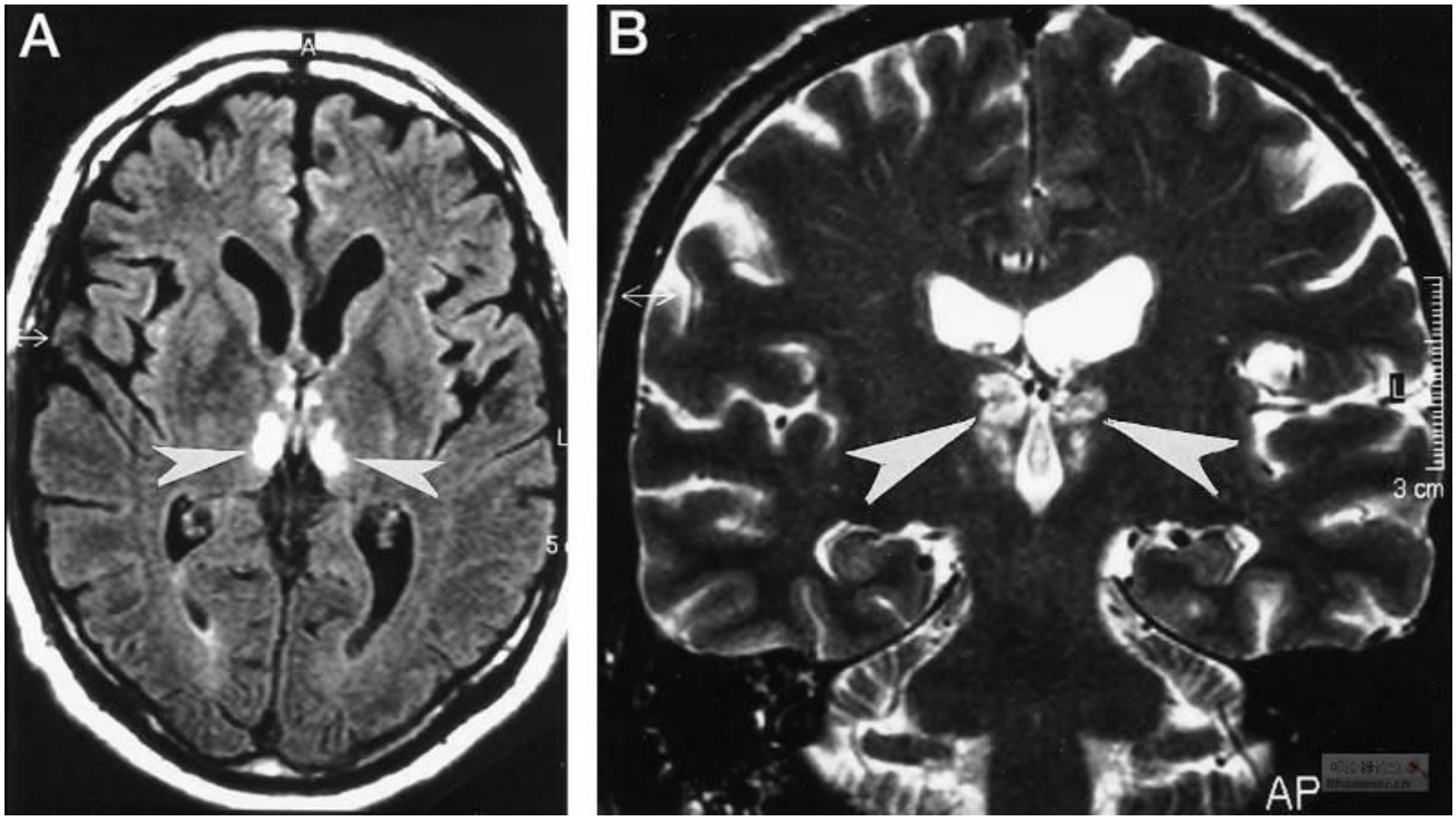

A


B
R
VA
MTT
VLa
Co
Pf
VLp
CL
VPM
Cm
DM
VPLa
VPLp
Pua
Pul
Pum

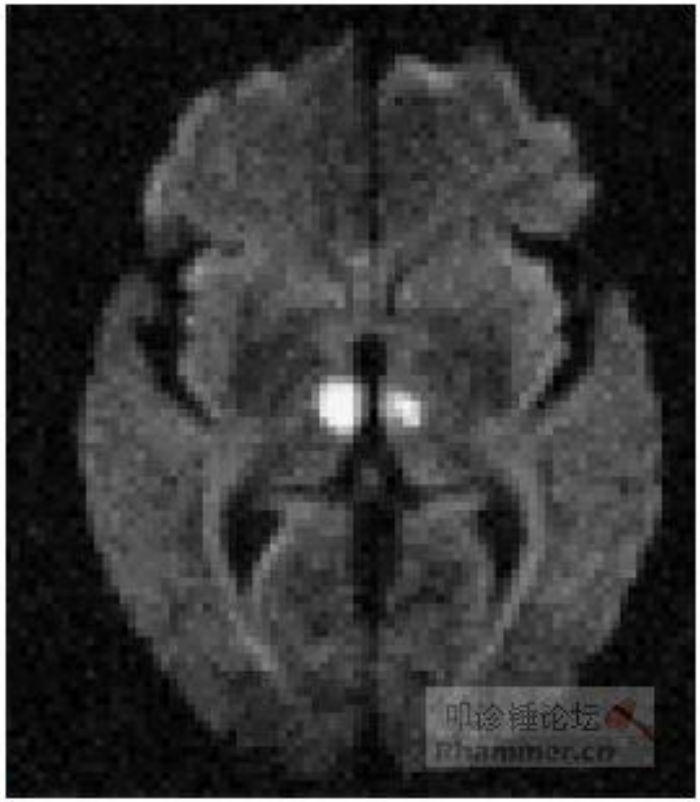

A

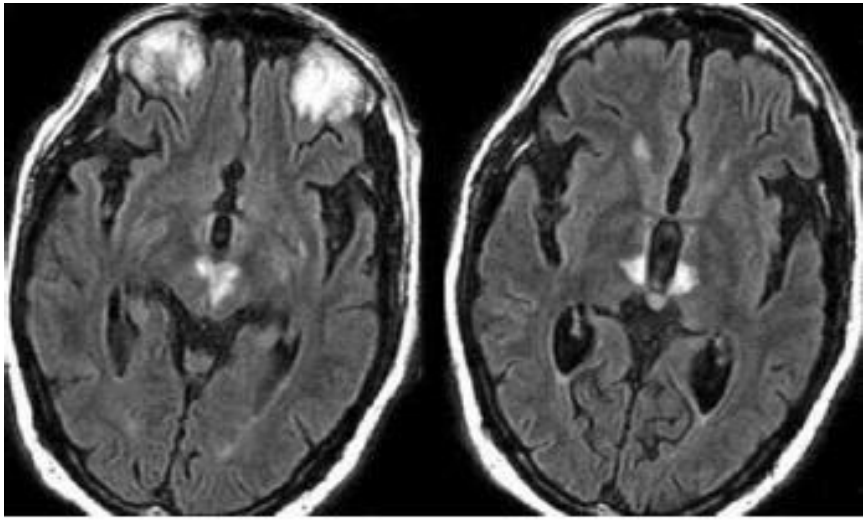

B
R
VA
MTT
Co
VLa
Pf
VLp
CL
VPM
Cm
VPLa
DM
VPLp
Pua
Pul
Pum

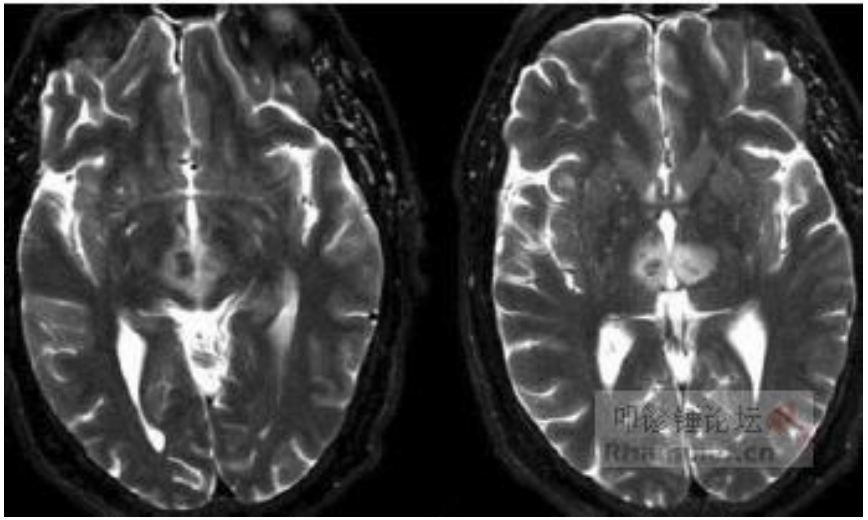

Anterior thalamo-perforating a.
Middle cerebral a.
Anterior choroidal a.
Posterior cerebral a.
Internal carotid a.
Thalamogeniculate a.
Posterior communi-cating a.
Lateral posterior choroidal a.
Posterior thalamo-perforating a.
Basilar a.

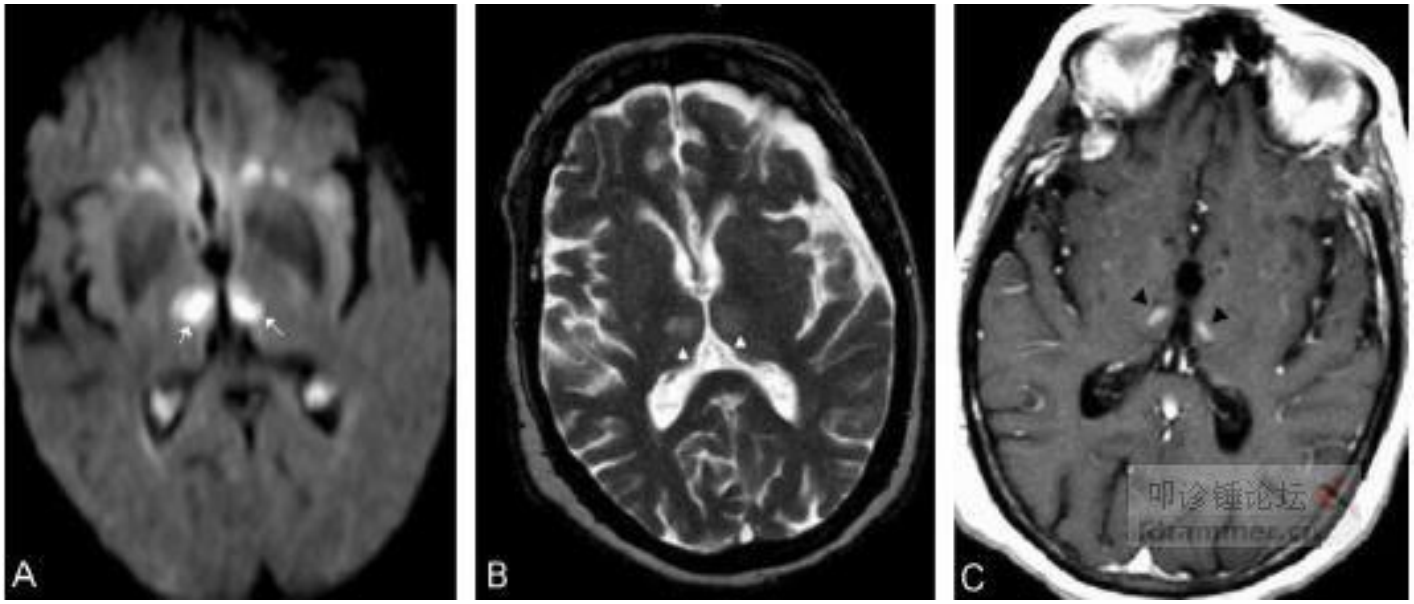

A
A
B
L
3 cm
AP

双侧丘脑穿通动脉

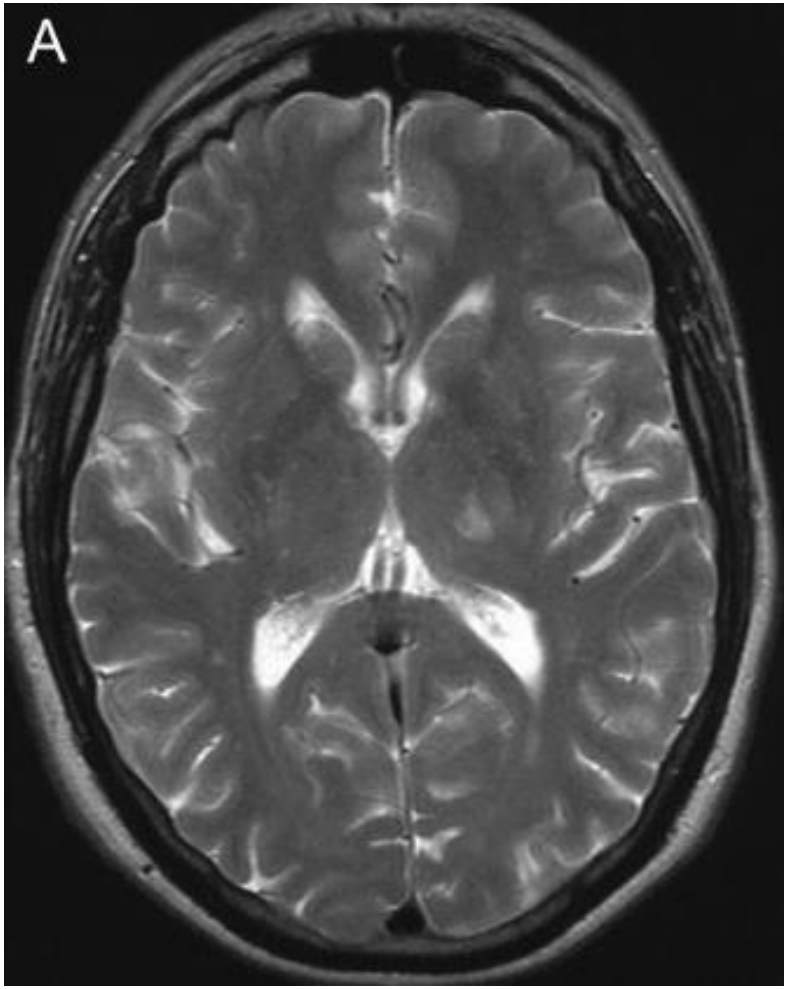


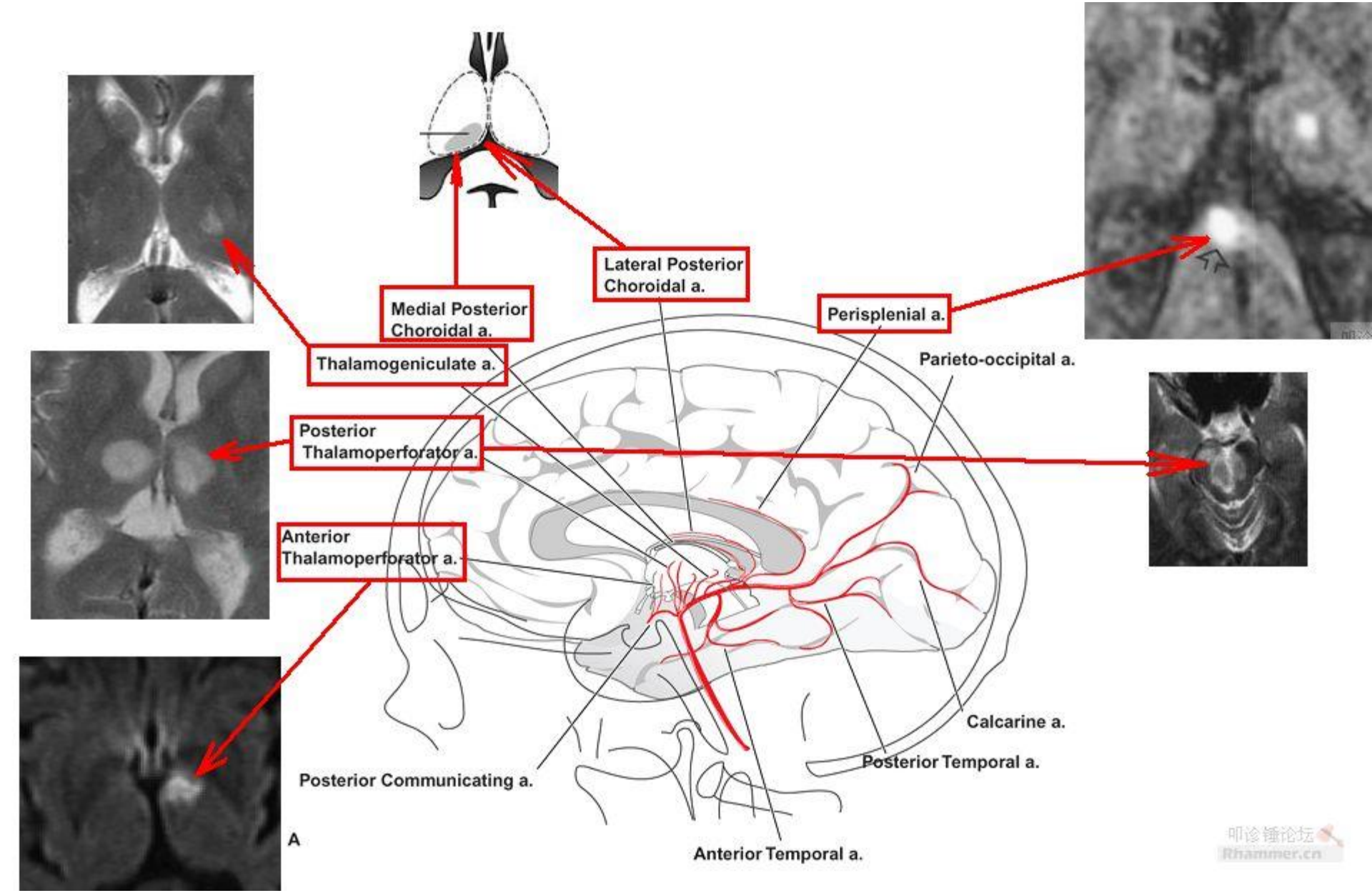




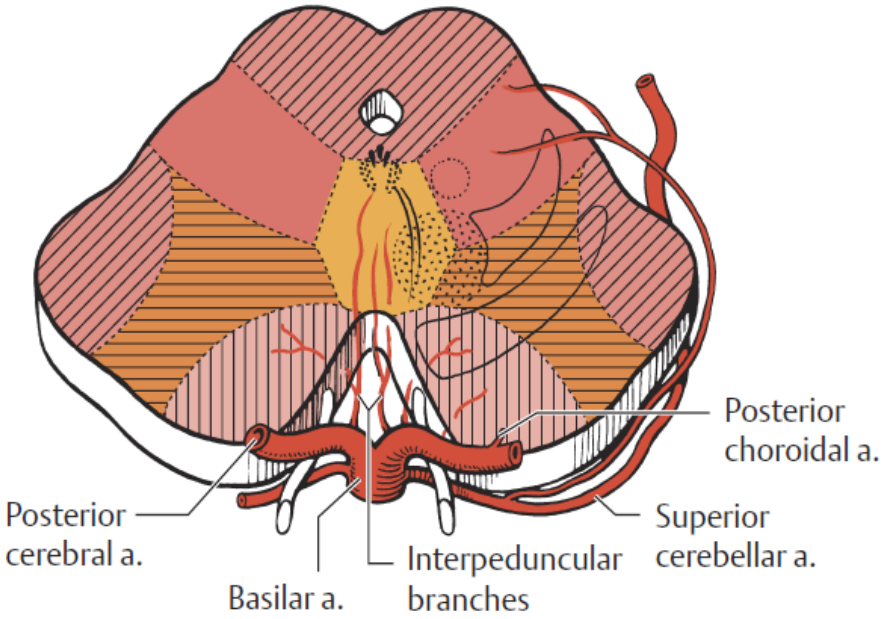

A
B
C

丘脑膝状体动脉




Lateral Posterior Choroidal a.
Medial Posterior Choroidal a.
Perisplenial a.
Thalamogeniculate a.
Parieto-occipital a.
Posterior Thalamoperforator a.
Anterior Thalamoperforator a.
Calcarine a.
Posterior Temporal a.
Posterior Communicating a.
Anterior Temporal a.
A

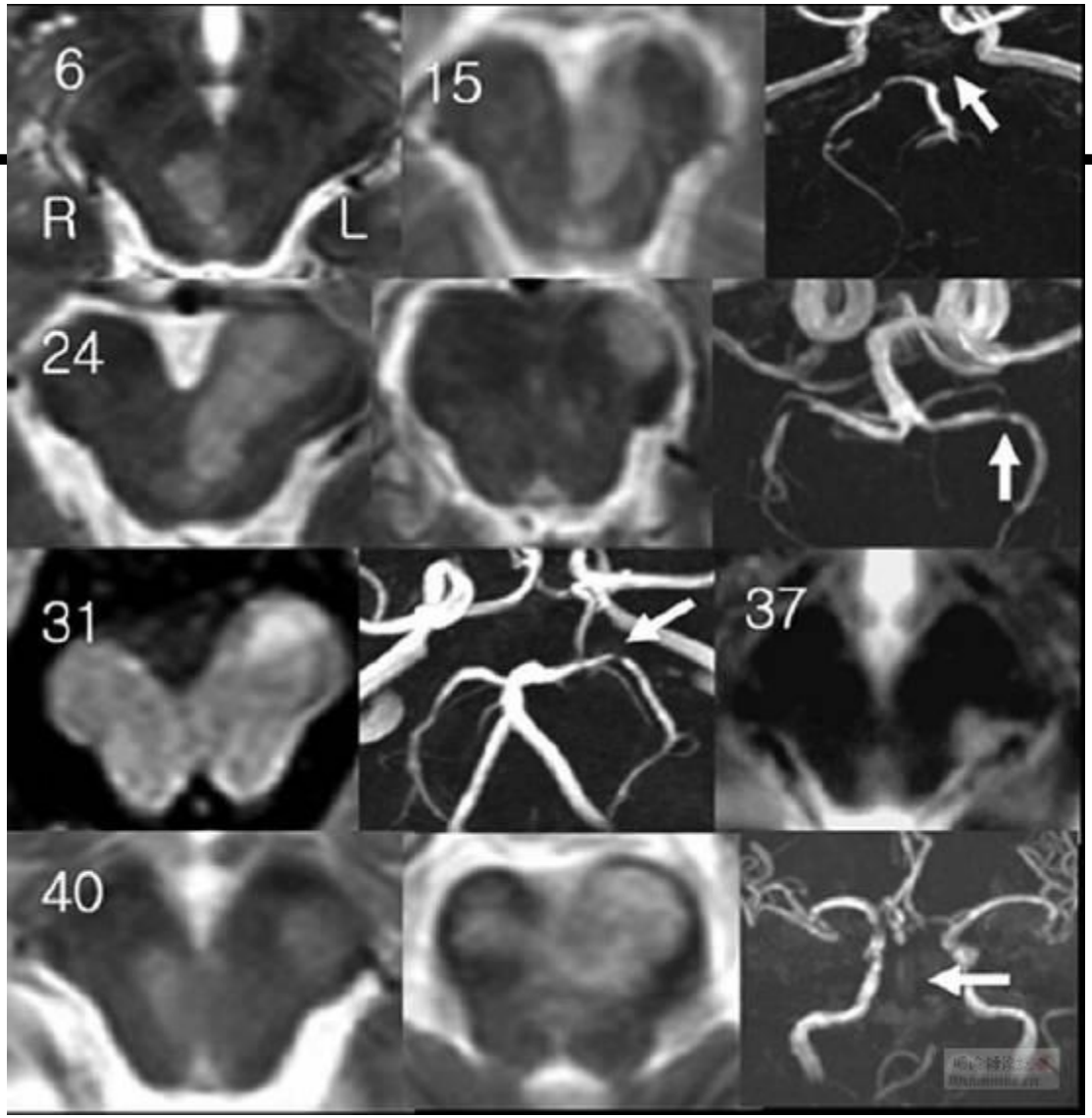
中脑的供血



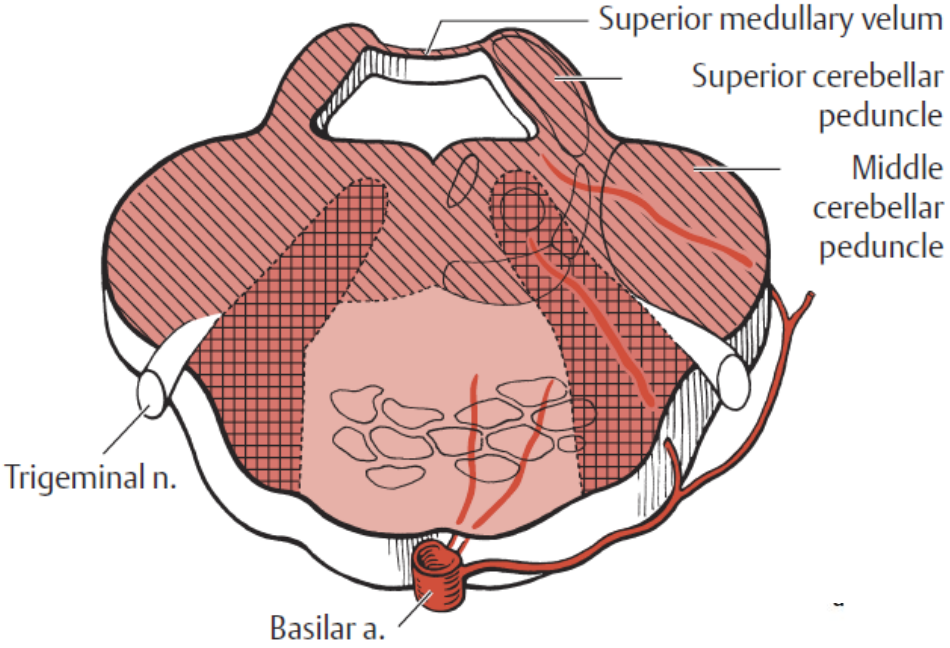
a Midbrain

- Superior cerebellar a.
- Posterior cerebral a.
- Posterior choroidal a.
- Interpeduncular branches
- Posterior communicating a.

(After Murphy)


6
R
L
15
24
31
37
40

桥脑的供血



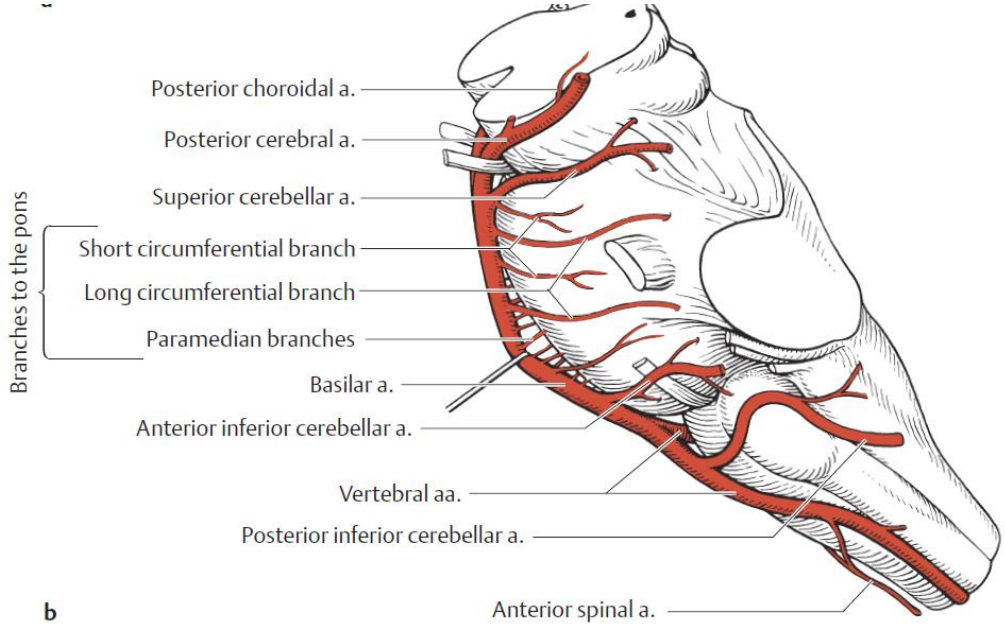
b Pons

Paramedian branches

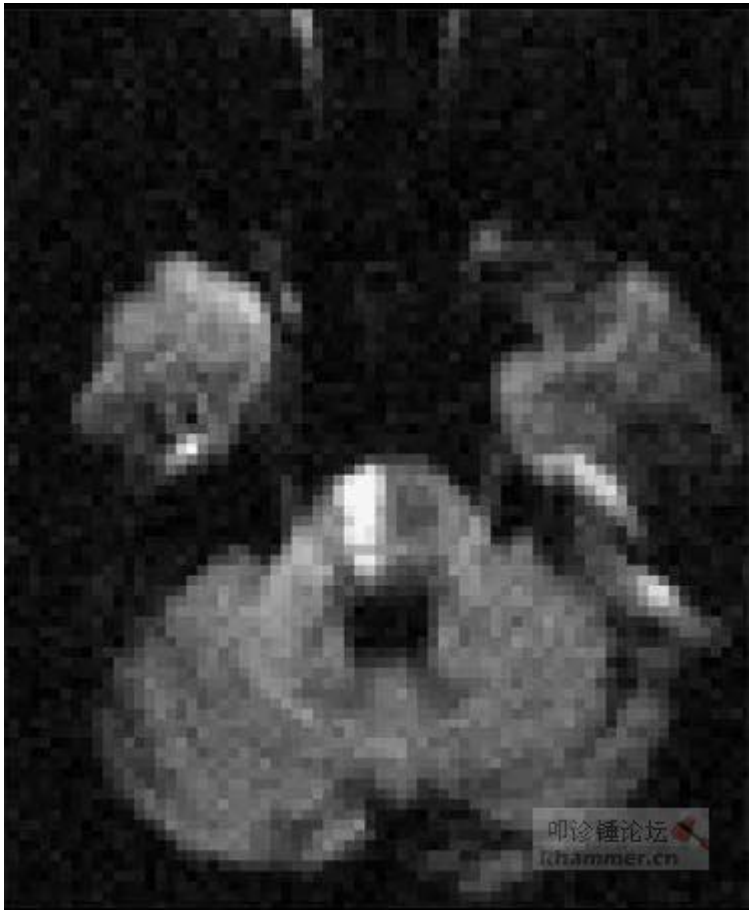
Short circumferential branches

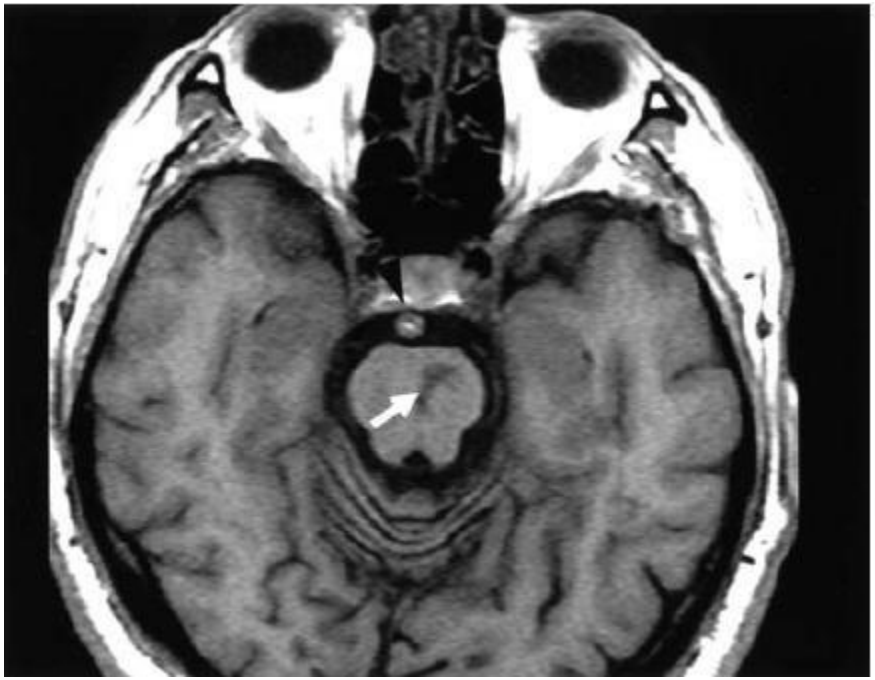
Long circumferential branches

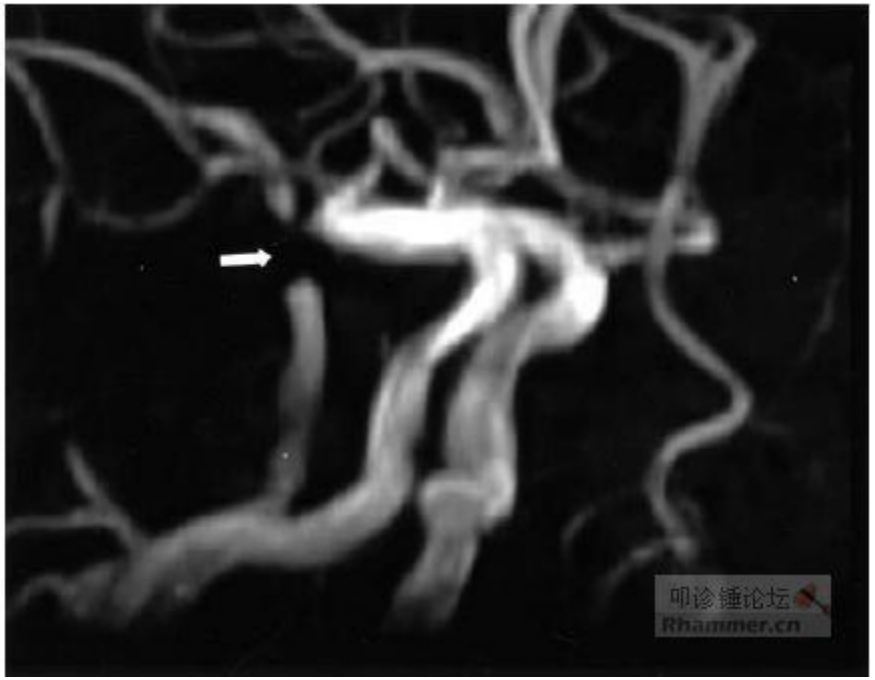
(After Foix and Hillemand)



旁正中支






叩诊锤论坛
Rhammer.cn

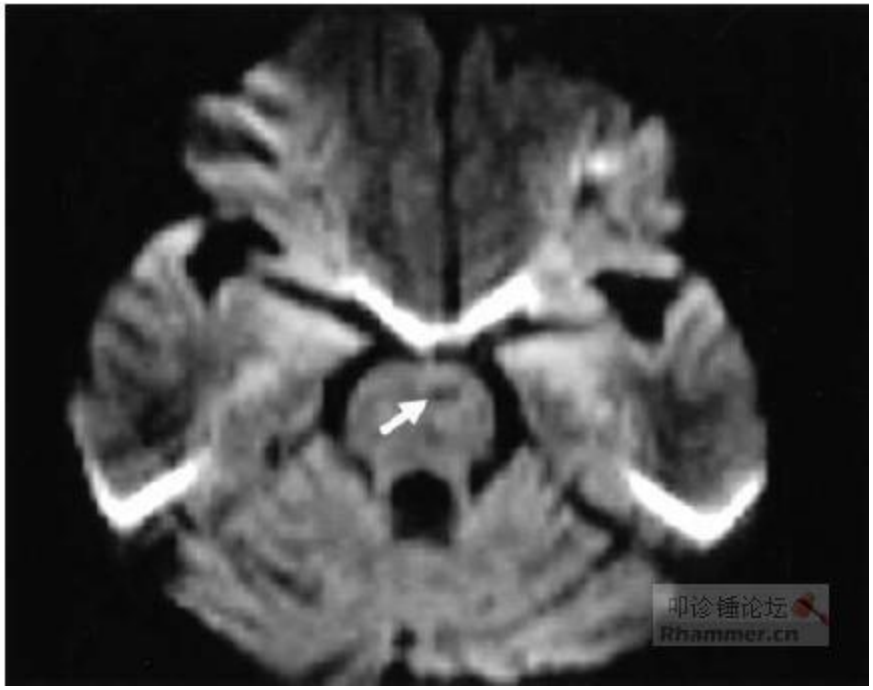
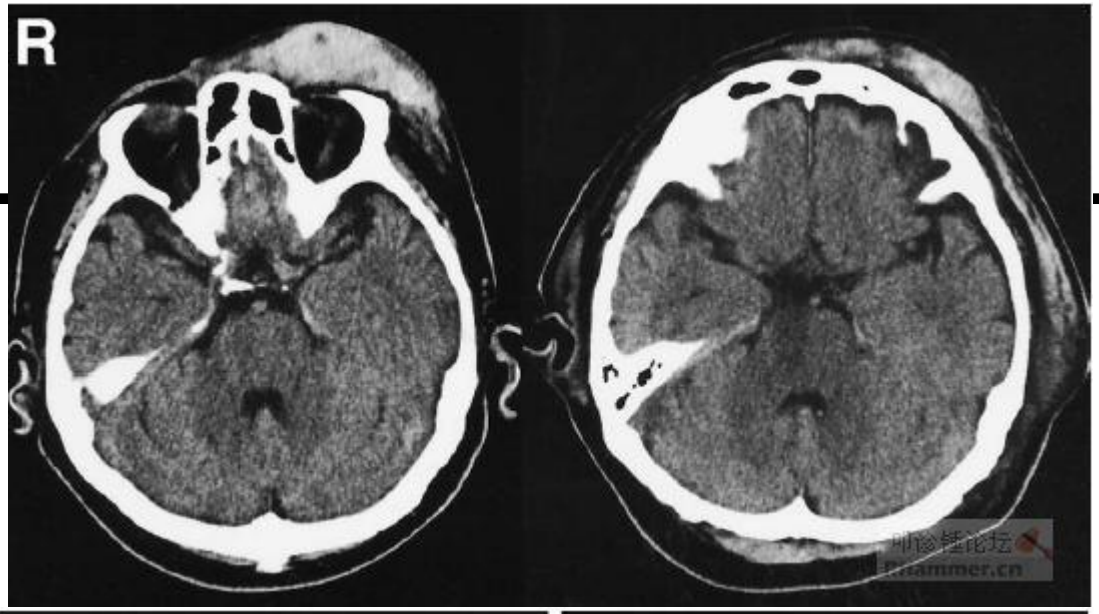
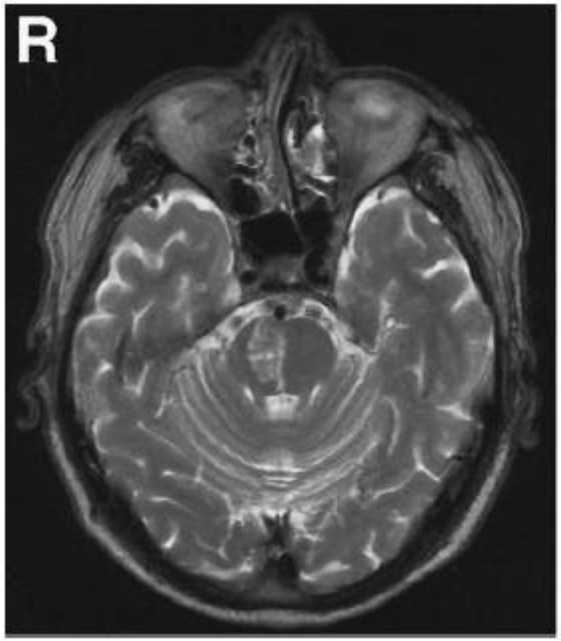
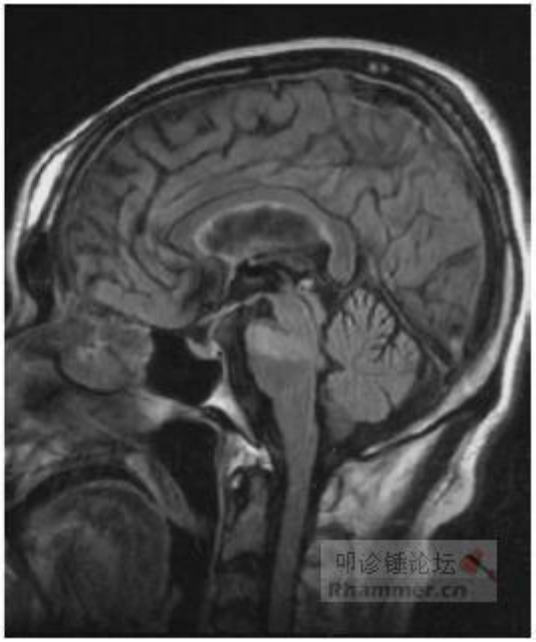


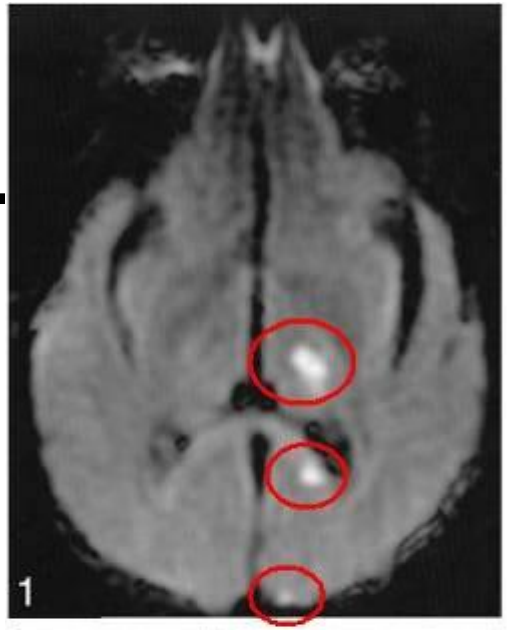
Fig. 2 Axial T2-weighted constructive interference of steady state

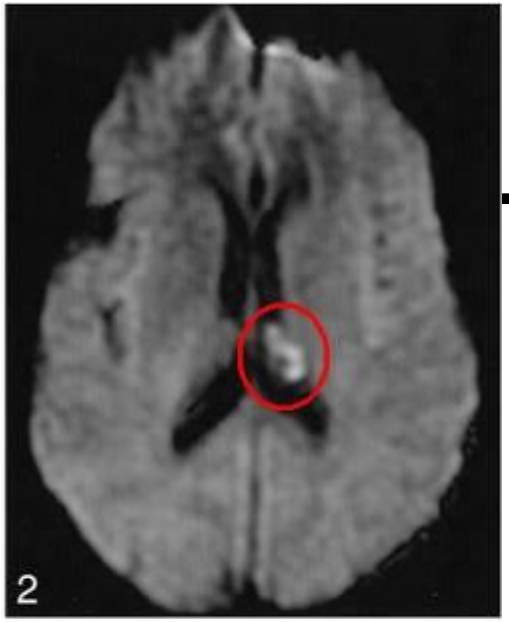

R

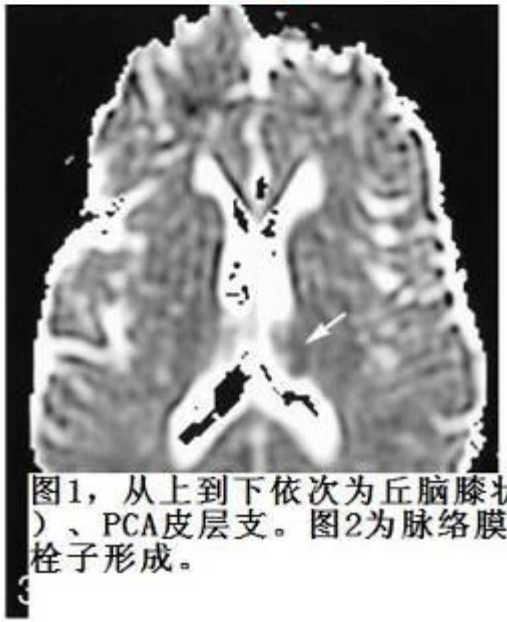

R



大脑后动脉







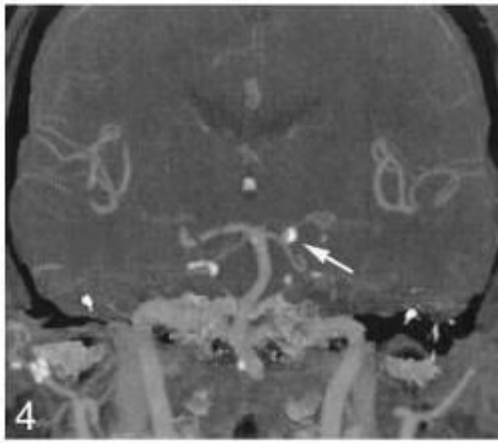
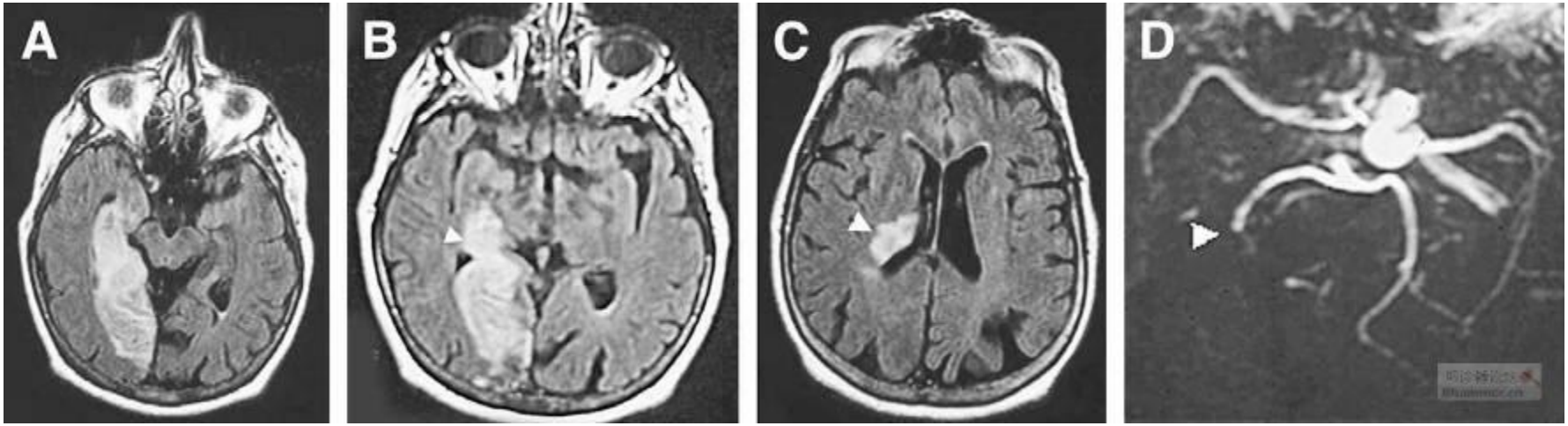
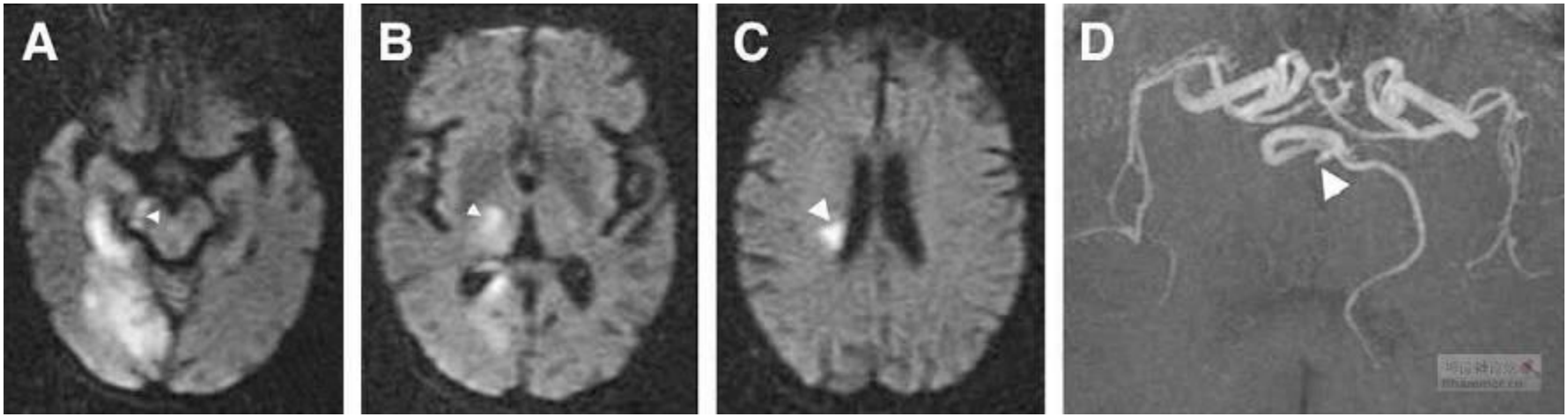
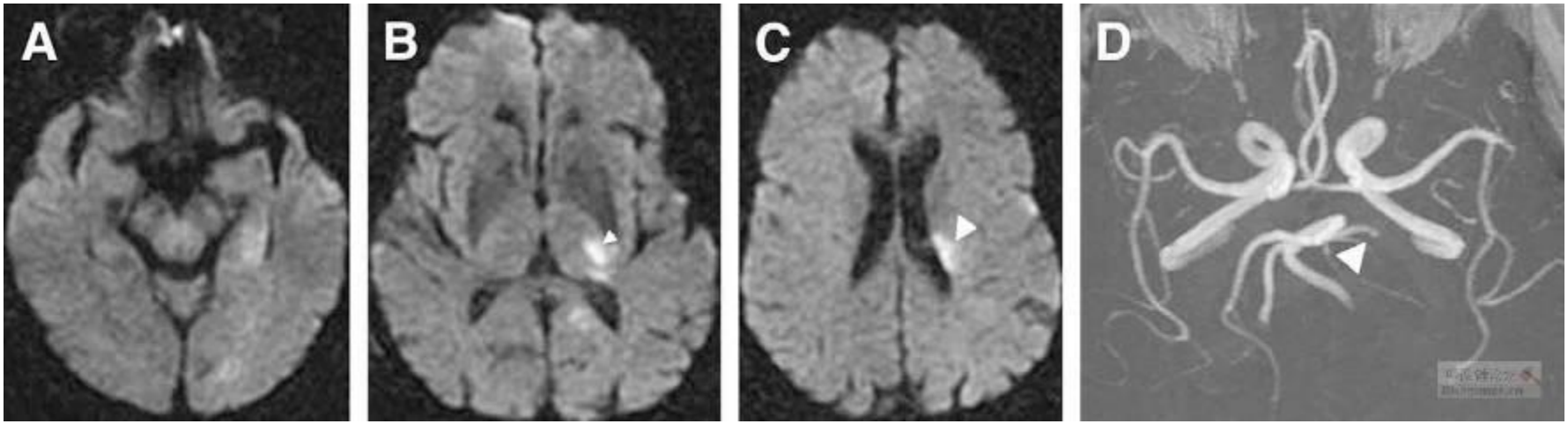
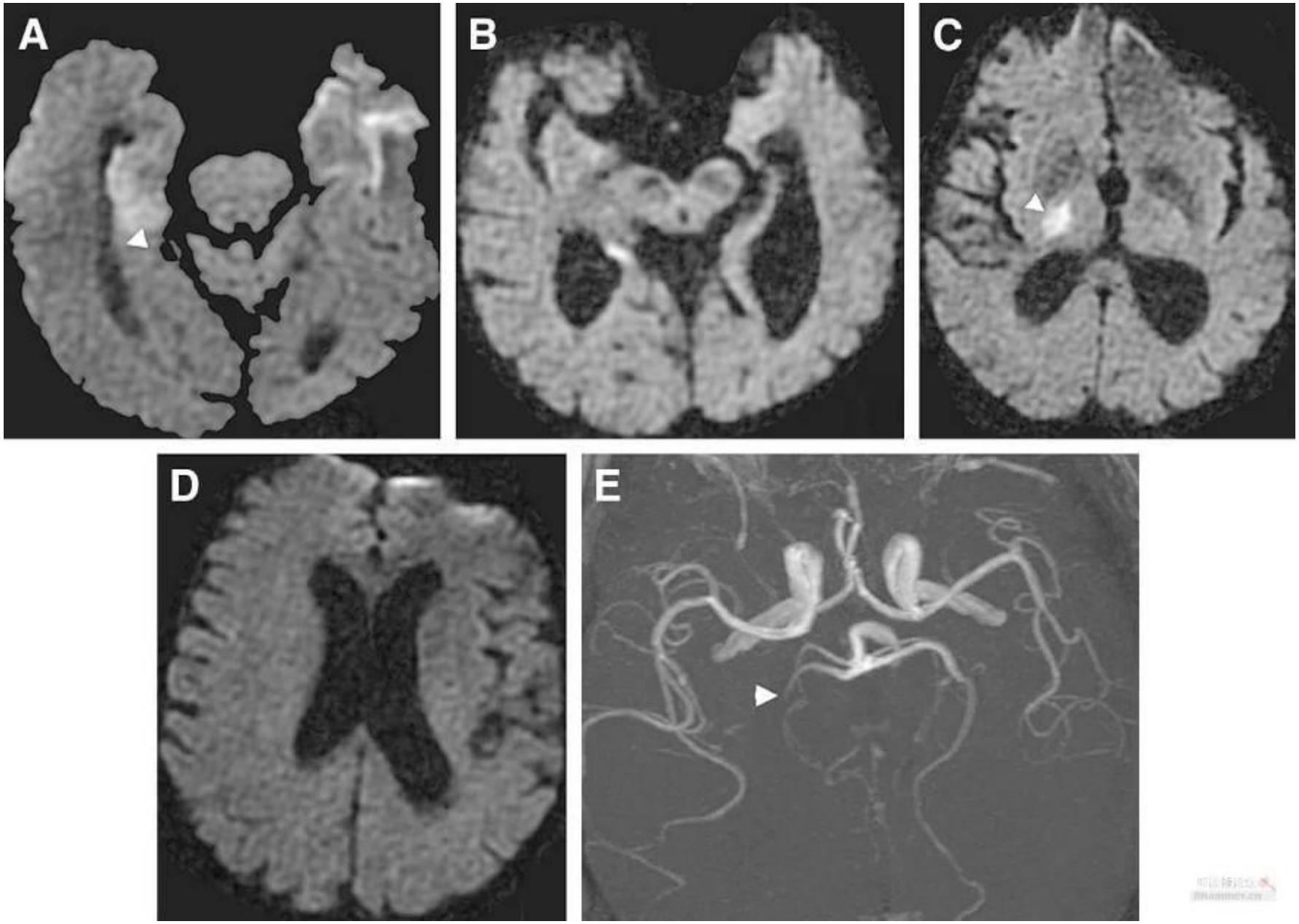


图1，从上到下依次为丘脑膝状体动脉、胼周动脉（PCA供血）、PCA皮层支。图2为脉络膜梗死。图4发现大脑后动脉钙化栓子形成。

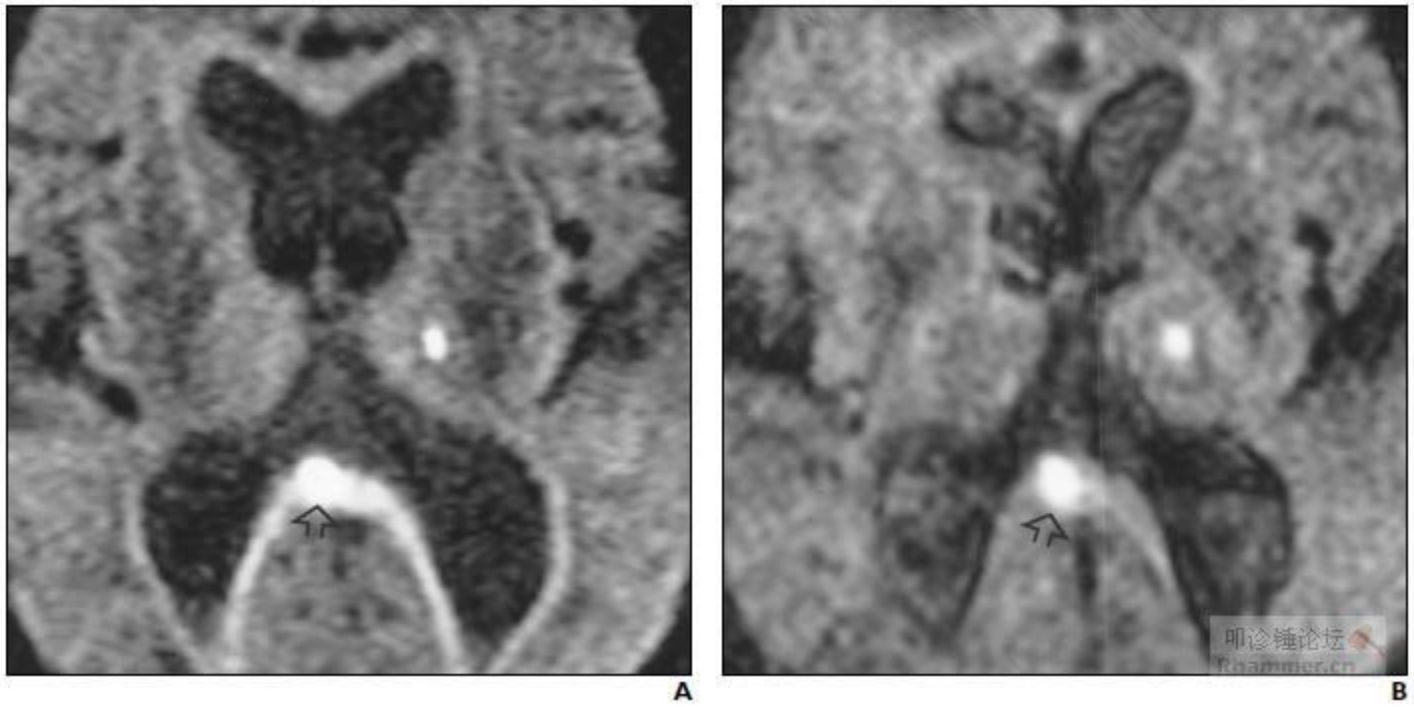

A
B
C
D


A
B
C
D


A
B
C
D


A
B
C
D
E

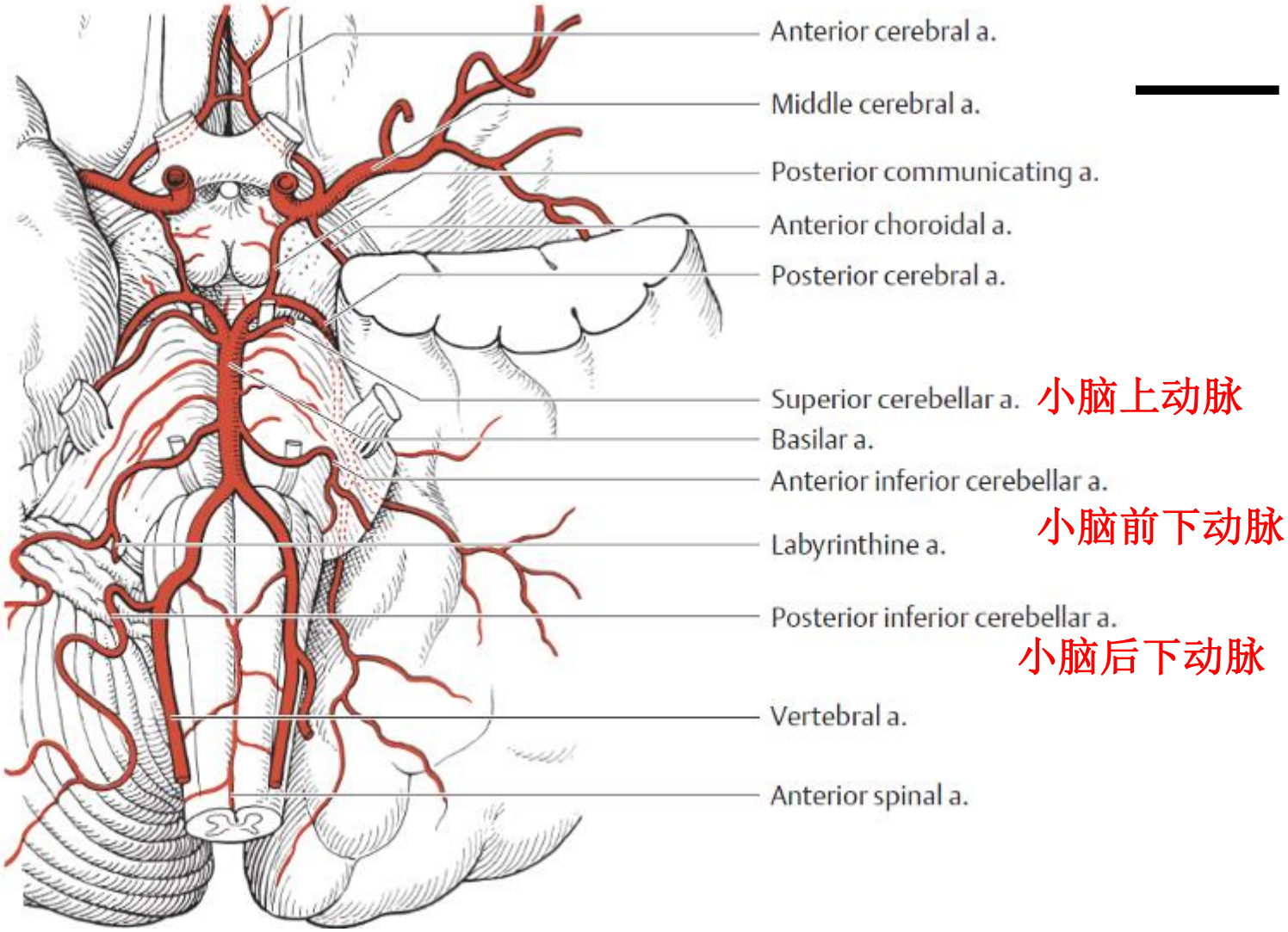
胼胝体压部梗死，应该属于大脑后的一个分支供血



后循环梗死三大重要血管

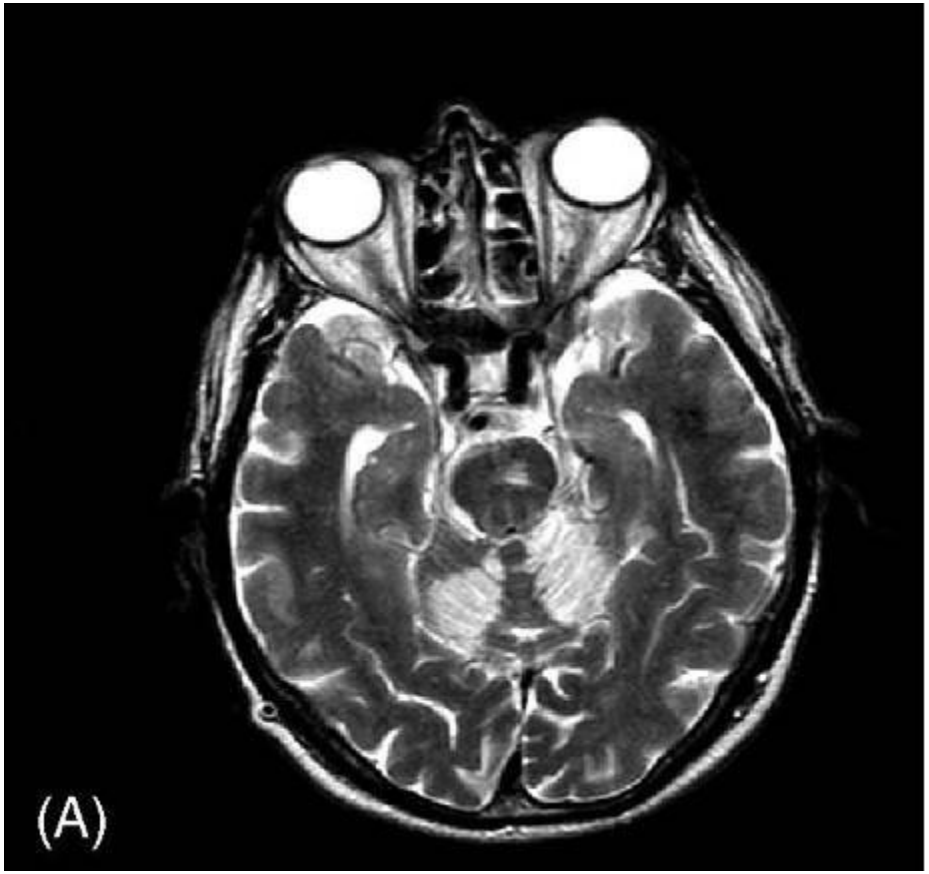
- 小脑上动脉
- 小脑前下动脉
- 小脑后下动脉

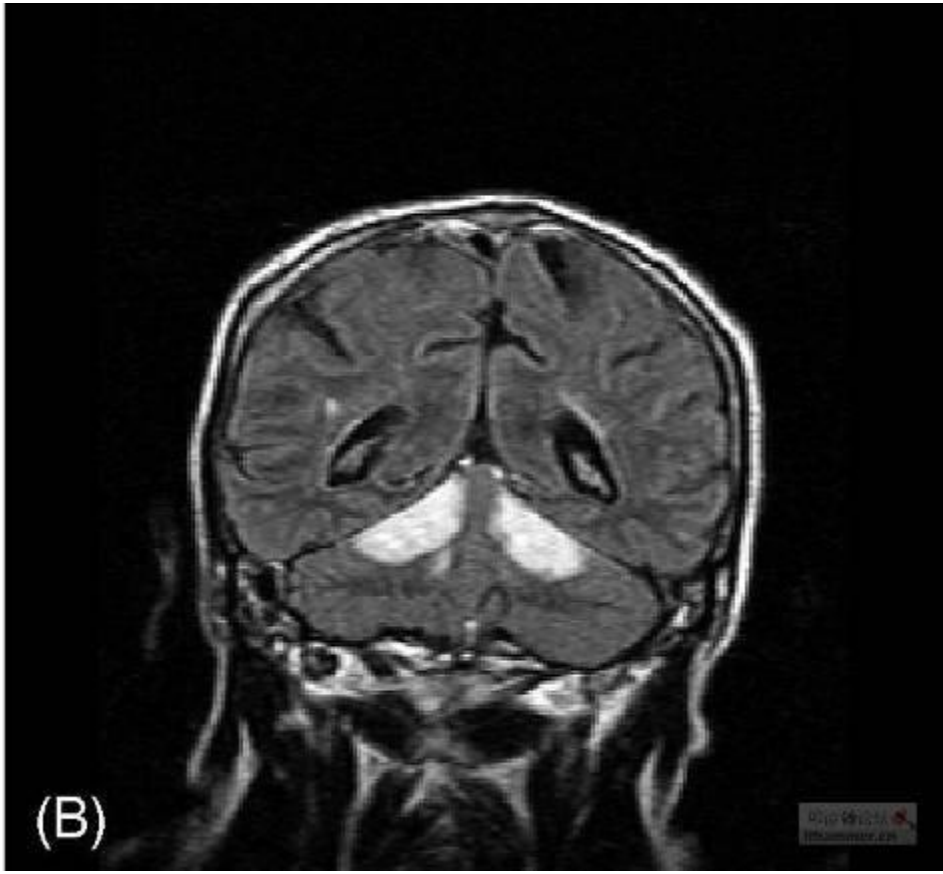
每条血管梗死都有特征性改变!


Anterior cerebral a.
Middle cerebral a.
Posterior communicating a.
Anterior choroidal a.
Posterior cerebral a.
Superior cerebellar a.
小脑上动脉
Basilar a.
Anterior inferior cerebellar a.
小脑前下动脉
Labyrinthine a.
Posterior inferior cerebellar a.
小脑后下动脉
Vertebral a.
Anterior spinal a.

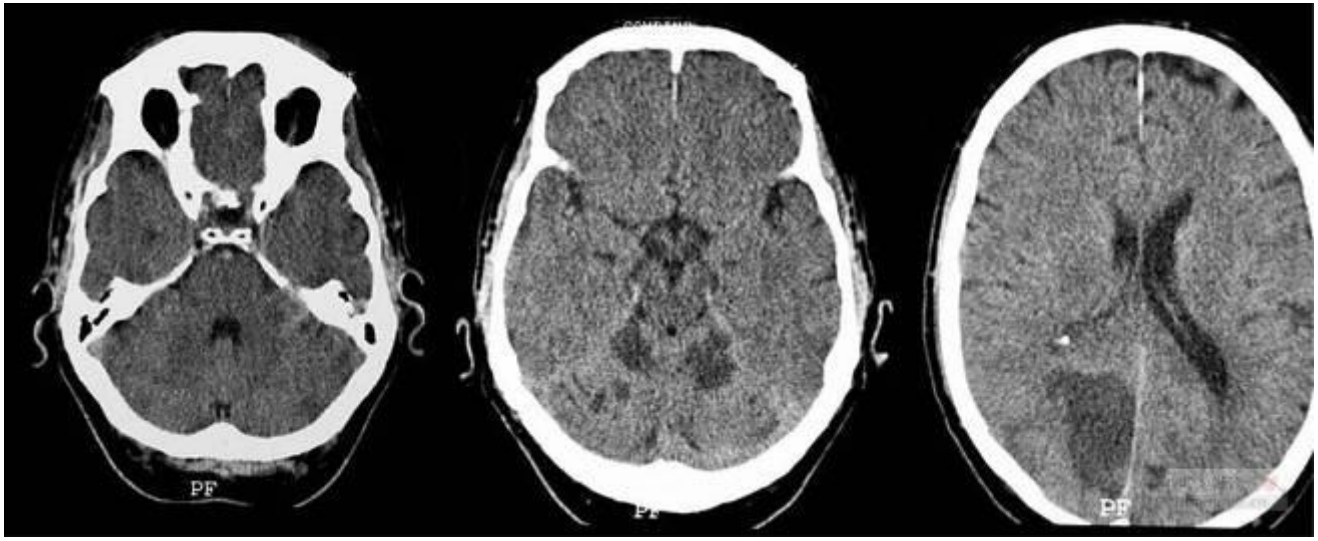
小脑上动脉

双侧小脑上动脉

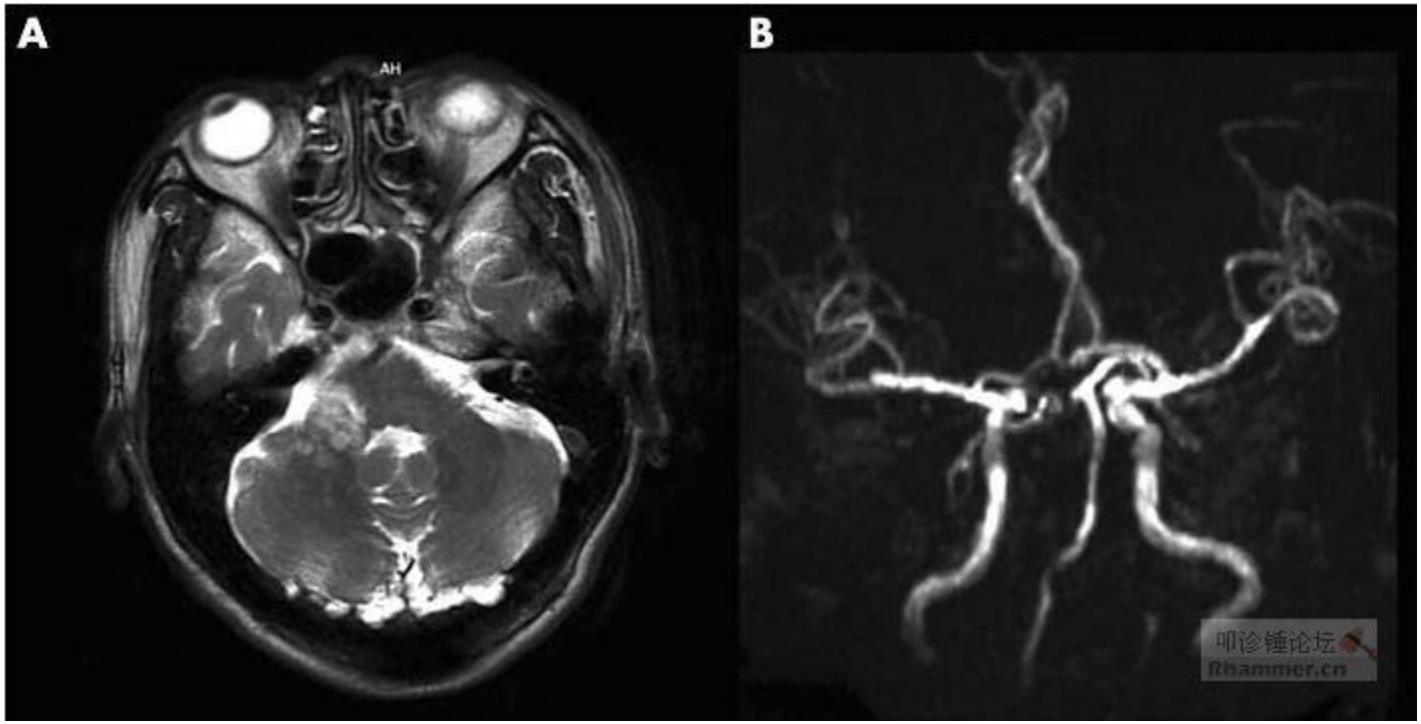




双侧小脑上动脉

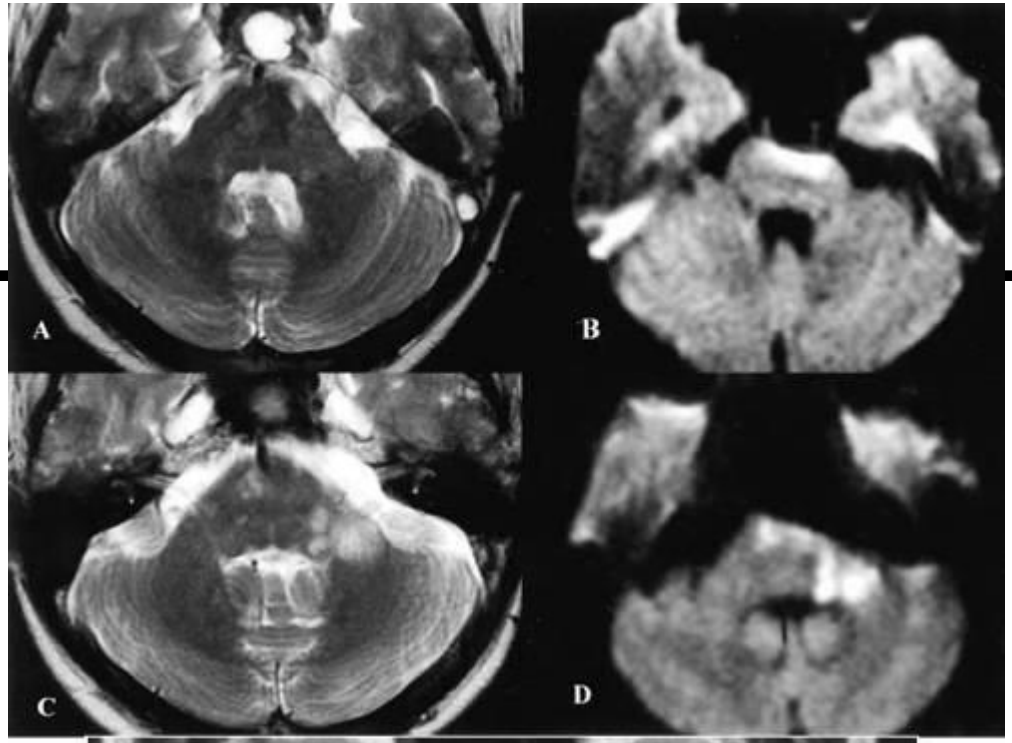


小脑前下动脉


A
AH
B
叩诊锤论坛
ftbammer.cn


A
B

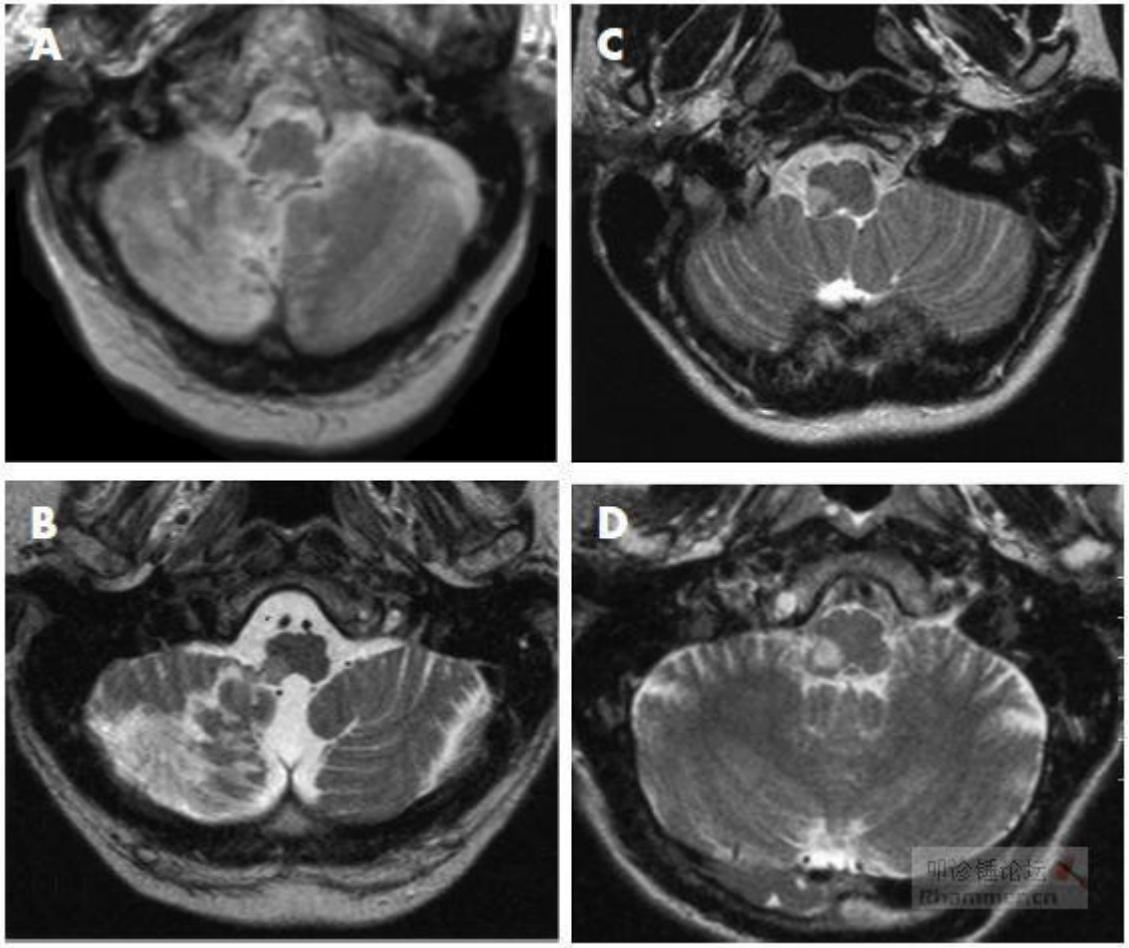

叩诊锤论坛
Rhammer.cn


A
B
C
D

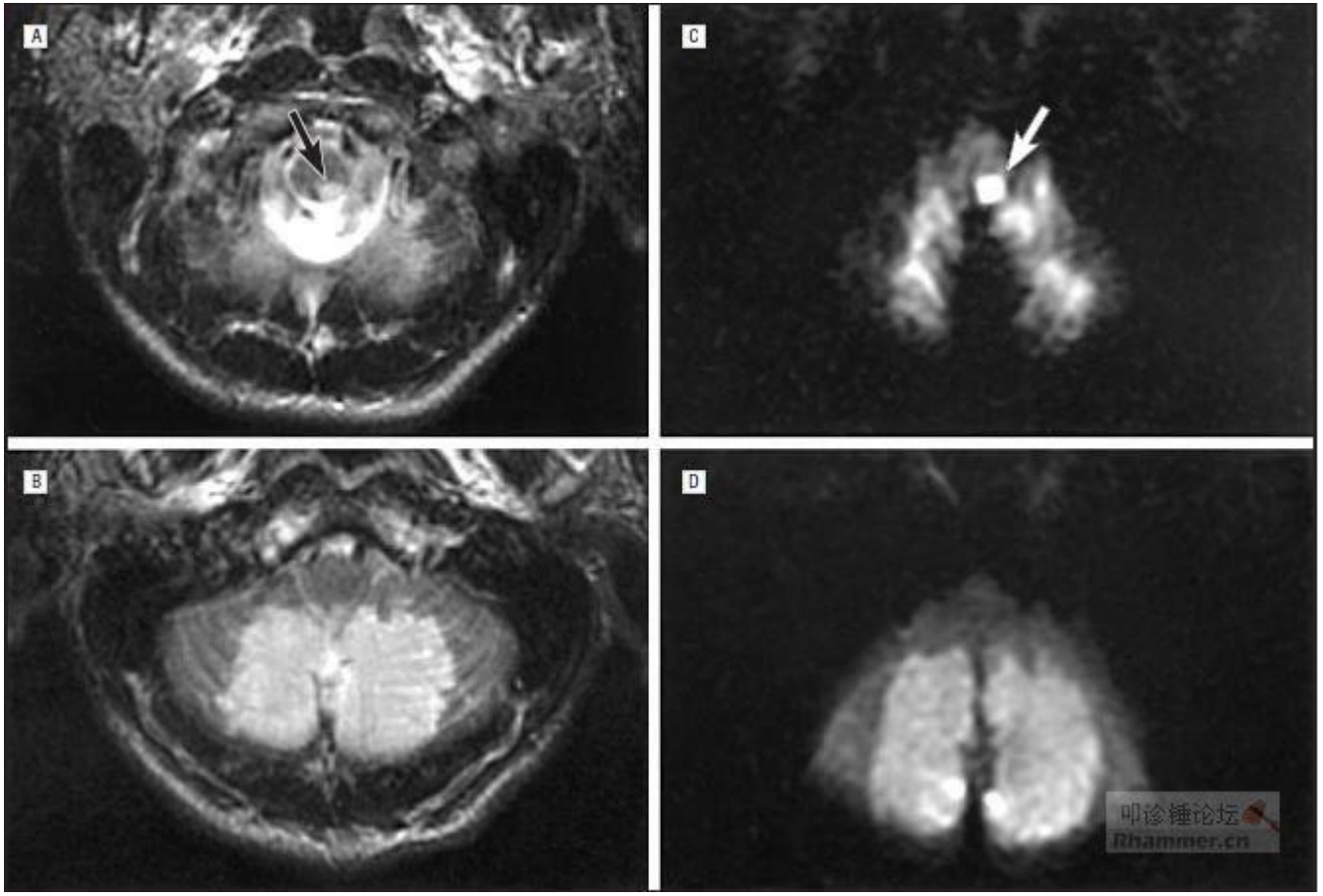

SP
SL
FoV
264
Tra

小脑后下动脉

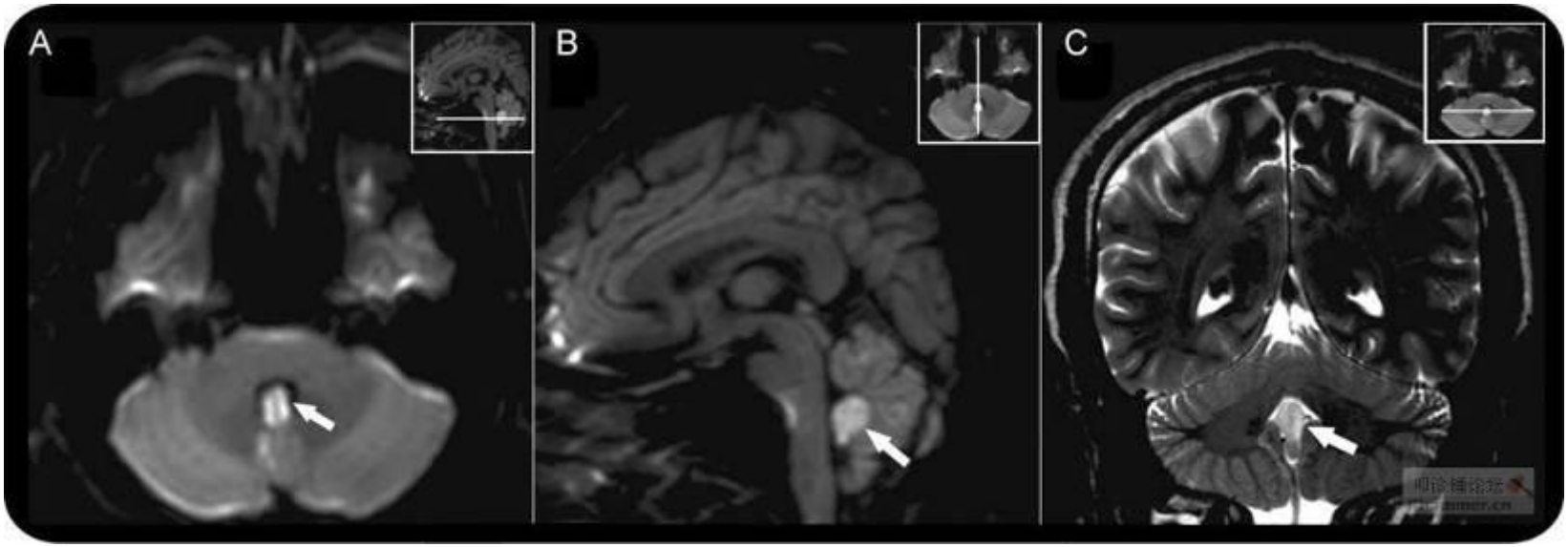
双侧小脑后下动脉



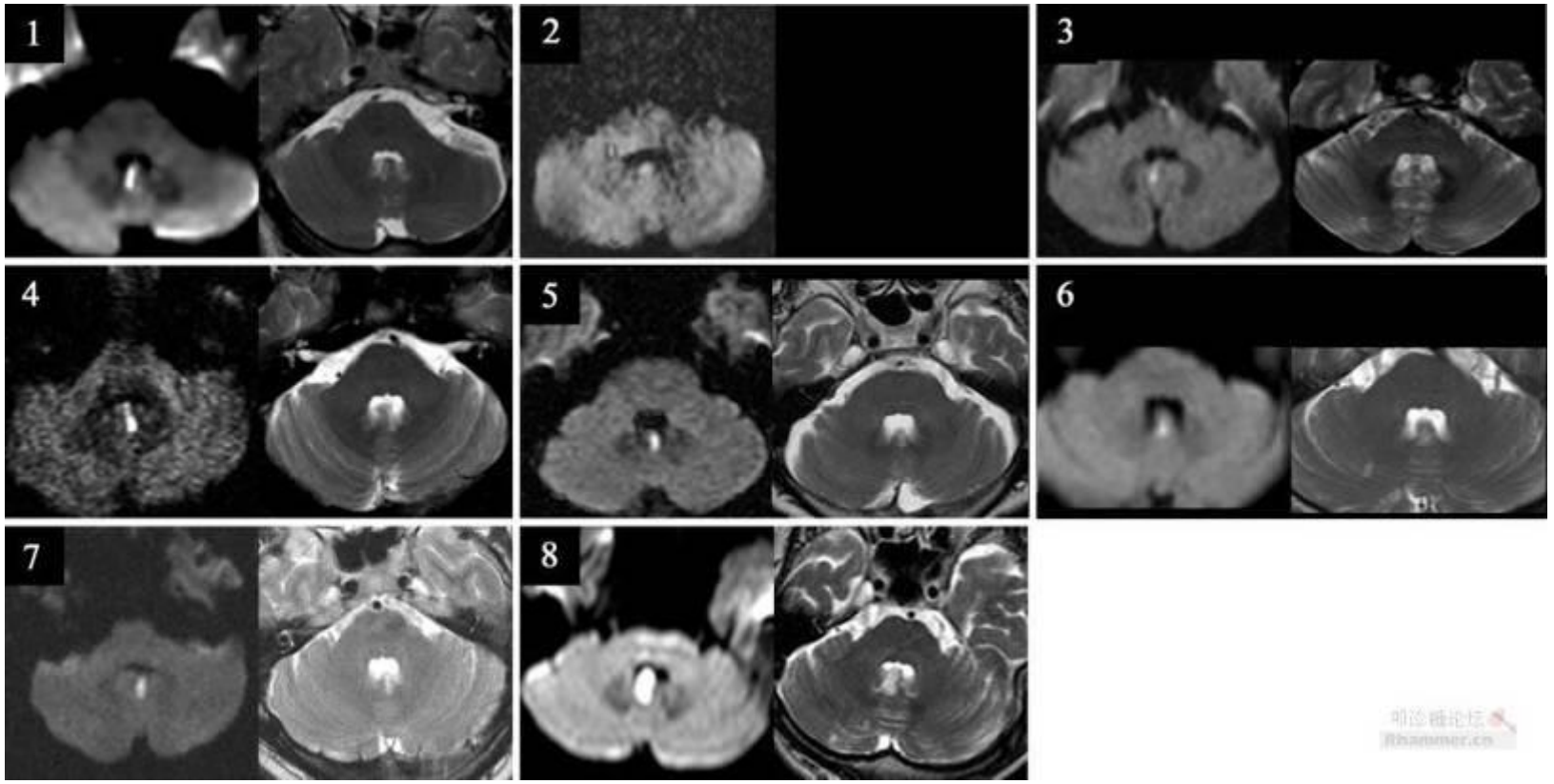
双侧小脑后下动脉

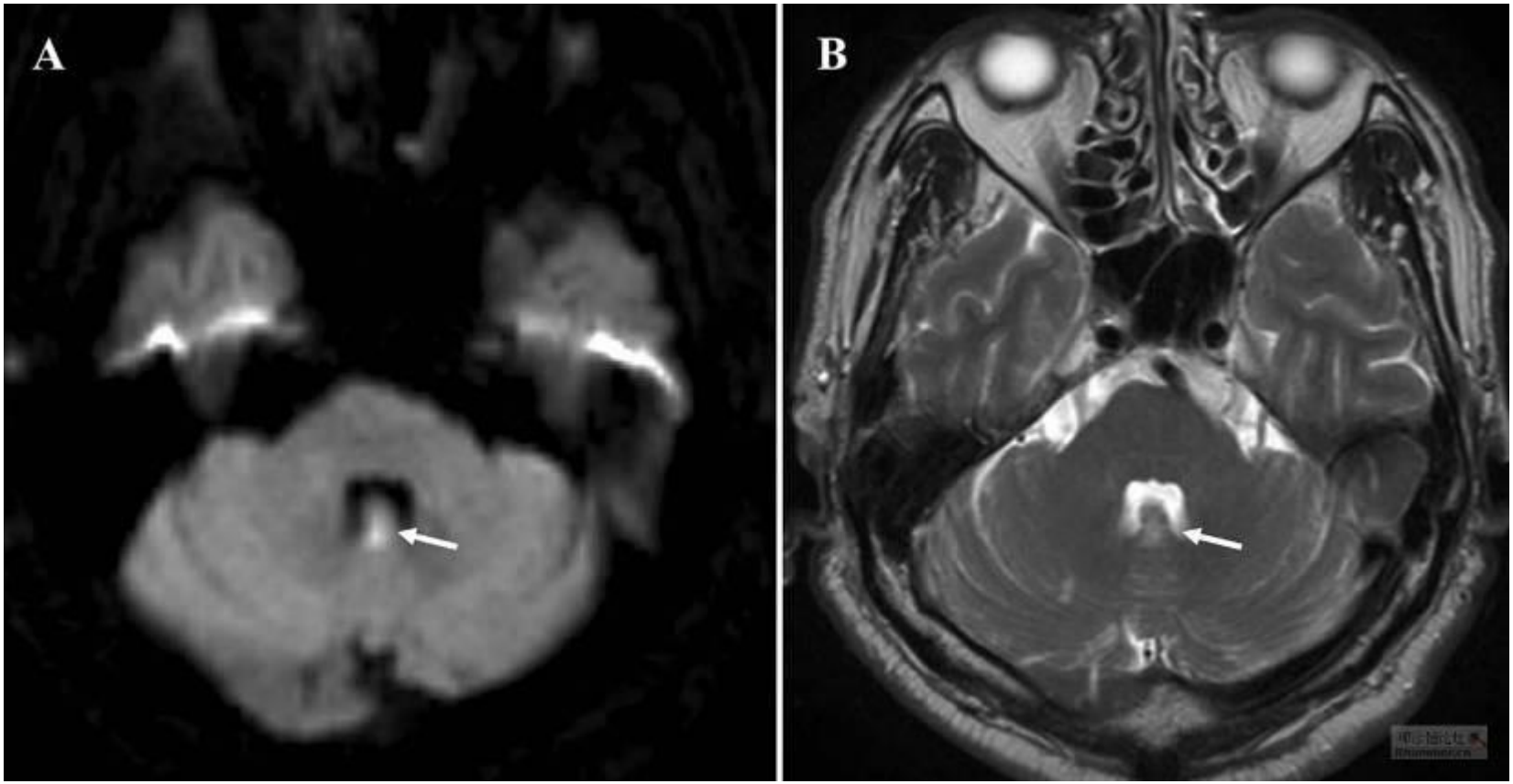


Nodular infarction

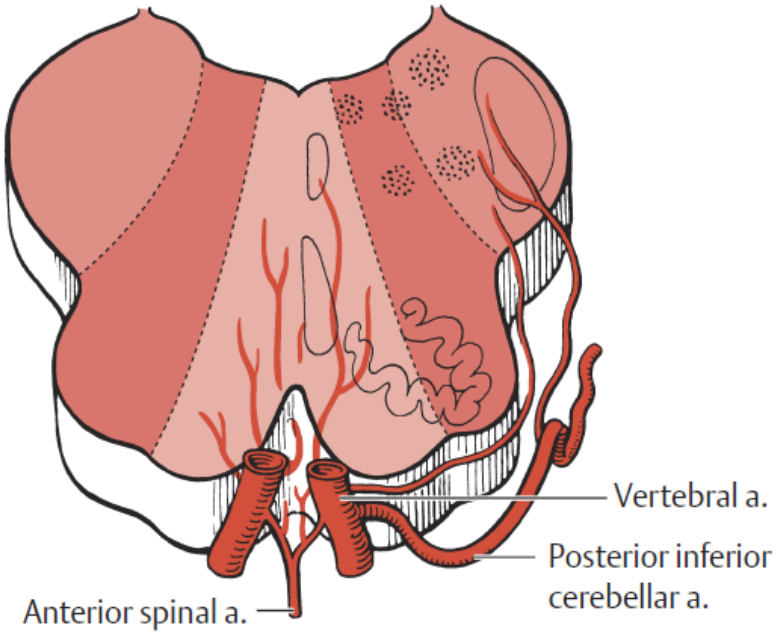


有些人认为与一侧椎动脉发育不全有关




A
B

脊髓前动脉
椎旁正中动脉

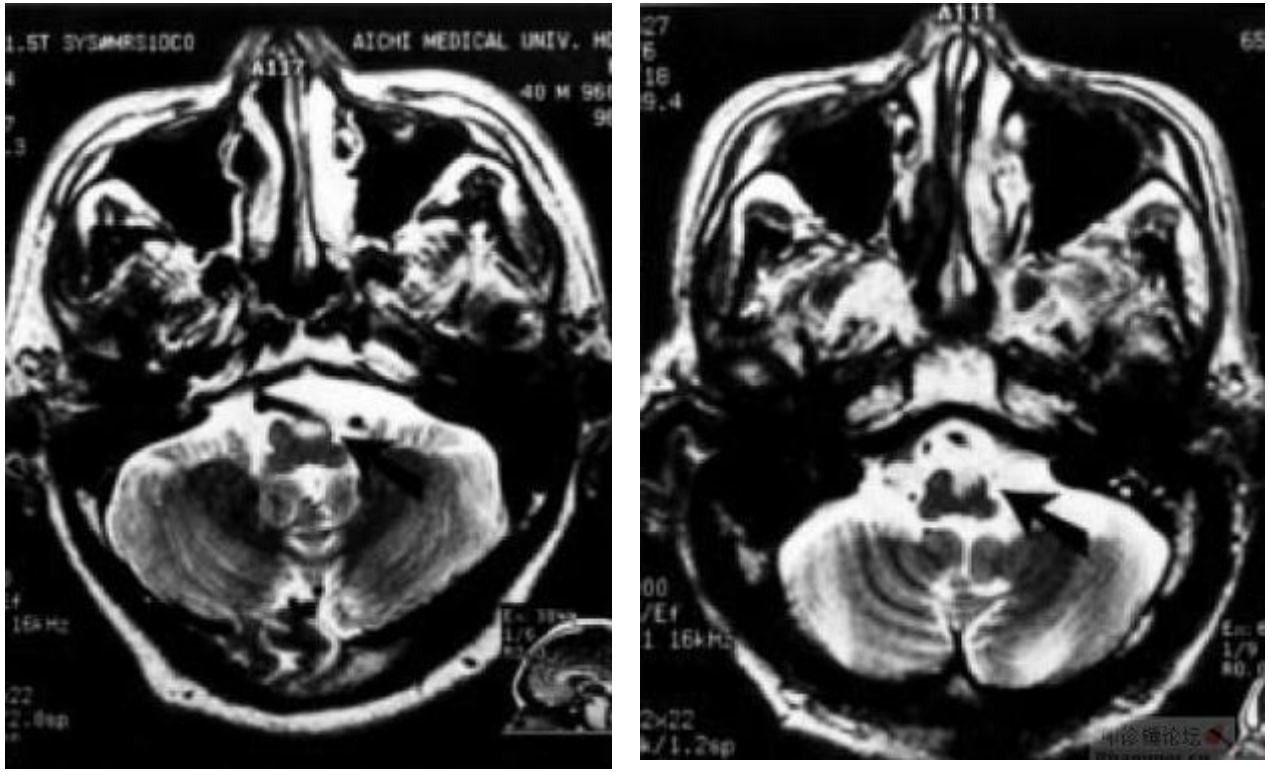


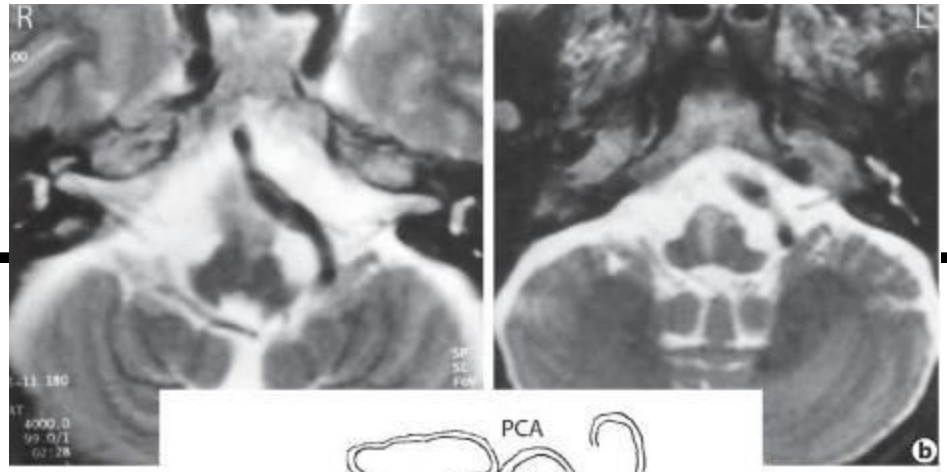
c Medulla

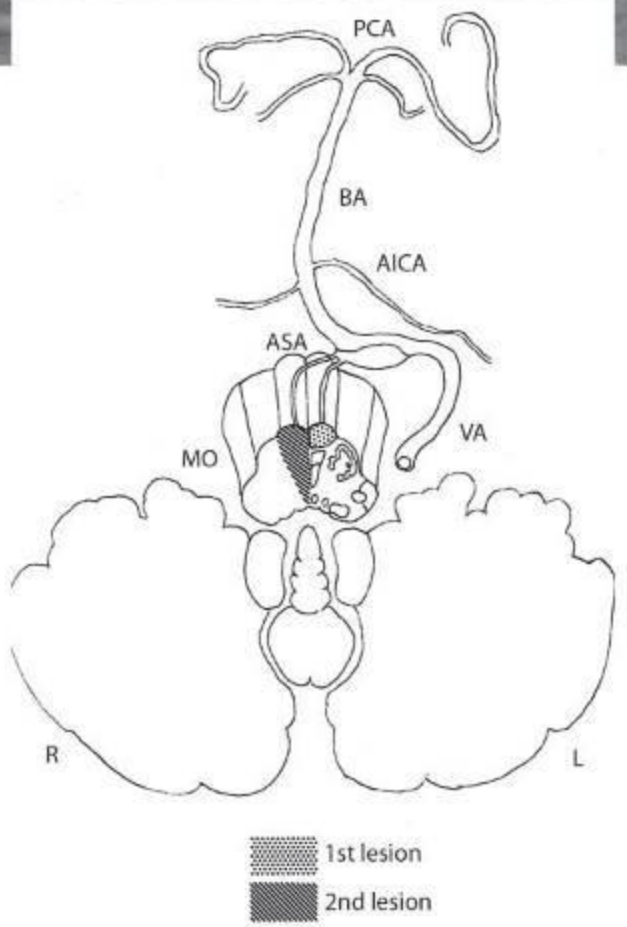
Posterior inferior cerebellar a.

Anterior inferior cerebellar a.

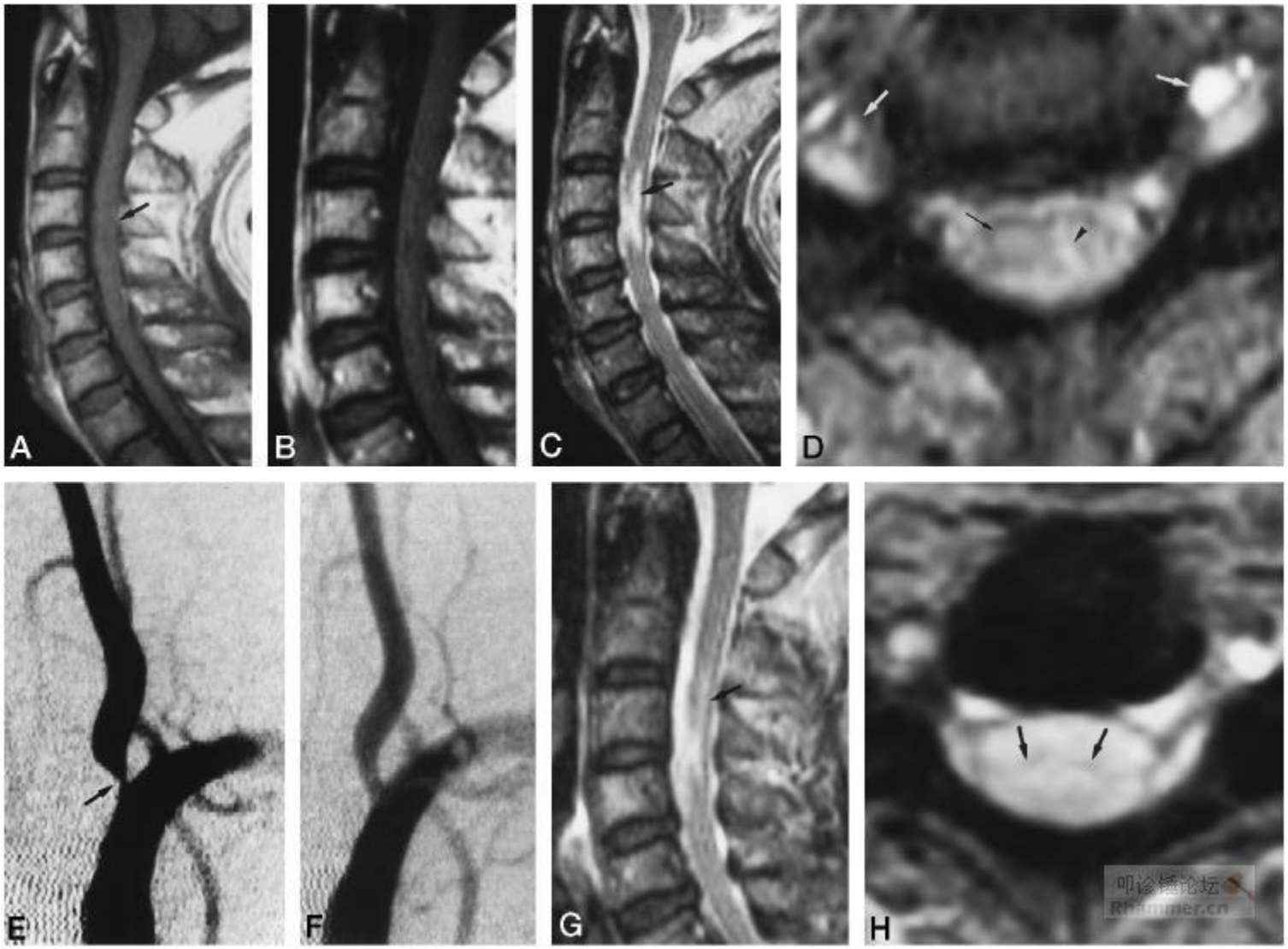
Anterior spinal a. und vertebral paramedian aa.

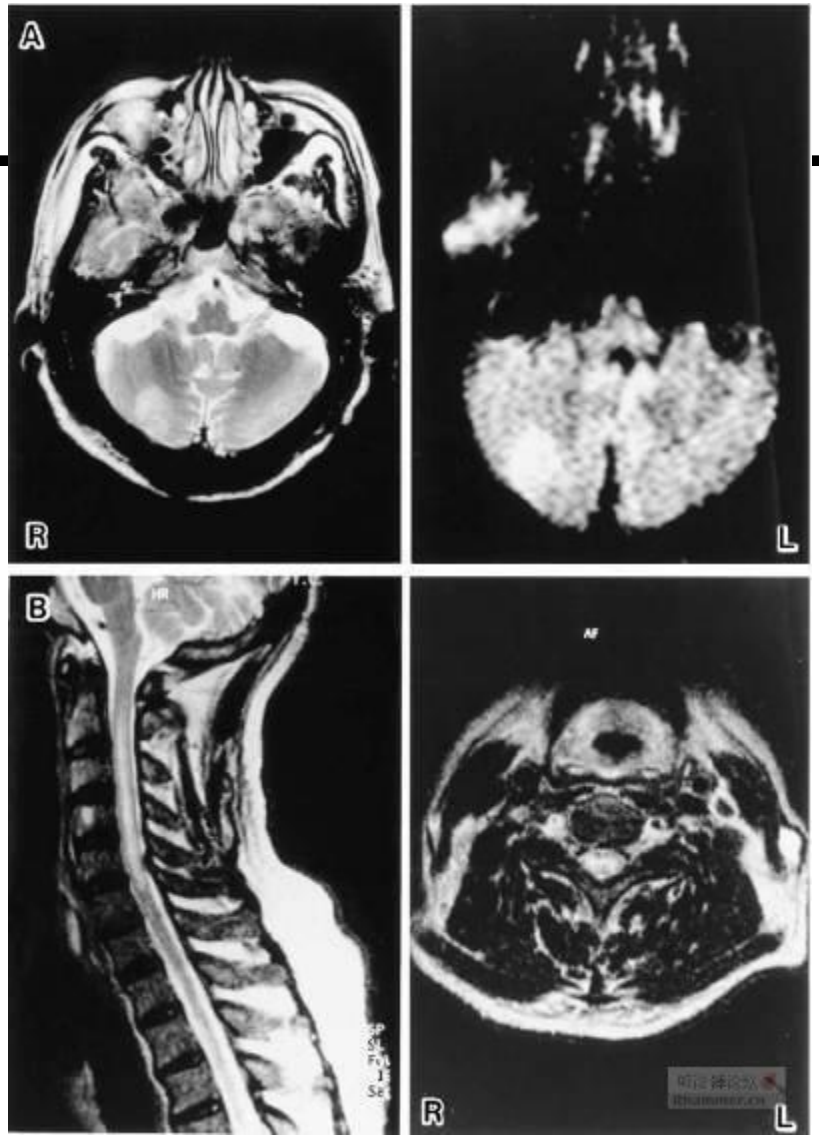

AICHI MEDICAL UNIV.

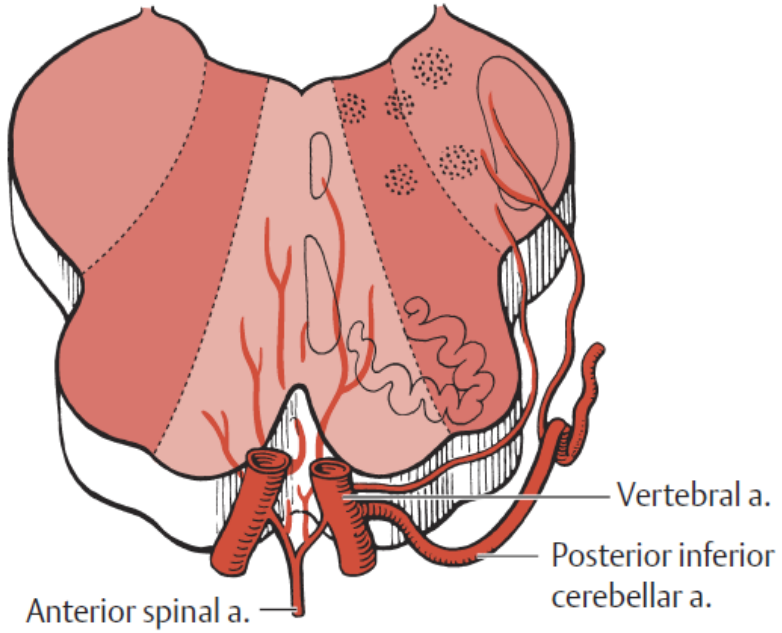

R
L
b


PCA
BA
AICA
ASA
VA
MO
R
L
1st lesion
2nd lesion

脊髓前动脉




A
R
L
B
R
L

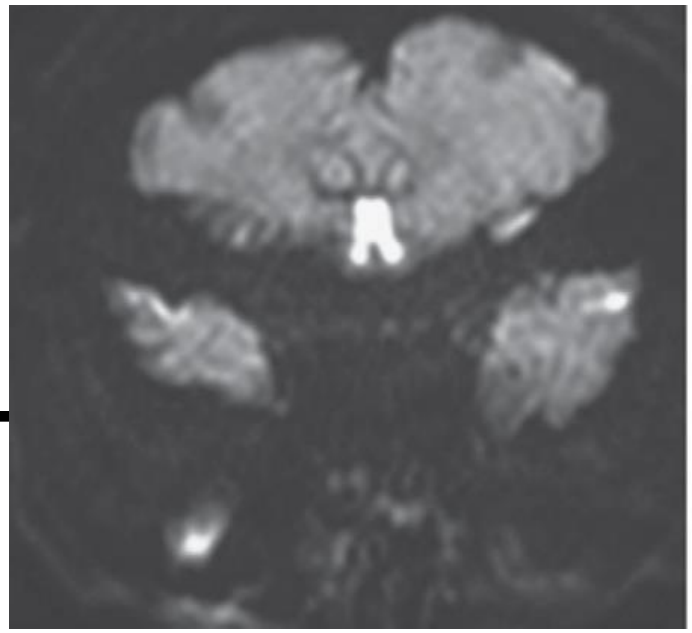


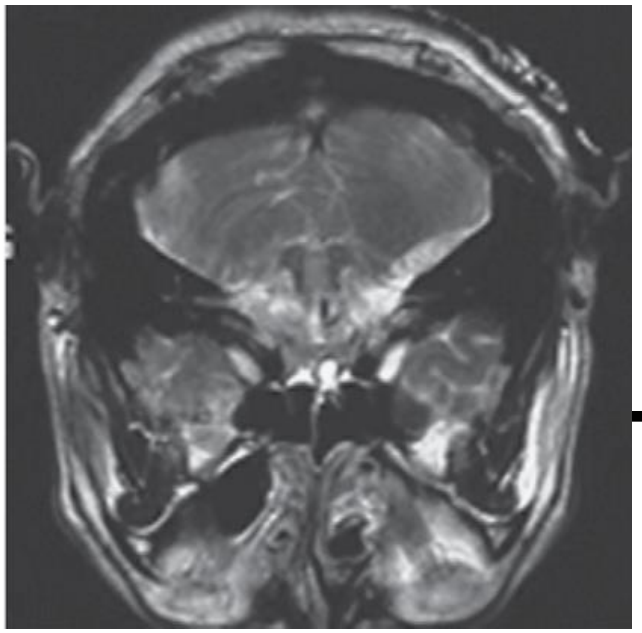
c Medulla

Posterior inferior cerebellar a.

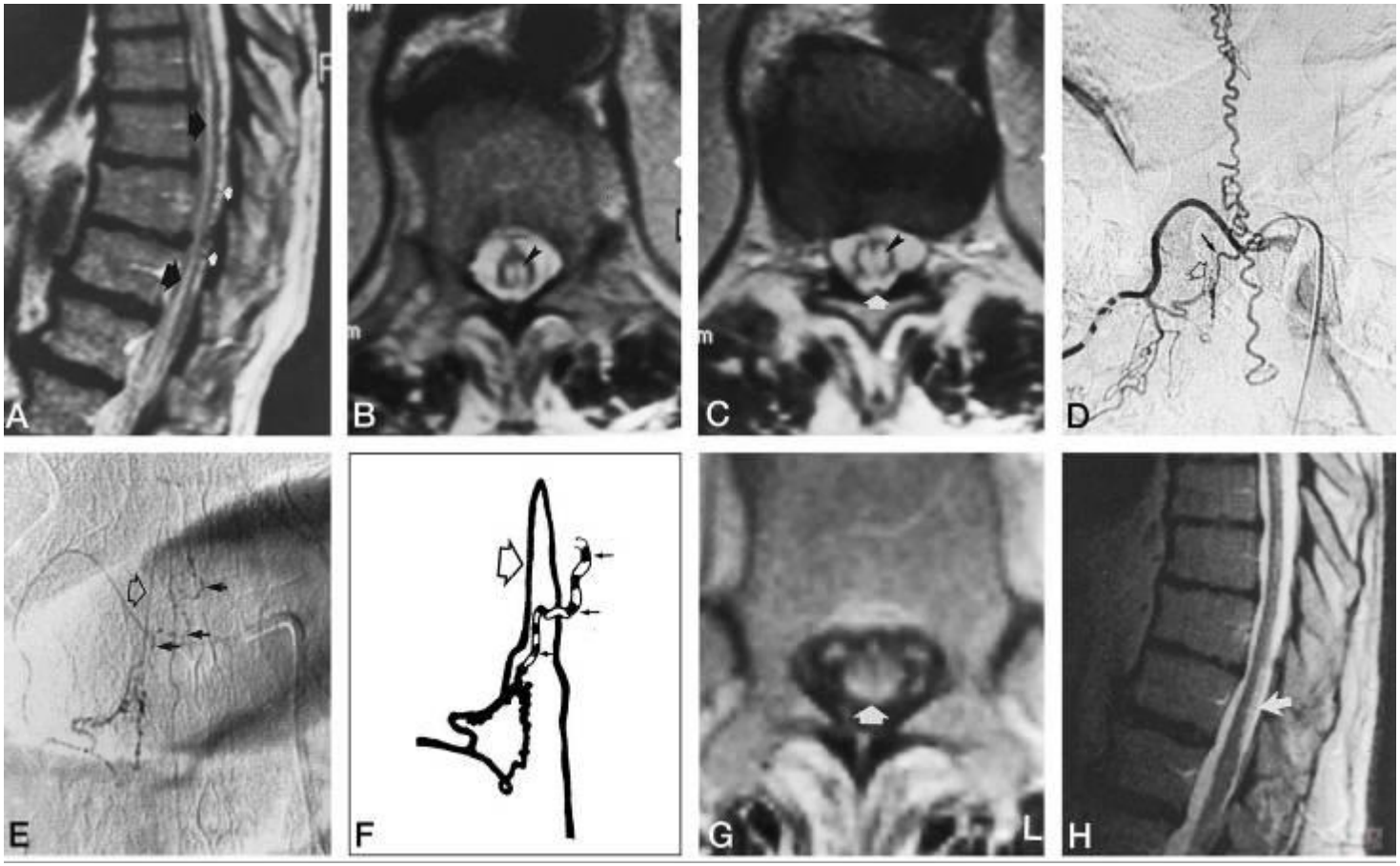
Anterior inferior cerebellar a.

Anterior spinal a. und vertebral paramedian aa.





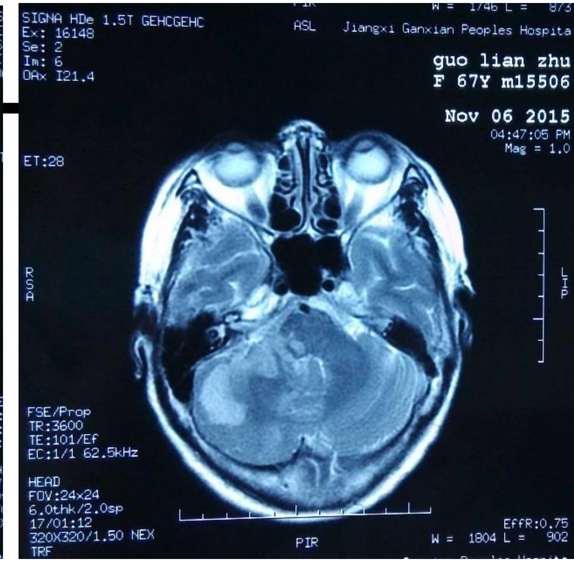
脊髓后动脉


A
B
C
D
E
F
G
L
H

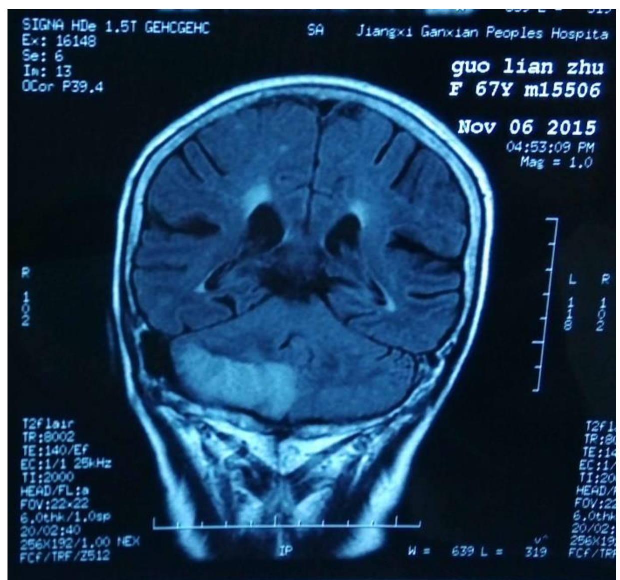
思考题：定位血管？

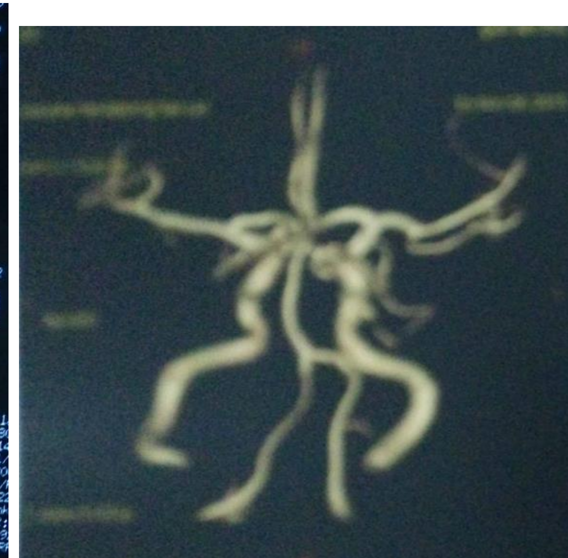

SIGNA HDe 1.5T GEHCGEHC
Ex: 16148
Se: 2
Im: 4
OAx I37.4
ASL
Jiangxi Ganxian Peoples Hospita
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
EffR:0.75


SIGNA HDe 1.5T GEHCGEHC
Ex: 16148
Se: 2
Im: 5
OAx I29.4
ASL
Jiangxi Ganxian Peoples Hospita
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
TRF
PIR
EffR:0.75
W = 1903 L = 951


SIGNA HDe 1.5T GEHCGEHC
Ex: 16148
Se: 2
Im: 6
OAx I21.4
ASL
Jiangxi Ganxian Peoples Hospita
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
TRF
PIR
EffR:0.75
W = 1804 L = 902


SIGNA HDe 1.5T GEHCGEHC
Ex: 16148
Se: 2
Im: 7
OAx I13.4
ASL
Jiangxi Ganxian Peoples Hospita
guo lian zhu
F 67Y m15506
Nov 06 2015
04:47:05 PM
Mag = 1.0
ET:28
FSE/Prop
TR:3600
TE:101/Ef
EC:1/1 62.5kHz
HEAD
FOV:24x24
6.0thk/2.0sp
17/01:12
320X320/1.50 NEX
TRF
PIR
EffR:0.75
W = 1743 L = 871


SIGNA HDe 1.5T GEHCGEHC
Ex: 16148
Se: 6
Im: 13
OCor F39.4
SA
Jiangxi Ganxian Peoples Hospita
guo lian zhu
F 67Y m15506
Nov 06 2015
04:53:09 PM
Mag = 1.0
T2flair
TR:8002
TE:140/Ef
EC:1/1 25kHz
TI:2000
HEAD/FL:a
FOV:22x22
6.0thk/1.0sp
20/02:40
256X192/1.00 NEX
FCF/TRF/Z512
IP
W = 639 L = 319



谢谢