# General Data

- Gender：Female
- Birthday and age：1981-09-02；22 y/o
- Occupation：商
- Date of Admission：2003-08-03

# Chief complaint

- Sudden onset

  consciousness disturbance and vomiting

# Present illness (1)

- Generally healthy before
- According to her friends' statement, she presented with sudden onset of headache and vomiting then she lost consciousness while she was working.
- Her family denied any traumatic history and there was no traumatic wound found.
- She was sent to our ER for help

# Present illness (2)

- On arrival to our ER, her consciousness was disturbance and irritable.
- Vital sign :

  BP: 112/61 mmHg

  T/P/R : 36/ 62 /18

  GCS : E3M5V3,

  pupil size was 3.0(+) / 3.0(+).
- Muscle power of right limbs were mild weak.

# Past and Personal History

- Previous Admission and Operation history :denied
- DM : denied
- HTN : denied

# Physical examination

- Consciousness : clear
- Vital signs : TPR : 36/62/18 ,
  BP : 112/61
  G.A : weakness , lethargy
  nausea , vomiting(+)
- Chest : breathing sound clear
- Heart : RHB without murmur
- Abdomen :soft and flat
- Extremities : R't limbs weakness

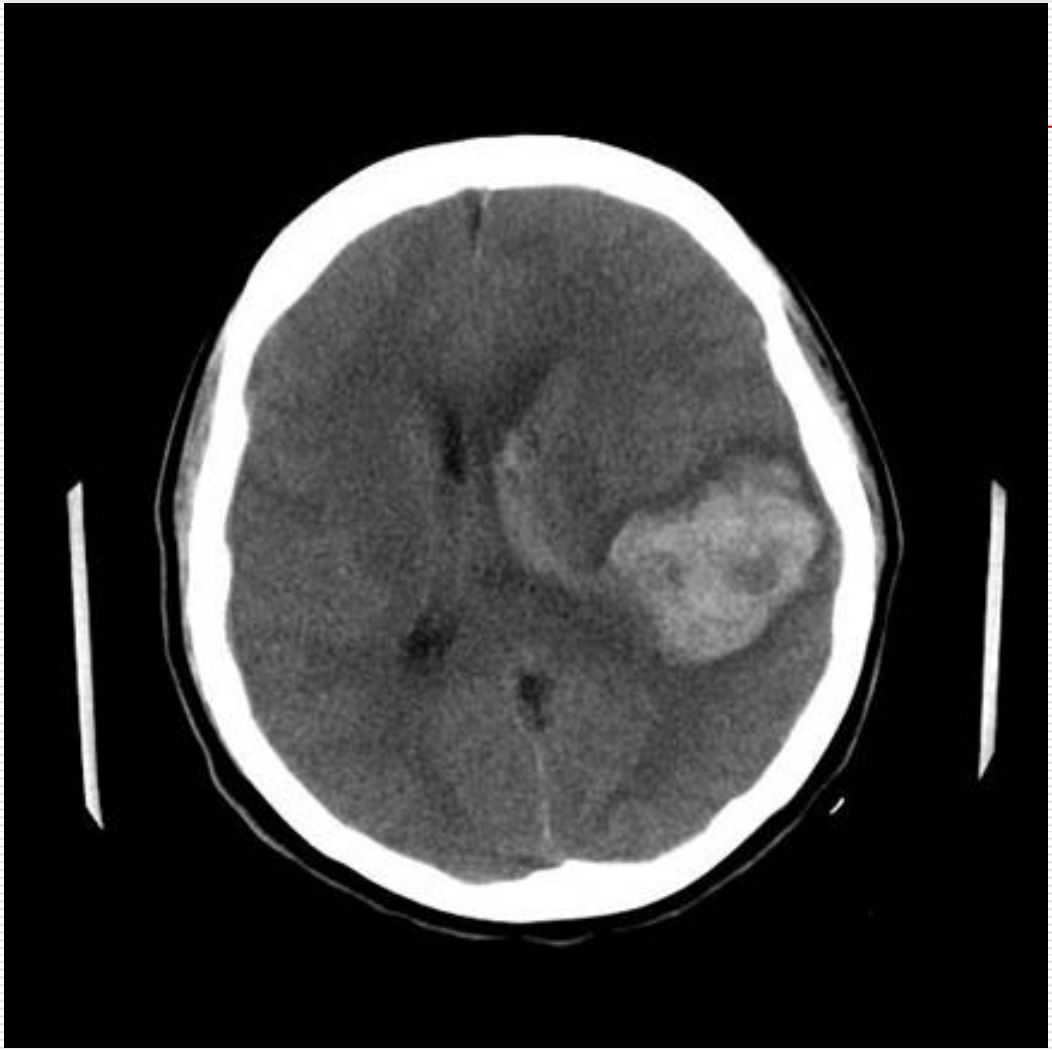
# Lab datas

- WBC : 13200/uL (5200-12400)
- Others : no positive finding

# Brain CT focus on routine(no C)

1. Large hematoma (measuring approximately 3.2x4.1 cm in dimension) with thin perifocal edema is located at left tempo-parietal lobe
2. The hematoma also cause left hemisphere edema , leading to midline shift

# Brain CT focus on routine(no C)



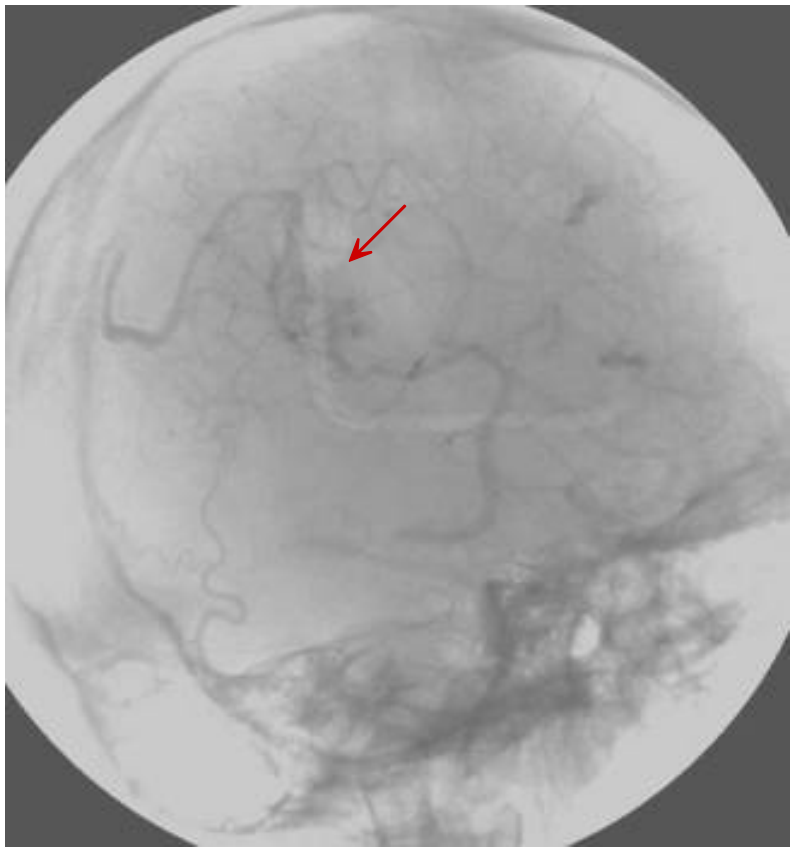
3.The hematoma ruptured into the ipsilateral lateral ventricle, resulting in hematoventricle and hydrocephalus and subarachnoid hemorrhage

4.No definite abnormal radiolucent fracture line at skull

# R+L Carotid angiography vertebral angiography(1)

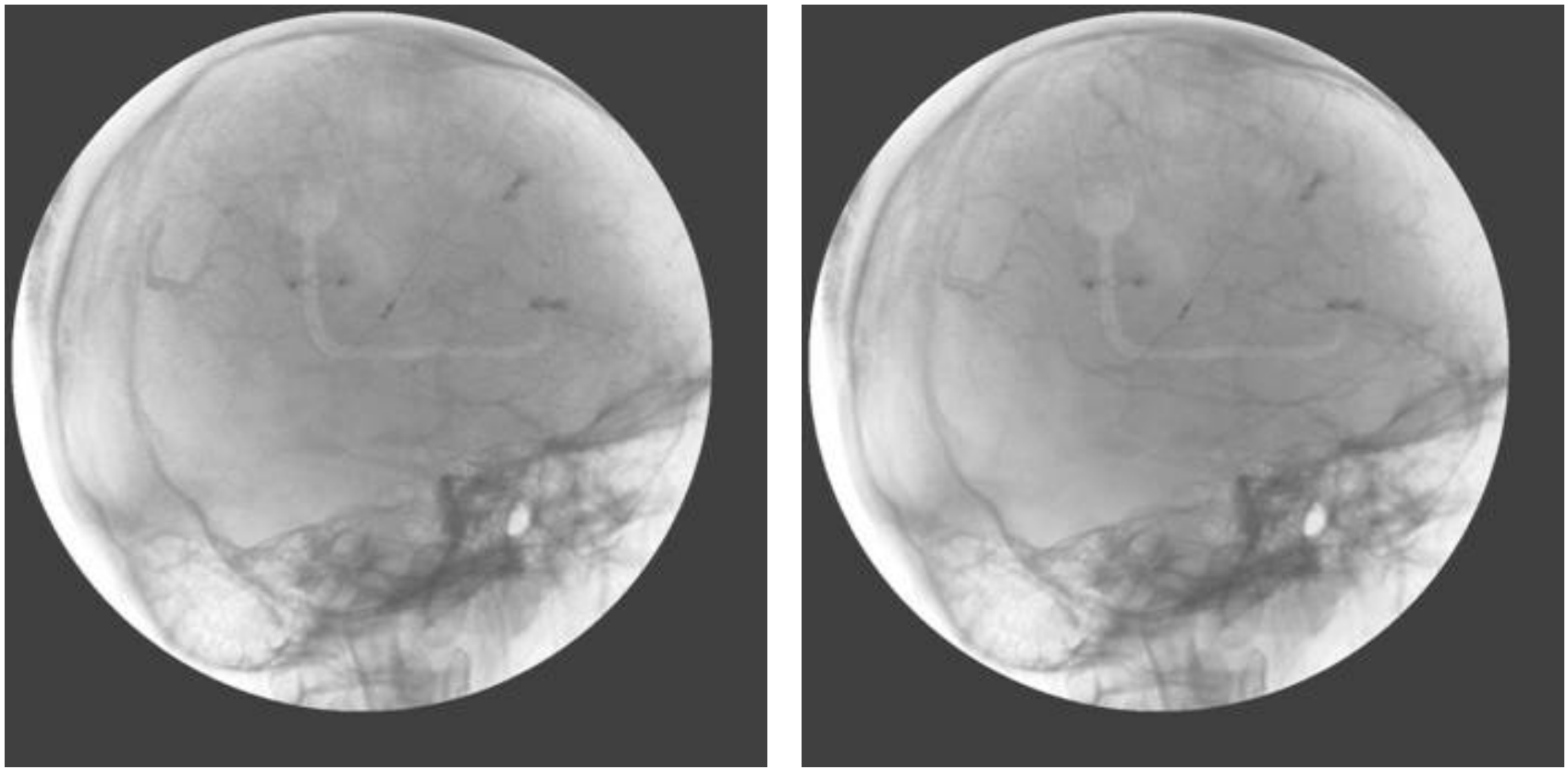
1. Post Operation bone change at the left temporal bone
2. Enlarged left posterior parietal artery

# R+L Carotid angiography vetebral angiography(2)



Enlarged left posterior parietal artery supplies a tangle of abnormal vessels with a dilated superficial veins drains into superficial sagittal sinus

# R+L Carotid angiography vertebral angiography(3)



# Differential diagnosis(1)

- Vascular anomaly with bleeding
- Post-traumatic hemorrhage
- Tumor bleeding

# Differential diagnosis(2)

- Vascular Anomalies
  1. AVM
  2. AV Fistula
  3. Cavernous hemangioma
  4. Capillary telangiectasias
- Post-traumatic Hemorrhage

# Differential diagnosis(3)
# Arteriovenous Fistula

- Abnormal communication between A.+ V.
  leading to enlargement + elongation of draining veins
- Cause:
  1.vessels laceration (delay between trauma )
  2.angiodysplasia (fibromuscular disease, neurofibromatosis)
  3.congenital fistula
- Location:
  a. carotid-cavernous sinus fistula (most common)
  b. vertebral artery fistula
  c. external carotid fistula

# Cavernous Hemangioma

- Pathology:
  1.well-circumscribed nodule
  2.honeycomb-like large sinusoidal vascular spaces
  3.separated by fibrous collegenous bands
  4.without intervening neural tissue
  5.slow blood flow in vascular channels
- Age: 20~50 y/o , M>F
- NCCT: extensive calcification(20%)
  small round hyperdense region
- MR : well-defined area of mixed signal intensity centrally
- Angio : negative= cryptic/occult vascular malformation

# Capillary telangiectasias

- Capillary angioma
- Abnormal dilated capillaries separated by normal neural tissue, commonly cryptic
- Age: typically in elderly
- Location : mostly in pons/midbrain, usually multiple/maybe solitary
- Poorly defined area of dilated vessels(resemble petechiae)
- Best delineated with MR (due to hemorrhage)

# Impression

AVM was highly suspected

Due to image finding and personal history

# Operation method

1. Craniotomy+removal of ICH
2. ICP monitor

Operation Finding:

1. Horse-shoe skin lesion was done on L't temporal – parietal region
2. Craniotomy 3.5x5 cm
3. Abnormal vessels were noted on superficial cortex

   AVM was suspected highly
4. ICH was about 60 ml
5. ICP monitor was placed on subdural space
6. Close the W'd by vicryl 2-0 and nylon 3-0

# Pathological findings

病理診斷

Brain, temporo-parietal , left, craniotomy and removal, blood clots

檢查報告

The specimen submitted consists of three tissue fragments measuring up to 1.8 x 1.3 x 0.7 cm in size, fixed in formalin

Grossly they are blood clots

All for section

Microscopically, it shows a picture of blood clots

# Introduction

- Congenital abnormality
- Consisting of nidus of
  1. abnormal dilated tortuous arteries
  2. veins with racemose tangle of closely packed pathologic vessels
  3. without intermediary capillary bed
- Prevalence : most common vascular lesion
- Age: 80% by the end of 4th decade

  20% < 20 y/o

# Location & Vascular Supply

Location:

(a) supratentorial(90%) : parietal > frontal >temporal lobe> paraventricular > intraventricular region > occipital lobe

(b) infratentorial (10%)

Vascular supply:

(a) pial branches of ICA in 73% of supratentorial location, in 50% of posterior fossa location

(b) dural branches of ECA in 27% with infratentorial lesions

# Image Dx

- Skull film
  1. Speckled/Ringlike calcification(15~30%)
  2. Thin/Thicken of skull at contact area with AVM
  3. Prominent vascular grooves on inner table of skull in 27%

# NCCT

- Mixed density (60%):
  dense large vessels + hemorrhage
  + calcification
- Isodense lesion(15%) :
  maybe recognizable by mass effect
- Low density(15%):
  brain atrophy due to ischemia
- Not visulized(10%)

# CECT

- Serpiginous dense enhancement in 80%(tortuous dilated vessels)
- No enhancement in thrombosed AVM
- No avascular spaces within AVM
- Lack of mass effect/edema(unless thrombosed/bleeding)
- Rapid shunting
- Thicken arachnoid covering
- Adjacent atrophic brain

# MR & Angio

MR :

- Flow void (imaging with GRASS gradient echo+long TR sequences)

Angio :

- Grossly dilated efferent + afferent vessels with a racement tangle(bag of worm)
- AV shunting into at least one early draining vein
- Negative angiogram(compression by hematoma/thrombosis)

# Clinical S/S

- Headache
- Vomiting that occurs with headache
- Vision changes
- Seizures
- Muscle weakness, any part of the body
- Decreased sensation, any part of the body
- Mental status change
- Stiff neck

# Clinical S/S

- Complete PE and NE :

  Detect abnormal flow in vessels and any focal neurologic signs (weakness, numbness, language problems, visual problems).

# Treatment

- Bleeding AVM : medical emergency
  immediate hospitalization
- Goal of treatment :
  prevent further complications
  by limiting bleeding,
  controlling seizures , if possible removing AVM
- Treatment : Open brain surgery
  Endovascular treatment(Embolization)
  Stereotactic radiosurgery (small ,deep)
- Often treatment options used in combination

# Complication & Prognosis

Hemorrhage (common) :

bleeding on venous side

- Infarction

Prognosis :

- 10% mortality
- 30% morbidity
- 2~3 % yearly chance of bleeding
- increasing to 6% in year following 1st bleed
  25% in year following 2nd bleed