Subarachnoid Haemorrage

Dr. Perfecto Oscar González-Vargas

Neurólogo

INNN-HMP MPS-SOMENE-UAEM

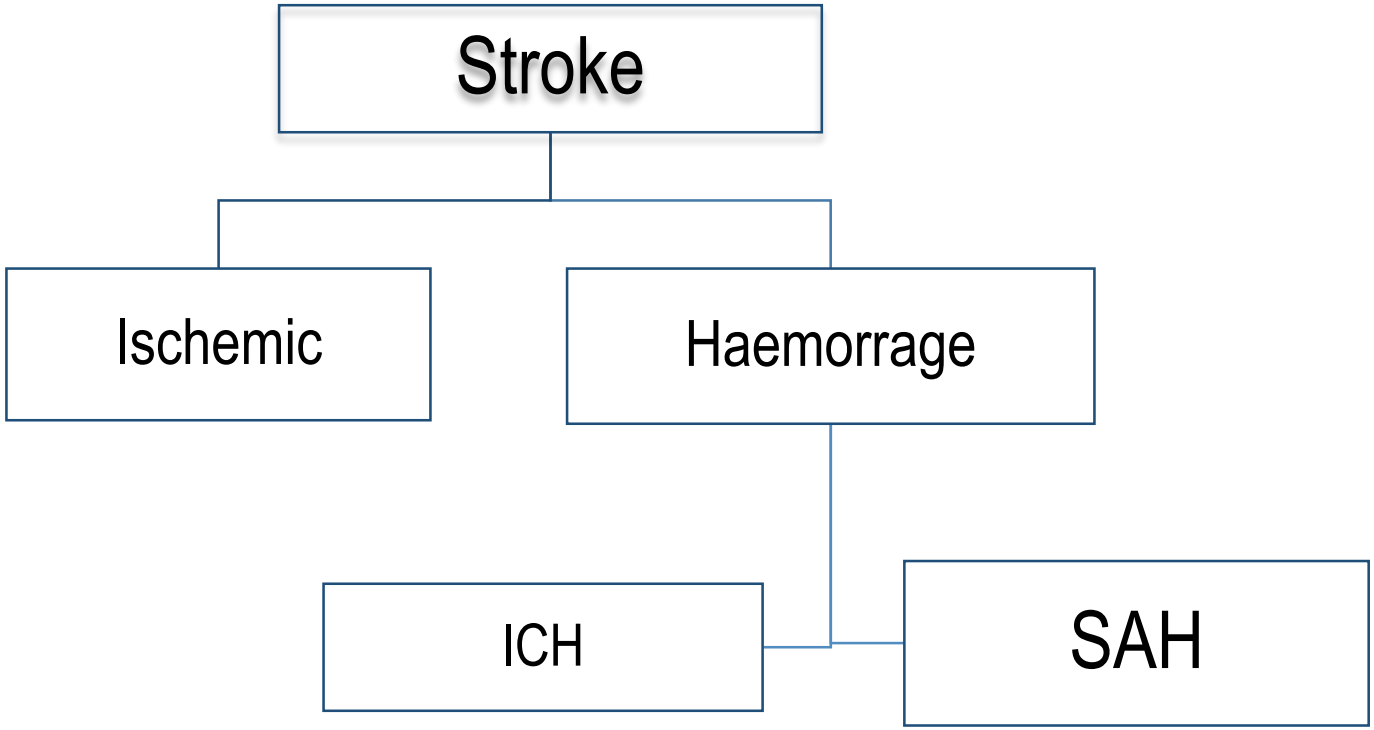
Subarachnoid Haemorrage

Dr. Perfecto Oscar González Vargas

Neurólogo

INNN-HMP MP- MDS- SOMENE

Classification

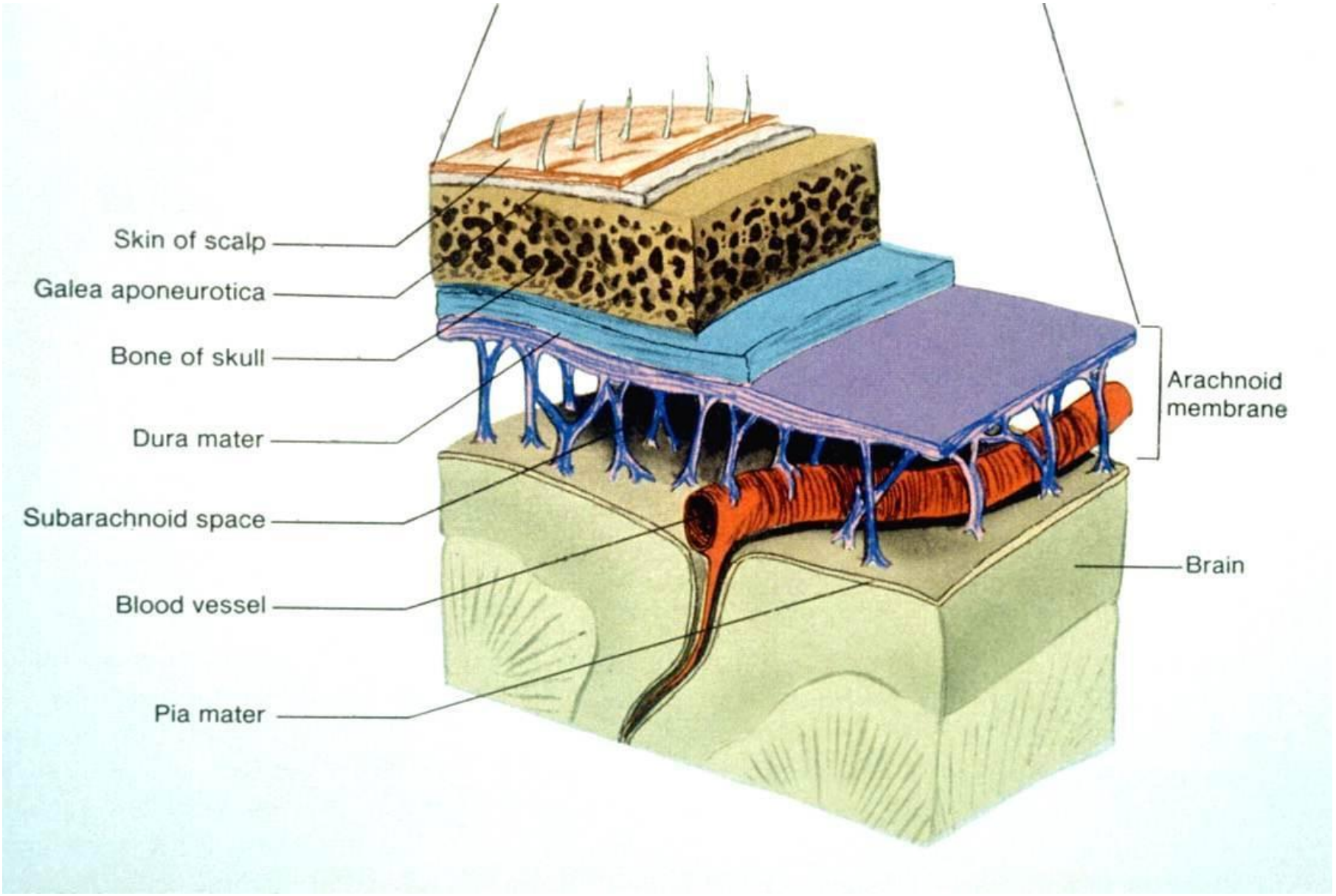


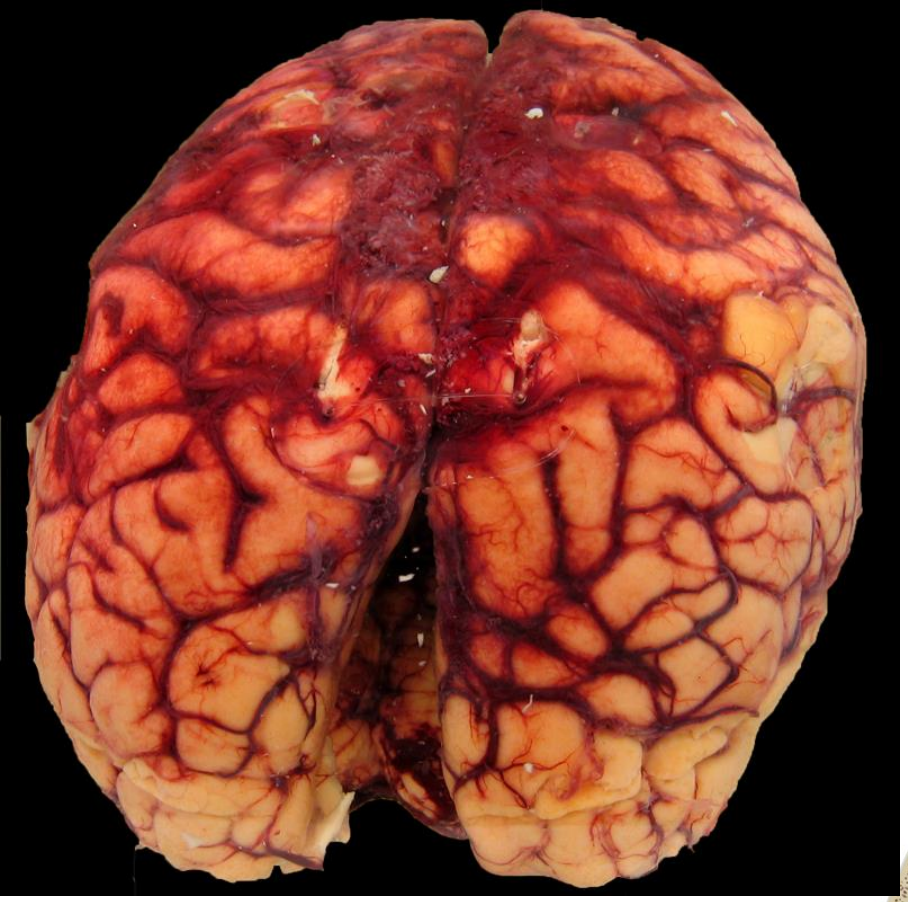
Epidemiology

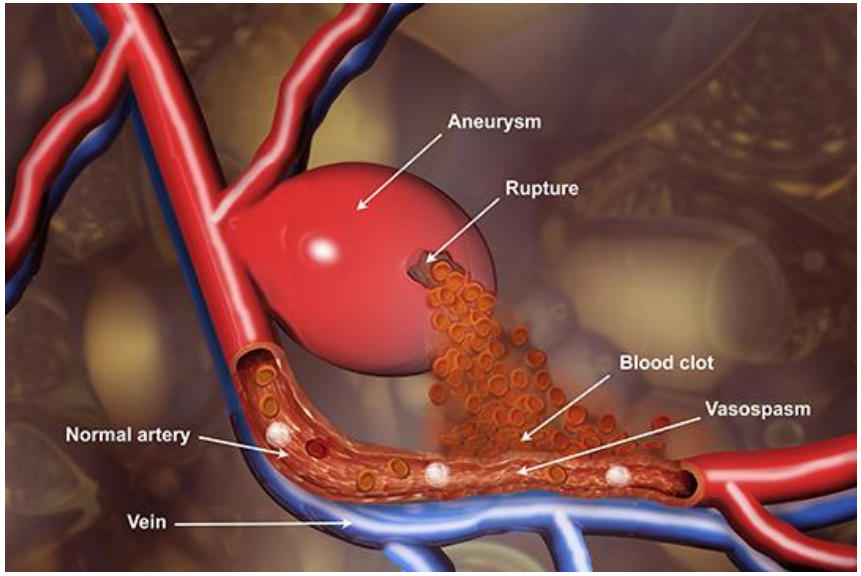
- Prevalence in the adult population: 1-5%
- 2-5 % of all new strokes
- **75-80 %** of cases related to ruptured intracranial aneurysms
- Estimated incidence:
  - more common in women than in men (2:1)
  - peak incidence is in people 55 to 60 years old
  - 1/ 10,000 people

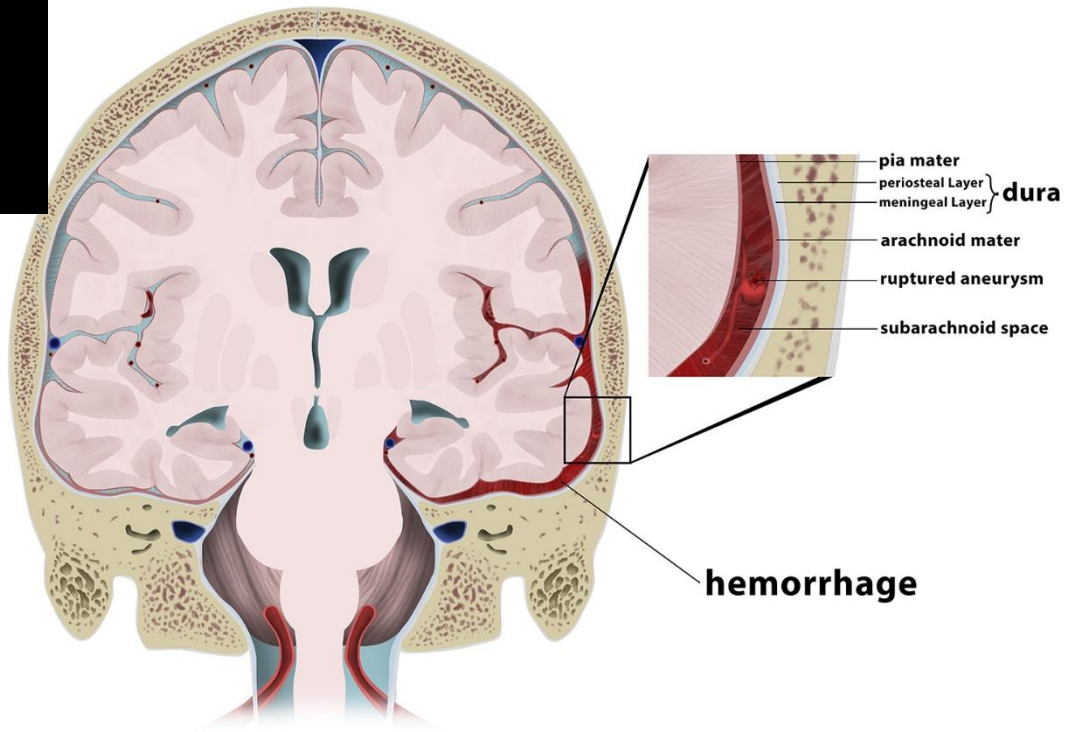
Epidemiology

- 51% fatality rate
- 25% deaths after the event.
- 10% occurring before the patient receives medical attention
- 20 % of cases and carries a good prognosis


Skin of scalp
Galea aponeurotica
Bone of skull
Dura mater
Subarachnoid space
Blood vessel
Pia mater
Arachnoid membrane
Brain




Aneurysm
Rupture
Blood clot
Vasospasm
Normal artery
Vein

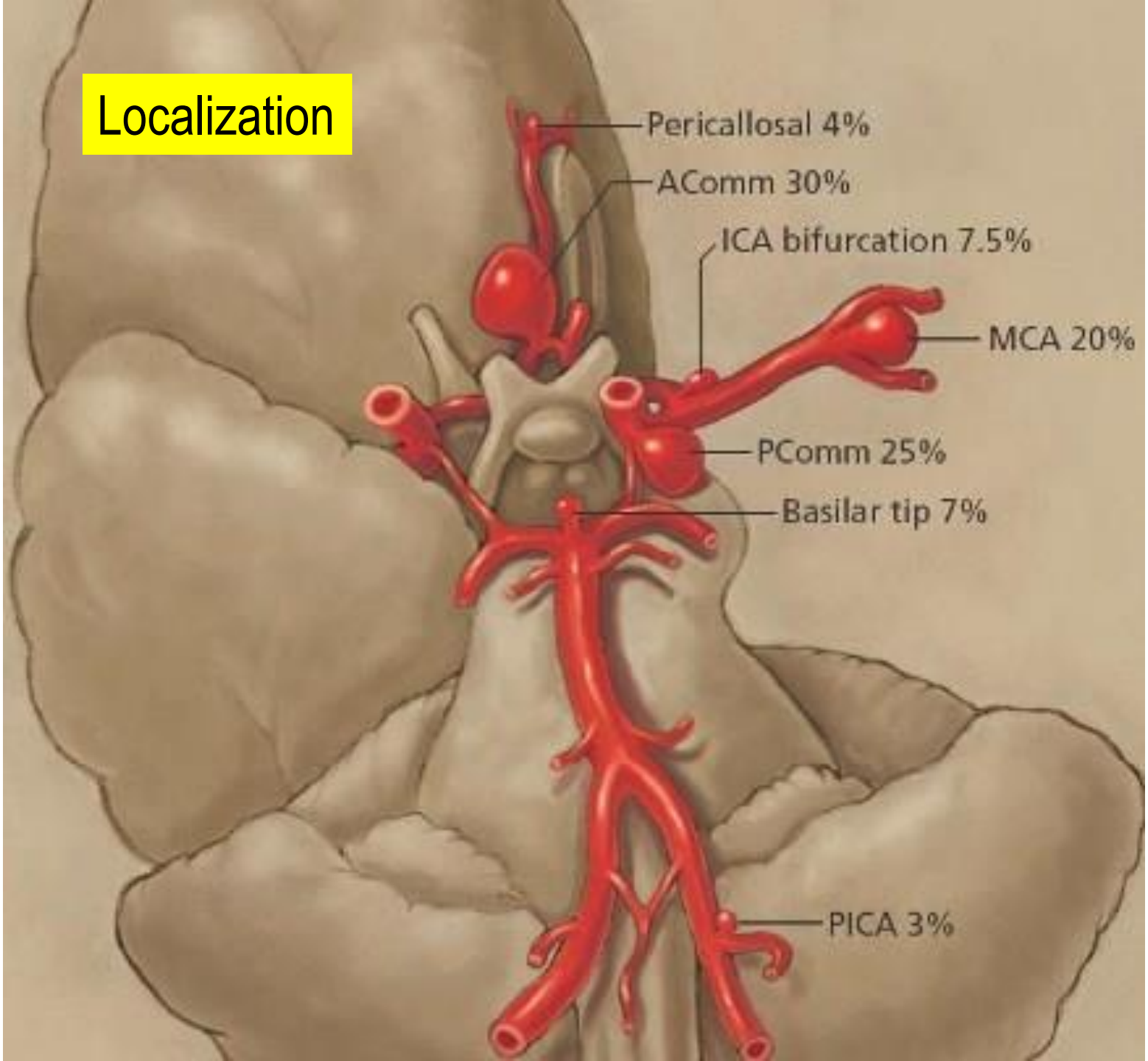

pia mater
periosteal Layer
meningeal Layer
dura
arachnoid mater
ruptured aneurysm
subarachnoid space
hemorrhage

Associated conditions

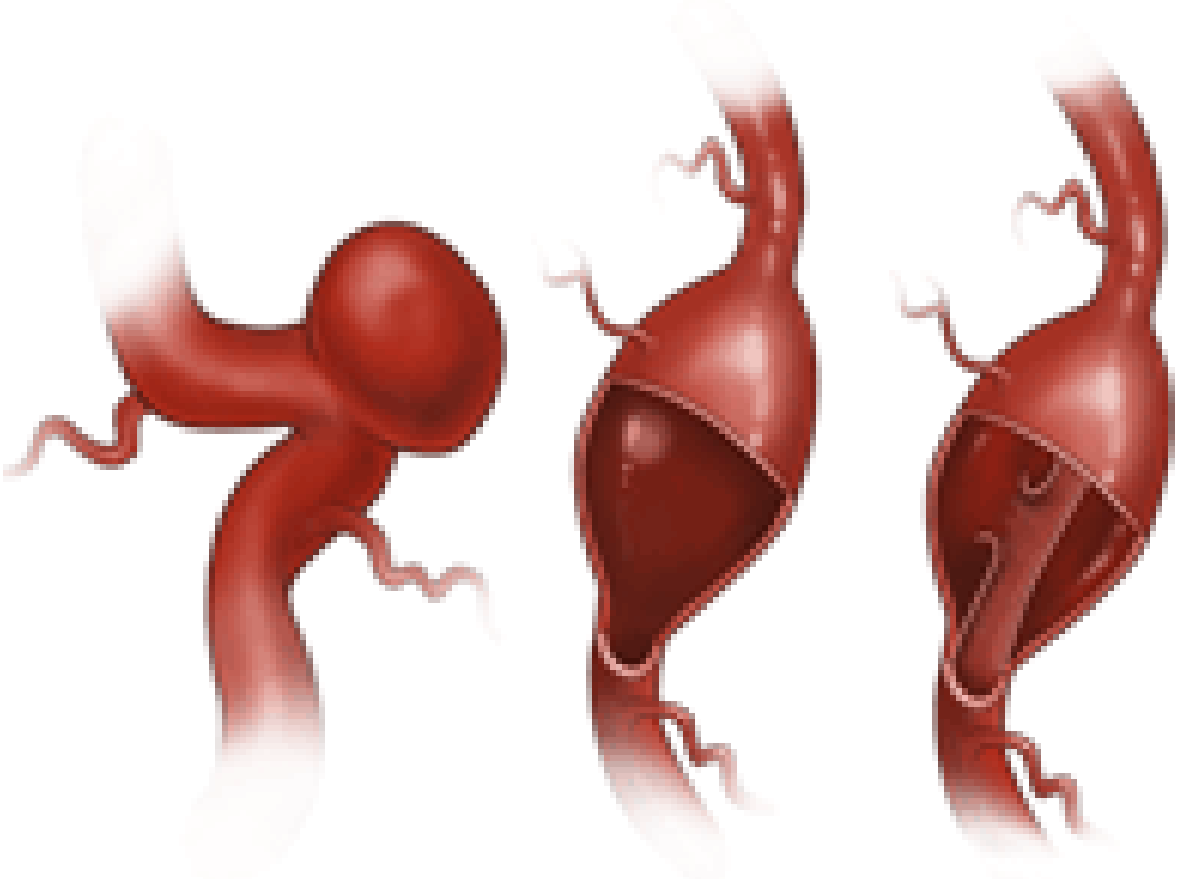
- Autosomal dominant polycystic kidney disease
- Fibromuscular dysplasia
- Marfan's syndrome
- Ehlers–Danlos syndrome type IV
- Arteriovenous malformations of the brain

Cause of intracranial aneurysms

- Little is known.
- Hypertension and smoking-induced vascular changes are thought to have a major role.


Localization
Pericallosal 4%
AComm 30%
ICA bifurcation 7.5%
MCA 20%
PComm 25%
Basilar tip 7%
PICA 3%

Types of Aneurysms



Saccular Fusiform Dissecting

Clinical Presentation and Diagnosis

- **Acute onset** of severe headache, often described by patients as the “worst headache of my life”
- Many others present in a coma or with severe neurologic compromise
- Nucal rigidity
- Focal neurologic deficit….poor.

Hunt-Hess Scale

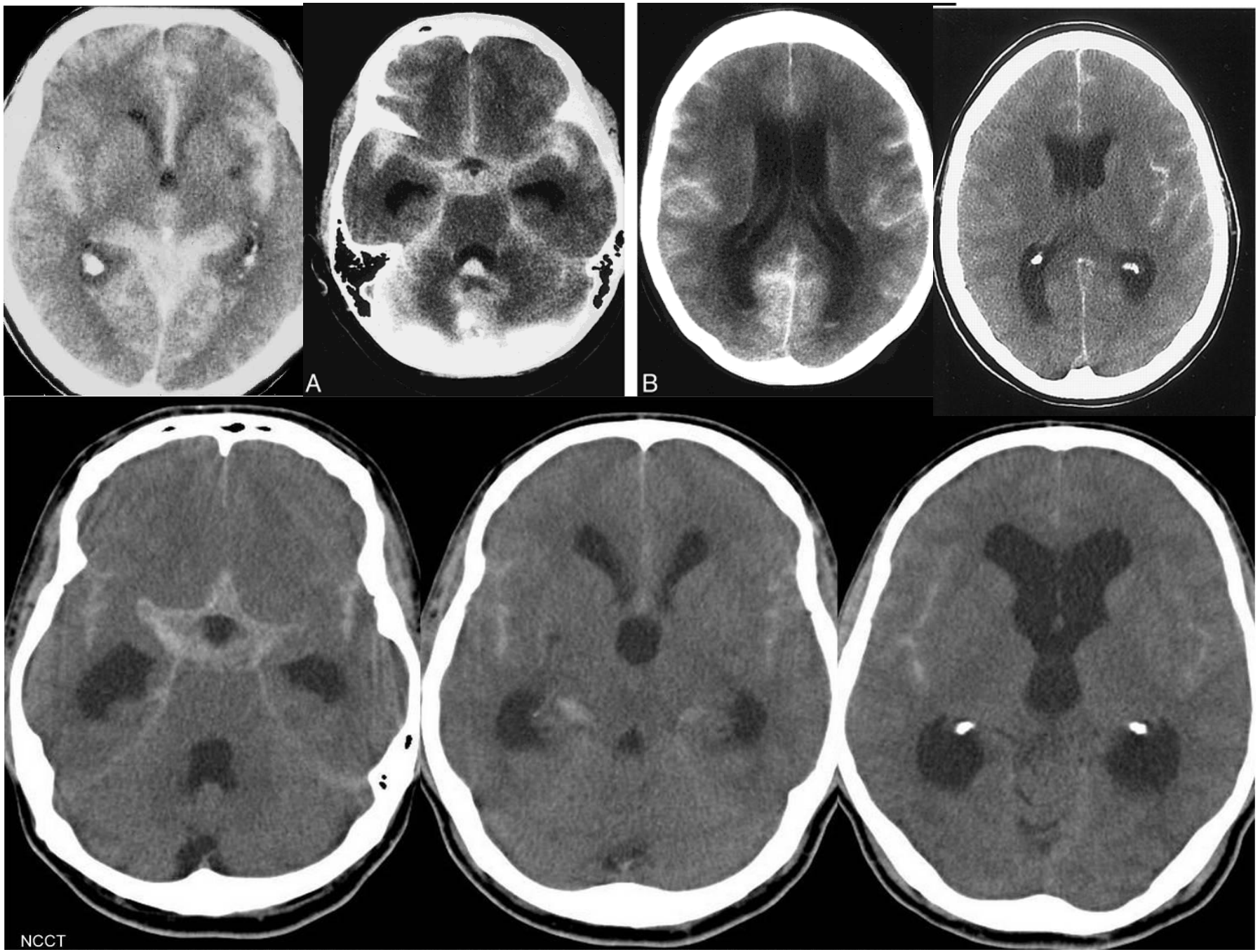
Table 3. Hunt And Hess Classification Of Subarachnoid Hemorrhage.

- **Grade 1:** Asymptomatic, or minimal headache; slight nuchal rigidity.
- **Grade 2:** Moderate to severe headache, nuchal rigidity; no neurological deficit (apart from cranial nerve palsy).
- **Grade 3:** Drowsiness, confusion, or mild focal deficit.
- **Grade 4:** Stupor, moderate to severe hemiparesis; possible early decerebrate posturing.
- **Grade 5:** Deep coma, decerebrate posturing, moribund.

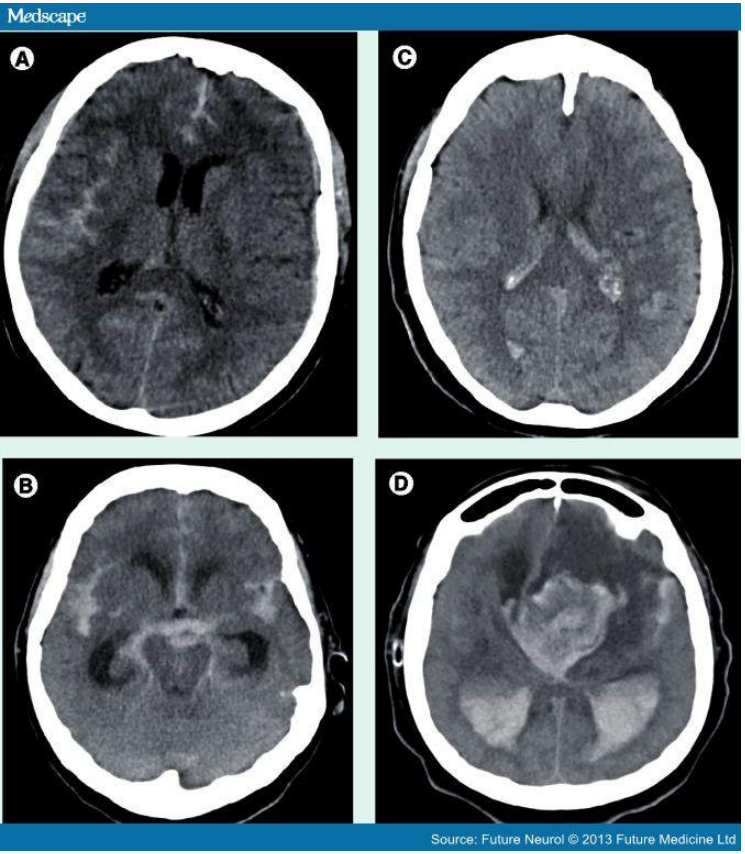
Adapted from: Hunt WE, Hess RM. Surgical risk as related to time of intervention in the repair of intracranial aneurysms. *J Neurosurg* 1968;28:14-20.

Diagnosis

- Clinical suspect
- Computed tomography (**CT**) of the head **without** contrast
- Lumbar puncture is reserved for the approximately 5 percent of patients in whom cranial CT reveals no abnormalities


A
B
NCCT

Fisher Scale. CT



Points	Description
0	Unruptured
1	No blood detected
2	Diffuse or vertical layers <1 mm thick
3	Clot and/or vertical layer >1 mm thick
4	Intracerebral or intraventricular clot

Clinical Presentation and Diagnosis

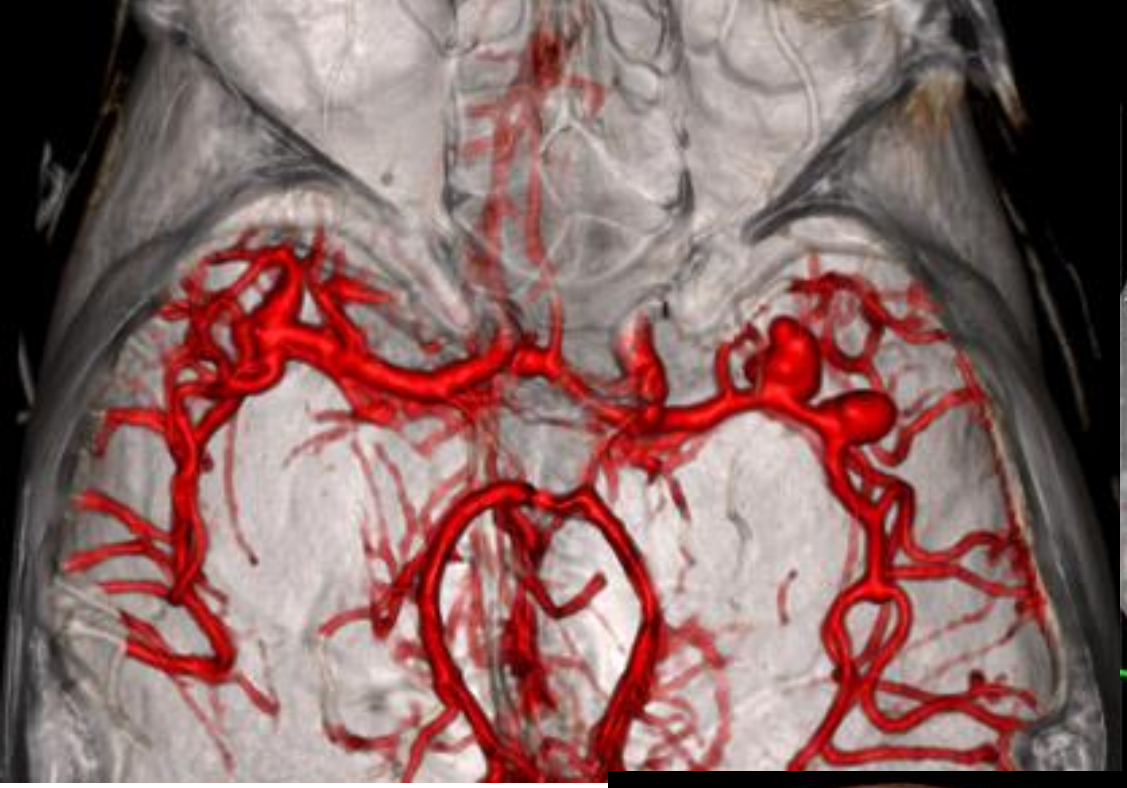
- The next step after making a definitive diagnosis of a spontaneous subarachnoid hemorrhage:

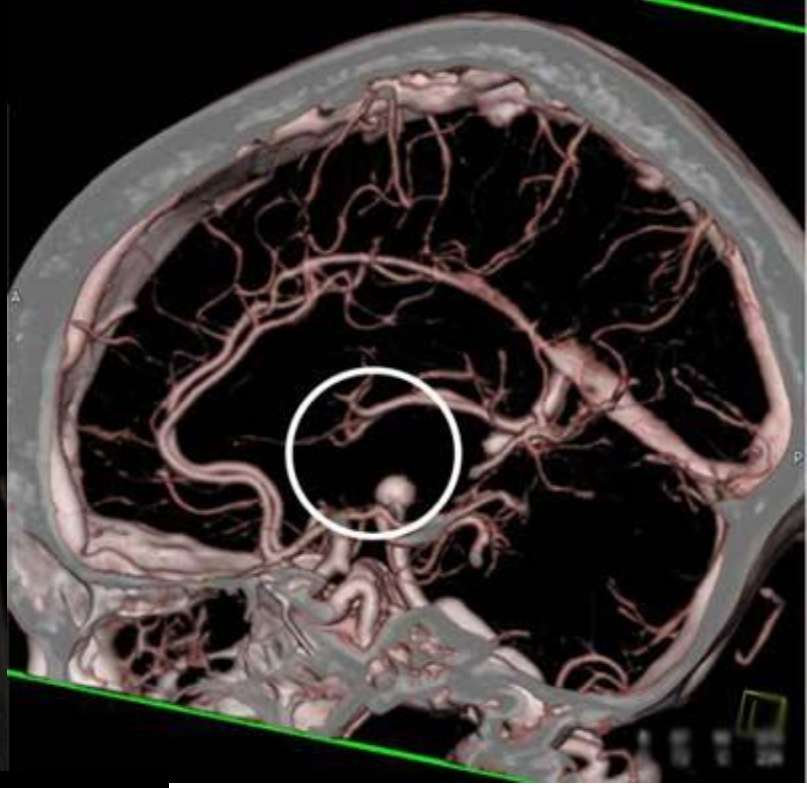
  ⇨**to determine whether an aneurysm is the cause**

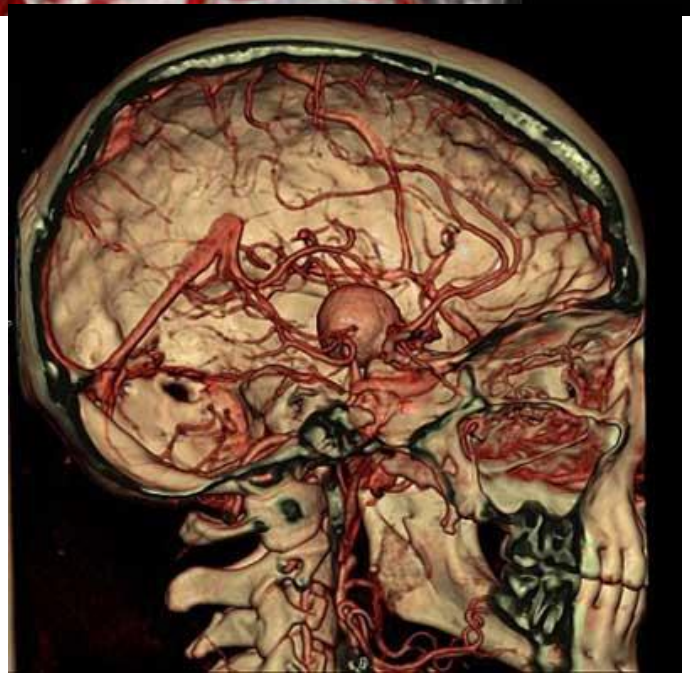
- To do so, it is important to select the **best** imaging method for a given patient.

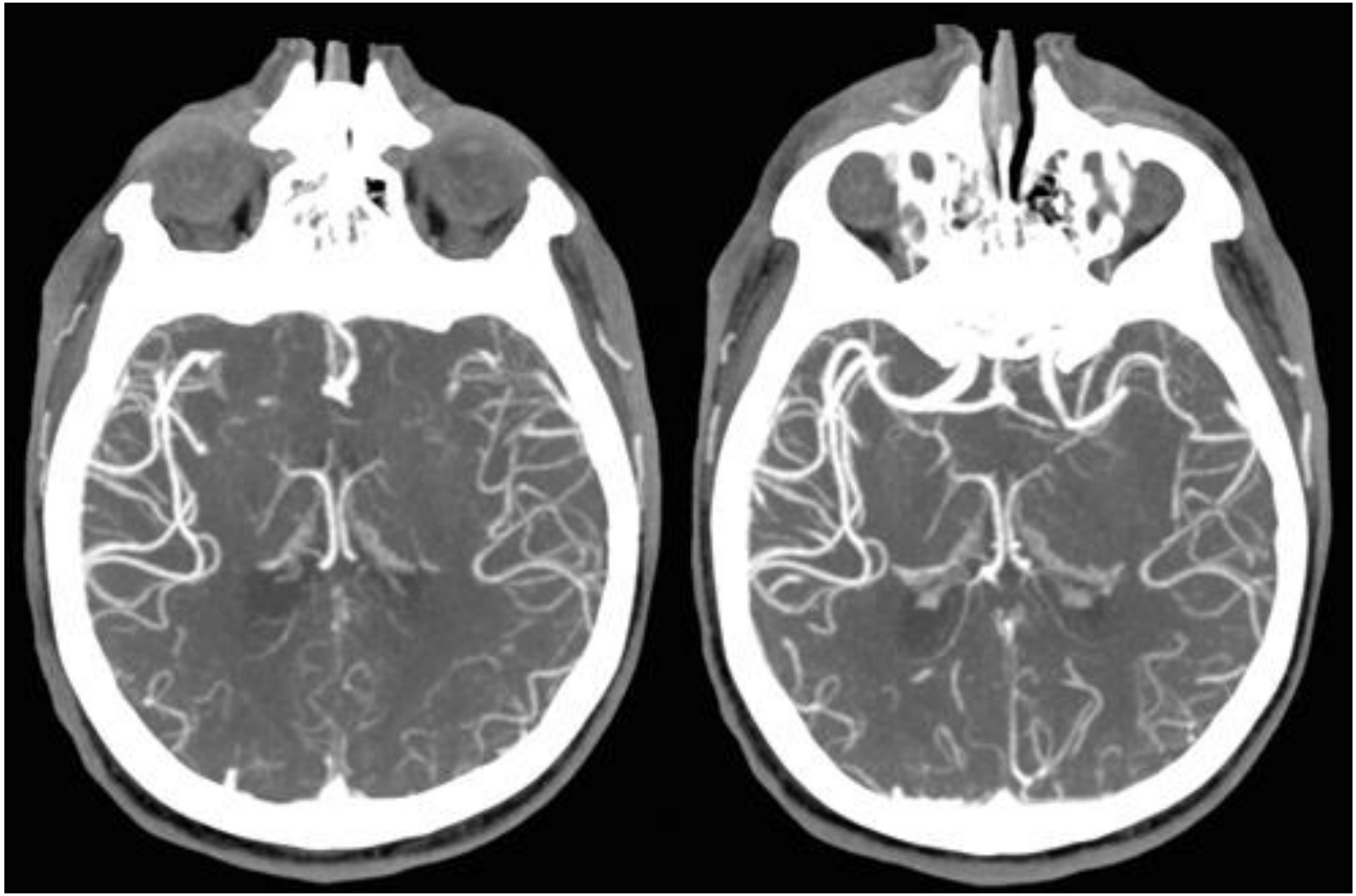
Imaging Methods and Options

- The three methods of choice to identify or rule out an intracranial aneurysm and to delineate the size and morphologic features of an intracranial aneurysm:
  - CT angiography (CTA) after a venous injection
  - magnetic resonance angiography (MRA)
  - angiography by direct intraarterial catheterization (catheter angiography)
- the last is still considered the benchmark

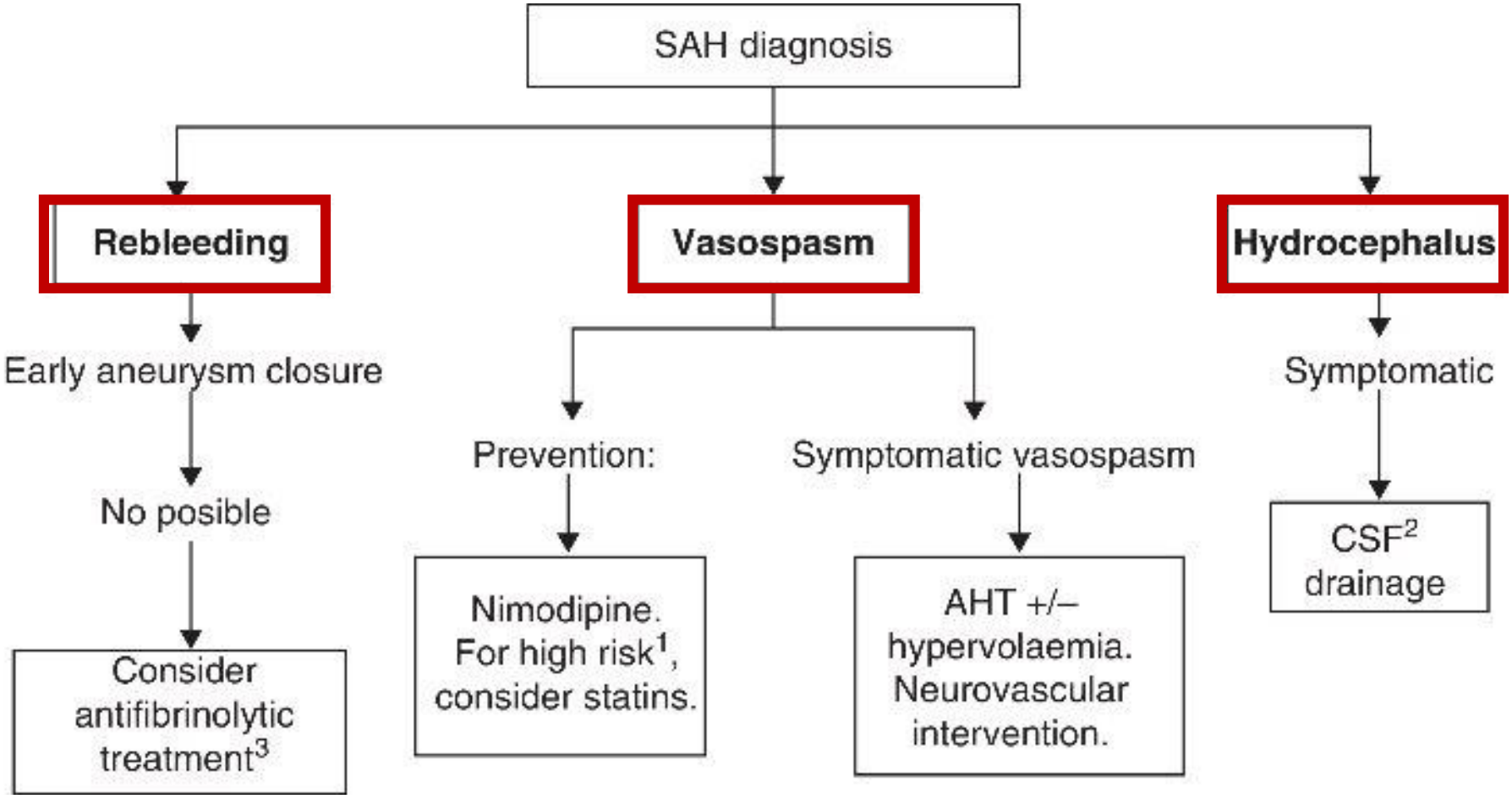




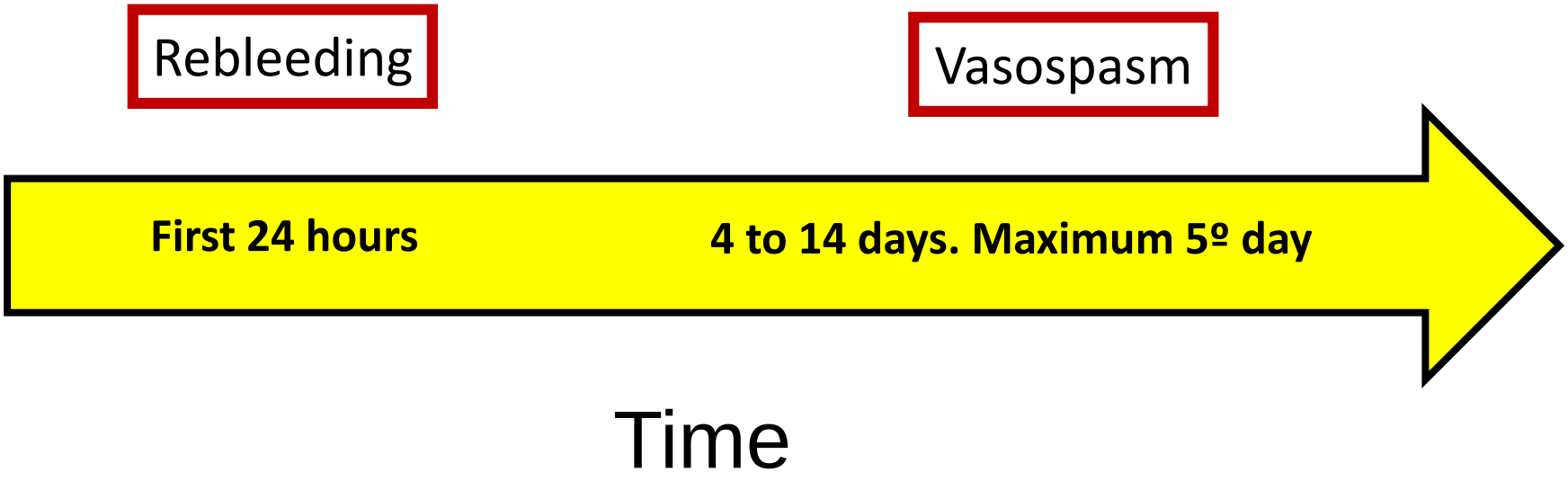


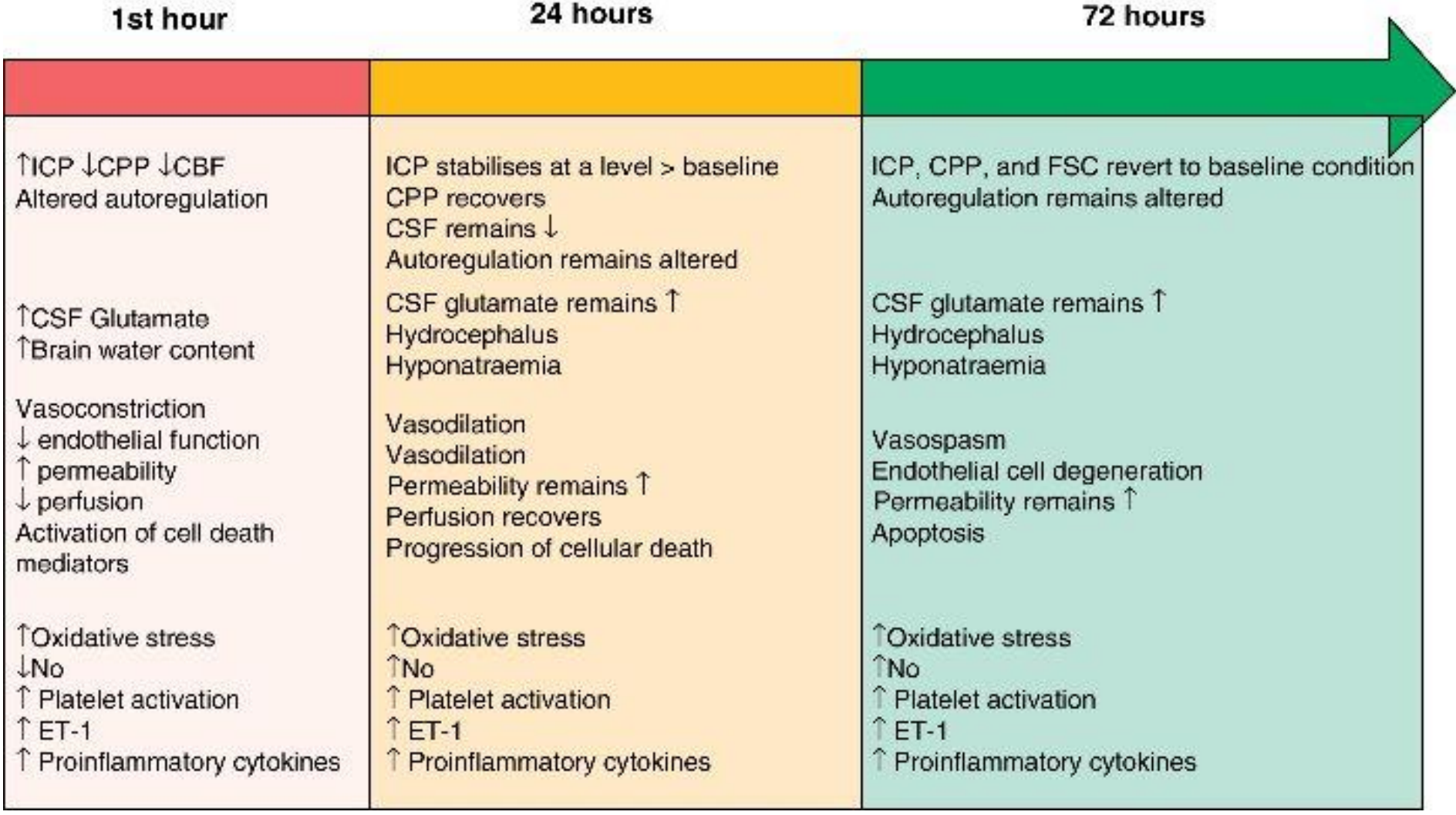


Acute Effects of Subarachnoid Hemorrhage



Acute Effects of Subarachnoid Hemorrhage




1st hour
24 hours
72 hours
↑ICP ↓CPP ↓CBF
Altered autoregulation
↑CSF Glutamate
↑Brain water content
Vasoconstriction
↓ endothelial function
↑ permeability
↓ perfusion
Activation of cell death mediators
↑Oxidative stress
↓No
↑ Platelet activation
↑ ET-1
↑ Proinflammatory cytokines
ICP stabilises at a level > baseline
CPP recovers
CSF remains ↓
Autoregulation remains altered
CSF glutamate remains ↑
Hydrocephalus
Hyponatraemia
Vasodilation
Vasodilation
Permeability remains ↑
Perfusion recovers
Progression of cellular death
↑Oxidative stress
↑No
↑ Platelet activation
↑ ET-1
↑ Proinflammatory cytokines
ICP, CPP, and FSC revert to baseline condition
Autoregulation remains altered
CSF glutamate remains ↑
Hydrocephalus
Hyponatraemia
Vasospasm
Endothelial cell degeneration
Permeability remains ↑
Apoptosis
↑Oxidative stress
↑No
↑ Platelet activation
↑ ET-1
↑ Proinflammatory cytokines

Acute Effects of Subarachnoid Hemorrhage

- Hydrocephalus develops in about 15 to 20 percent of patients who have an aneurysmal subarachnoid hemorrhage.
  - Symptomatic hydrocephalus is usually treated with ventriculostomy and drainage of cerebrospinal fluid.
- Cerebral vasospasm, a major cause of morbidity and mortality, refers to the intracranial vasoconstriction that may occur between 3 and 12 days after a subarachnoid hemorrhage.
  - The cause of vasospasm is unknown; even with maximal therapy, vasospasm can cause strokes and death.
    - Transcranial Doppler ultrasonography is a useful noninvasive method to detect vasospasm.

Medical Therapy

Medical Therapy for Vasospasm

- orally administered **nimodipine** (60 mg every four hours for 21 days)
  - ⇨has been shown to improve the outcome after subarachnoid hemorrhage
- clear increase in the transcranial Doppler velocities or in whom new neurologic deficits develop
  - triple-H (hypertension, hypervolemia, and hemodilution) therapy.
  - Is not current

Medical Therapy

"Triple H" Therapy for Aneurysmal Subarachnoid Haemorrhage: Real Therapy or Chasing Numbers?

J. A. MYBURGH
Department of Intensive Care Medicine, The St George Hospital, Sydney, NEW SOUTH WALES

There is little or no evidence to justify the aggressive use of anti-vasospastic therapies as a preventative manner with exception of oral nimodipine in patients with low-grade aneurysmal subarachnoid haemorrhage. Concomitant use of induced hypertension/hypervolaemia/haemodilution cannot be recommended on current evidence, but if employed should be done on an individualised basis, considering the patients underlying neurological condition, cardiopulmonary reserve, adequacy of systemic and neurological monitoring and access to expert neuroradiological, neurosurgical and neurocritical care services. (**Critical Care and Resuscitation 2005; 7: 206-212**)

Stroke
JOURNAL OF THE AMERICAN HEART ASSOCIATION

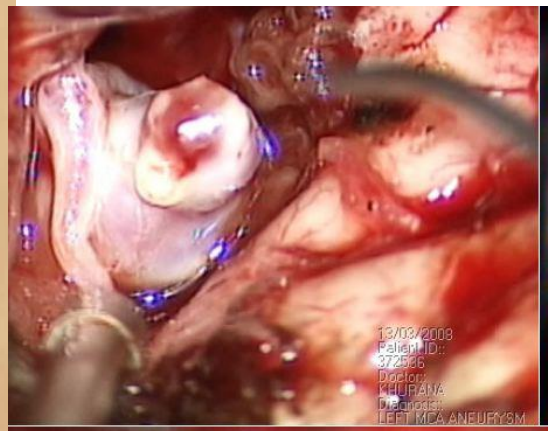
Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

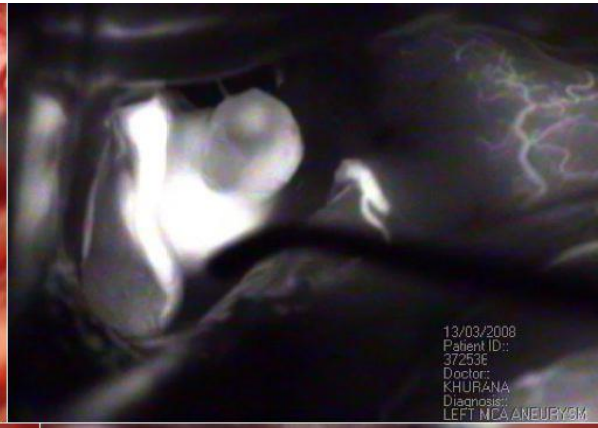
E. Sander Connolly, Jr, Alejandro A. Rabinstein, J. Ricardo Carhuapoma, Colin P. Derdeyn, Jacques Dion, Randall T. Higashida, Brian L. Hoh, Catherine J. Kirkness, Andrew M. Naidech, Christopher S. Ogilvy, Aman B. Patel, B. Gregory Thompson and Paul Vespa
on behalf of the American Heart Association Stroke Council, Council on Cardiovascular Radiology and Intervention, Council on Cardiovascular Nursing, Council on Cardiovascular Surgery and Anesthesia, and Council on Clinical Cardiology

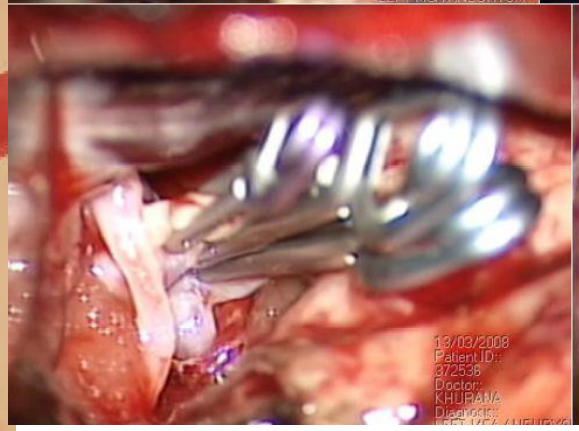
(*Stroke*. 2012;43:00-00.)

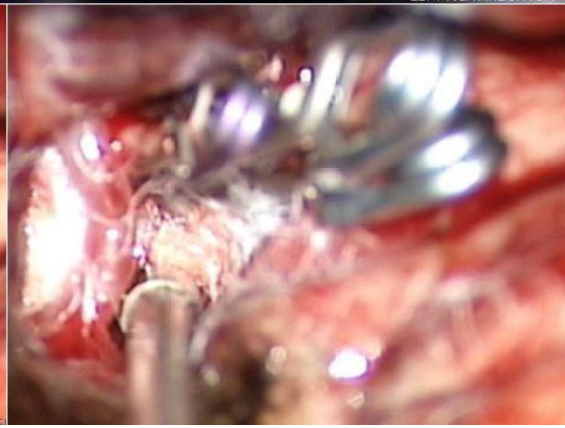
Treatment options

- There are four options for treating intracranial aneurysms:
  1. **Observation**
  2. **Craniotomy with clip ligation (clipping)**
  3. **Endovascular occlusion with the use of detachable coils (coiling)**
  4. **Radio neurosurgery (gamma knife)**


13/03/2008
Patient ID::
372536
Doctor::
KHURANA
Diagnosis::
LEFT MCA ANEURYSM

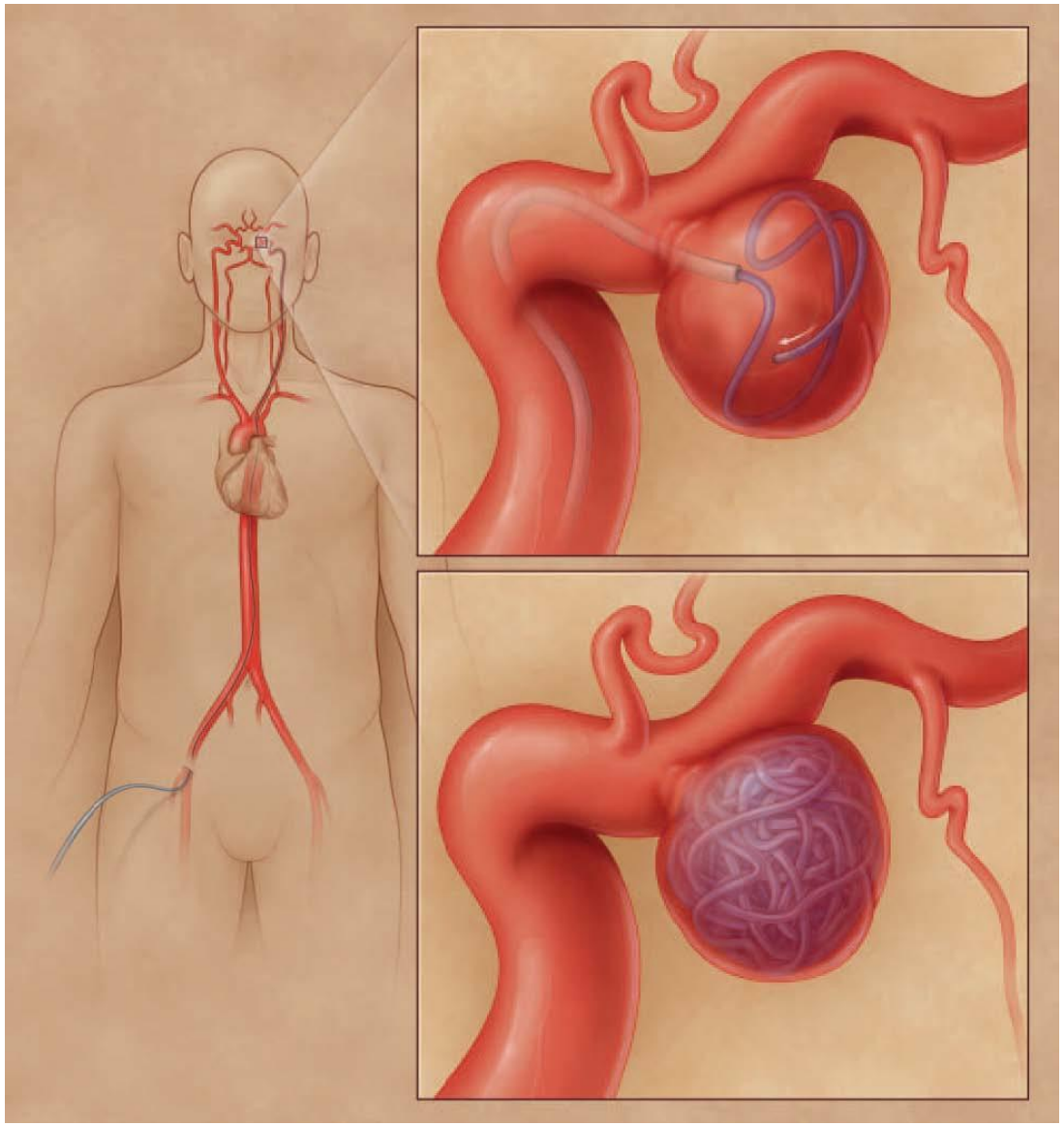

13/03/2008
Patient ID::
37253E
Doctor::
KHURANA
Diagnosis::
LEFT MCA ANEURYSM


13/03/2008
Patient ID::
372536
Doctor::
KHURANA
Diagnosis::

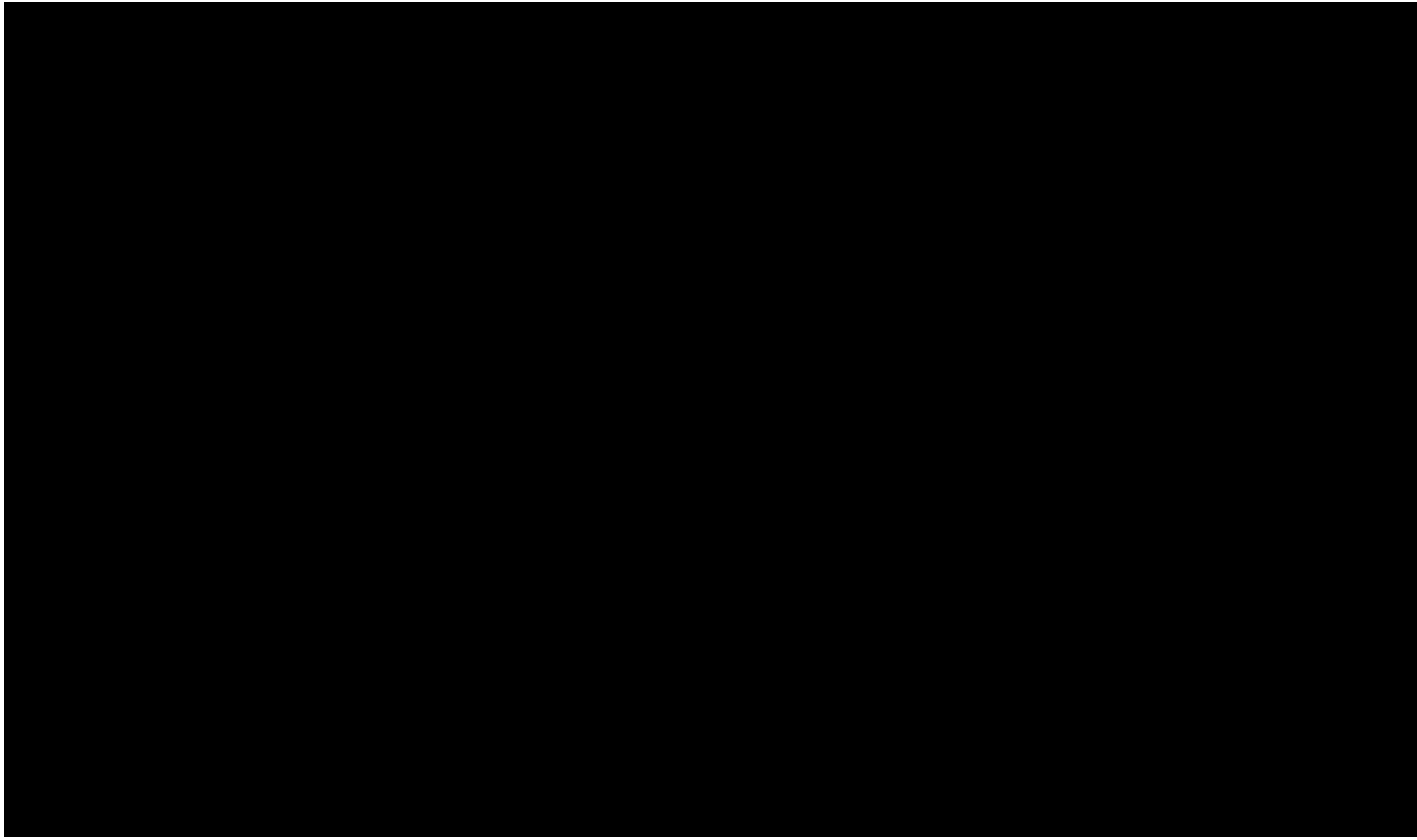


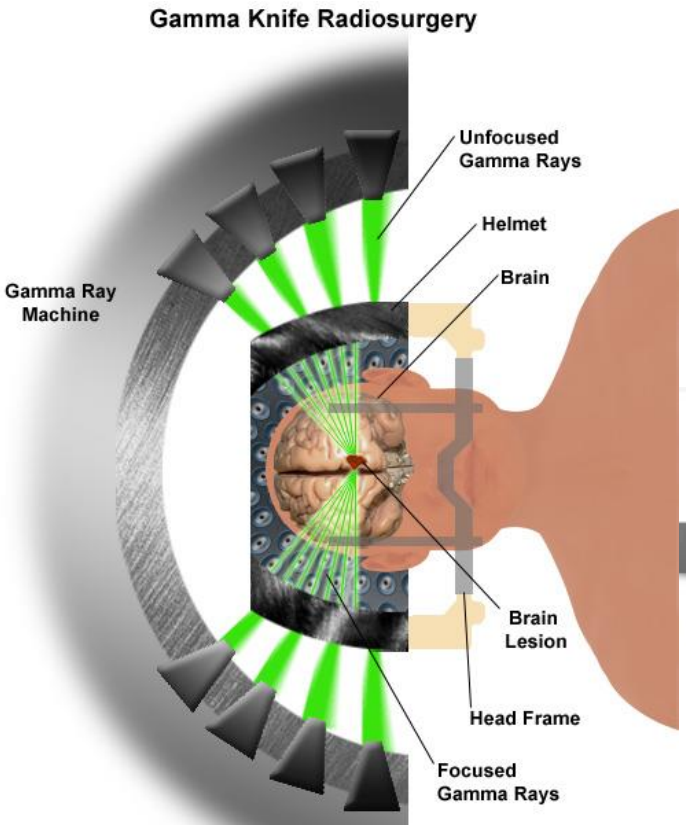
Clipping of Middle Cerebral Artery Aneurysm

Peyman Pakzaban, M.D.
Houston MicroNeurosurgery




C





70 AÑOS 1943 - 2013 SALUD SECRETARÍA DE SALUD

Instituto Nacional de Neurología y Neurocirugía
Manuel Velasco Suárez

INICIO > ATENCIÓN A PACIENTES > RADIONEUROCIRUGÍA

Imprimir Recomienda a un amigo

UNIDAD DE RADIONEUROCIRUGÍA

Desde diciembre del 2002 el Instituto Nacional de Neurología y Neurocirugía se convirtió en la primera institución en México en albergar el acelerador lineal Novalis(R). Equipo totalmente dedicado para el tratamiento de tumores del sistema nervioso central.

Radioneurocirugía

La radiocirugía es una modalidad de tratamiento cuyo objetivo es la destrucción de una o más lesiones intracraneales depositando una alta dosis de radiación ionizante, utilizando para ello, dispositivos de localización de alta precisión.

La radiocirugía tuvo su origen en la década

Risk Factors for and Prevention of aSAH: Recommendations

- 1. Treatment of high blood pressure with antihypertensive medication is recommended to prevent ischemic stroke, intracerebral hemorrhage, and cardiac, renal, and other end-organ injury
- 2. Hypertension should be treated, and such treatment may reduce the risk of aSAH
- 3. Tobacco use and alcohol misuse should be avoided to reduce the risk of aSAH

Conclusions

- aSAH is a serious medical condition in which outcome can be dramatically impacted by early, aggressive, expert care.
- Very **pitfall** in diagnosis
- General physicians need to know about the diagnosis
- Cerebral **aneurism** is a principal aetiology
- Need to be sent to 3rd level. INNN

How I wish
How I wish you were
here