

磁共振成像诊断学

- 磁共振成像技术在临床医学中的应用 ✓
- 中枢神经系统（头颅、脊柱）
- 骨关节系统
- 体部脏器（胸部、腹部、盆腔）

头颅正常MRI

磁共振成像 (MRI)

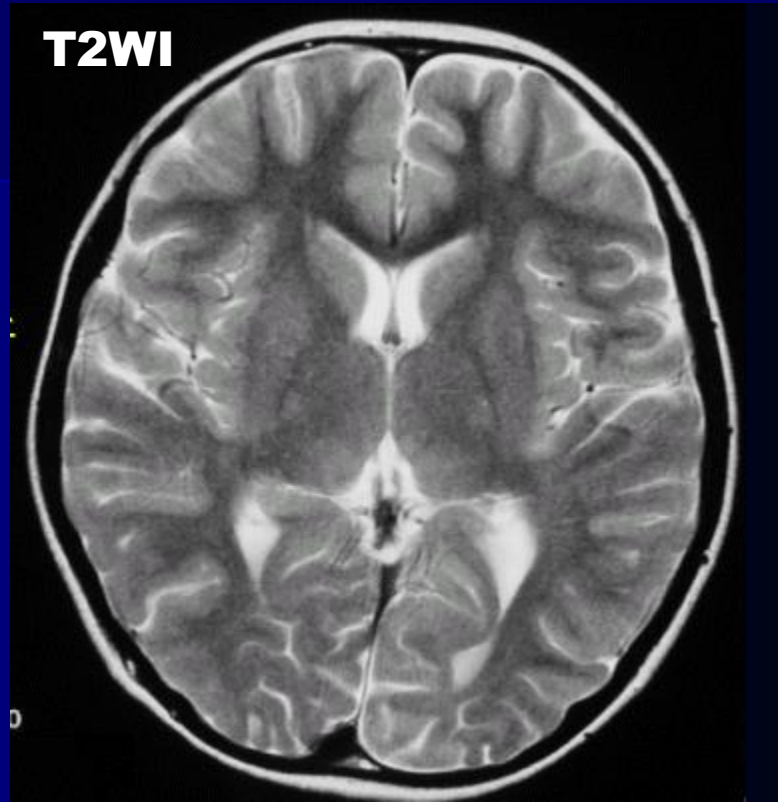
MRI通过**磁共振信号**的变化反应信息

人体不同器官的**正常组织与病理组织**的

T1和T2是相对恒定的，而且它们之间有一定的差别

这种组织间弛豫时间上的差别，是**MRI成像基础**

颅脑正常的MRI信号

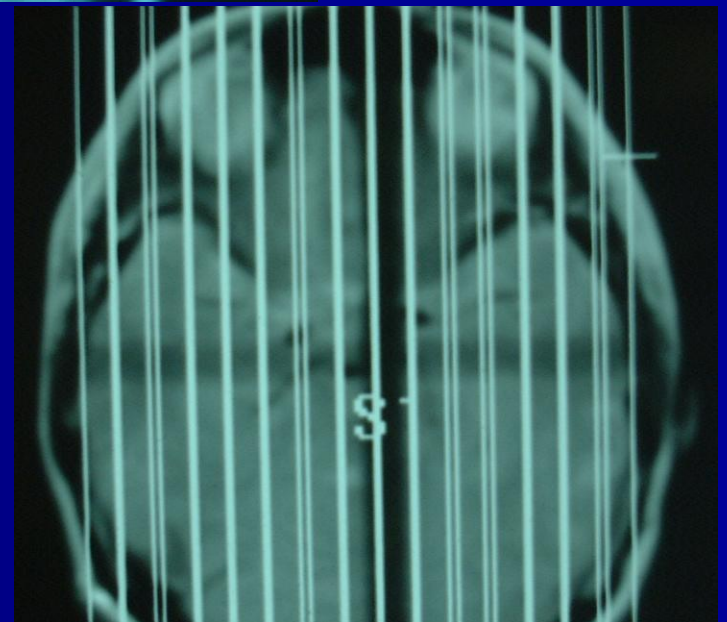
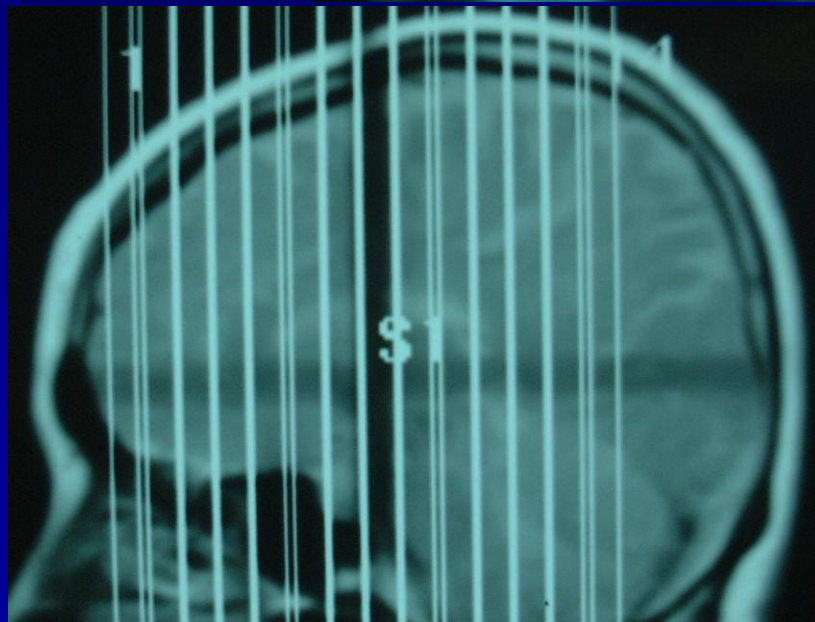
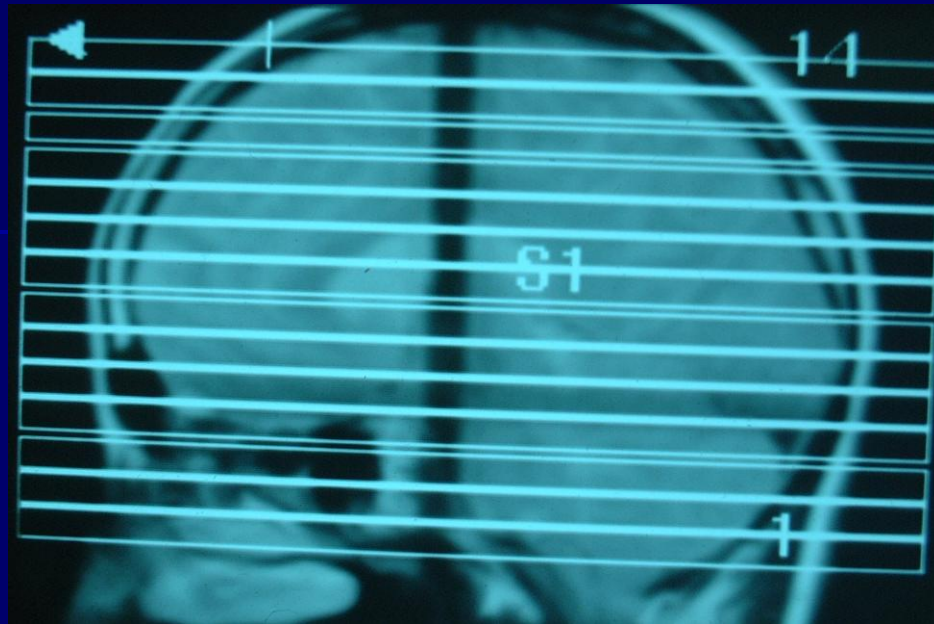


	脑白质	脑灰质	脑脊液	脂肪	骨皮质	骨髓质	脑膜
T1WI	高信号	等信号	低信号	高信号	低信号	高信号	低信号
T2WI	等信号	中高信号	高信号	高信号	低信号	中高信号	低信号

检查方法

- 常规取 SE序列 横断面 T1WI、T2WI 及 矢状面 T1WI 扫描，必要时加作 冠状面 扫描；水抑制成像 (**FLAIR**) 也较常用
- 扫描层厚 **6-8mm**，扫描垂体或听神经病变选用 **2-3mm** 层厚
- 对比剂用 Gd-DTPA 0.1~0.2mmol/kg 体重，取 头颅横断面、矢状面及冠状面 扫描。

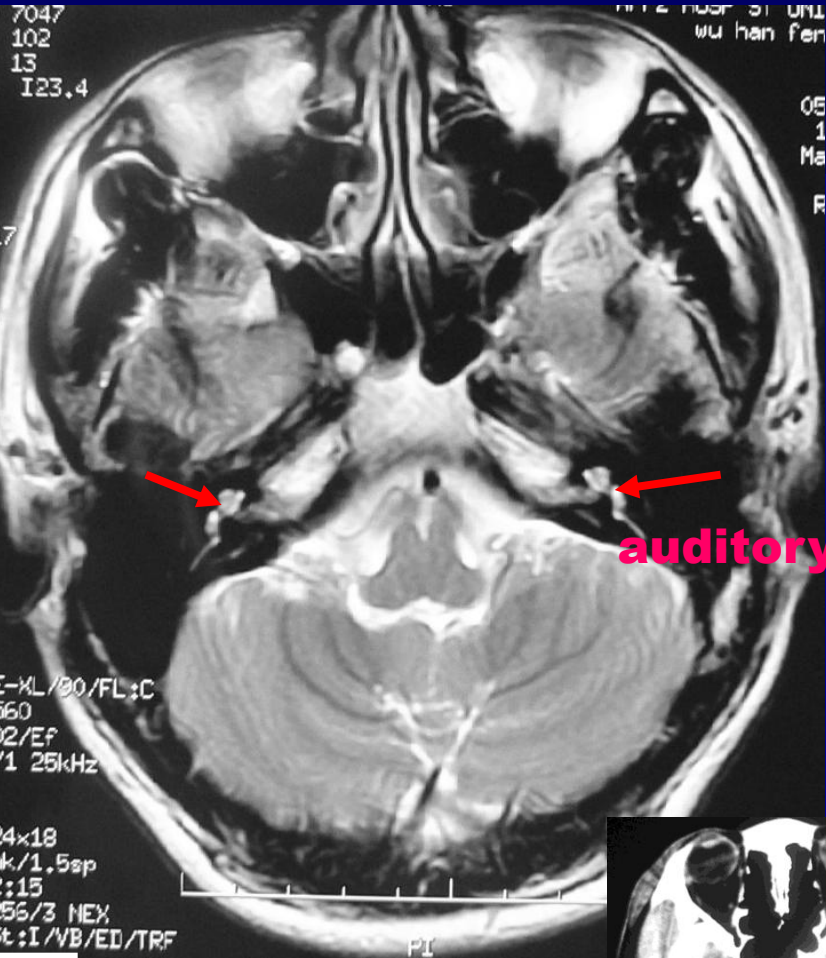
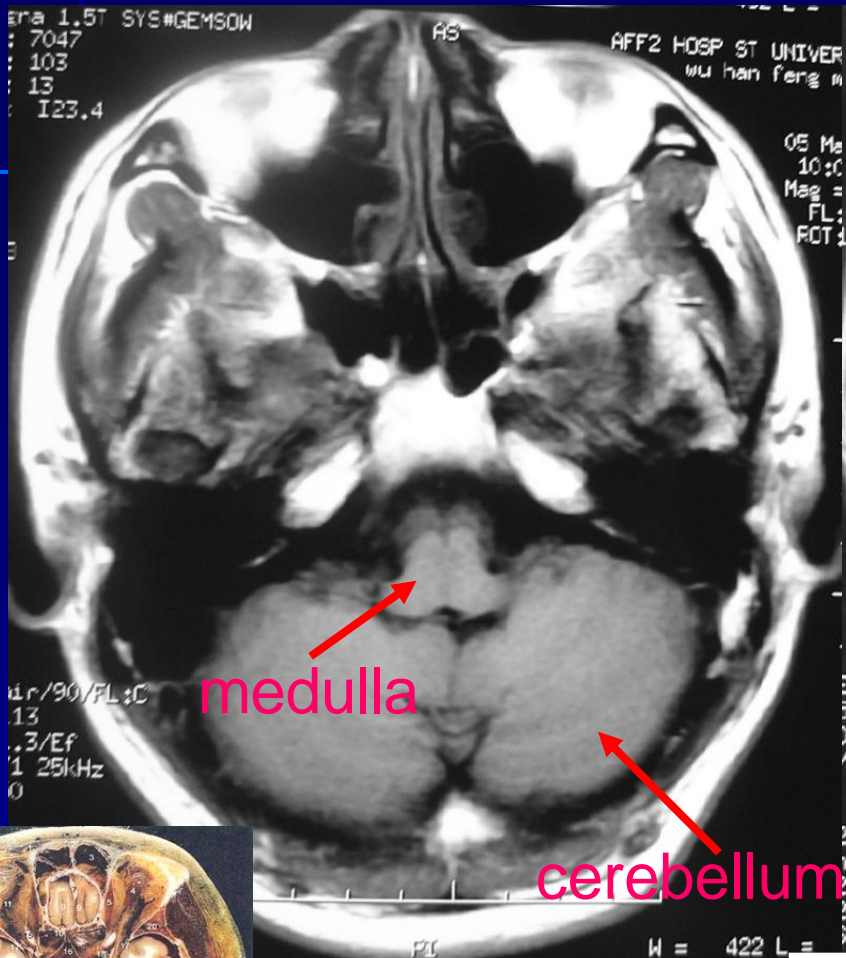
定位像(Scout image)



颅底层面

T1WI

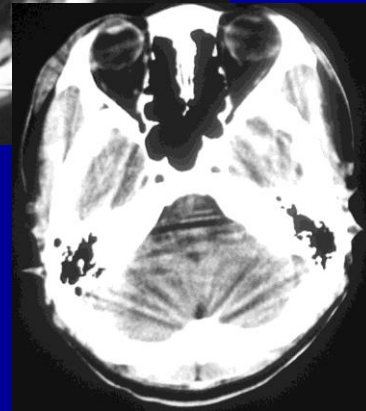
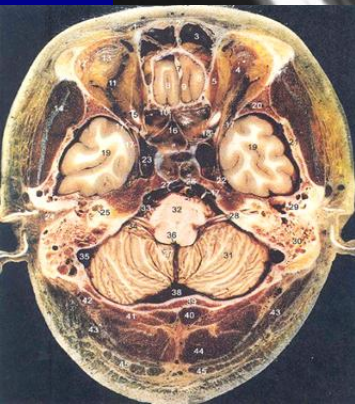
T2WI



medulla

cerebellum

auditory nerve

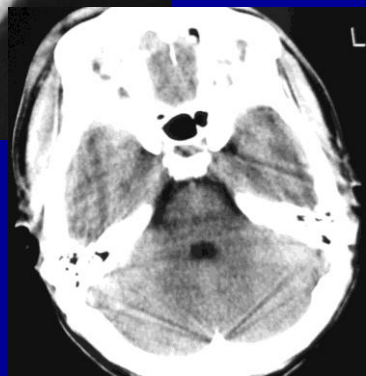
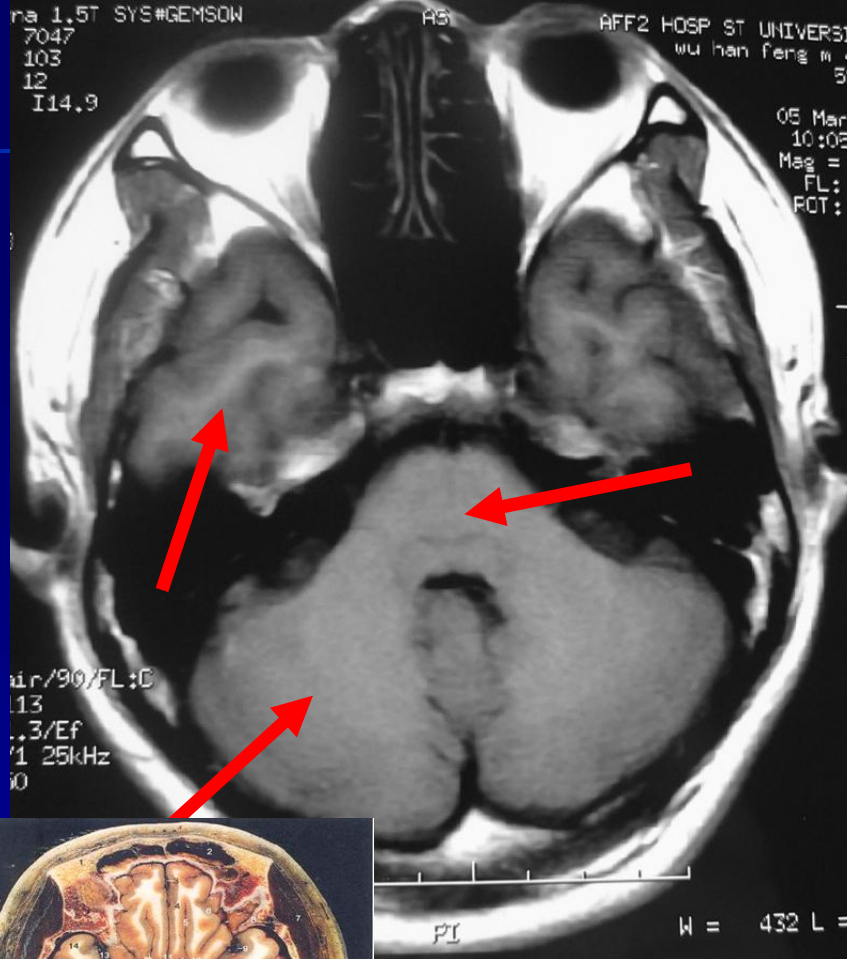


1

蝶鞍层面1

T1WI

T2WI



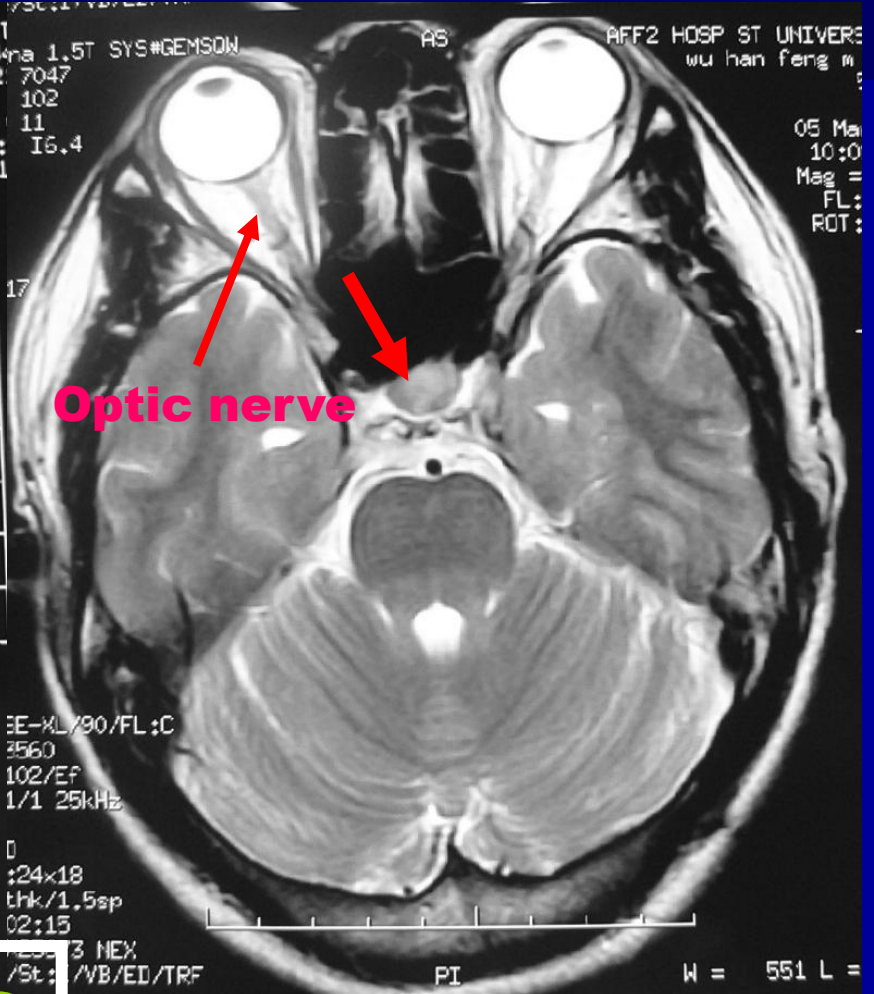
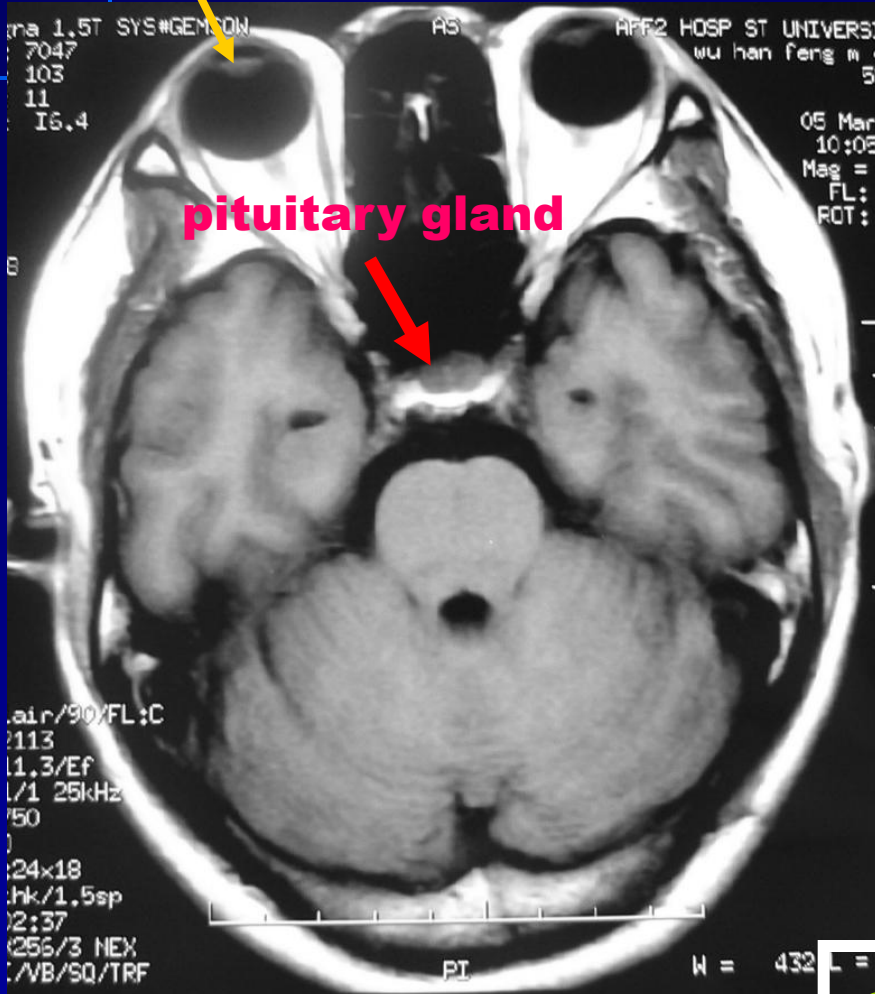
2

蝶鞍层面2

lens

T1WI

T2WI



正常头颅横断面标准层面结构

鞍上池层面1

T1WI

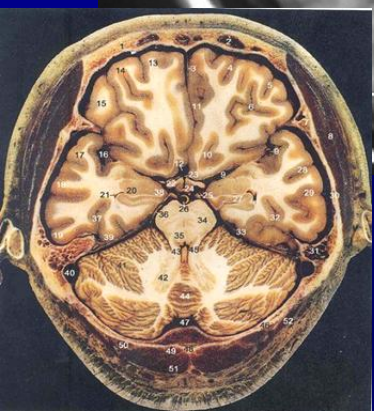
T2WI

frontal lobe

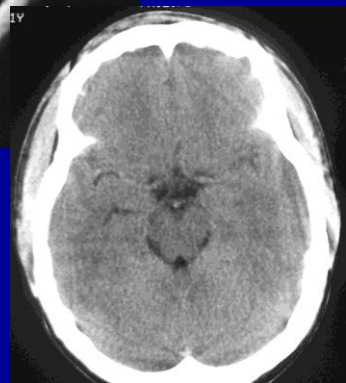
temporal lobe

cerebral peduncle

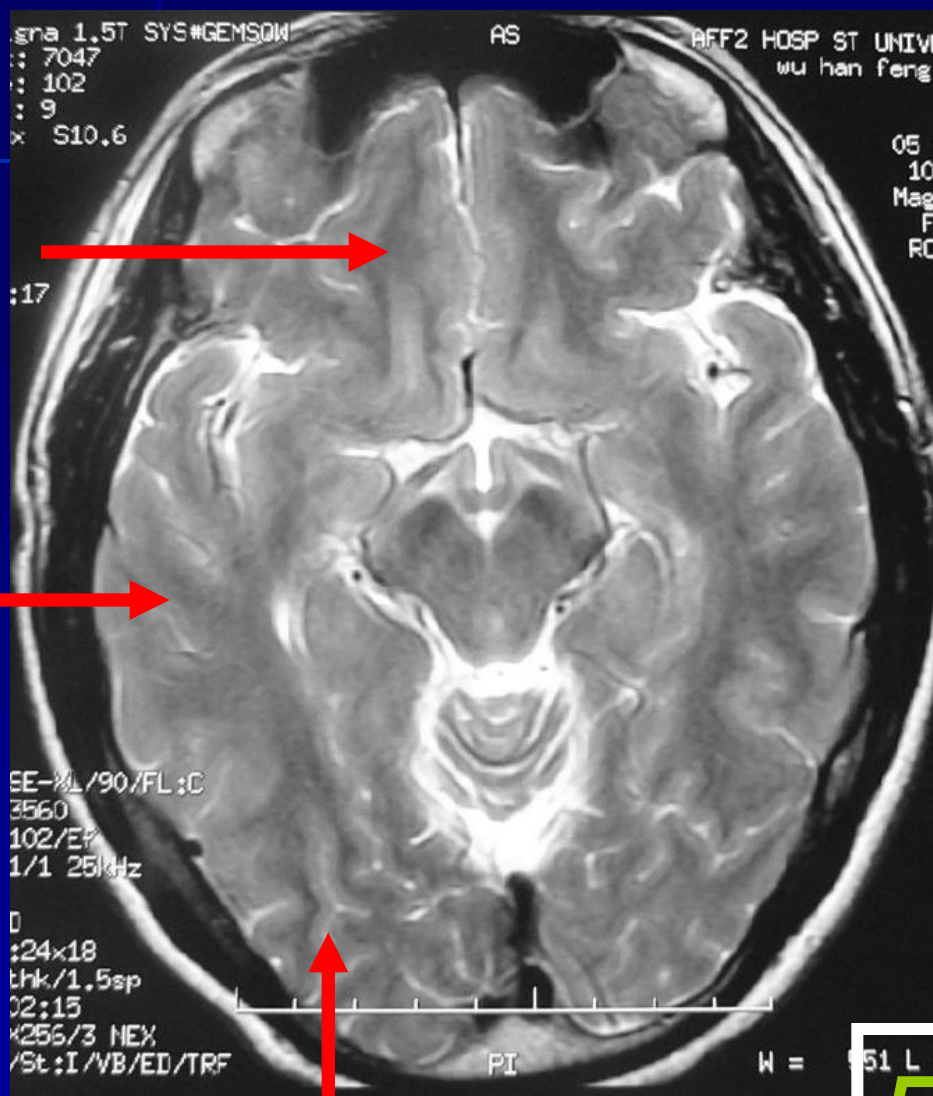
occipital lobe



4



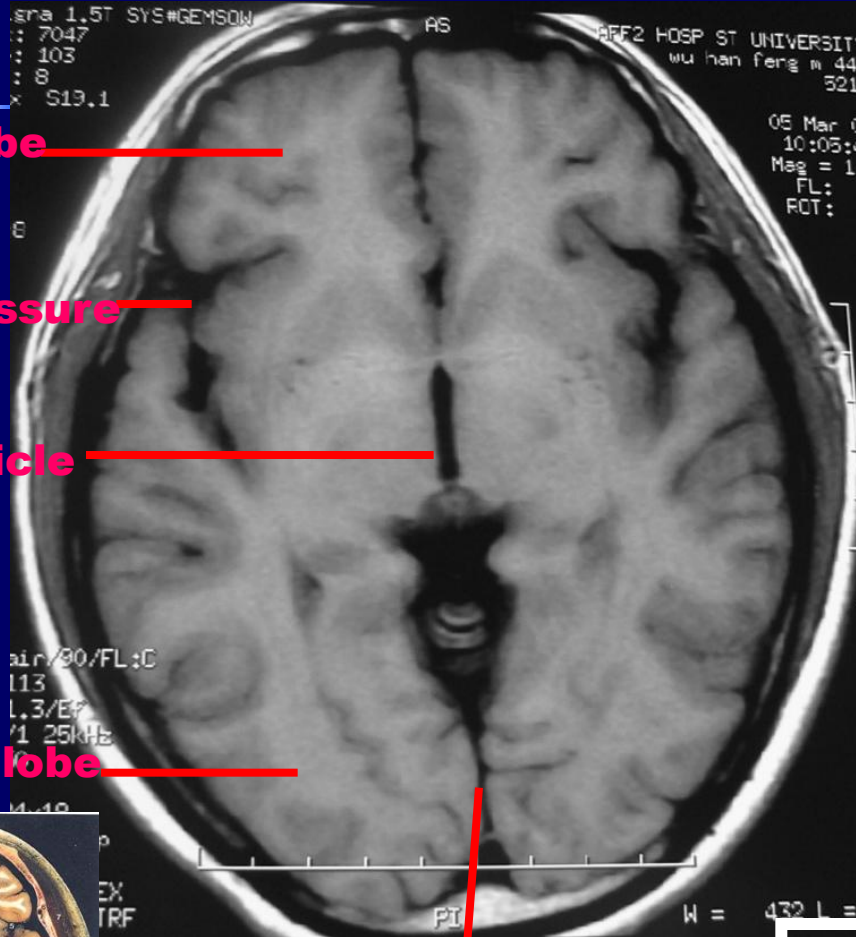
鞍上池层面2



第三脑室层面

T1WI

T2WI



frontal lobe

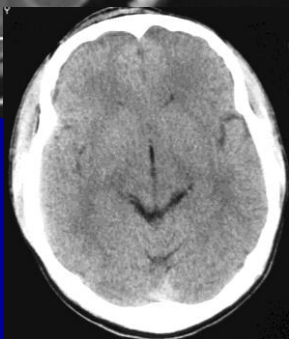
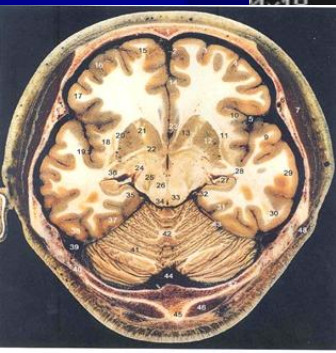
Sylvian fissure

3rd ventricle

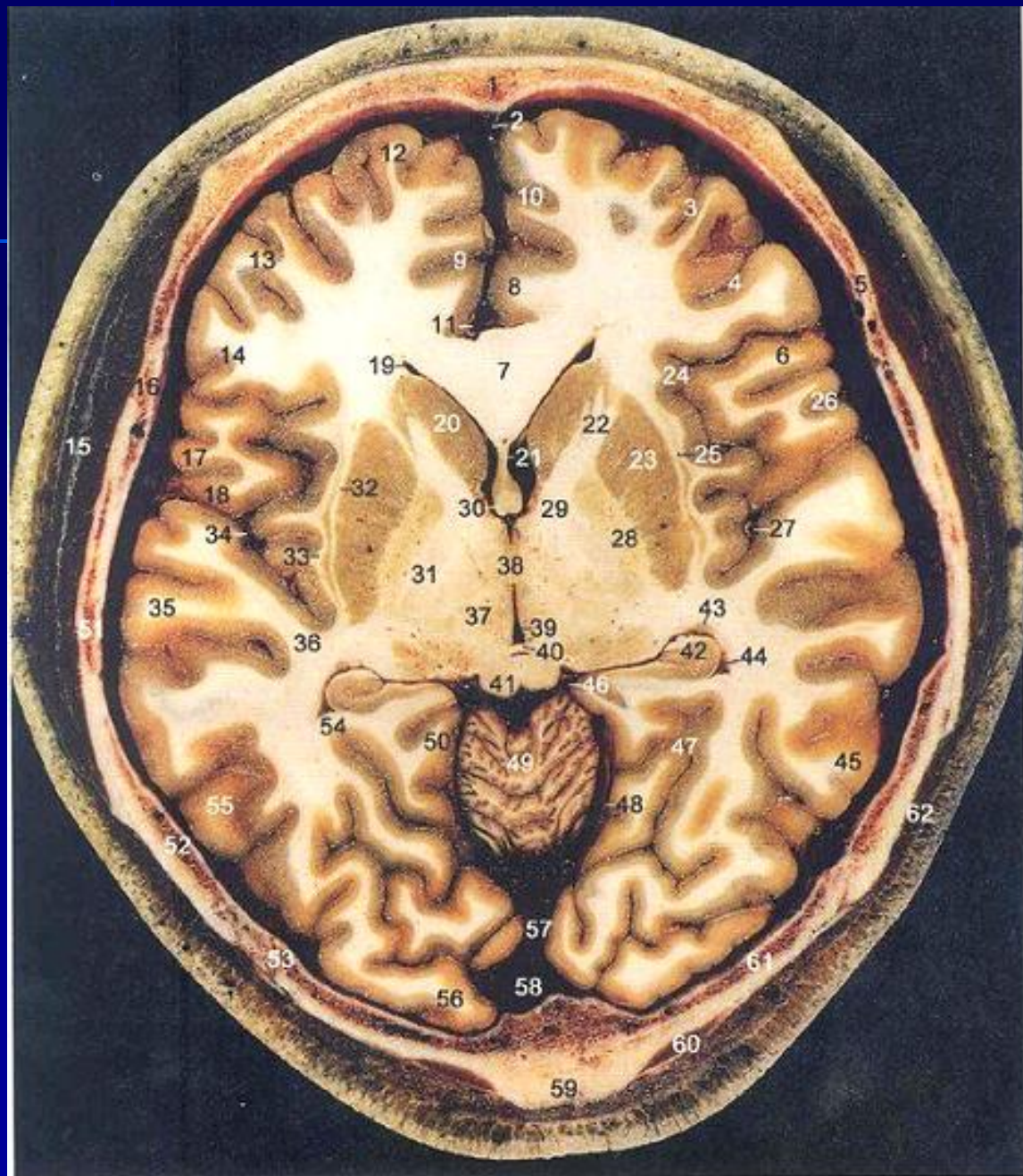
temporal lobe

superior sagittal sinus

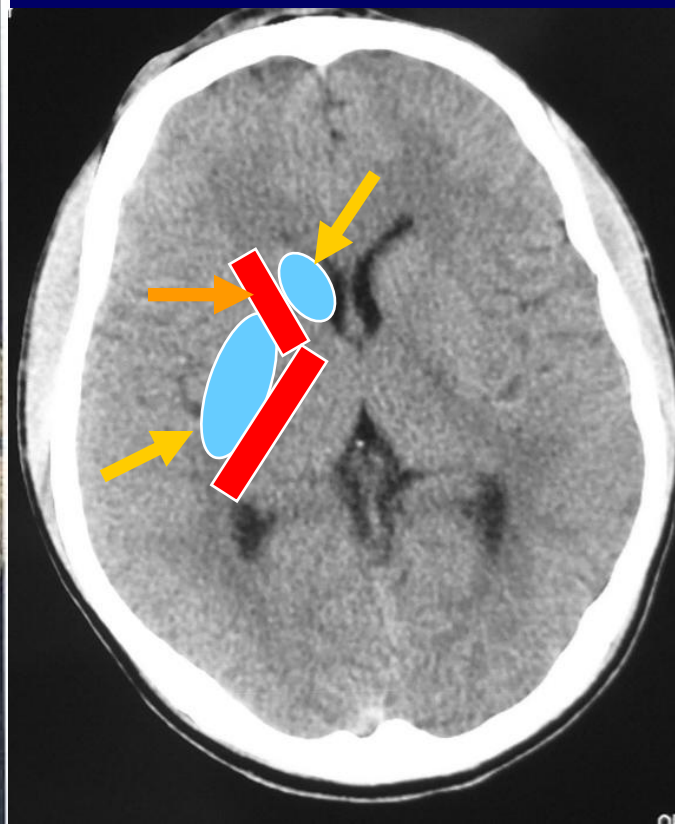
6



断层解剖



CT

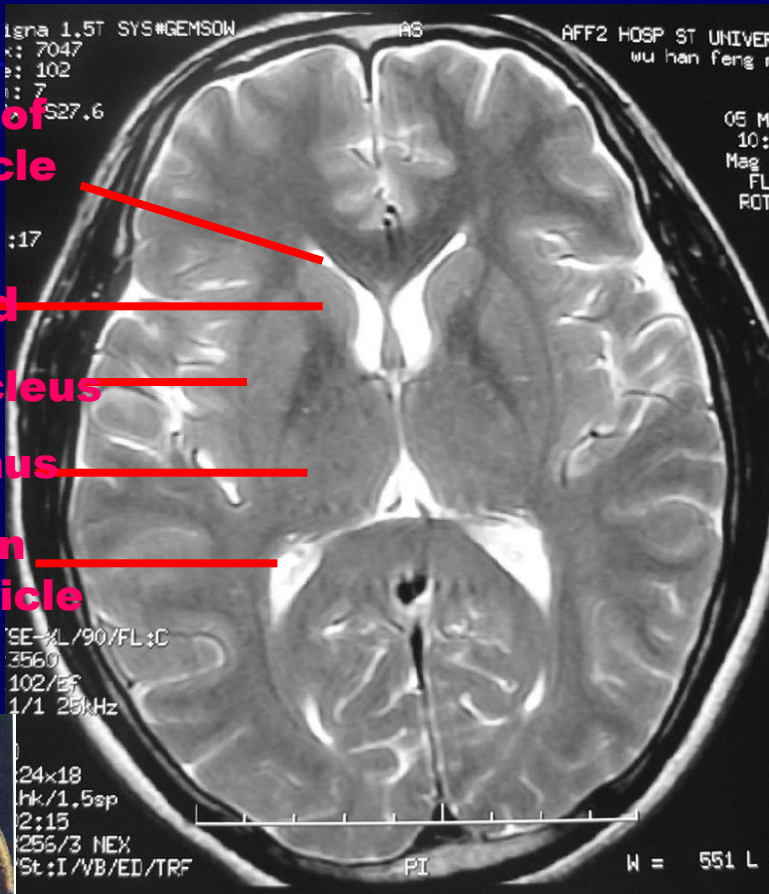


基底节区

基底节区层面

T2WI

T1WI



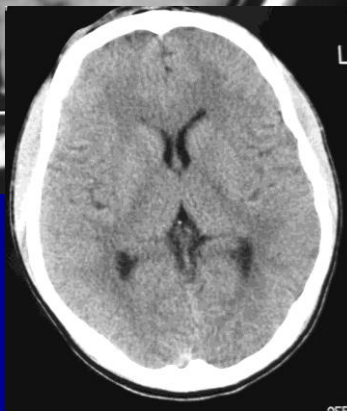
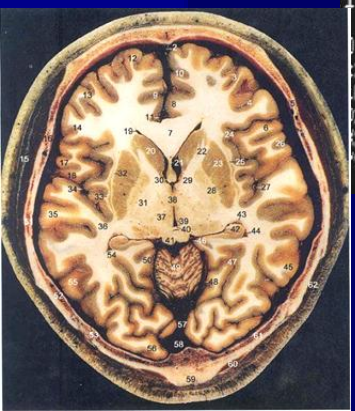
anterior horn of lateral ventricle

caudate head

lenticular nucleus

dorsal thalamus

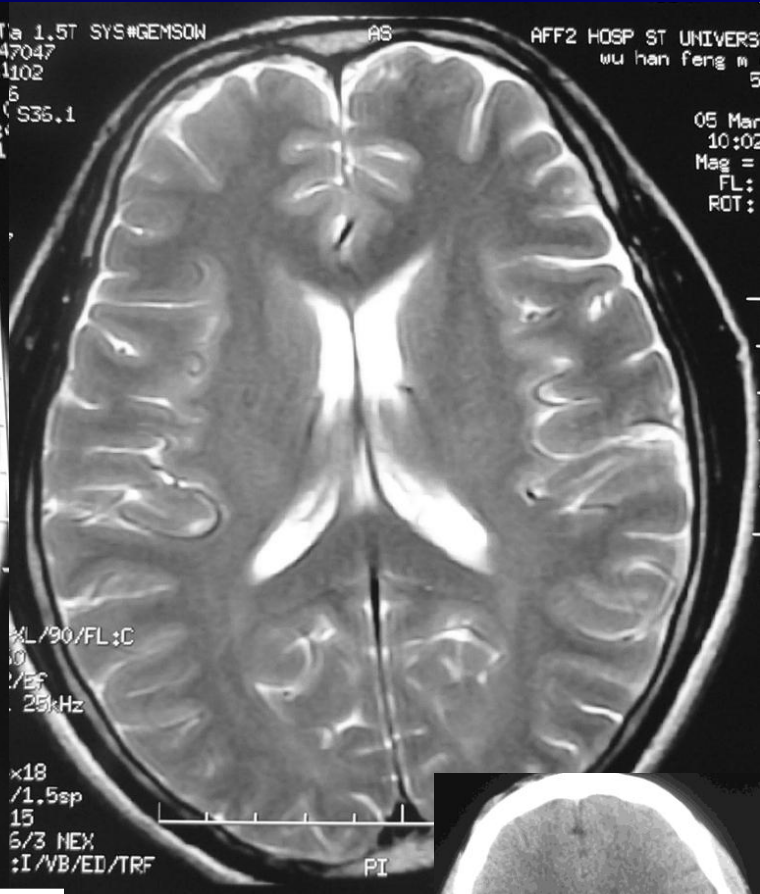
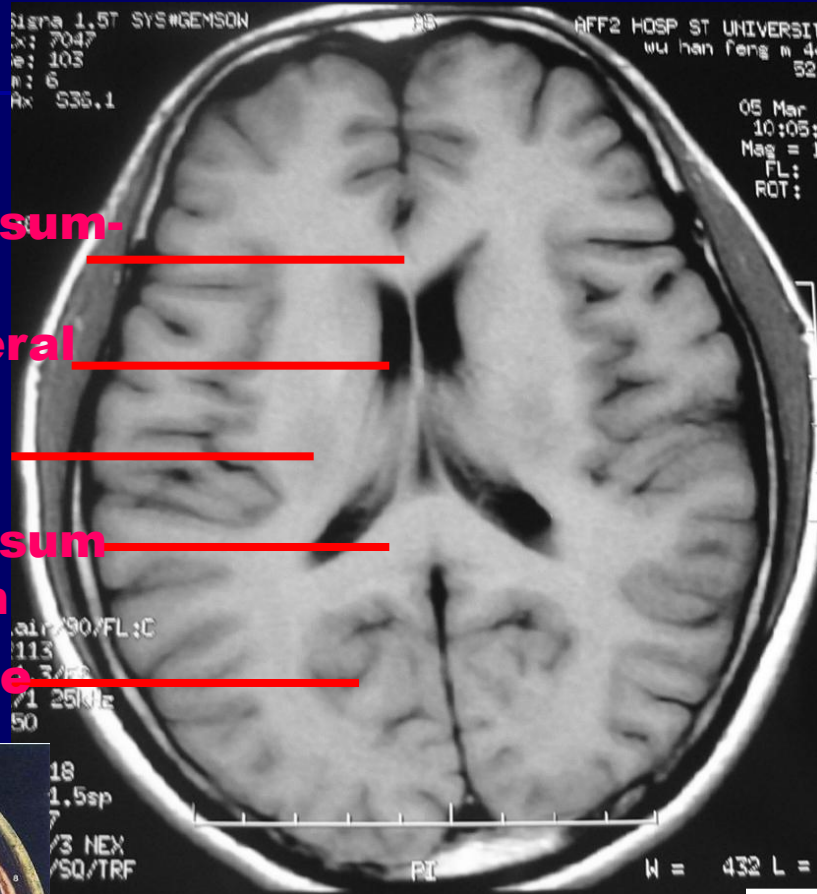
posterior horn of lateral ventricle



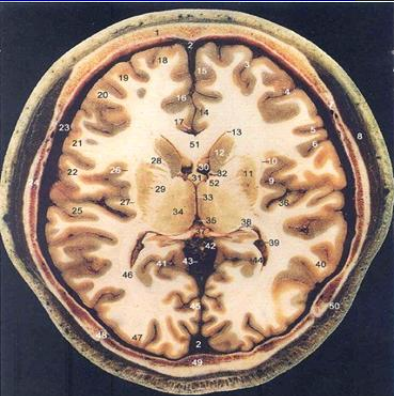
侧脑室体部层面

T1WI

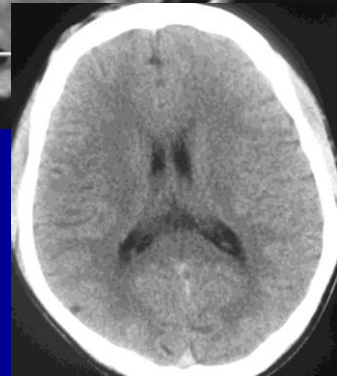
T2WI



corpus callosum-
 genu
 body of lateral
 ventricle
 thalamus
 corpus callosum-
 splenium
 occipital lobe



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侧脑室顶部层面

T1WI

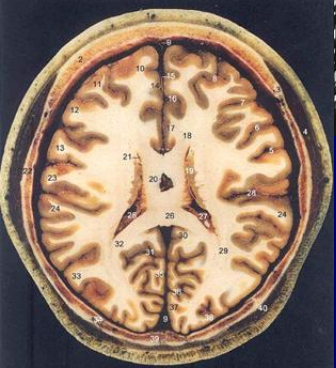
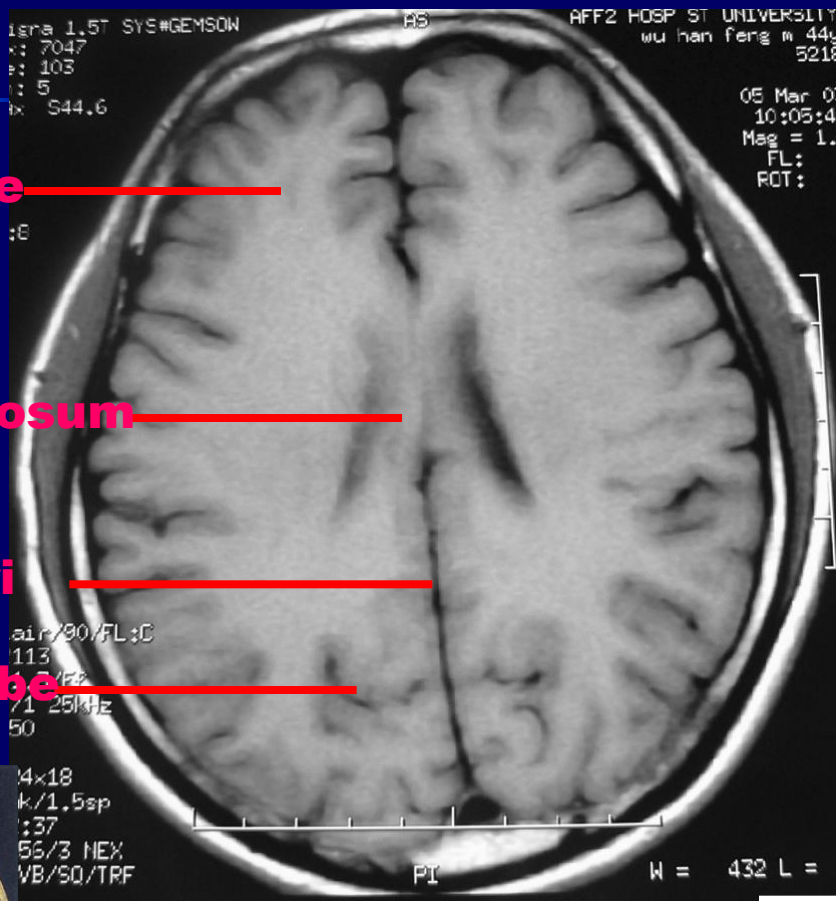
T2WI

frontal lobe

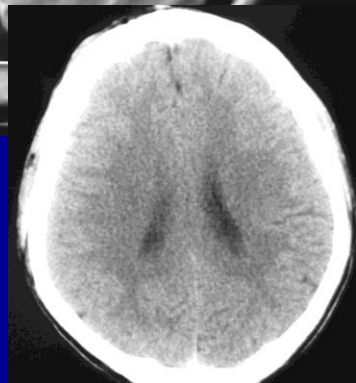
corpus callosum

falx cerebri

occipital lobe



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侧脑室上部层面

T1WI

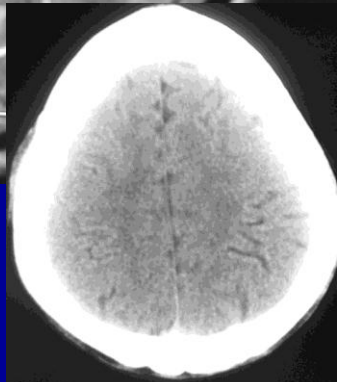
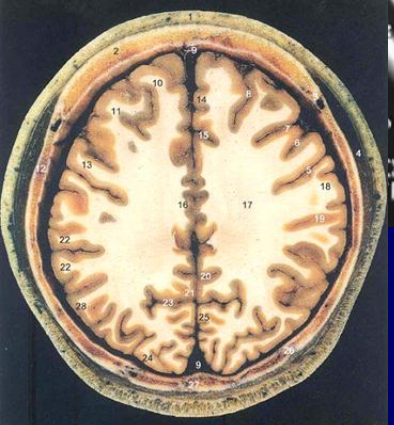
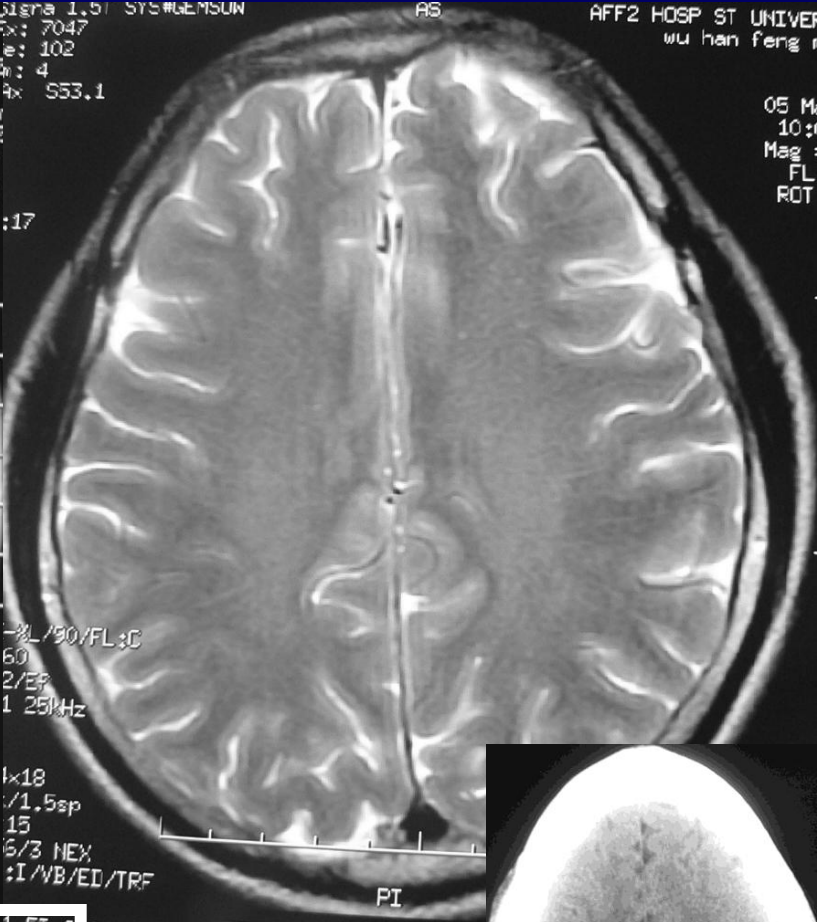
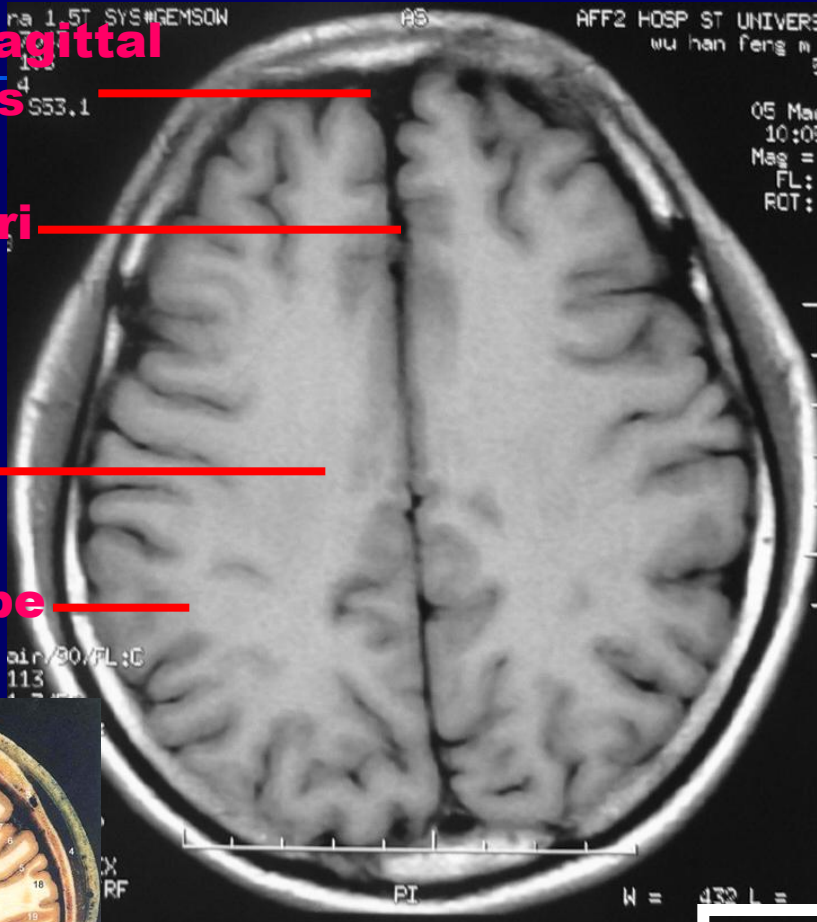
T2WI

superior sagittal sinus

falx cerebri

centrum semiovale

parietal lobe



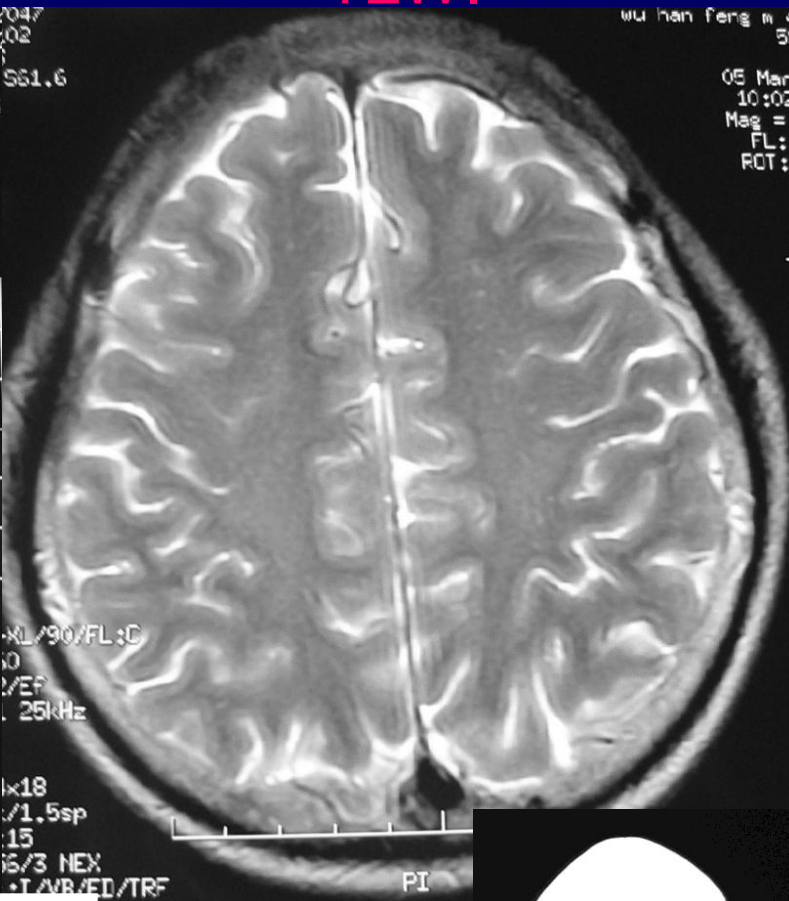
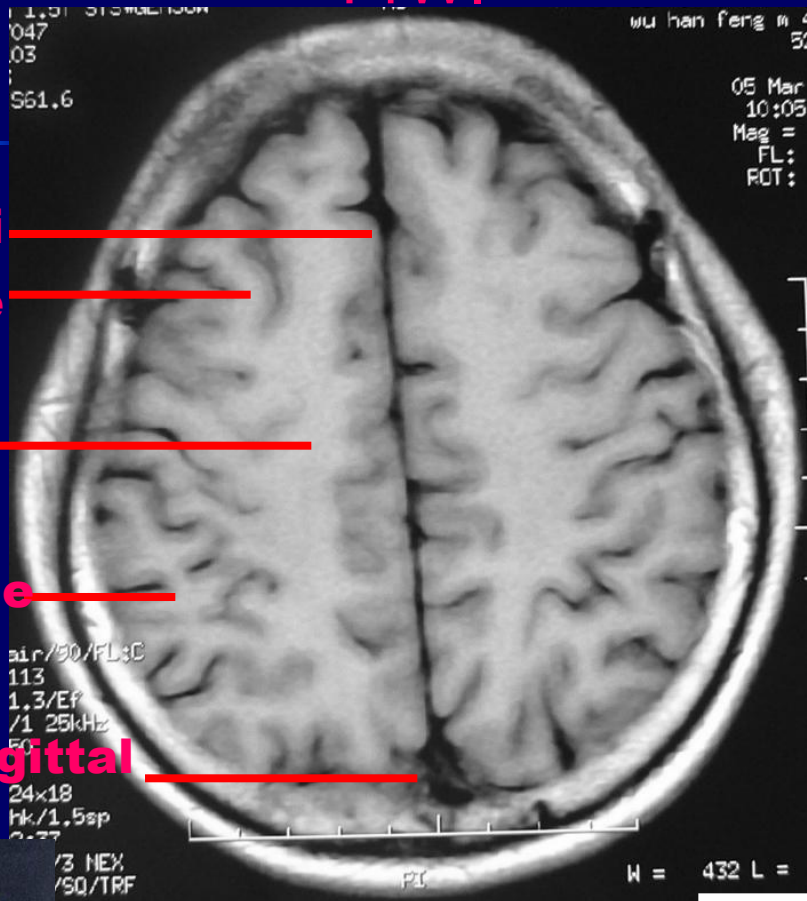
10

正常头颅横断面标准层面结构

侧脑室上方层面2

T1WI

T2WI



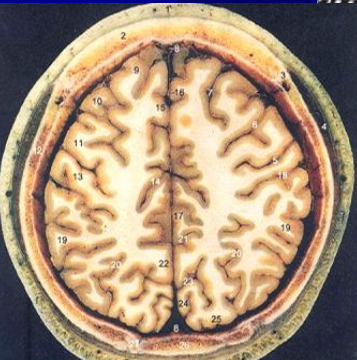
falx cerebri _____

frontal lobe _____

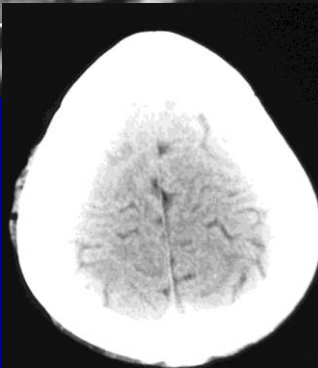
centrum semiovale _____

parietal lobe _____

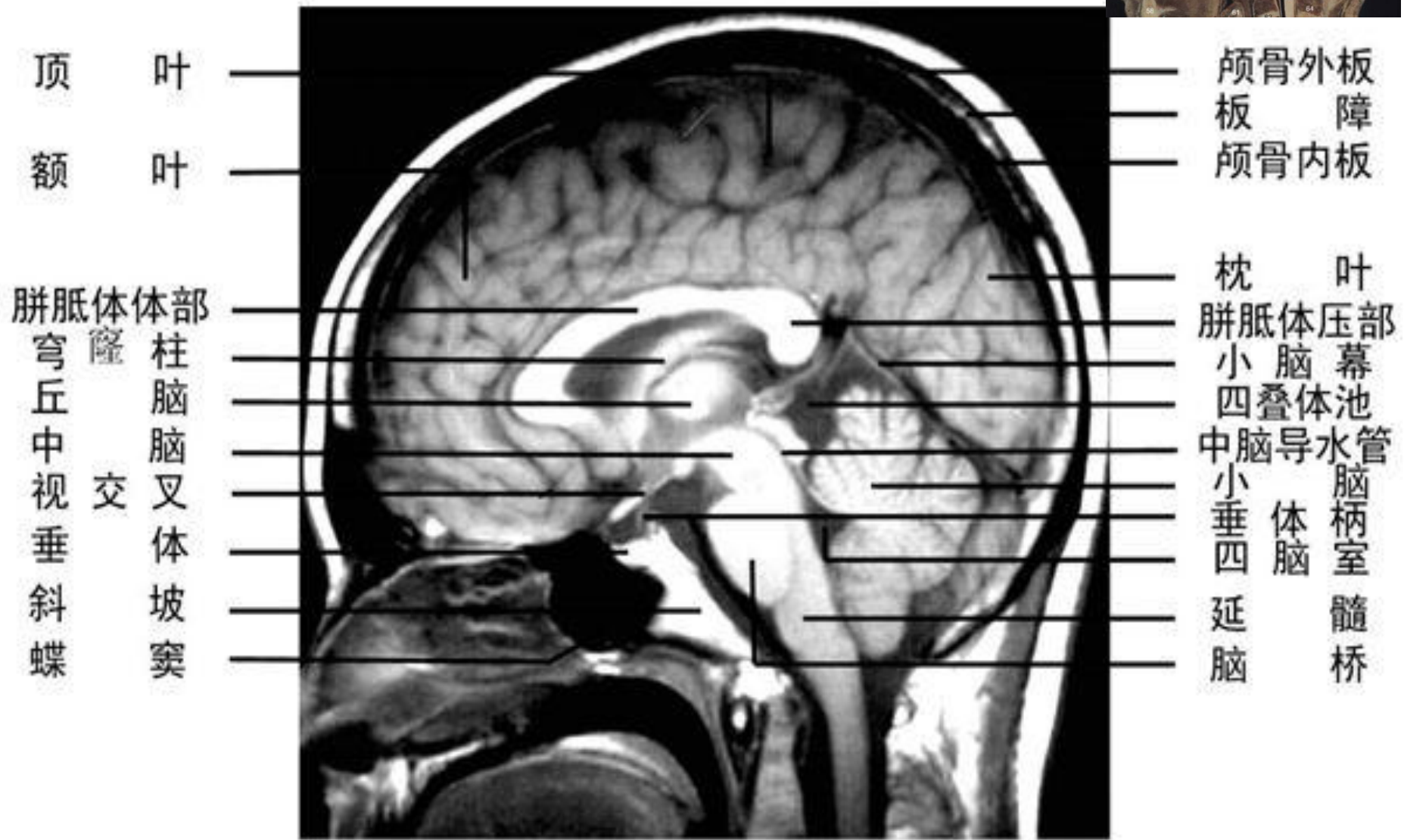
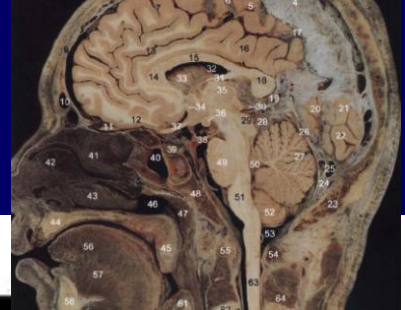
superior sagittal sinus _____



11

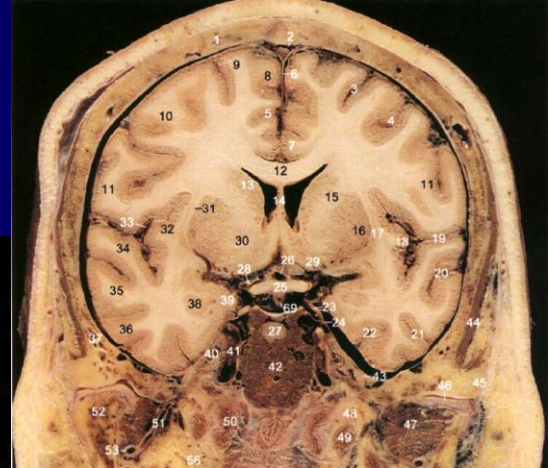


正中矢状位



MRI

冠状位



T1WI

大脑纵裂

侧脑室前角

第三脑室

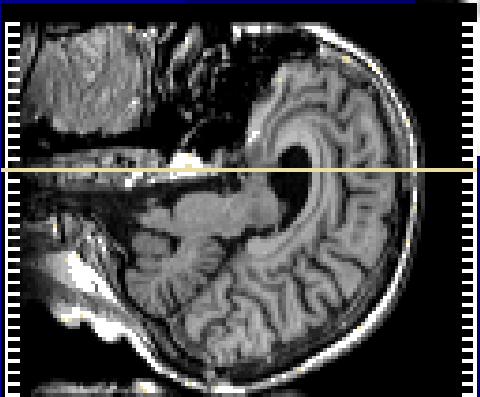
视交叉

胼胝体体部

尾状核头部

豆状核

垂体柄





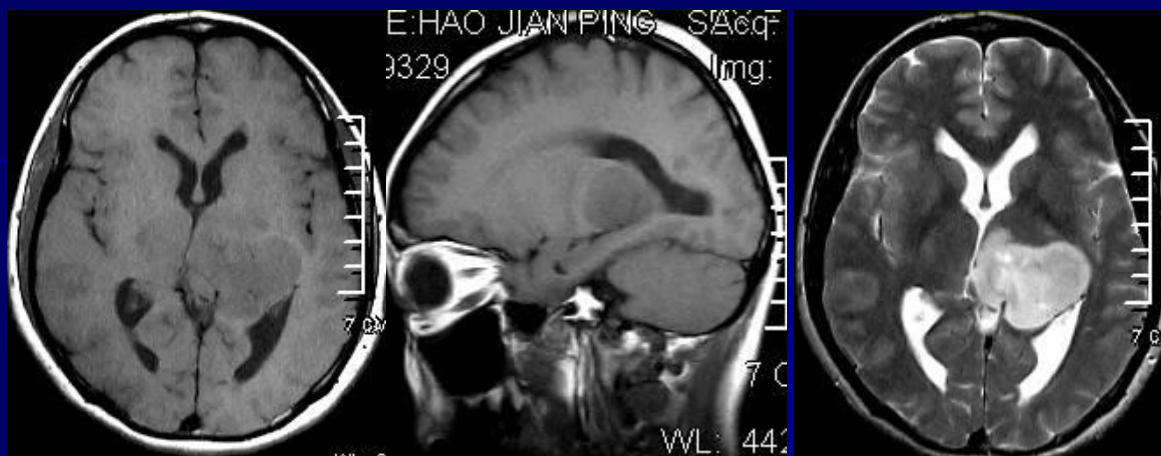
头颅基本病变MRI

MRI脑实质异常信号与常见疾病

T1WI	T2WI	常见疾病
低信号	高信号	脑肿瘤、转移瘤、脑梗死、脑软化、脱髓鞘病变
低信号	低信号	动脉瘤、动静脉畸形、烟雾病、肿瘤内血管、钙化、骨化
高信号	高信号	亚急性晚期脑出血、肿瘤内出血、脂肪性病变
高信号	低信号	亚急性早期出血、黑色素瘤、肿瘤卒中
混杂信号	混杂信号	动脉瘤、动静脉畸形伴血栓、部分脑肿瘤

星形胶质细胞瘤 (astrocytoma)

-C

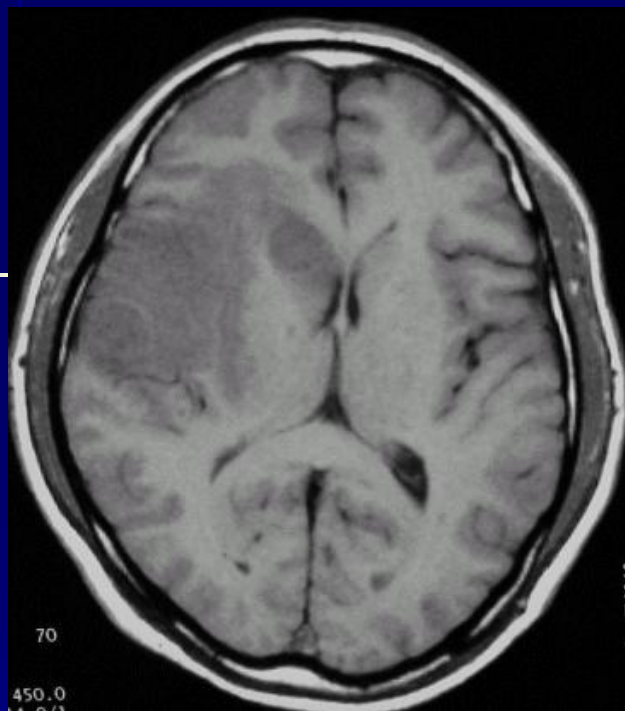


+C



T1WI: 低信号; T2WI: 高信号

脑转移瘤 (Metastatic tumor)

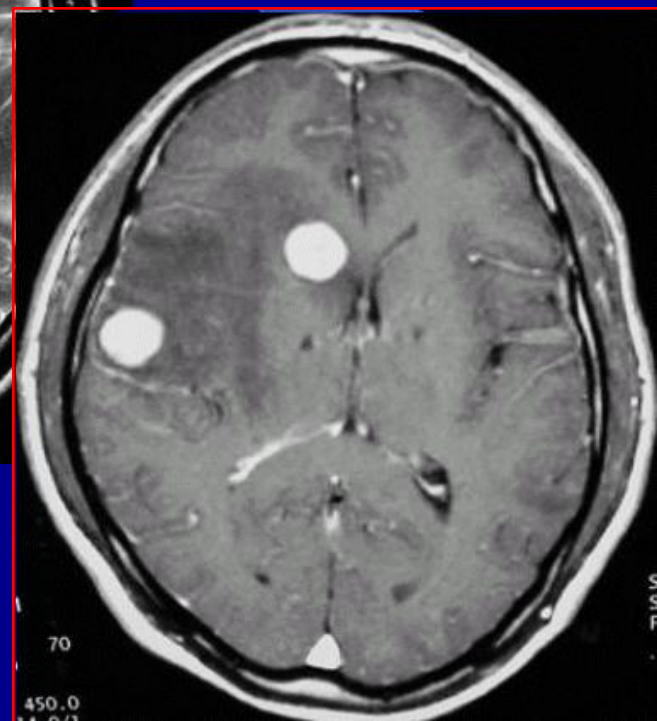


T1WI



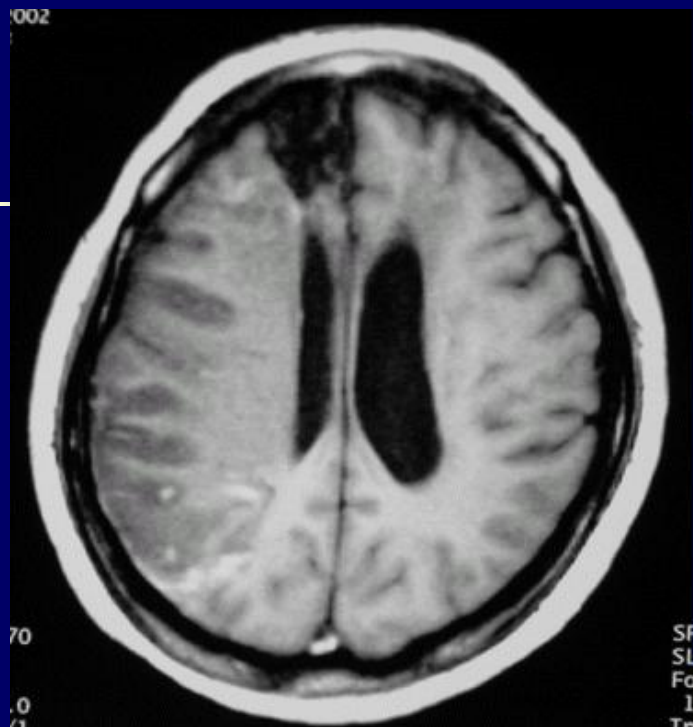
T2WI

+C T1WI

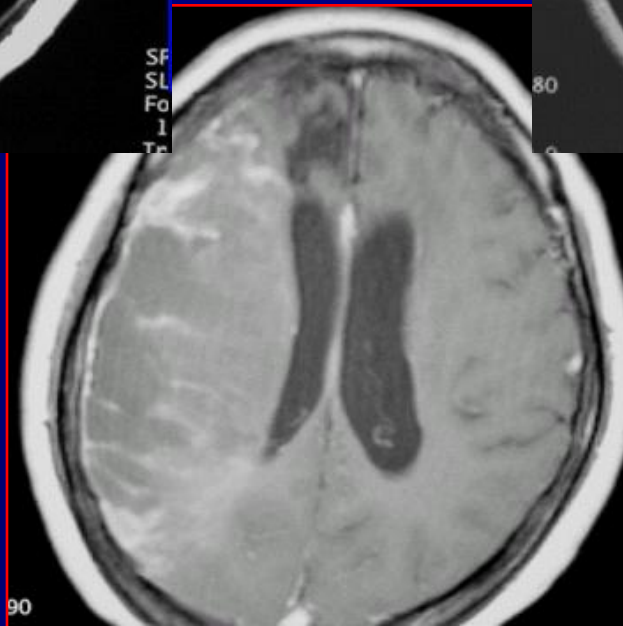
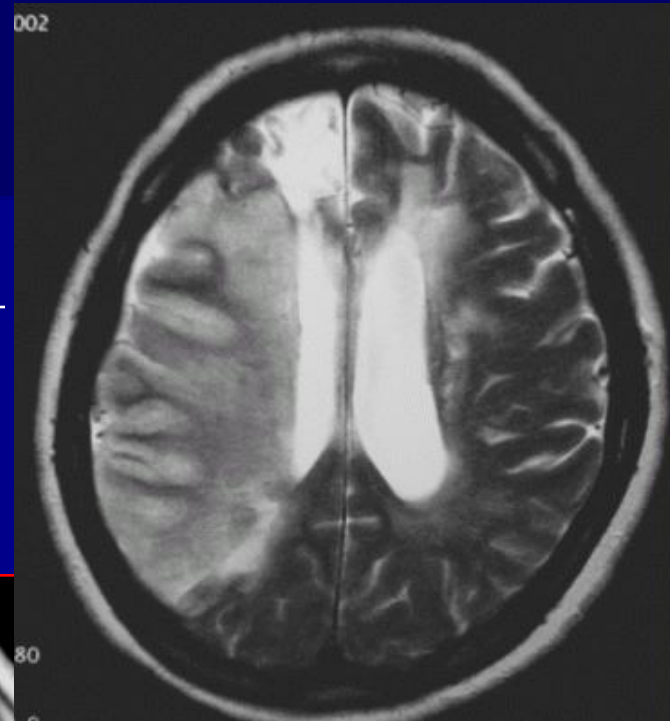


T1WI: 低信号; T2WI: 高信号

脑梗死与脑软化灶



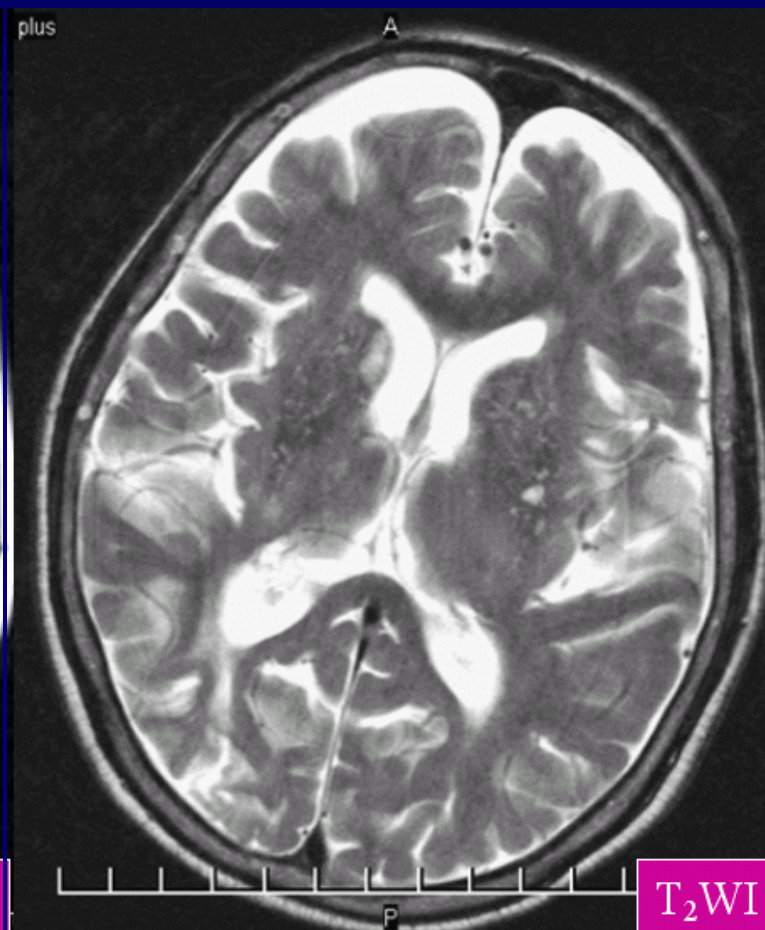
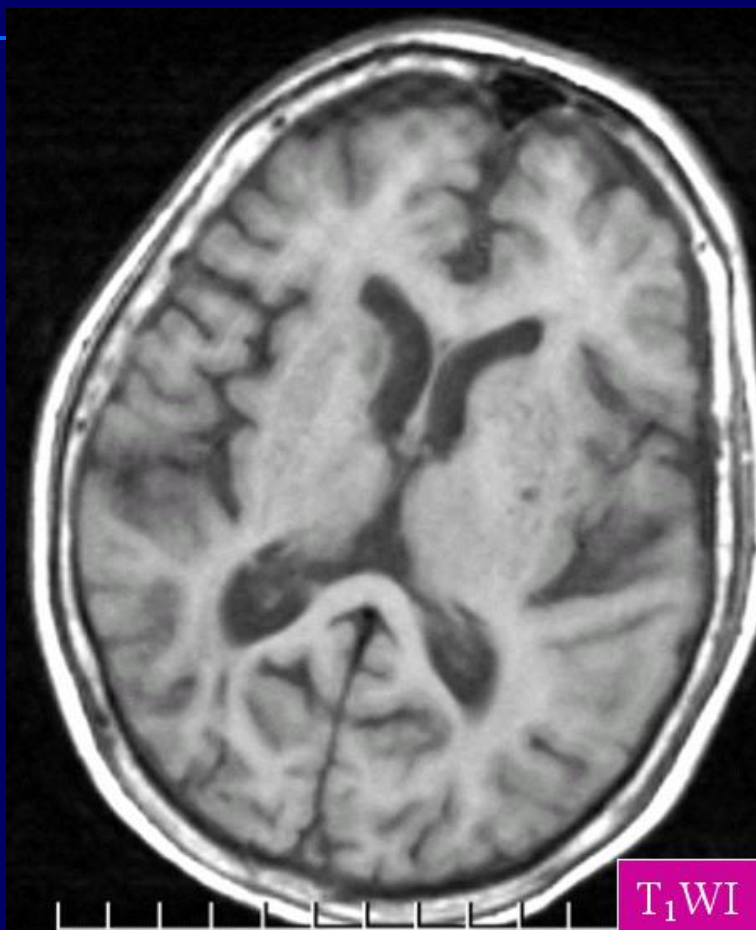
T1WI	T2WI
T1WI (+C)	



T1WI: 低信号; T2WI: 高信号

基底节区腔隙性梗塞灶

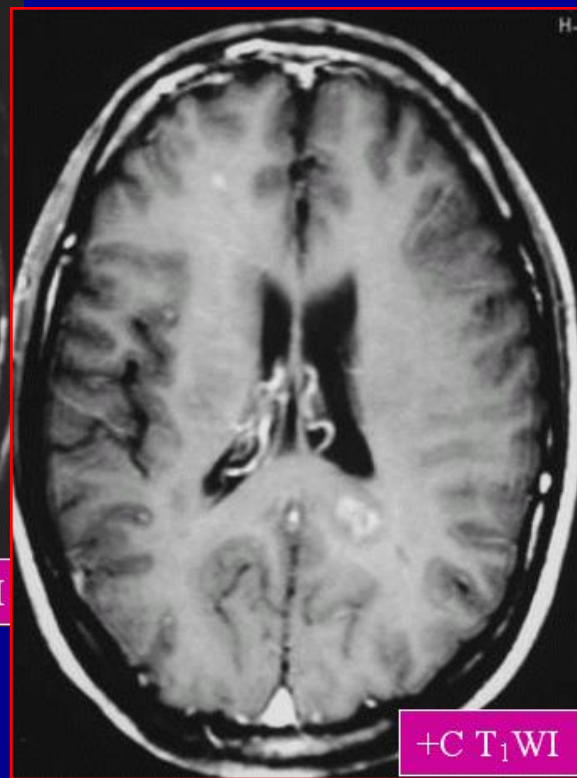
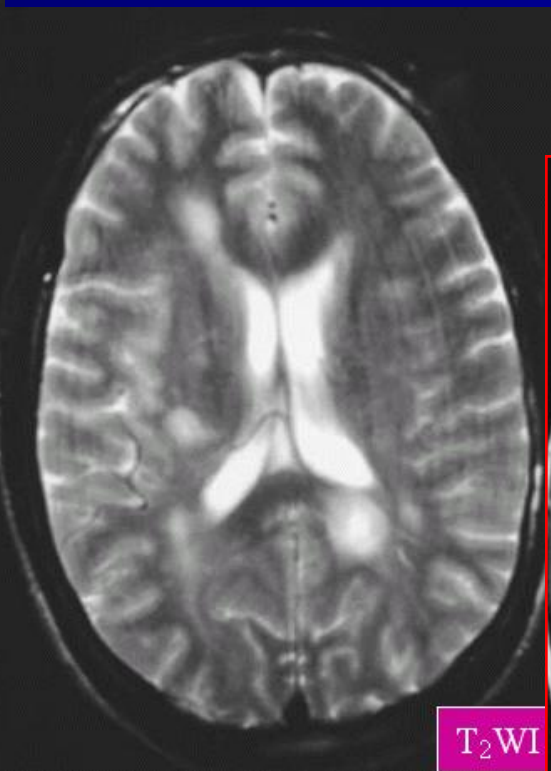
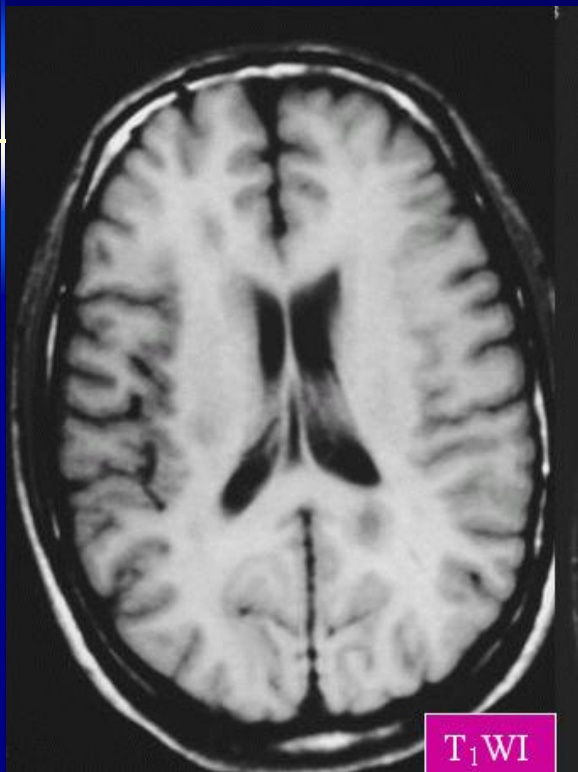
(lacunar infarction in basal ganglia area)



T1WI: 低信号; T2WI: 高信号

脱髓鞘病变

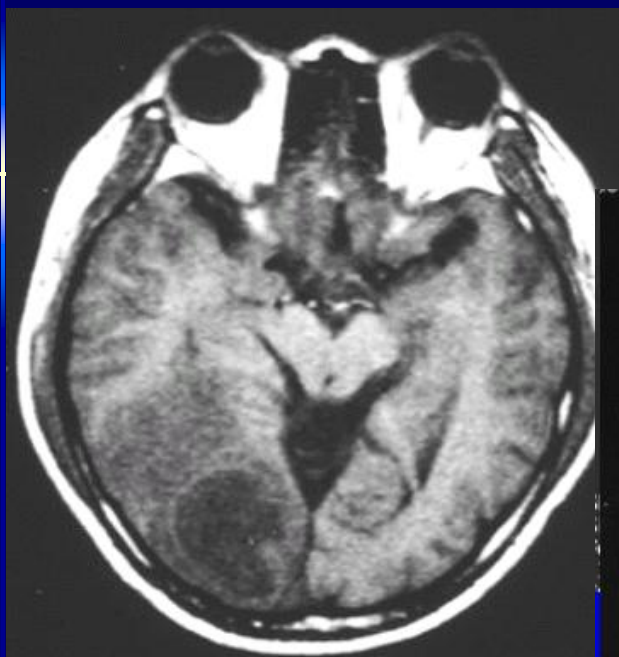
(Demyelinating disease)



多发性硬化
(multiple sclerosis)

T1WI: 低信号; T2WI: 高信号

脑脓肿 (brain abscess)

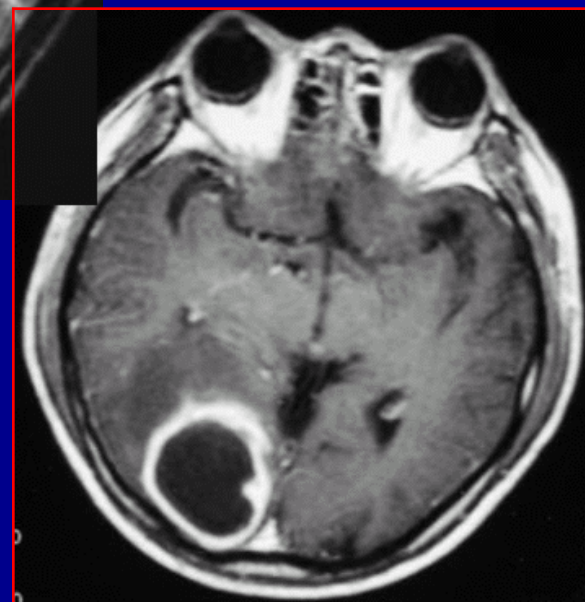


T1WI



T2WI

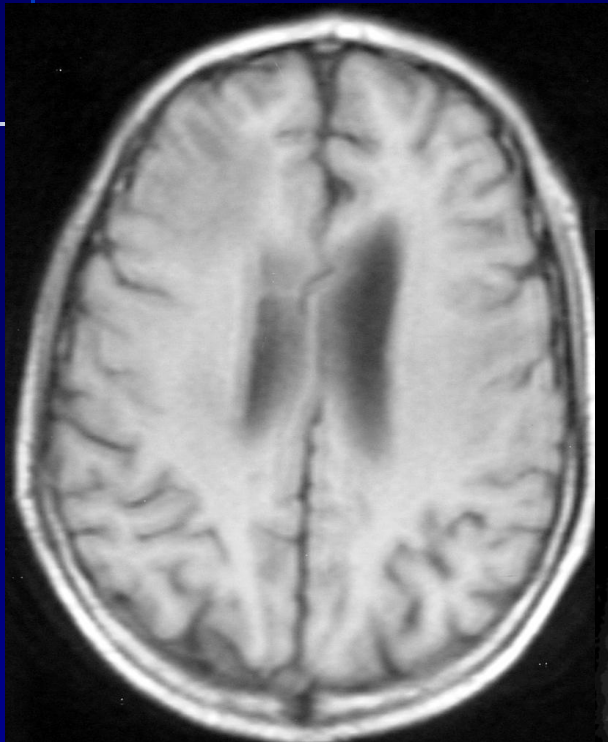
+c T1WI



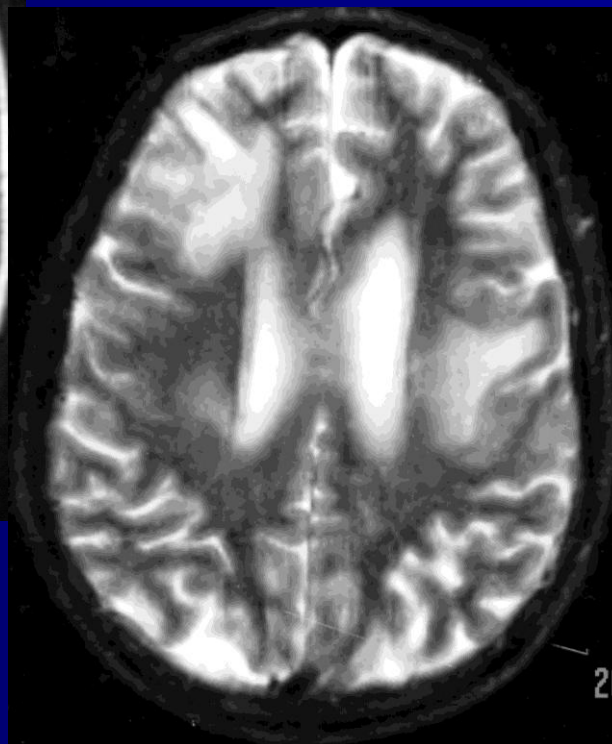
T1WI: 低信号; T2WI: 高信号

炎性病変-结核(tuberculous)

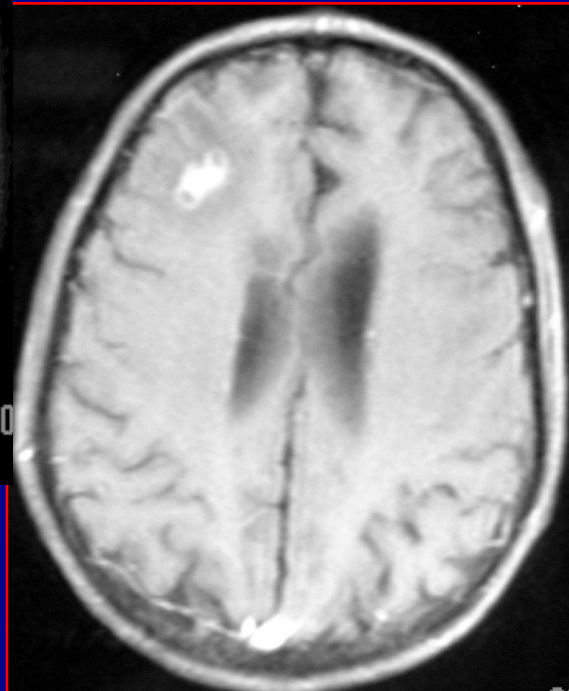
T1WI



T2WI



+C T1WI

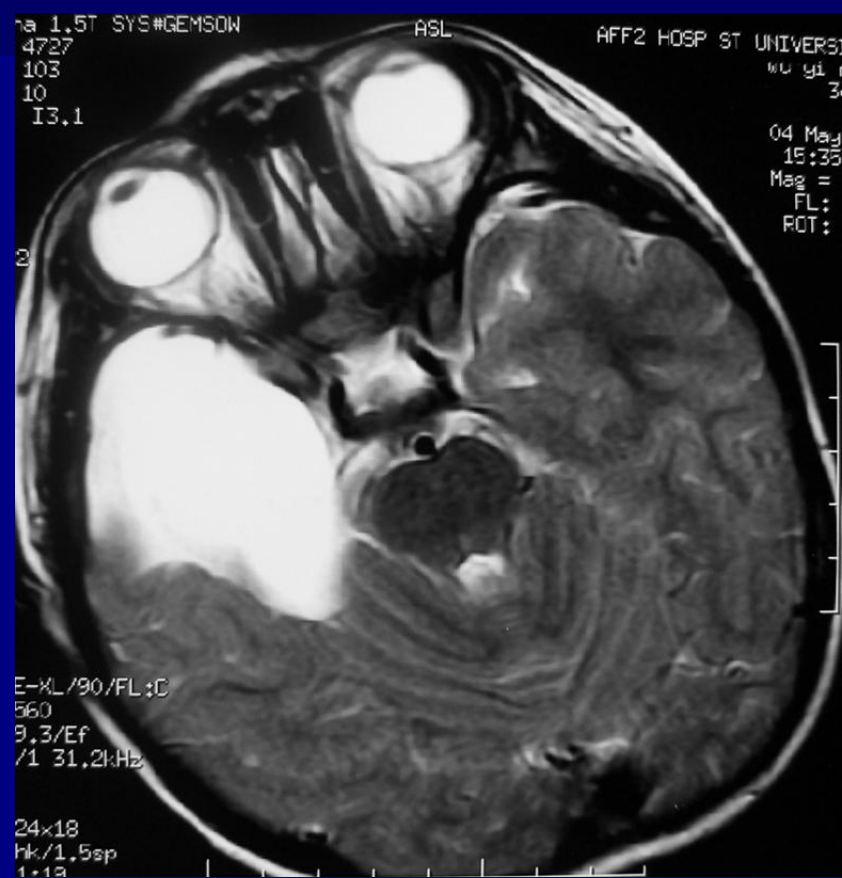


T1WI: 低信号; T2WI: 高信号

蛛网膜囊肿 (arachnoid cyst)



T1WI



T2WI

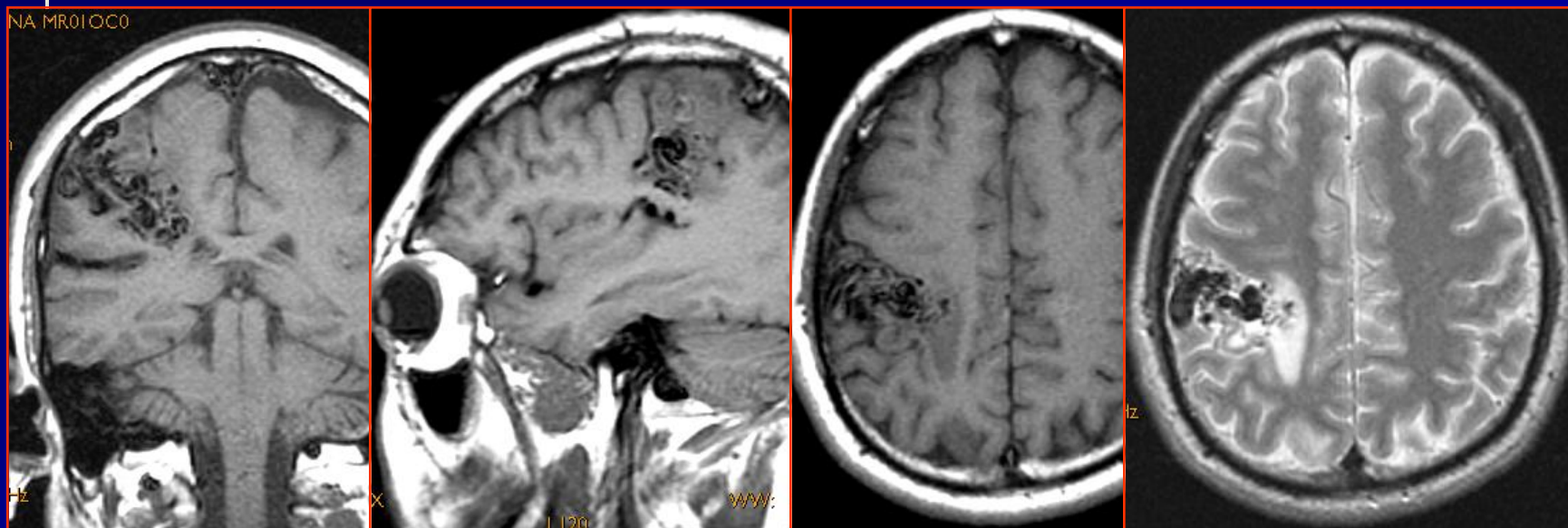
T1WI: 低信号; T2WI: 高信号

MRI脑实质异常信号与常见疾病

T1WI	T2WI	常见疾病
低信号	高信号	脑肿瘤、转移瘤、脑梗死、脑软化、脱髓鞘病变
低信号	低信号	动脉瘤、动静脉畸形、烟雾病、肿瘤内血管、 <u>钙化、骨化</u>
高信号	高信号	亚急性晚期脑出血、肿瘤内出血、 <u>脂肪性病变</u>
高信号	低信号	亚急性早期出血、黑色素瘤、肿瘤卒中
混杂信号	混杂信号	动脉瘤、动静脉畸形伴血栓、部分脑肿瘤

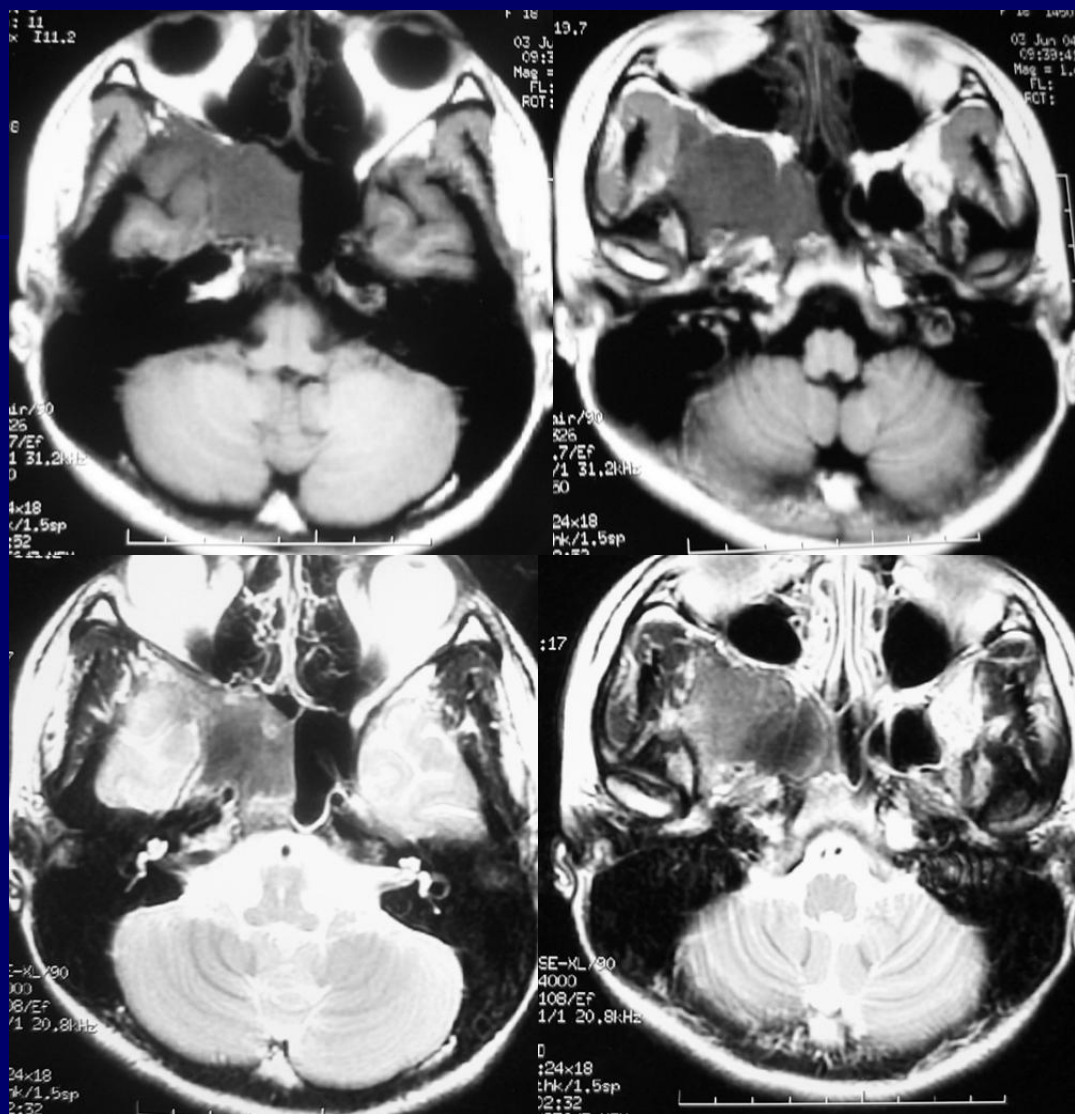
动静脉畸形

(Arteriovenous malformation, AVM)



T1WI：低信号； T2WI：低信号

骨纤维结构不良



T1WI

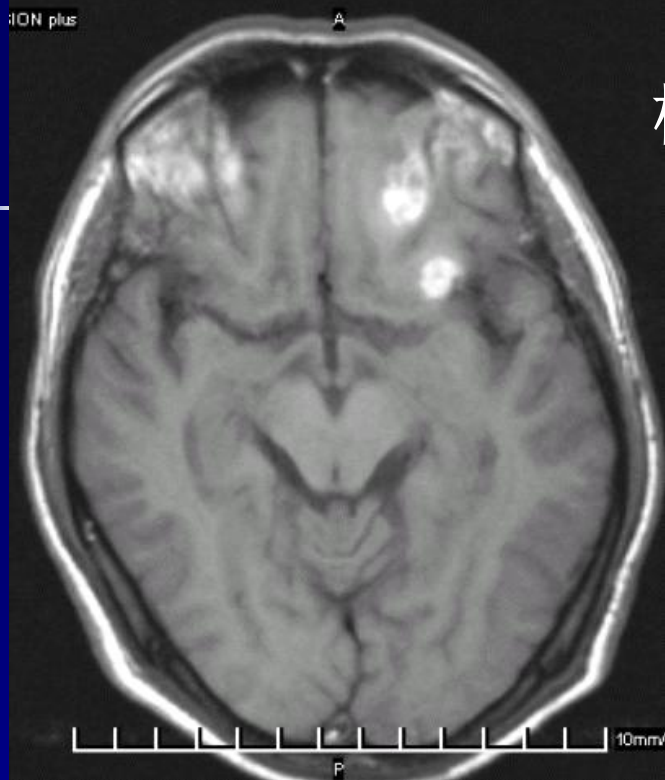
T2WI

T1WI: 低信号; T2WI: 低信号

MRI脑实质异常信号与常见疾病

T1WI	T2WI	常见疾病
低信号	高信号	脑肿瘤、转移瘤、脑梗死、脑软化、脱髓鞘病变
低信号	低信号	动脉瘤、动静脉畸形、烟雾病、肿瘤内血管、钙化、骨化
高信号	高信号	亚急性晚期脑出血、肿瘤内出血、 <u>脂肪性病变</u>
高信号	低信号	亚急性早期出血、黑色素瘤、肿瘤卒中
混杂信号	混杂信号	动脉瘤、动静脉畸形伴血栓、部分脑肿瘤

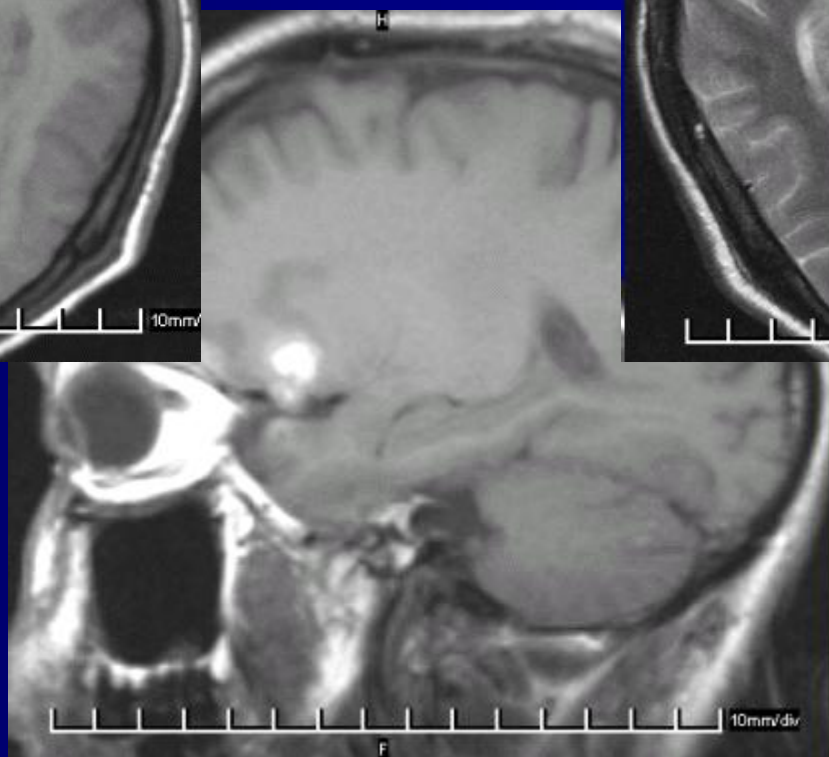
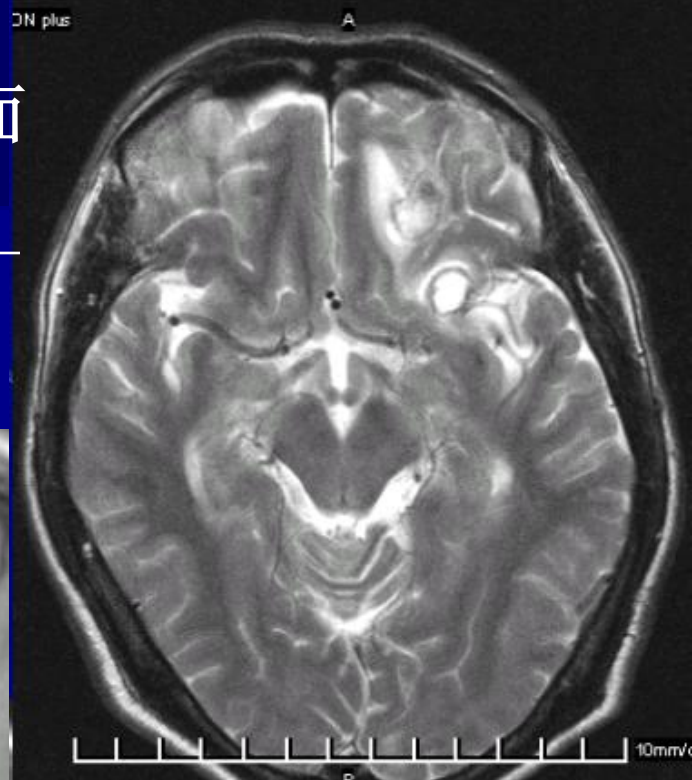
亚急性脑出血 (Subacute cerebral hemorrhage)



横断面
T1WI

横断面
T2WI

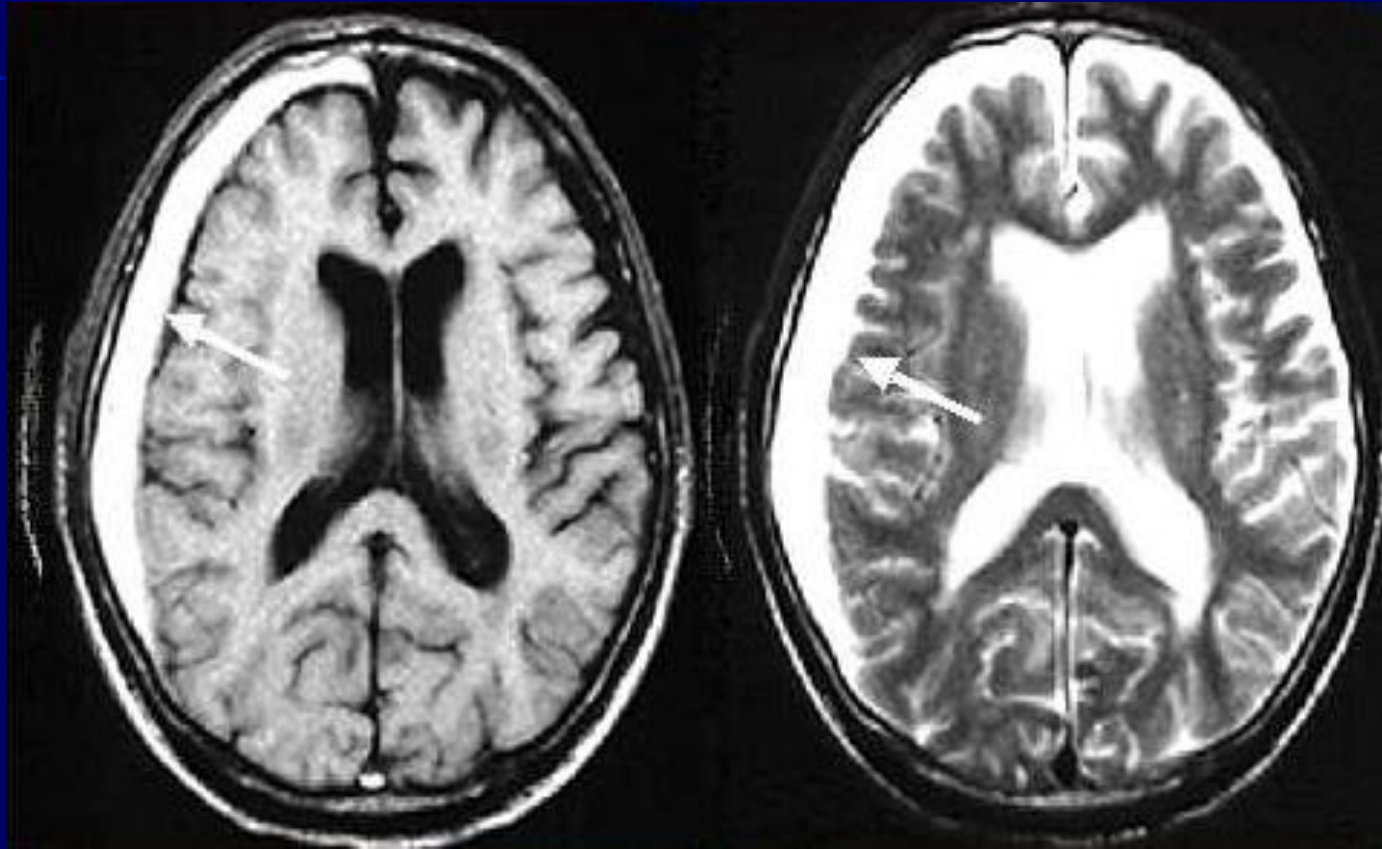
矢状面
T1WI



T1WI: 高信号; T2WI: 高信号

脑硬膜下出血

(subdural hemorrhage)



T1WI

T2WI

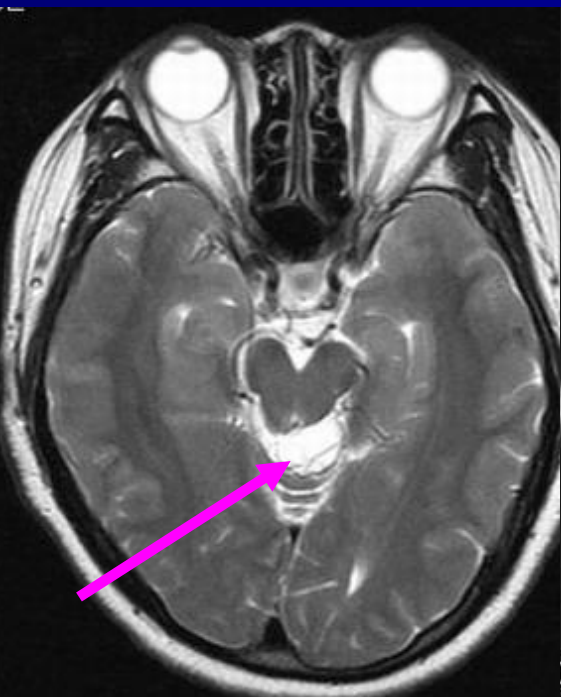
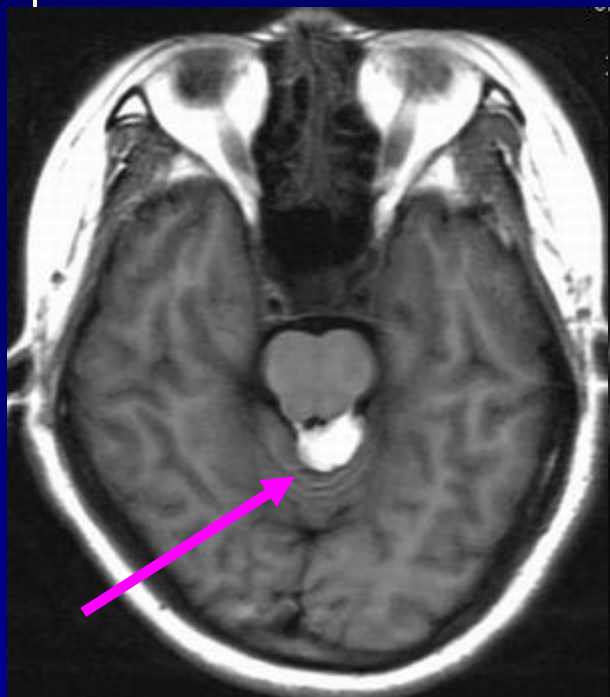
T1WI: 高信号; T2WI: 高信号

四叠体池脂肪瘤

T1WI

T2WI

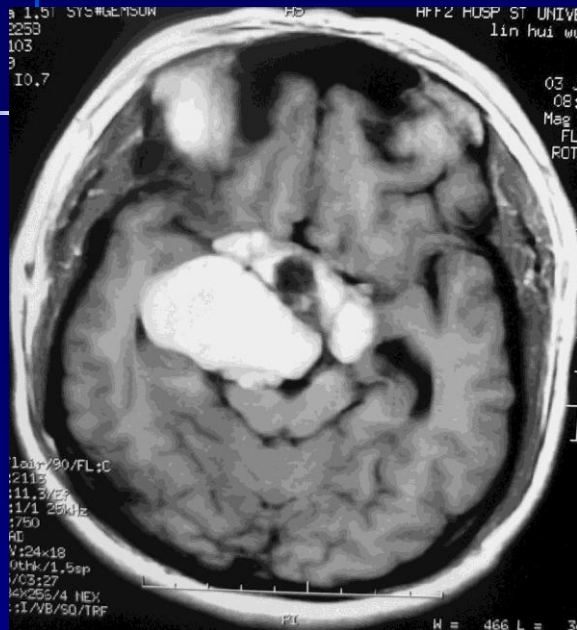
FS T1WI



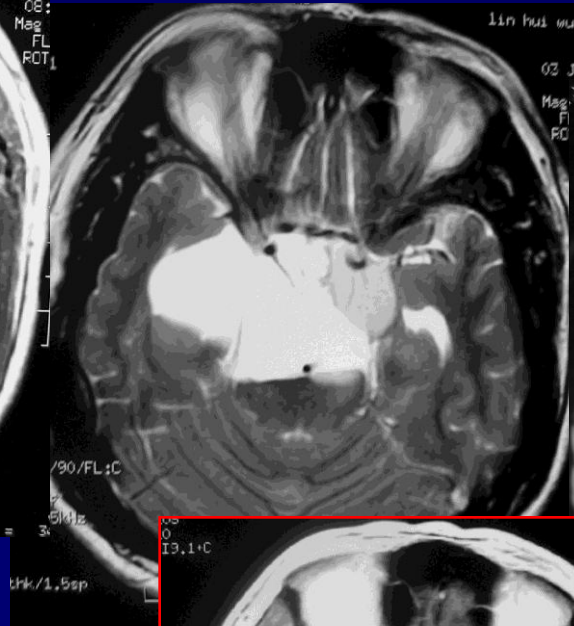
T1WI：高信号； T2WI：高信号

颅咽管瘤 (craniopharyngioma)

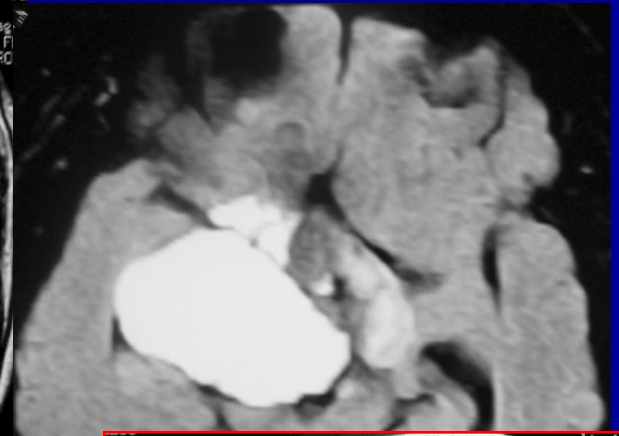
T1WI



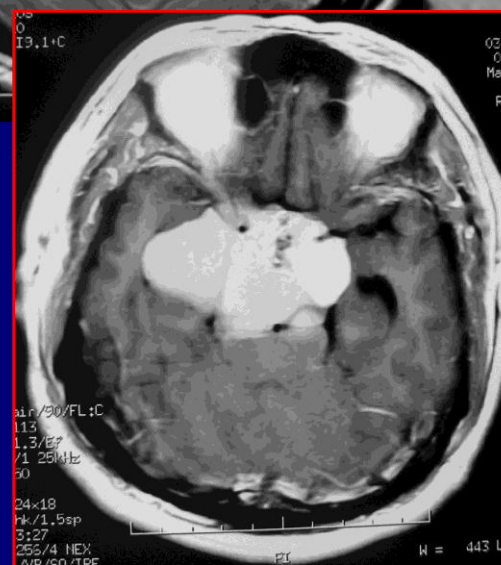
T2WI



FS T1WI



+C T1WI

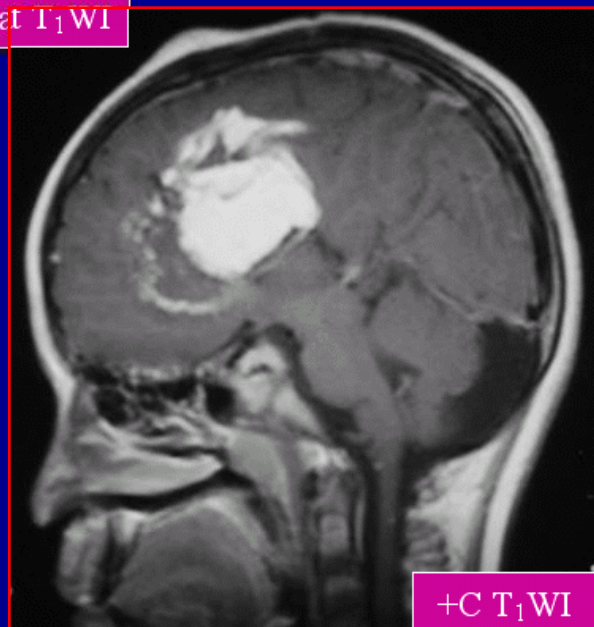


T1WI: 高信号

T2WI: 高信号



脑胼胝体发育不良并脂肪瘤

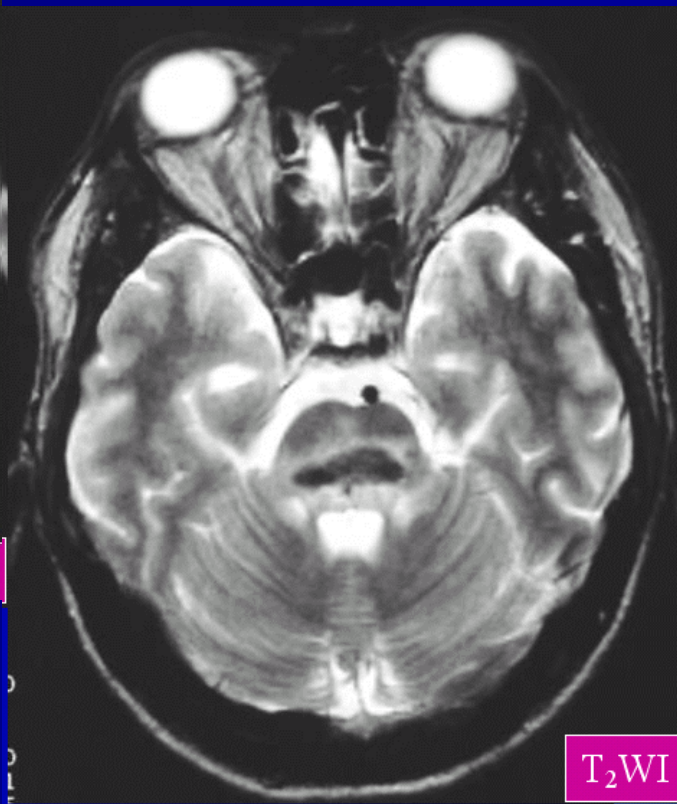
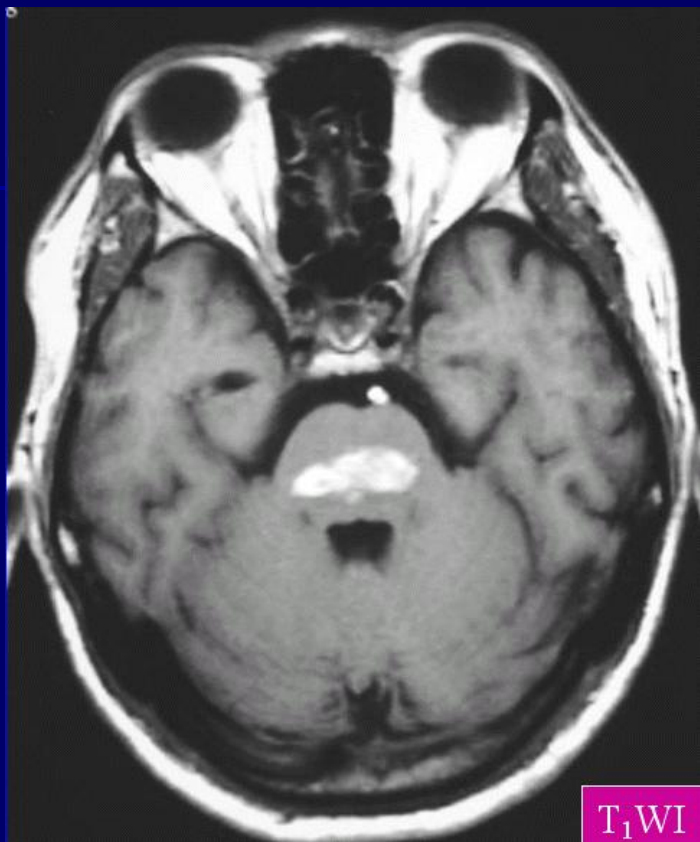


T1WI: 高信号; T2WI: 高信号

MRI脑实质异常信号与常见疾病

T1WI	T2WI	常见疾病
低信号	高信号	脑肿瘤、转移瘤、脑梗死、脑软化、脱髓鞘病变
低信号	低信号	动脉瘤、动静脉畸形、烟雾病、肿瘤内血管、钙化、骨化
高信号	高信号	亚急性晚期脑出血、肿瘤内出血、脂肪性病变
高信号	低信号	亚急性早期出血、黑色素瘤、肿瘤卒中
混杂信号	混杂信号	动脉瘤、动静脉畸形伴血栓、部分脑肿瘤

亚急性早期出血

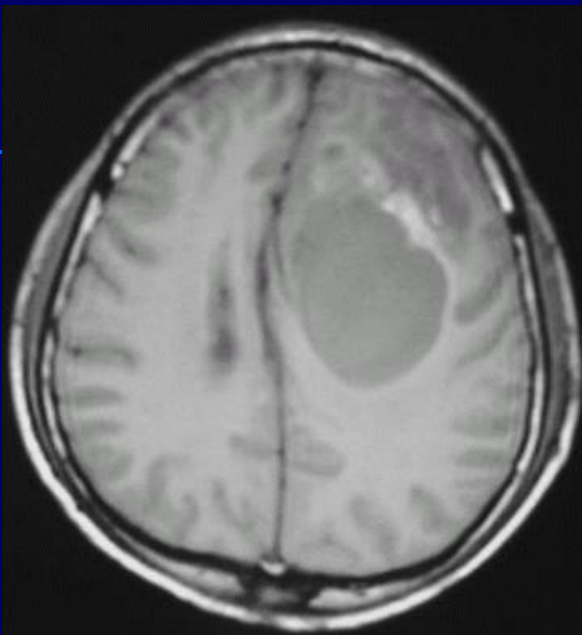


T1WI: 高信号; T2WI: 低信号

MRI脑实质异常信号与常见疾病

T1WI	T2WI	常见疾病
低信号	高信号	脑肿瘤、转移瘤、脑梗死、脑软化、脱髓鞘病变
低信号	低信号	动脉瘤、动静脉畸形、烟雾病、肿瘤内血管、钙化、骨化
高信号	高信号	亚急性晚期脑出血、肿瘤内出血、脂肪性病变
高信号	低信号	亚急性早期出血、黑色素瘤、肿瘤卒中
混杂信号	混杂信号	动脉瘤、动静脉畸形伴血栓、部分脑肿瘤

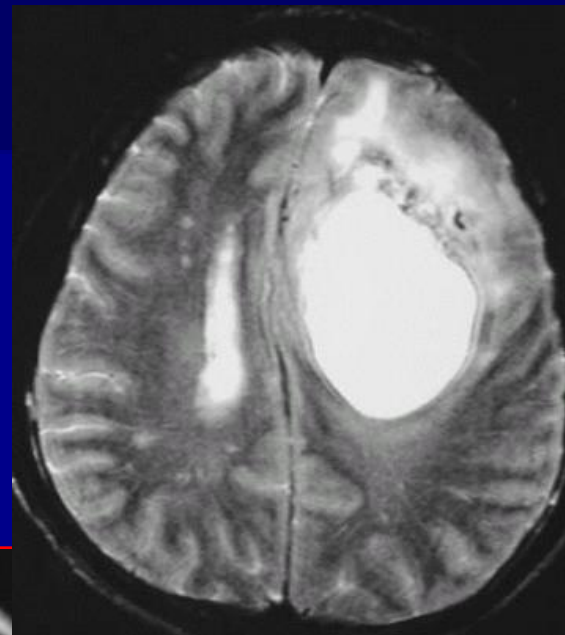
胶质瘤IV级



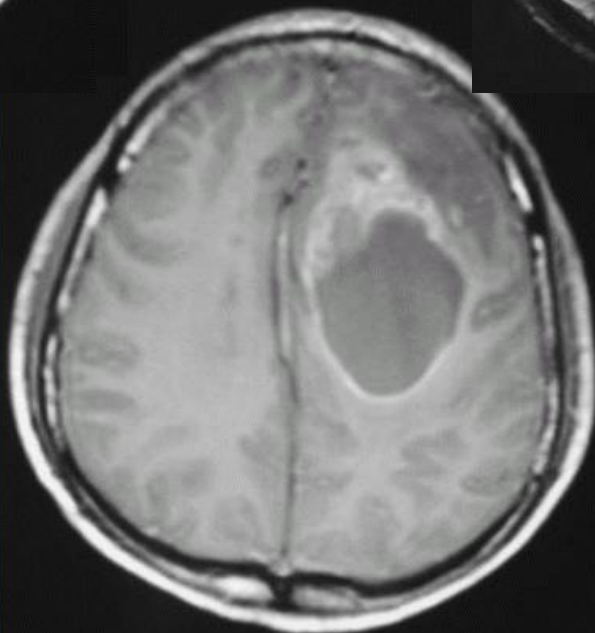
T1WI

T2WI

+C T1WI

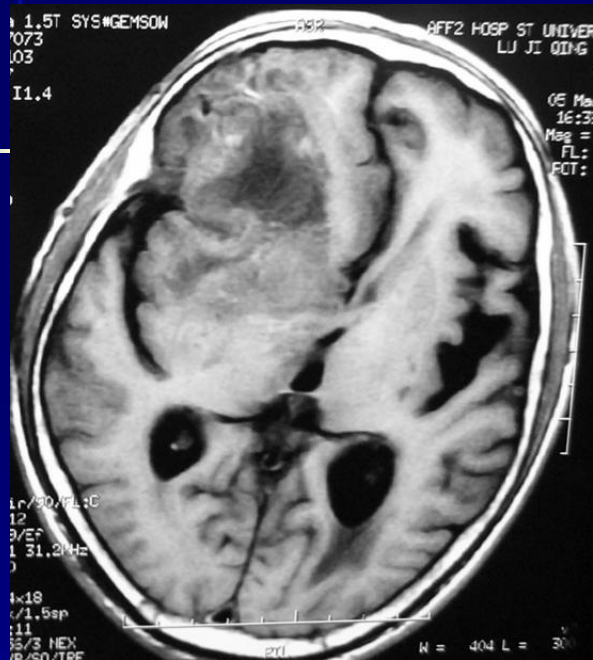


混杂信号



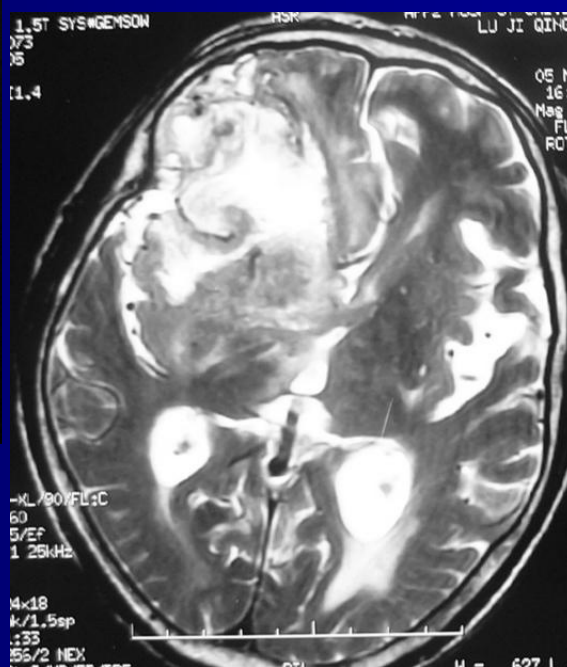
脑实质异常信号与常见疾病

T1WI

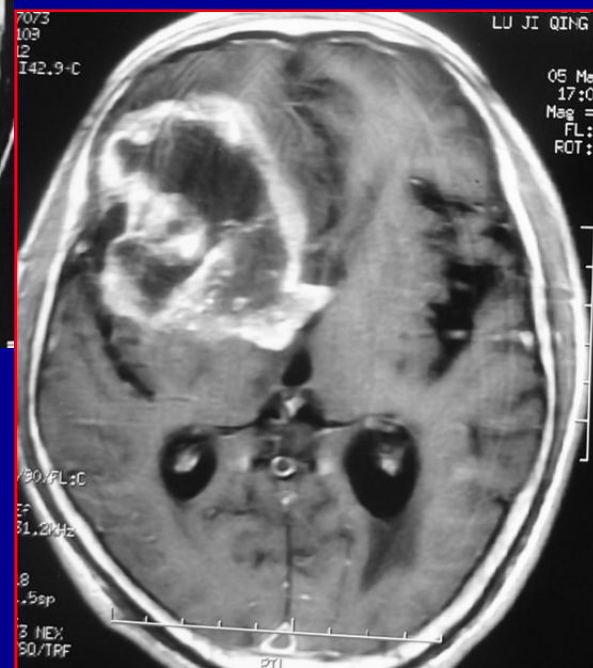


胶质瘤IV级

T2WI

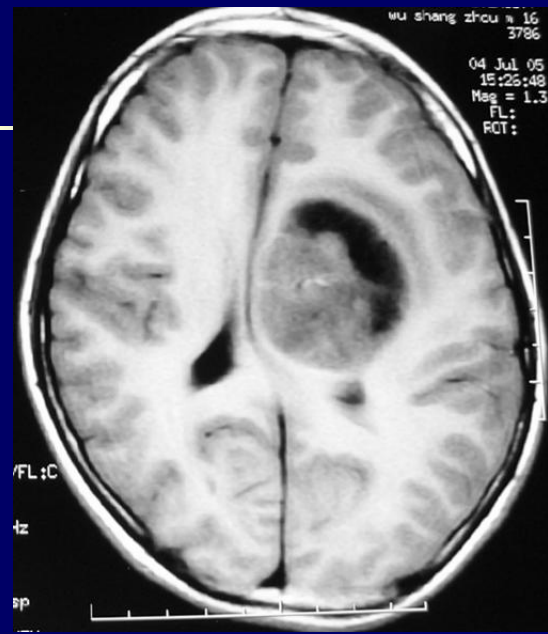


+C T1WI



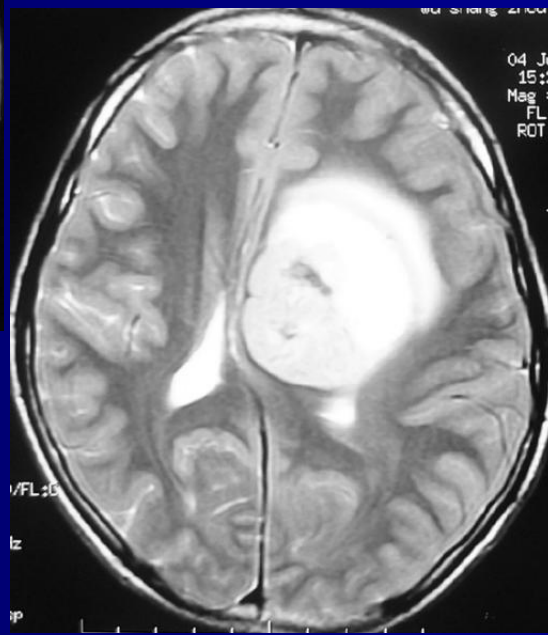
混杂信号

T1WI

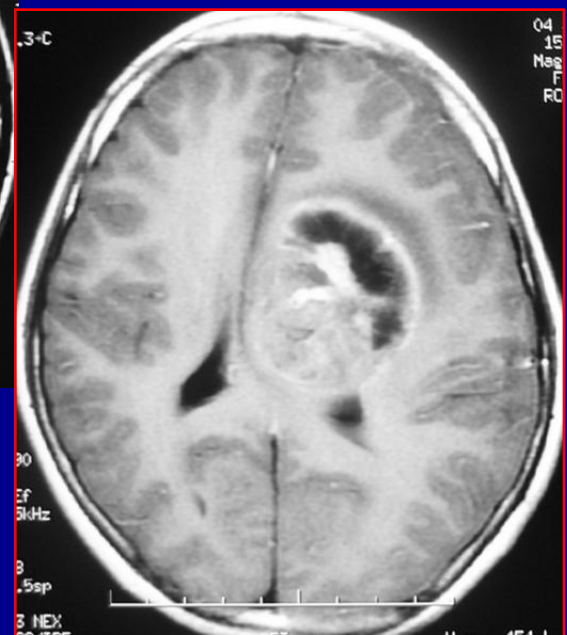


室管膜瘤
(ependymoma)

T2WI



+C T1WI



混杂信号

MRI增强检查

目的:

了解病灶血供情况；区别肿瘤和瘤周水肿；
显示平扫未发现病灶；有利诊断和鉴别诊断

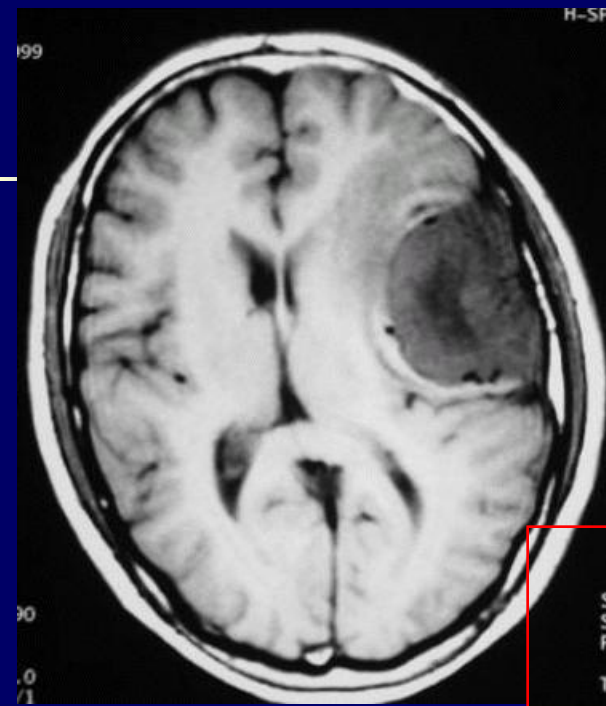


病灶强化程度:

- ✿ 明显强化
- ✿ 中度强化
- ✿ 轻度强化
- ✿ 不强化

脑病变增强后强化程度

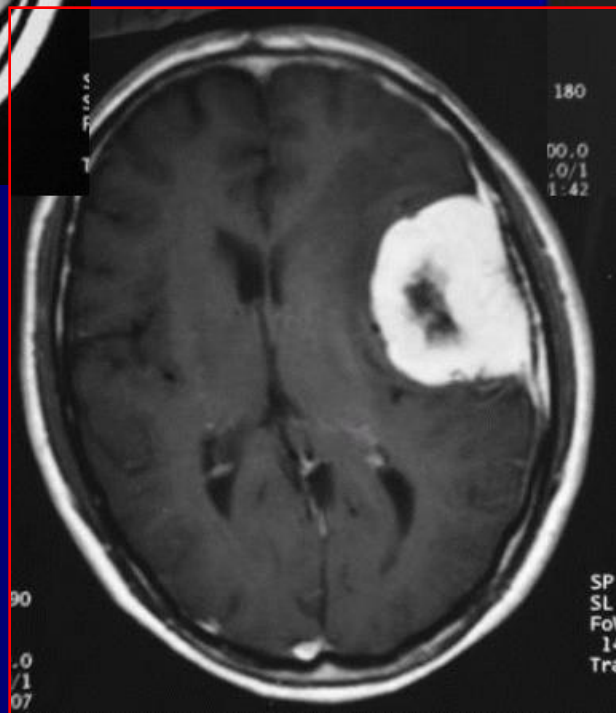
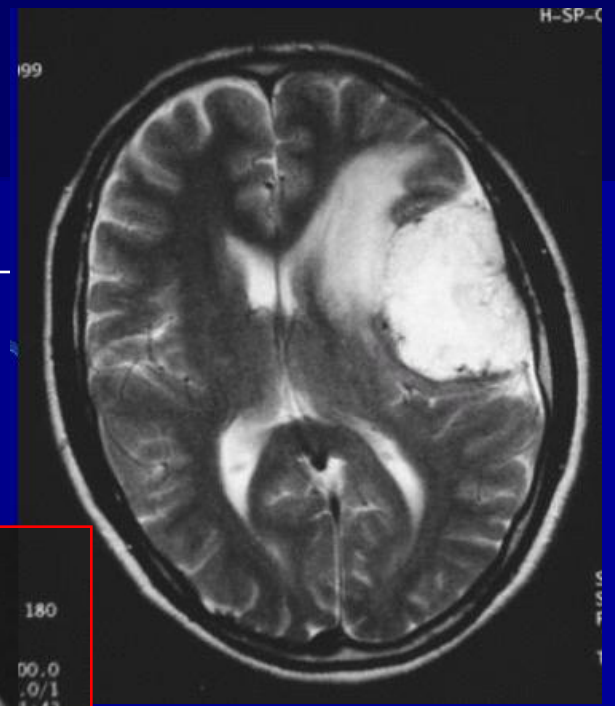
明显强化



T1WI

T2WI

+C T1WI



脑膜瘤
(Meningioma)

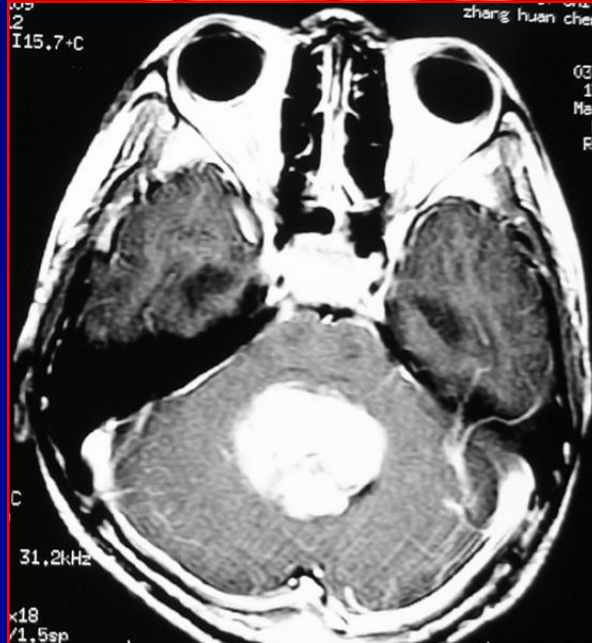
脑病变增强后强化程度

明显强化

T1WI

Sig T1WI

T2WI



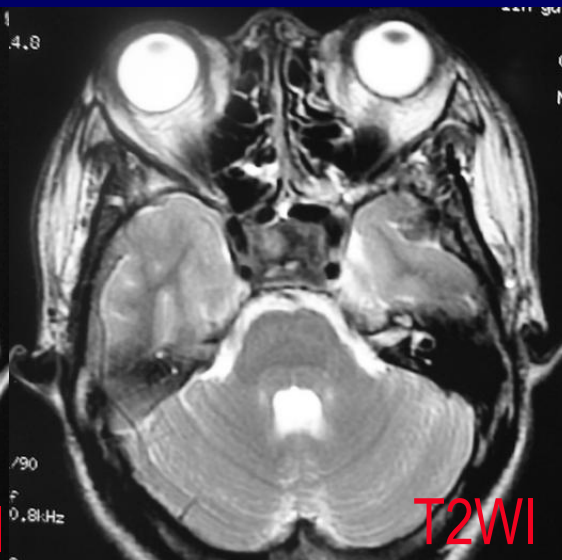
室管膜瘤
(ependymoma)

+C T1WI

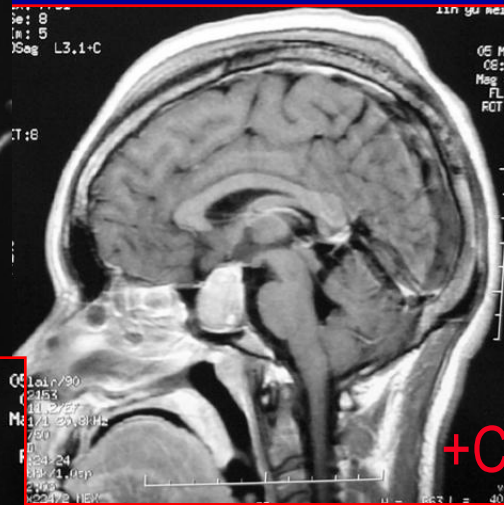
明显强化



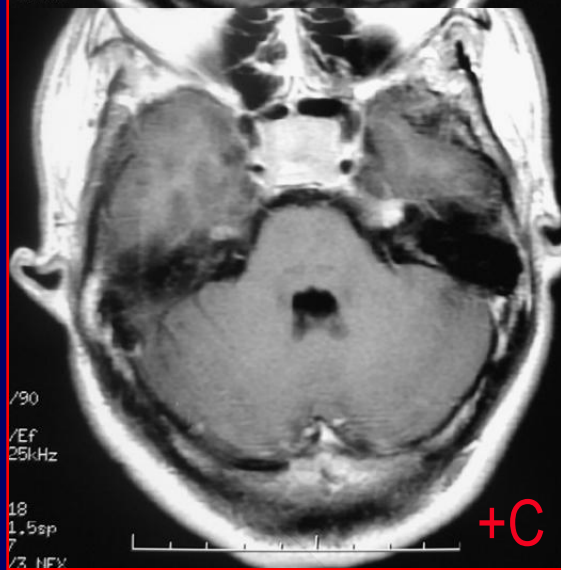
T1WI



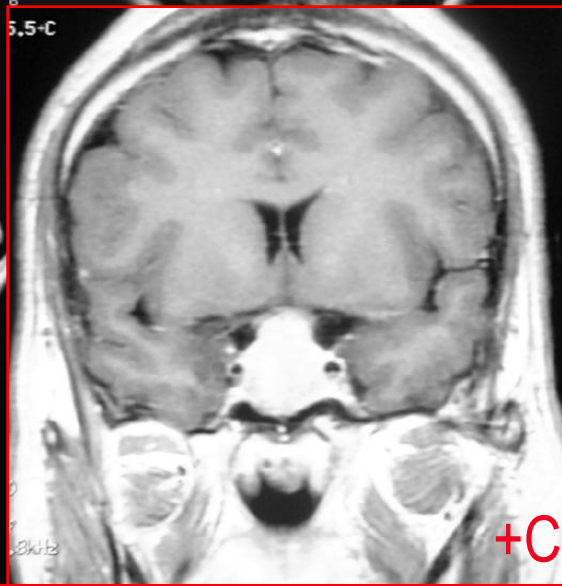
T2WI



+C



+C

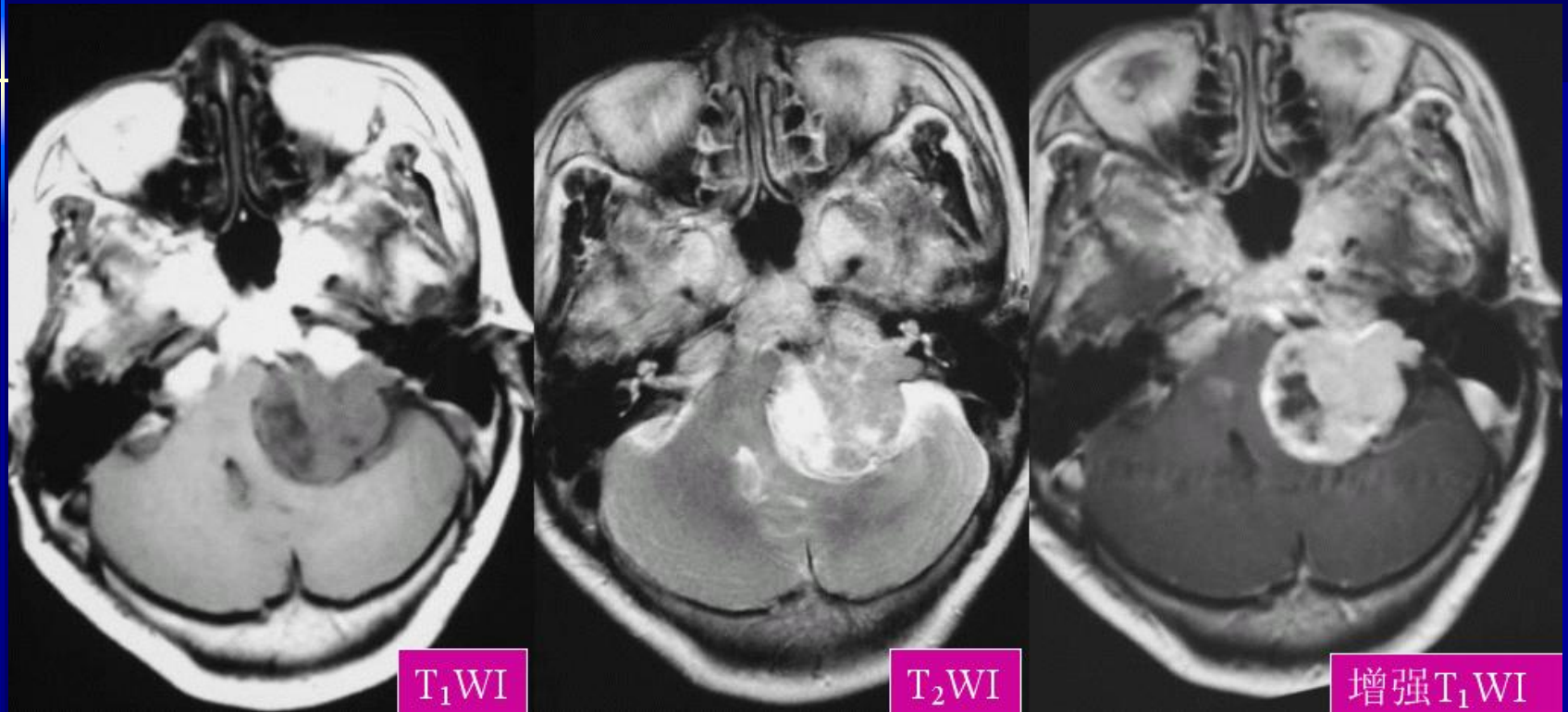


+C

垂体瘤

(pituitary adenoma)

明显强化



听神经瘤 (acoustic neurinoma)

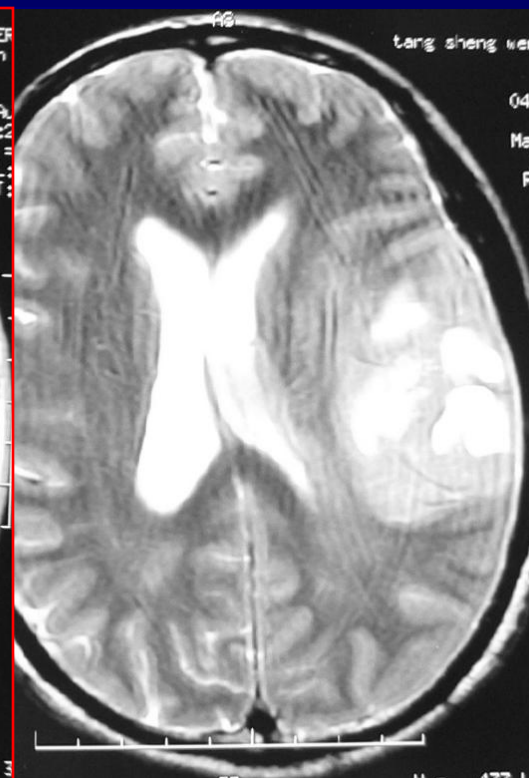
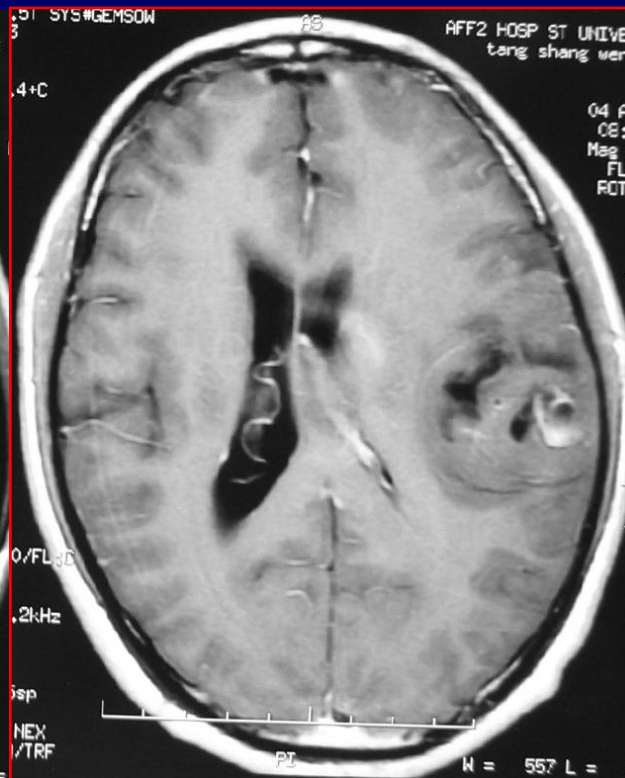
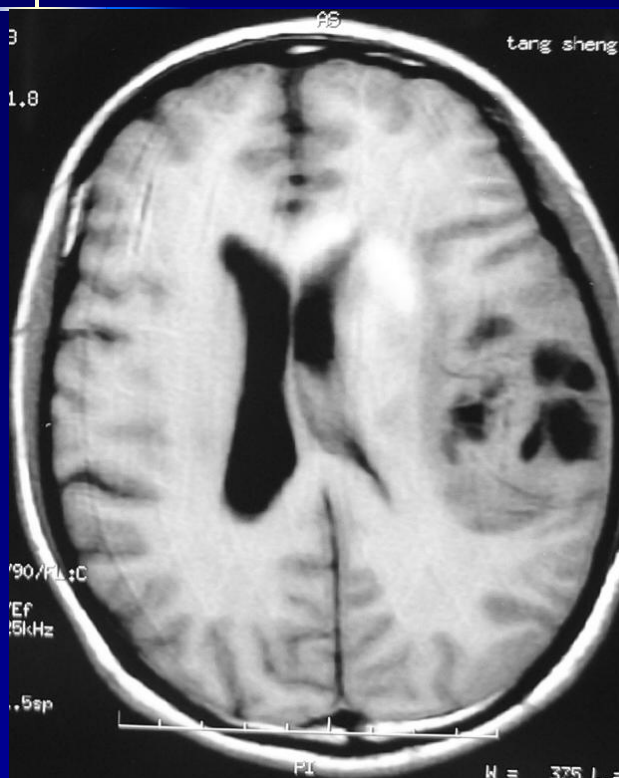
脑病变增强后强化程度

轻度强化

T1WI

+C T1WI

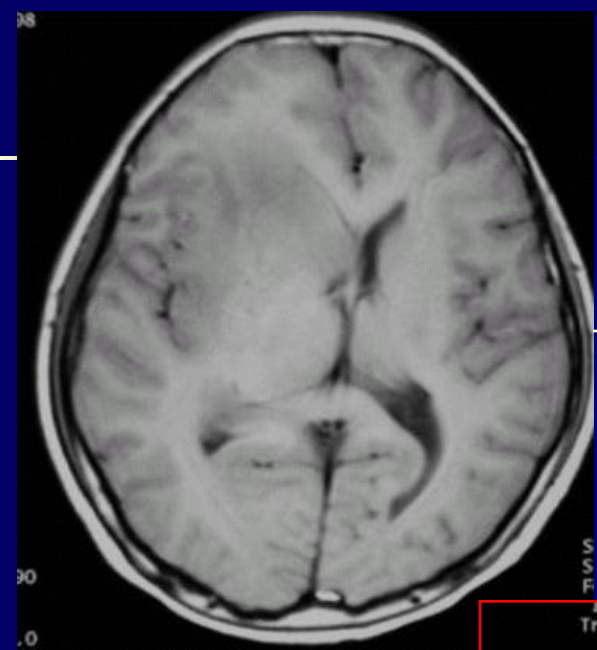
T2WI



脑胶质瘤 (Brain glioma)

脑病变增强后强化程度

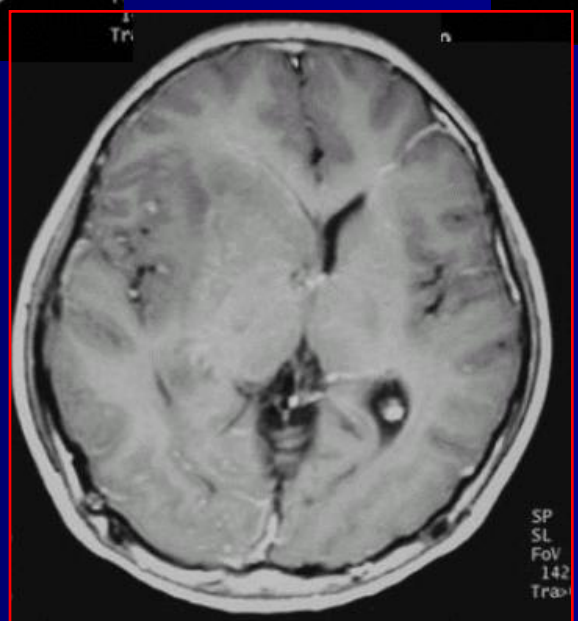
不强化



T1WI

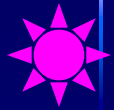
T2WI

+C T1WI

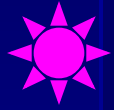


胶质瘤1级

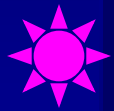
脑血管成像



DSA(digital subtraction angiography)



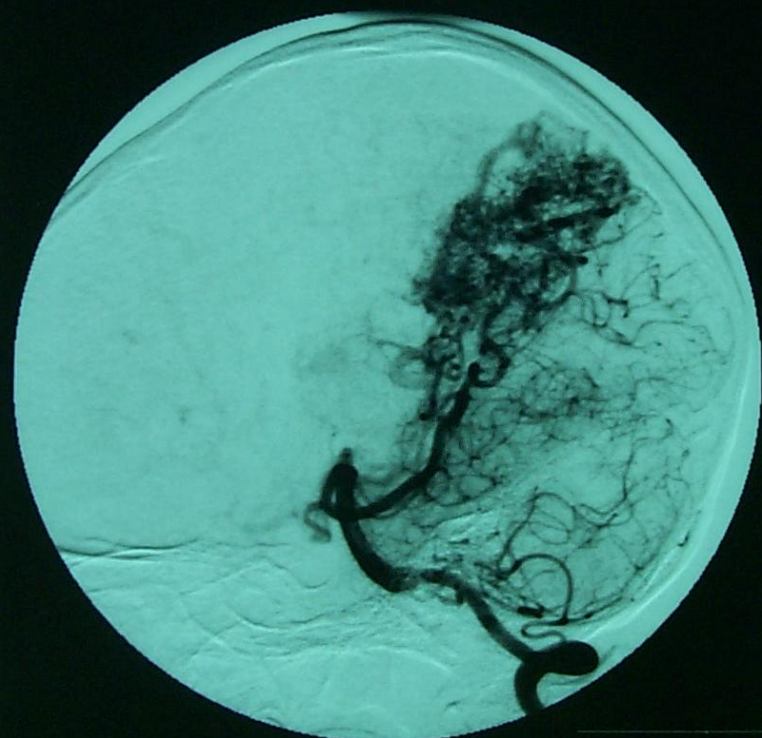
CTA(computed tomography angiography)

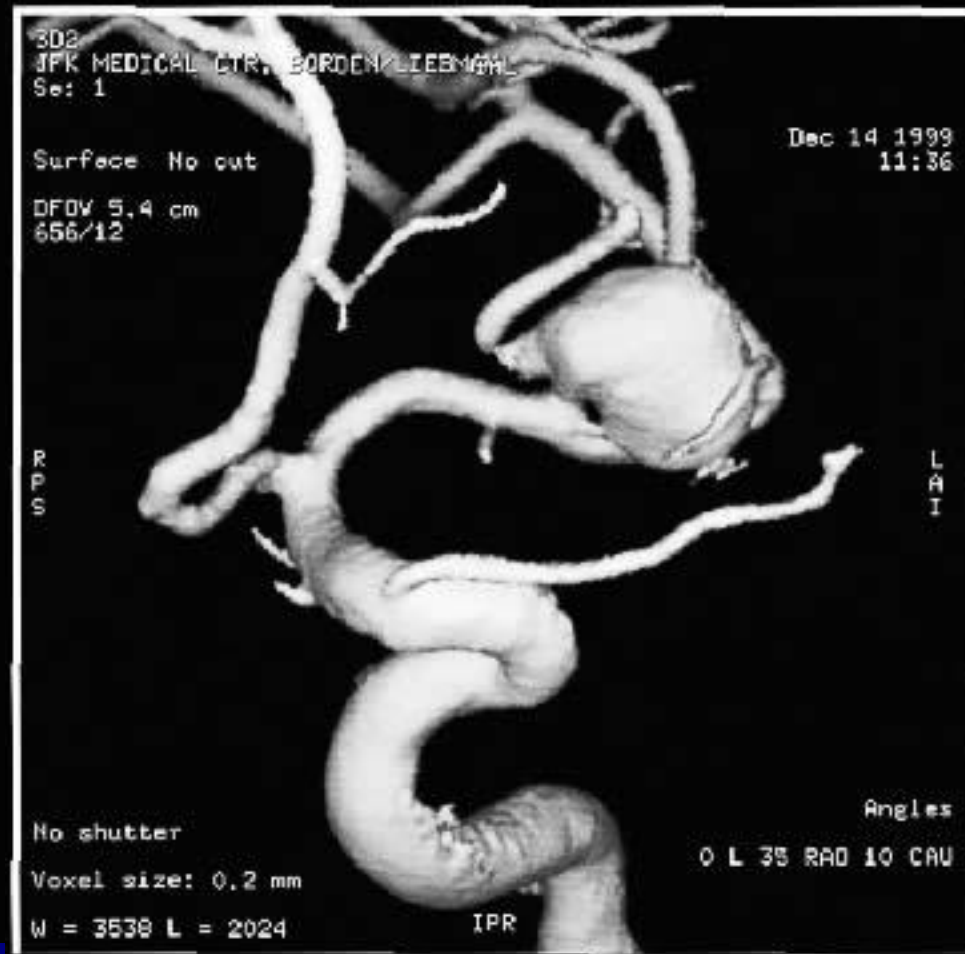


MRA(magnetic resonance angiography)

- TOF
- Phase contrast
- Contrast enhancement

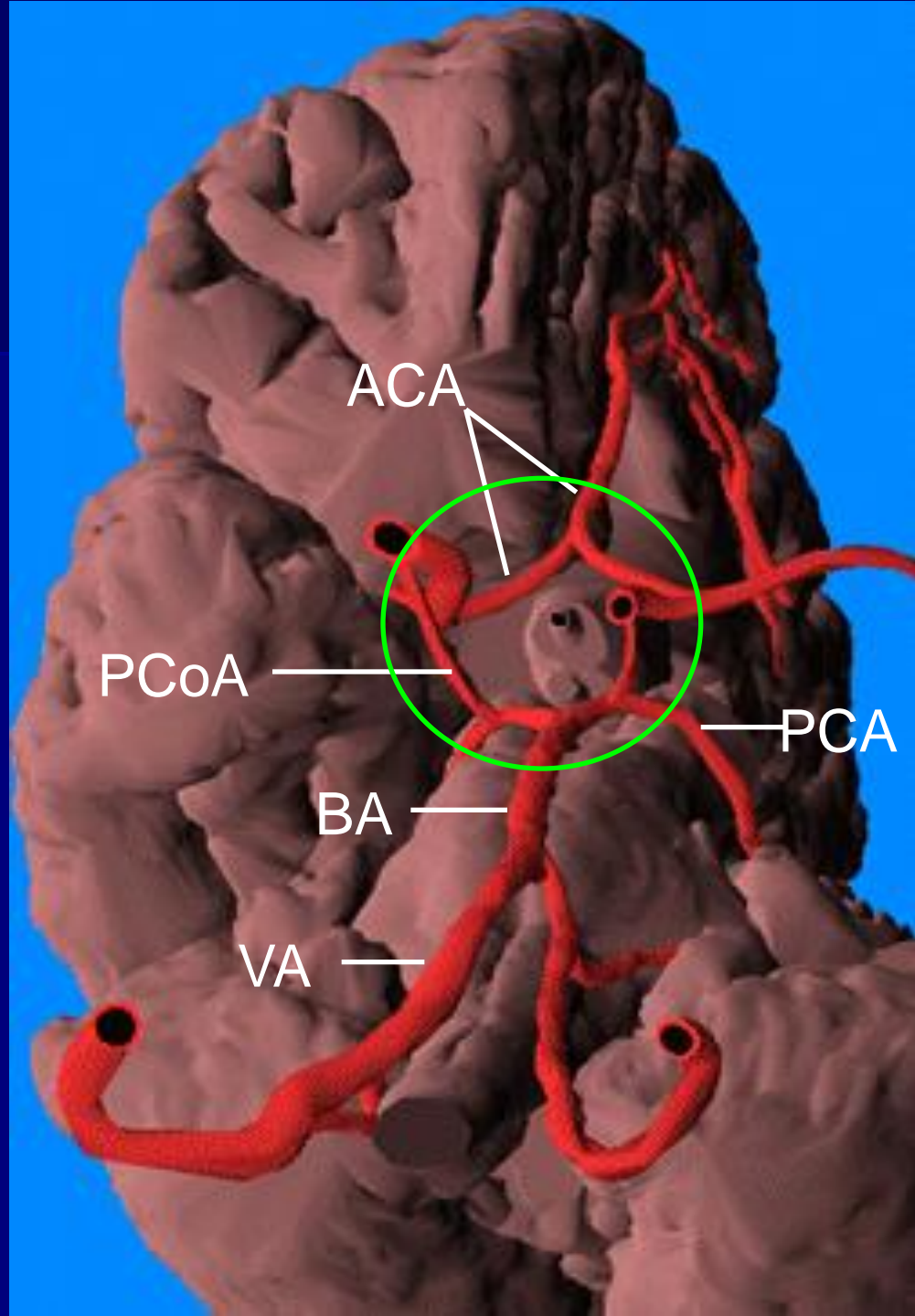
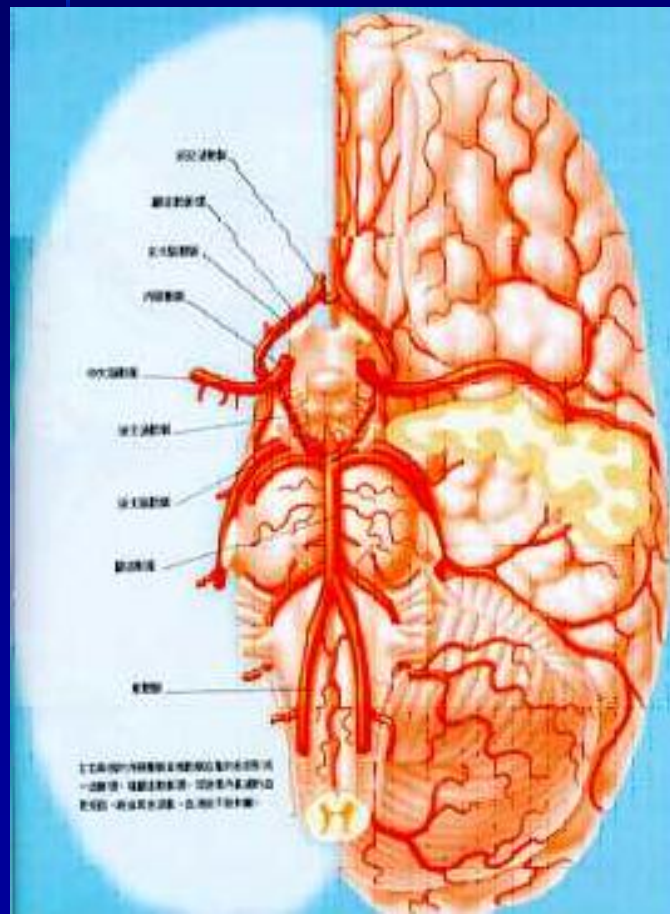
数字减影血管造影 (DSA)





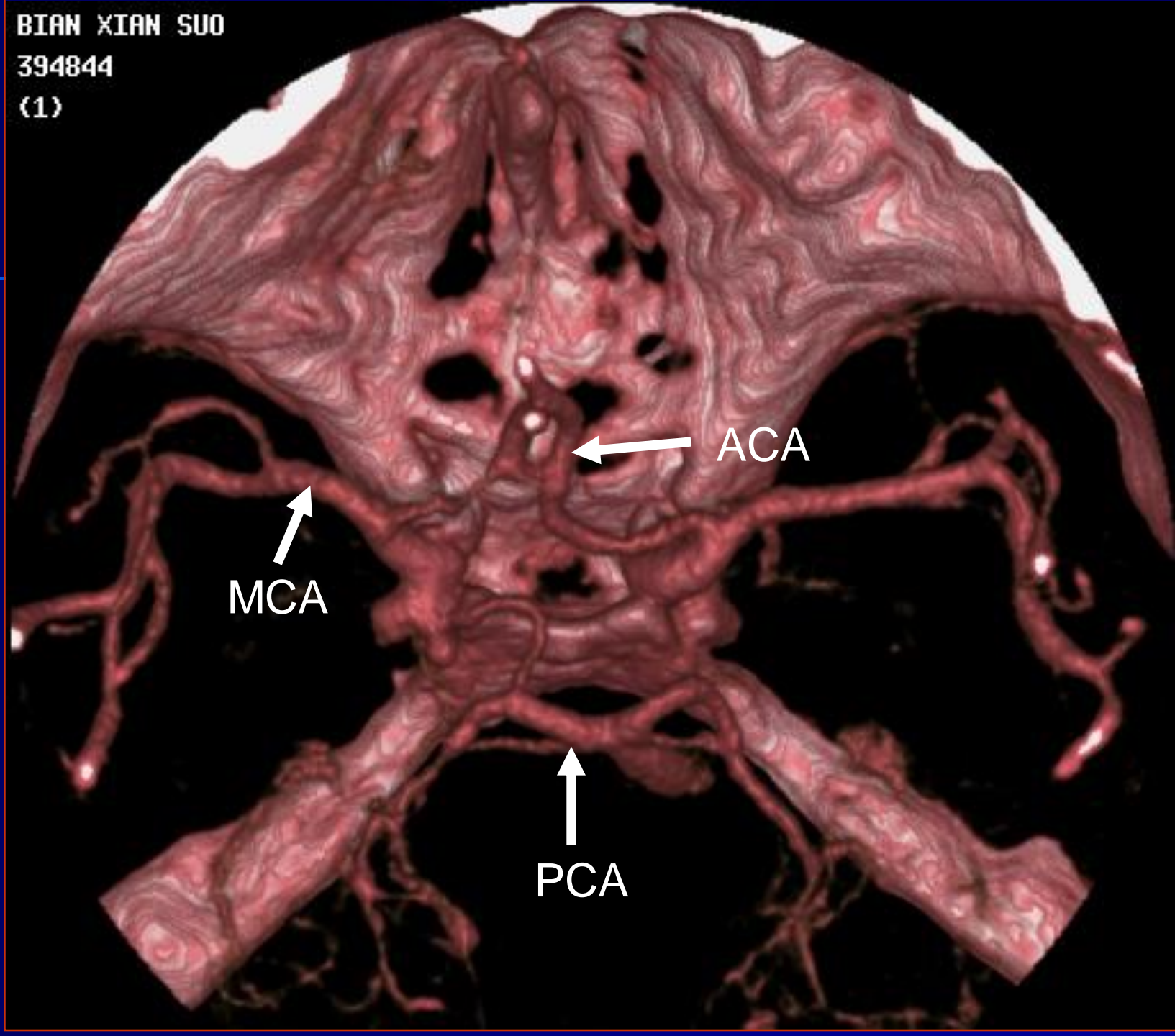
Circle of Willis:

- 颈内动脉的床突上段
- 大脑前动脉的A1段
- 前交通动脉
- 后交通动脉
- 大脑后动脉的P1段



BIAN XIAN SUO
394844
(1)

CTA

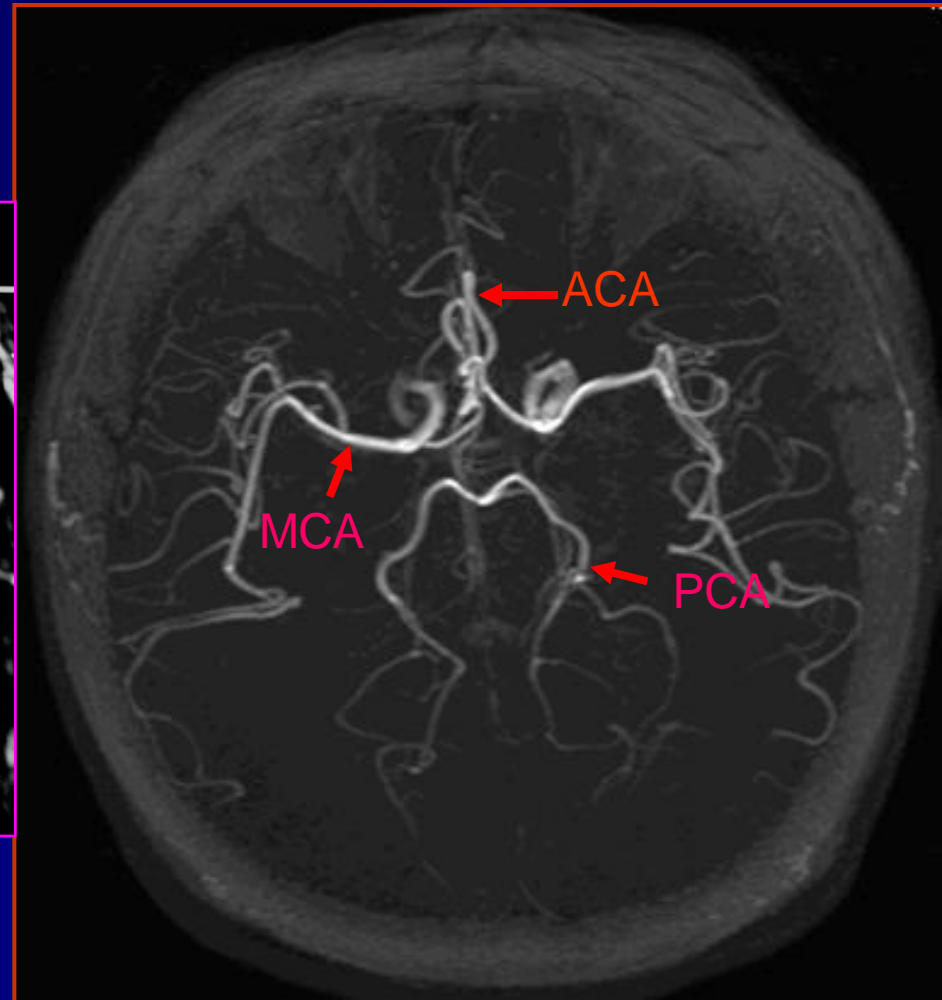
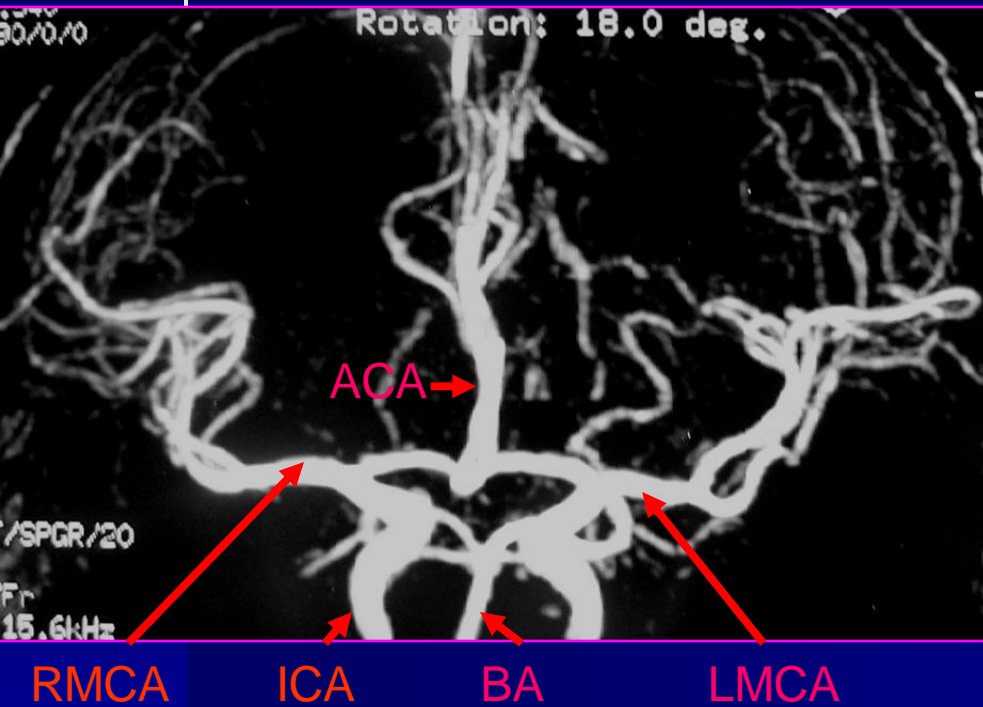


MCA

PCA

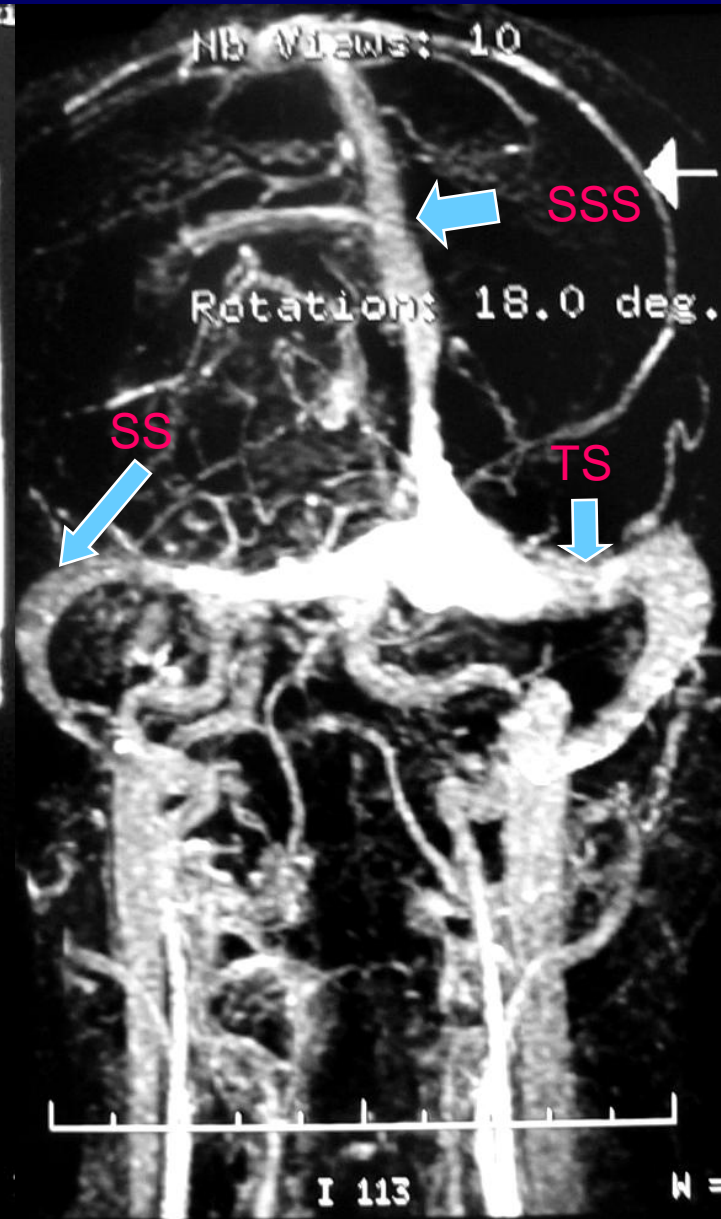
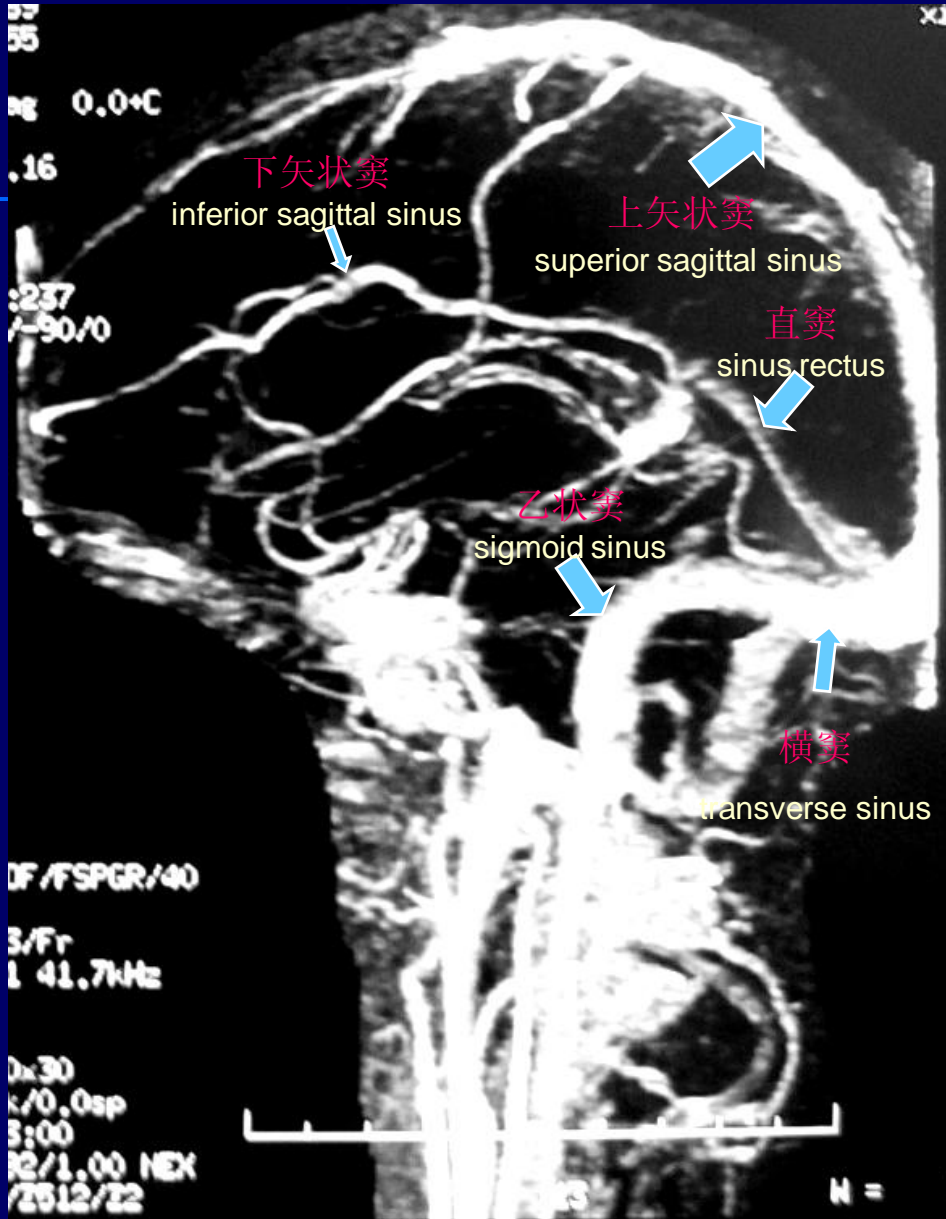
ACA

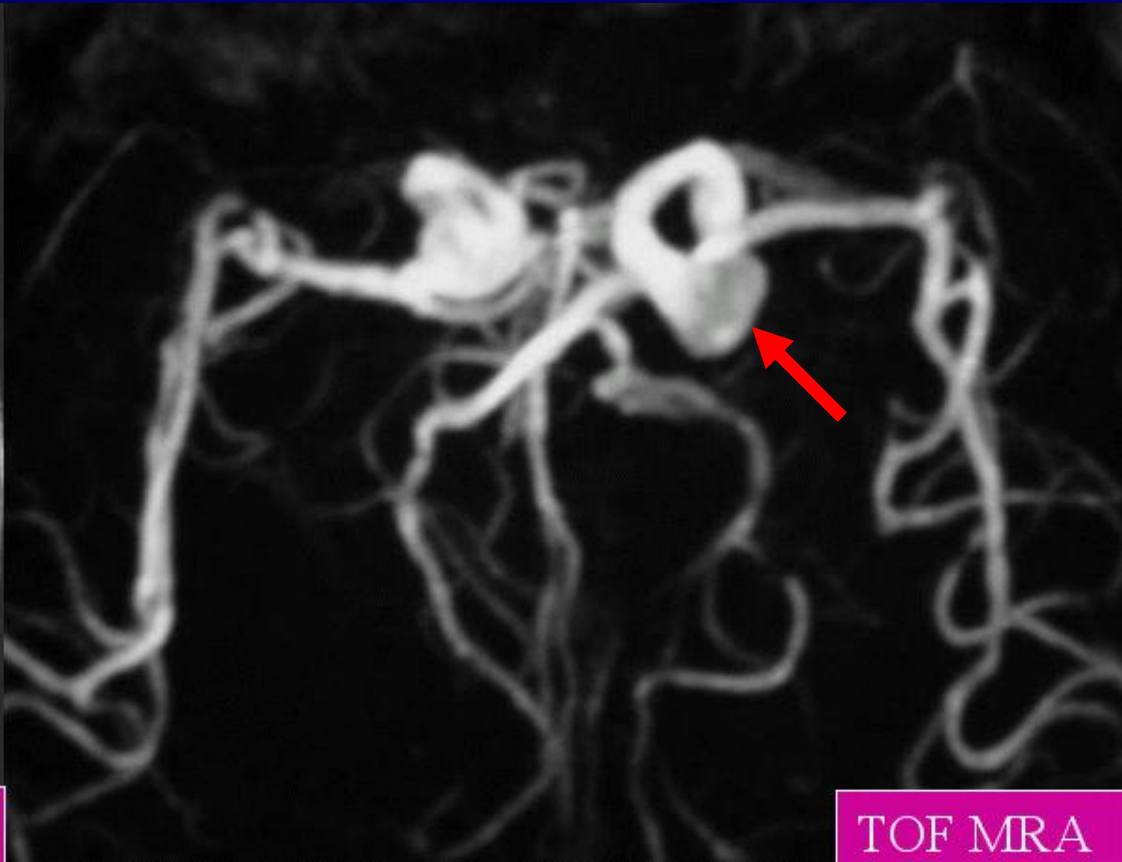
MRA

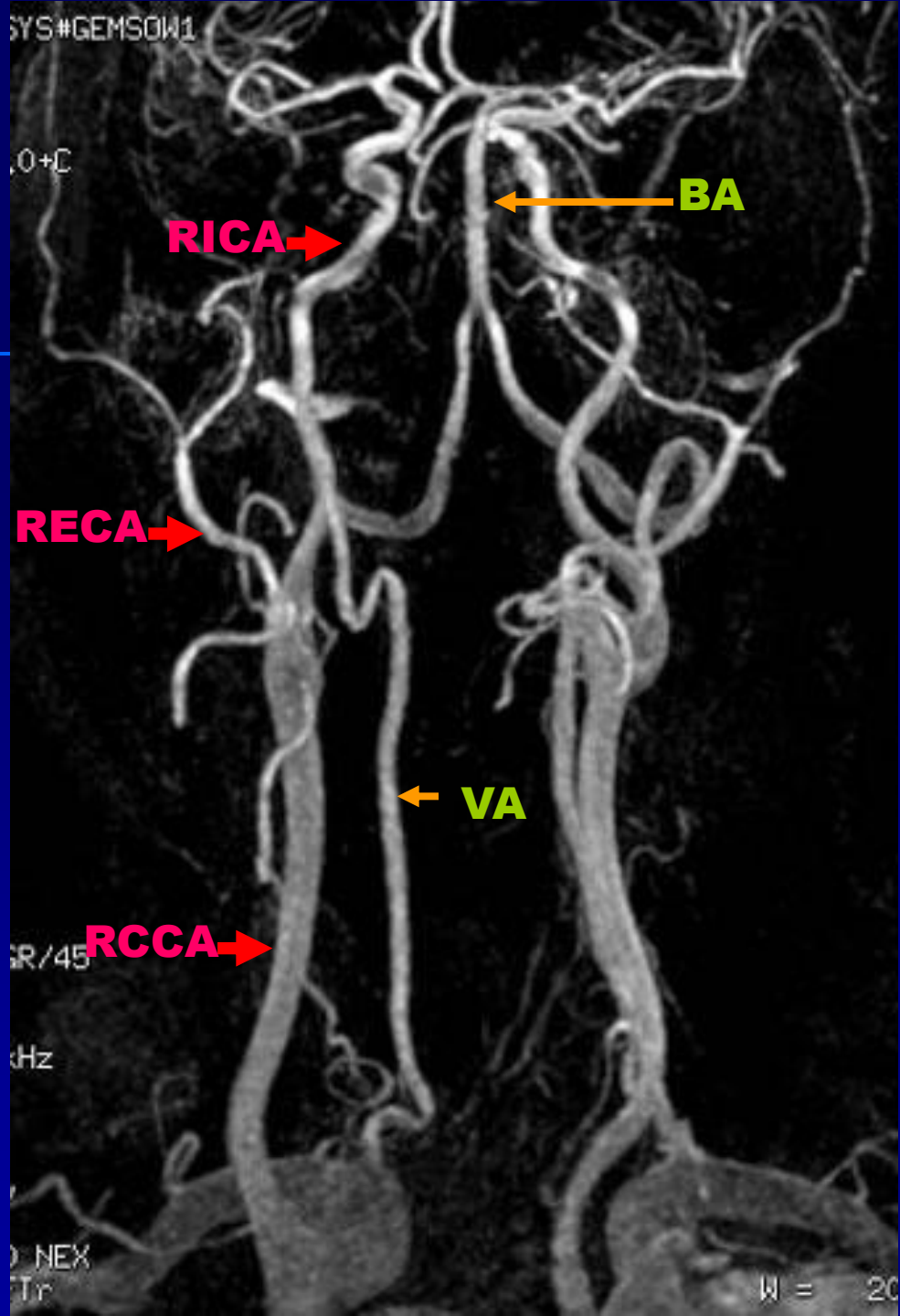


MRV

颅内静脉系统



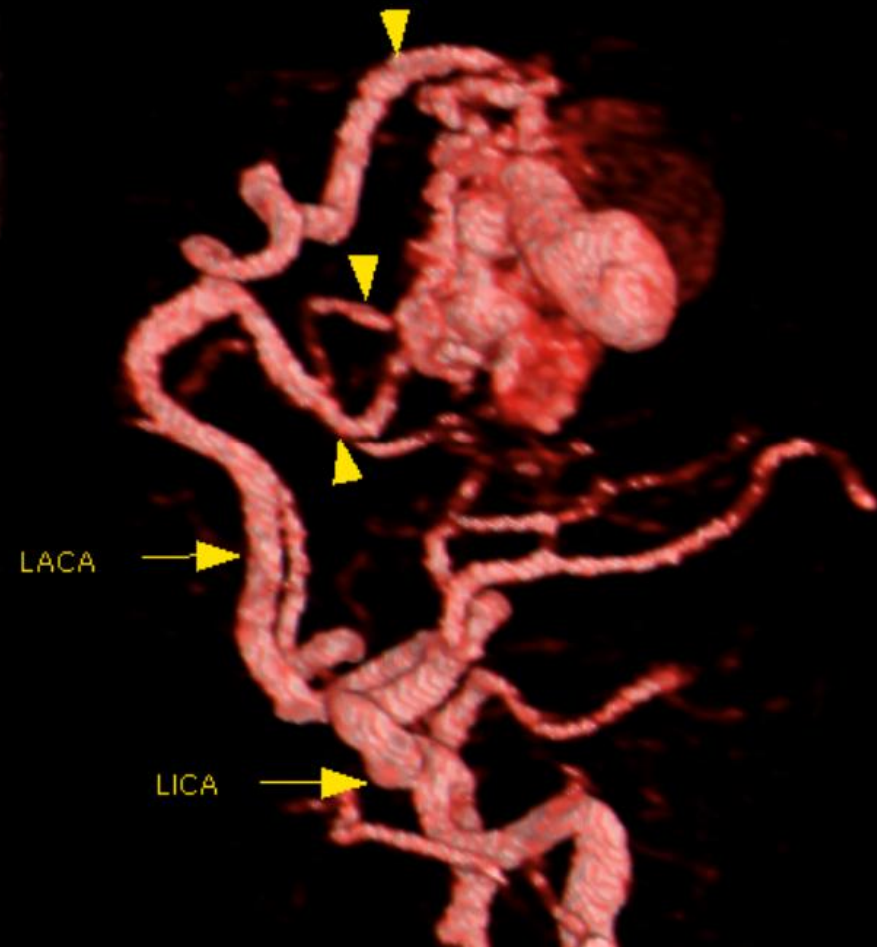






颈动脉分叉

AVM



3D
Ex: 8571
Se: 3

Volume Rendering No cut

DFOV 17.9 cm
STND

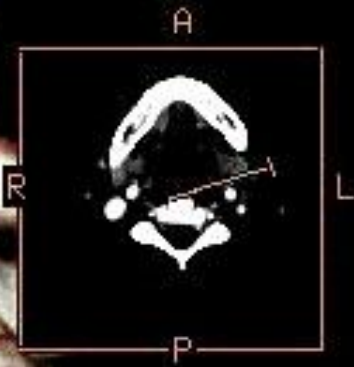
A
R
I

No shutter
kv 120
mA 200
0.7
2.0 mm/2.0var.sp
Tilt: -0.0
11:19:10 AM
W = 167 L = 170

BRA

ZX

P
L
S



ILP

S

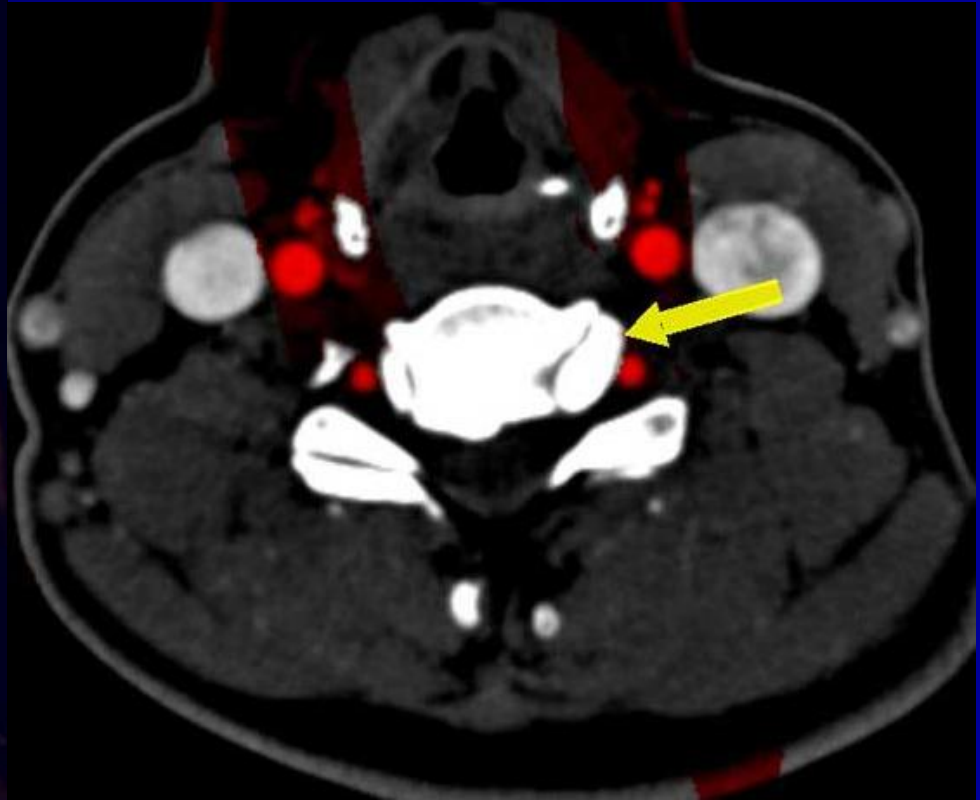
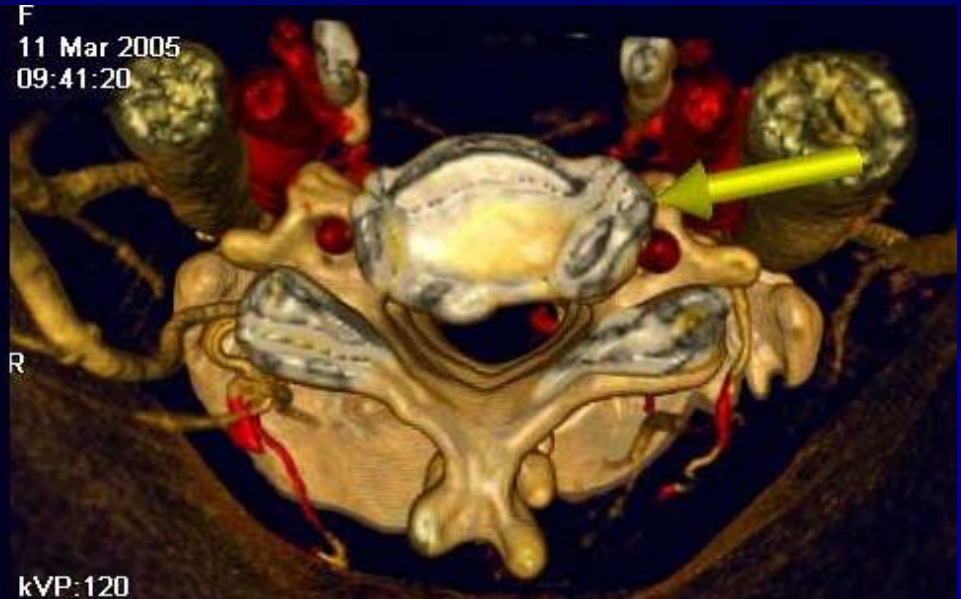
GAN ZHOU SH



F
11 Mar 2005
09:41:20

R

kVP:120



烟雾病

(moyamoya disease)

一种多发性进行性颅内血管狭窄或闭塞病。主要的病变血管位于大脑底部动脉环的附近，因为狭窄，局部代偿性增生的小血管形成了网状侧枝循环

