Management of the Endovascular Patient and Acute Emergencies in the Angio Suite

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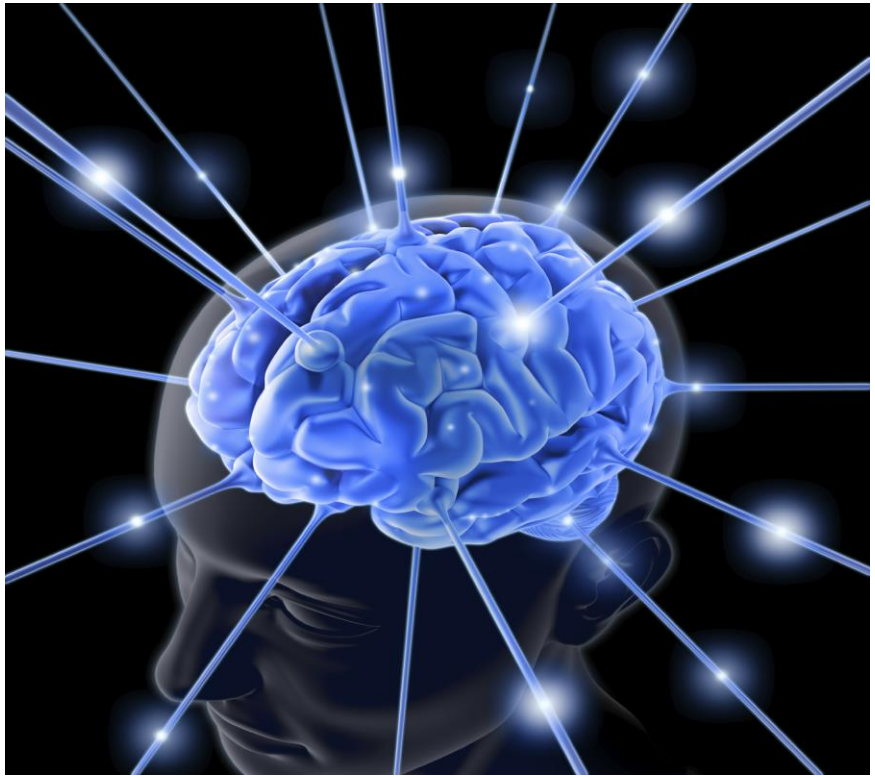
No Disclosures

The human brain is estimated to have about a hundred billion nerve cells, two million miles of axons, and a million billion synapses, making it the most complex structure, natural or artificial, on earth. – Tim Green, Stephan F. Heinemann and Jim F. Gusella (from a paper in *Neuron,* vol. 420, p. 427, 1998)



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Peri-Procedural Complications

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Getting to know one another…. Pre-procedural considerations

Medical, surgical, and social history

-Medication or contrast allergies

-Anxiety, coping capabilities

-Elective vs. emergent procedure

-Sedation/anesthesia considerations

- Sedation/anesthesia considerations
  - Primary goals of sedation in the interventional suite.

1. Provide to the patient the level of sedation that provides them comfort but that permits prompt neurological assessment when needed.
2. Render the patient physiologically stable and immobile.
3. Manipulate systemic blood pressure optimally as dictating by needs of procedure.
4. Provide emergent management in catastrophic complications.

(*Management of Therapeutic Interventional Procedures, 2010)*

-Comorbidities

-Cardiac : rhythm, rate, blood pressure

-Kidney function: elevated serum creatinine (1.5 mg/dl or greater) or estimated glomerular filtration rate (60mL/1.73m2)

Acetylcysteine (Mucomyst) – is a thiol compound with antioxidant and vasodilatory properties. Since agent is potentially beneficial, well tolerated, and relatively inexpensive is often administered to high risk patients. The American College of Cardiology/American Heart Association do not recommend as it is an unproven therapy.

If there are no contraindications to volume expansion, isotonic intravenous fluids prior to and continued for several hours after contrast administration is recommended (Grade 1B).

-Comorbidities

  -Skin: breakdown, positioning

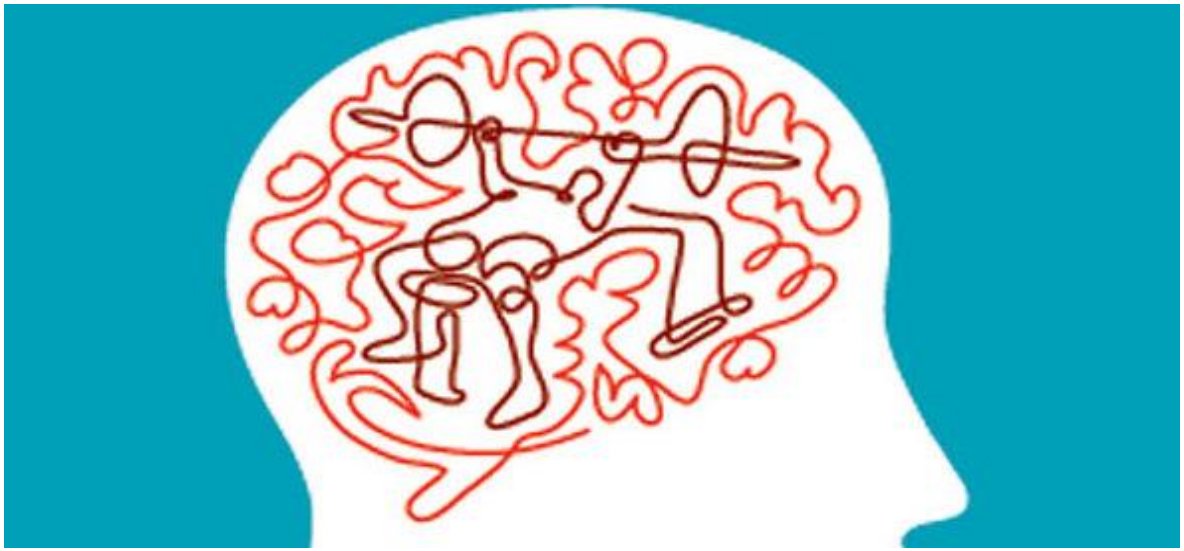
  -Chronic pain: positioning, sedation

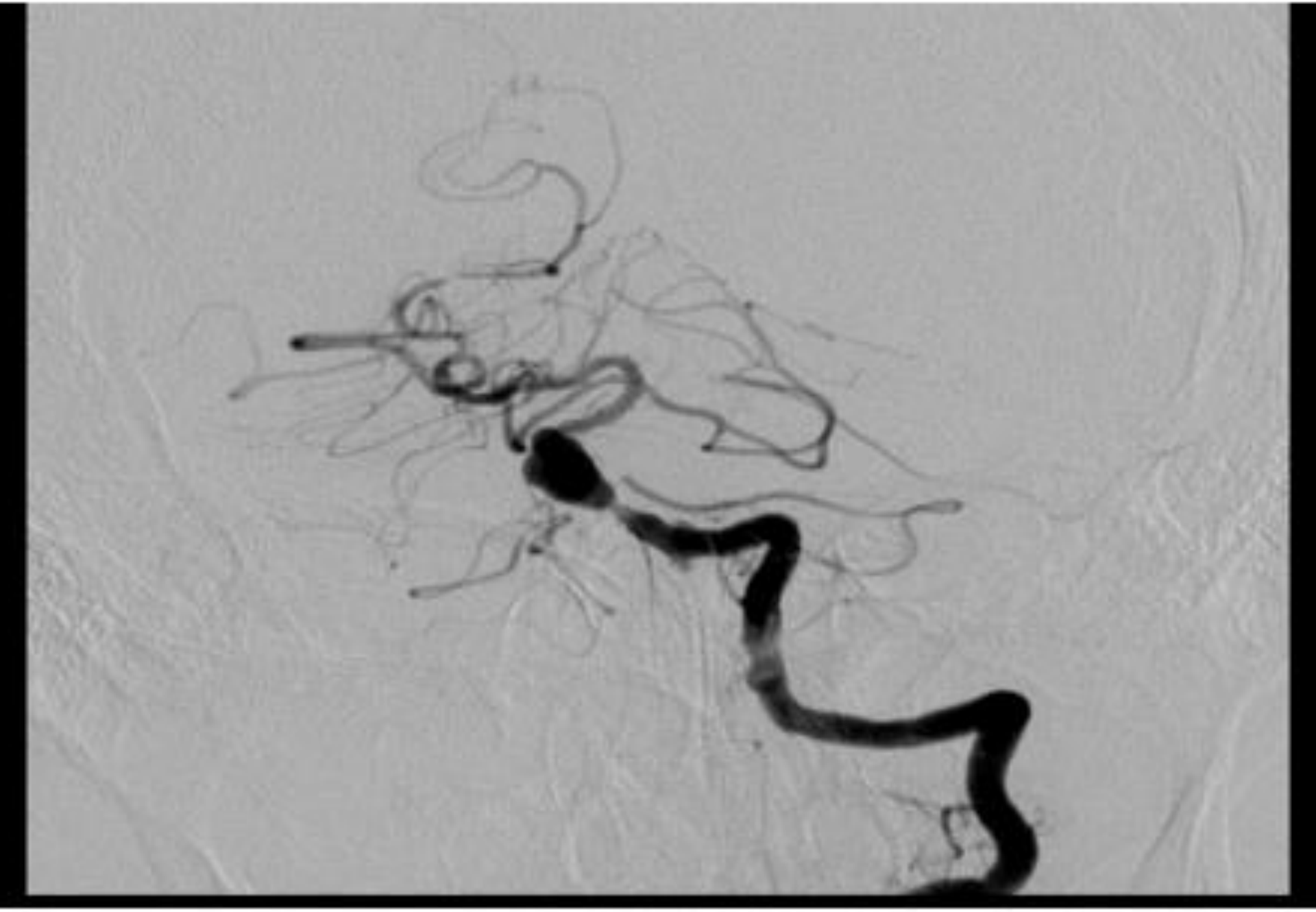
  -Vascular: pedal pulses pre and post

-Informed consent

“The brain is a monstrous, beautiful mess.” -William F. Allman,

Apprentices of Wonder: Inside the Neural Network Revolution





Intra- procedure complications

D.D. , 70 year old Caucasian male

PMH: CAD, CVA (with residual aphasia and right sided weakness), seizure disorder, DM, HTN, HLD, dementia

PSH: CABG (on Aspirin and Coumadin)

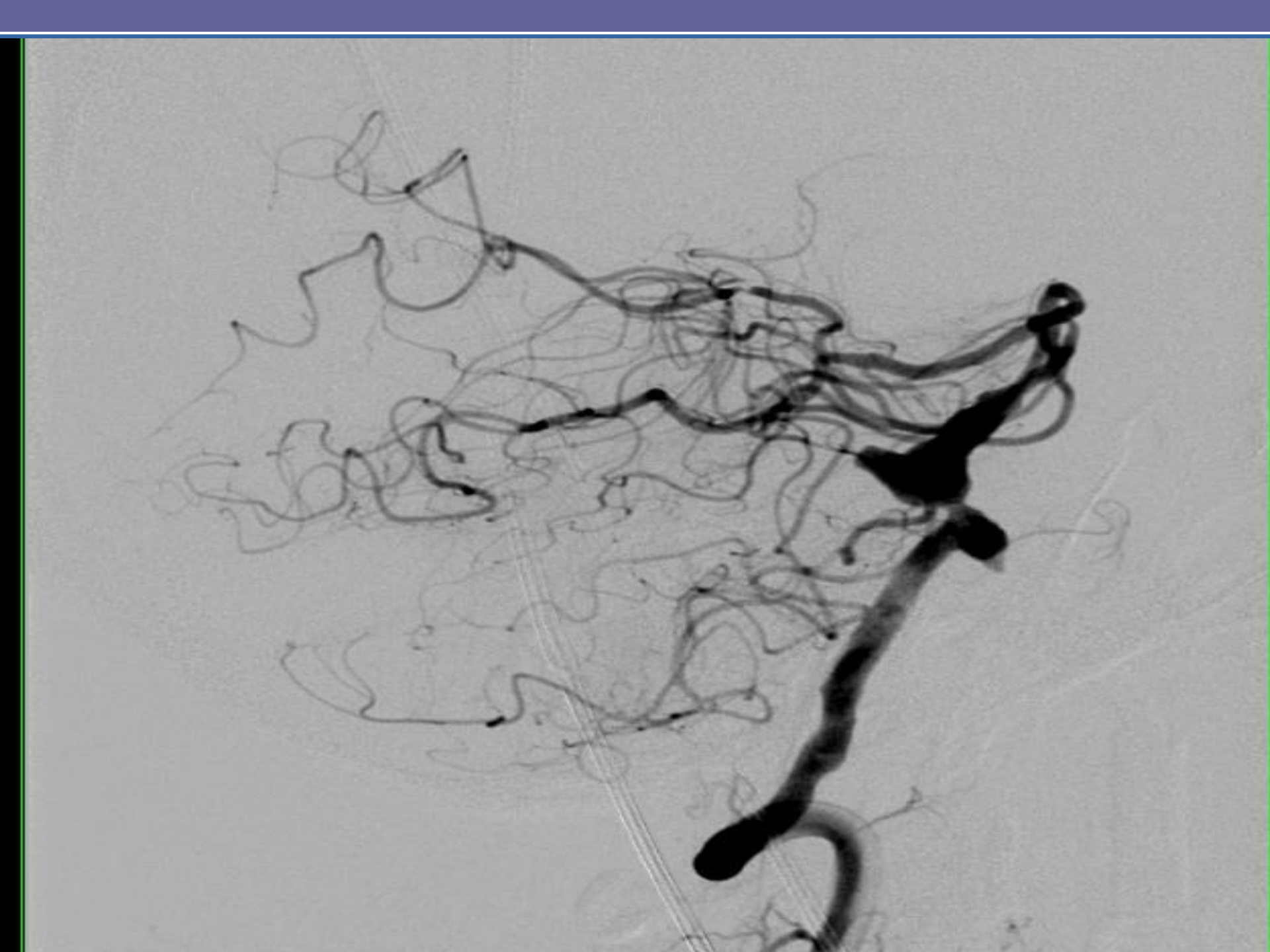
Allergy: Simvastatin

CT head demonstrated extensive SAH with moderate hydrocephalus.

CTA brain demonstrated an irregular, wide neck 5mm aneurysm arising from the right lateral wall of the proximal basilar artery.

Exam: Drowsy, orientated x 2, follows commands, 4/5 motor on right, 5/5 motor on left. Hunt Hess 1

Cerebral angiogram confirmed CTA finding with a severe focal stenosis of the V4 vertebral artery just proximal to the aneurysm.



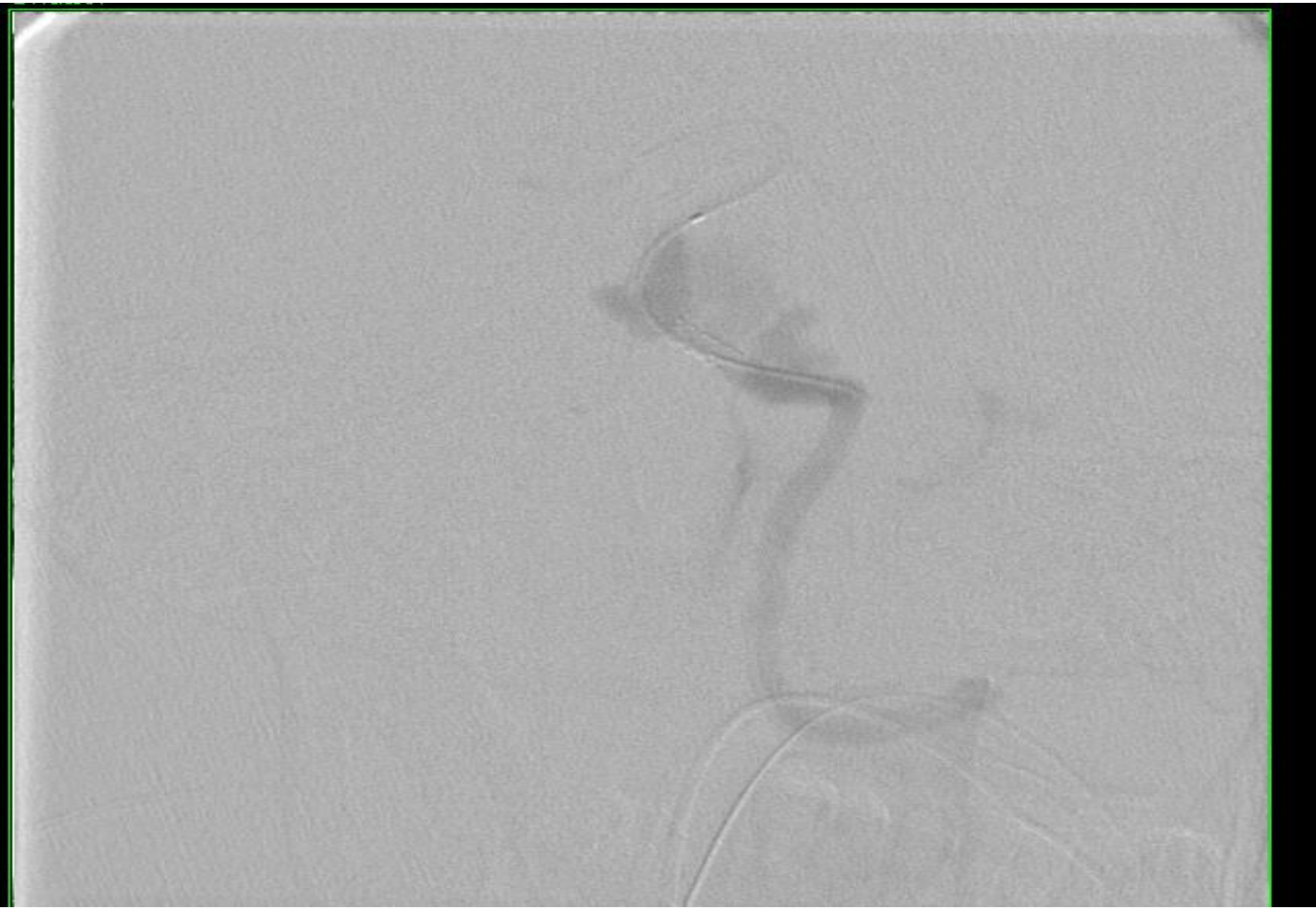
Anticipate potential problems

Kept patient intubated, EVD was placed

Plavix 300mg per ng and Aspirin 300mg suppository

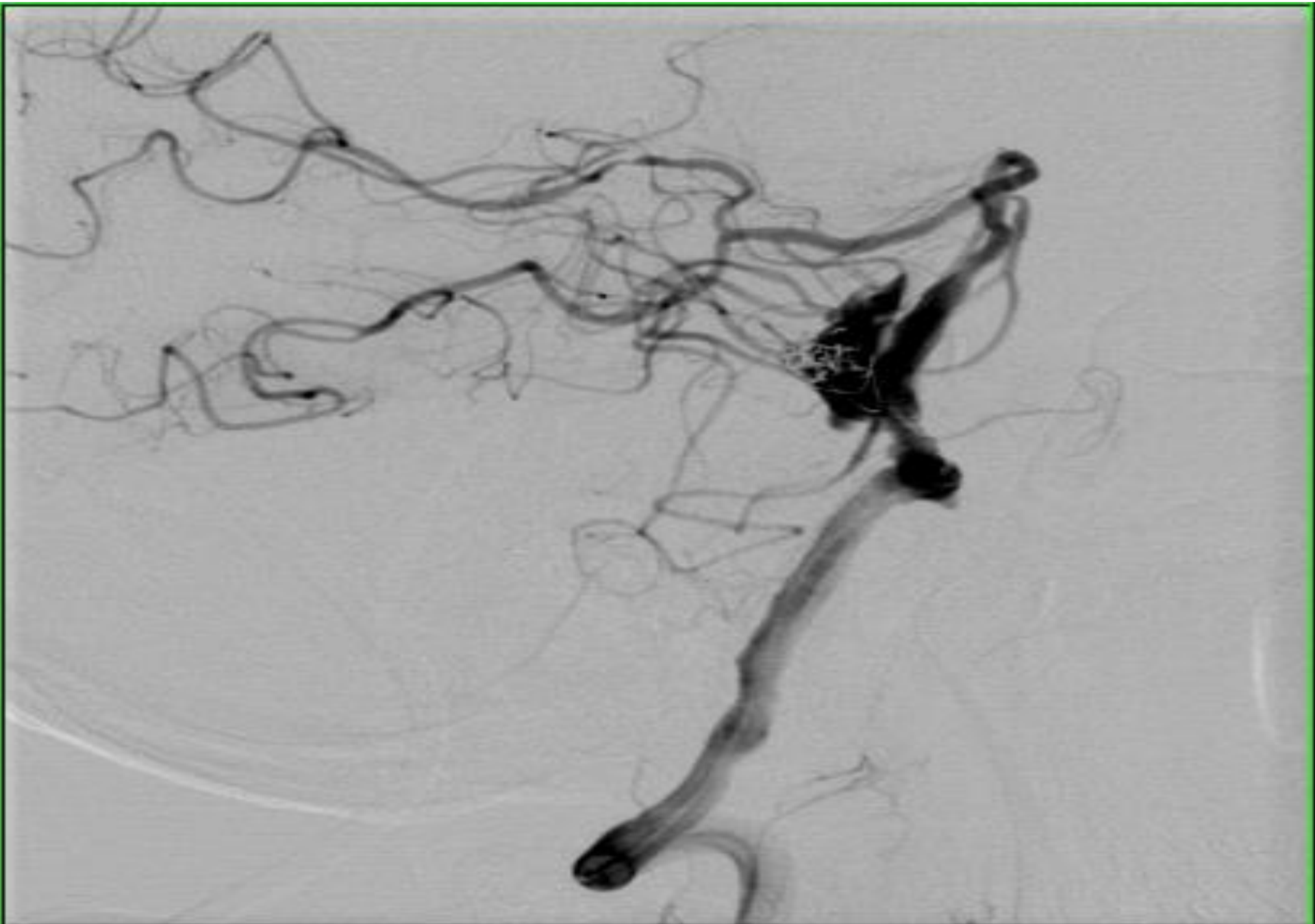
Informed consent with family

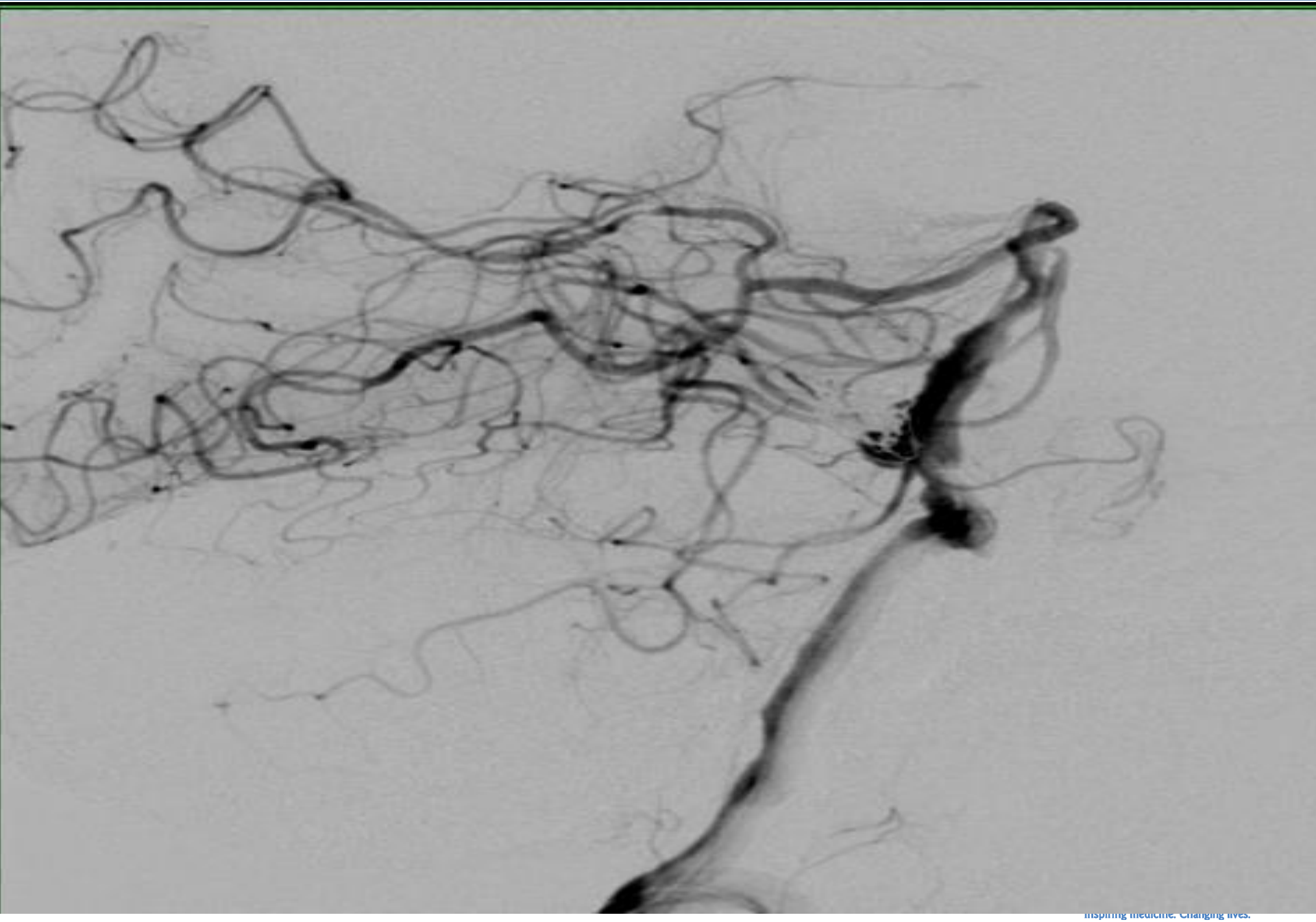
In order to access and treat aneurysm, the proximal stenosis was treated with placement of 3mm x 8mm balloon mounted stent



Intra-procedure rupture

- Reversal of heparin (Protamine 1mg for every 100 unit of Heparin)
- Coils/embolization glue
- EVD open, EVD placement
- Mannitol (Osmitrol)- osmatic diuretic, not compatible with most other medications, use IV filter, can cause renal failure if dehydration status persists, know dosage
- Hypertonic saline, osmotic agent





Intra-procedure rupture

Aneurysm was treated immediately with stent assisted coil embolization.

CT head post procedure demonstrated increased subarachnoid hemorrhage.

Post procedure, patient not responsive, withdrawing all extremities

EVD clotted a few hours post procedure

Withdrew care and patient expired 3 days later

R.A., 44 year old Caucasian male

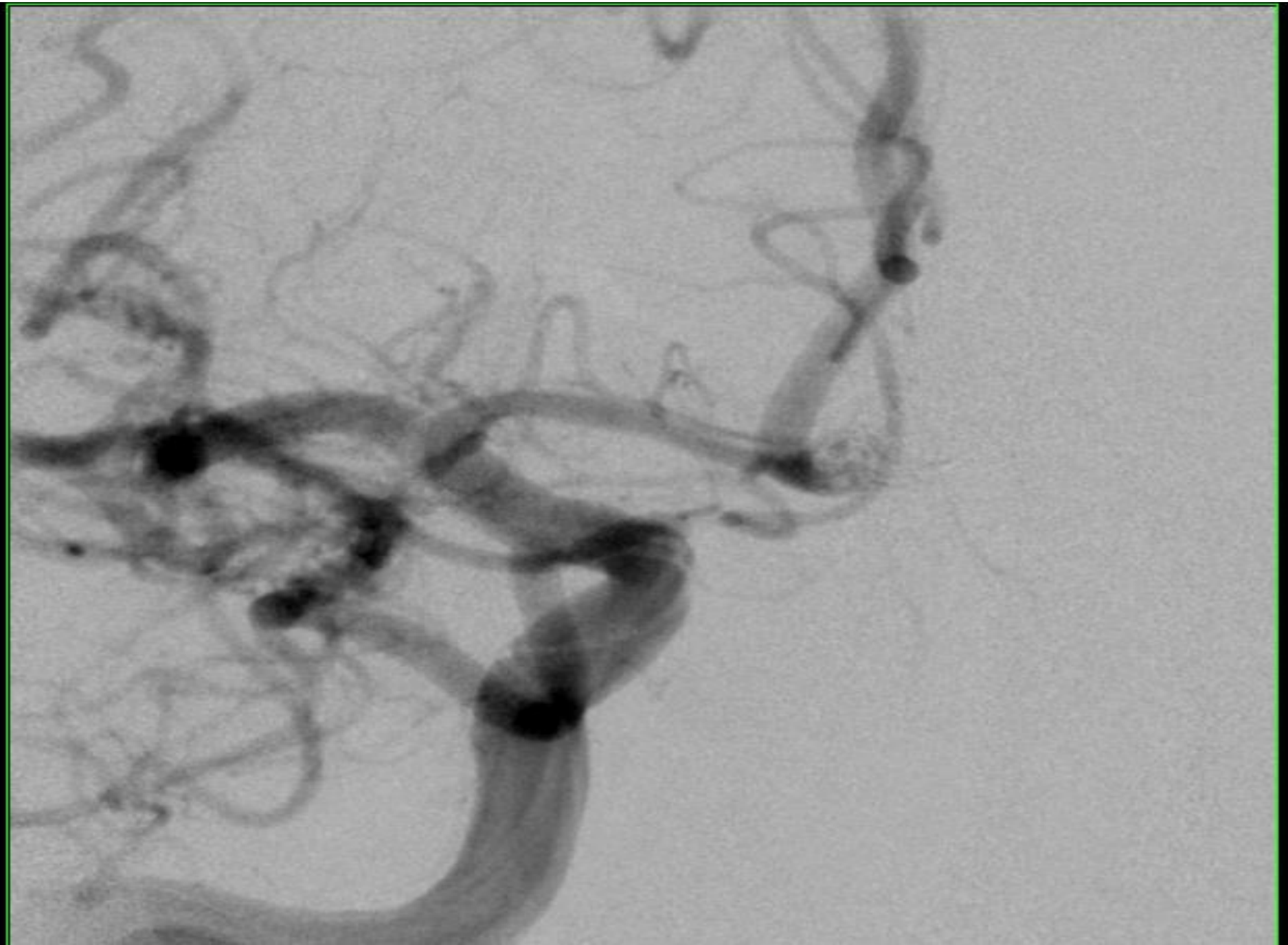
No medical or surgical history

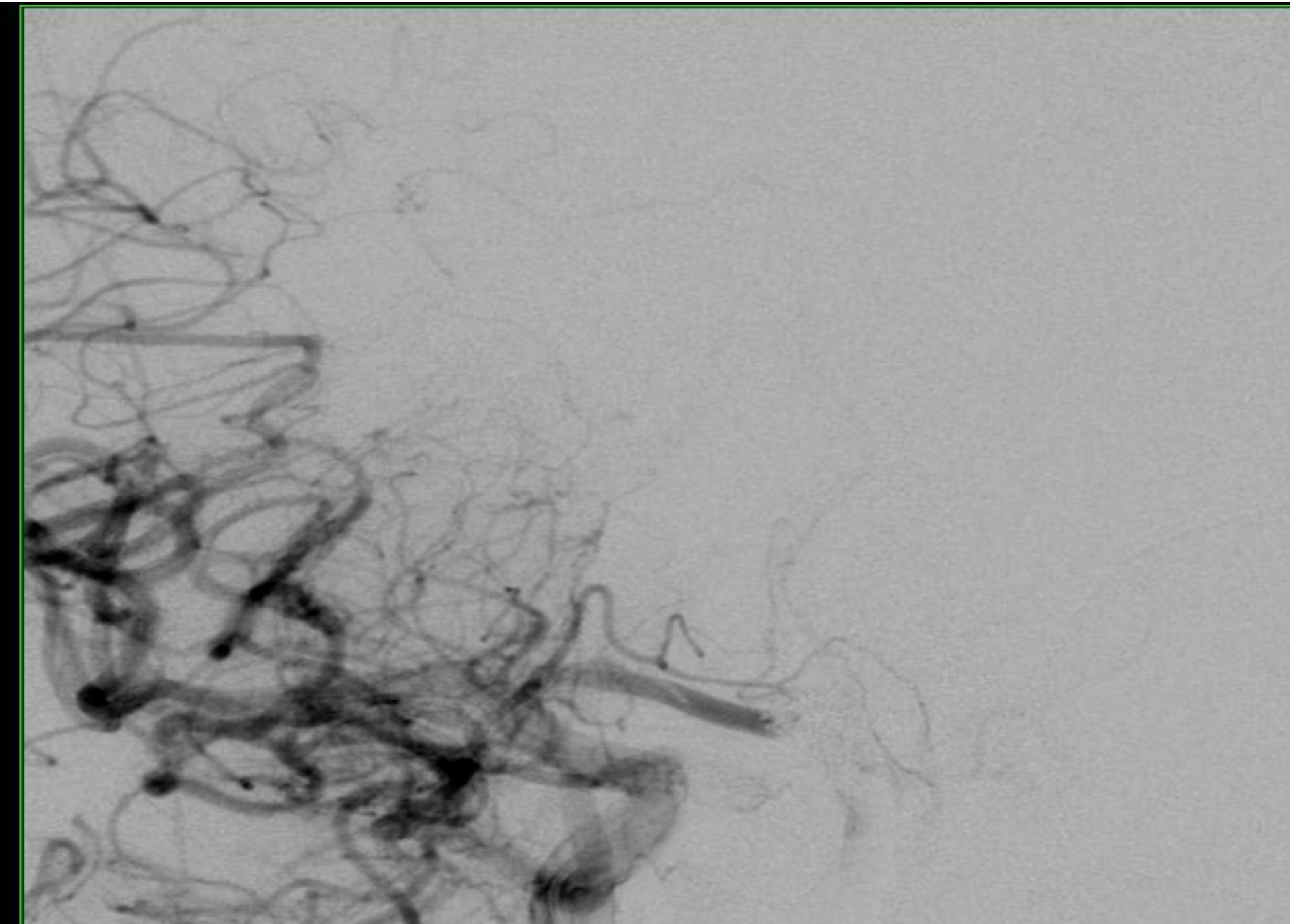
Presented with severe headache and photophobia

CT head demonstrated subarachnoid hemorrhage

Hunt Hess 1

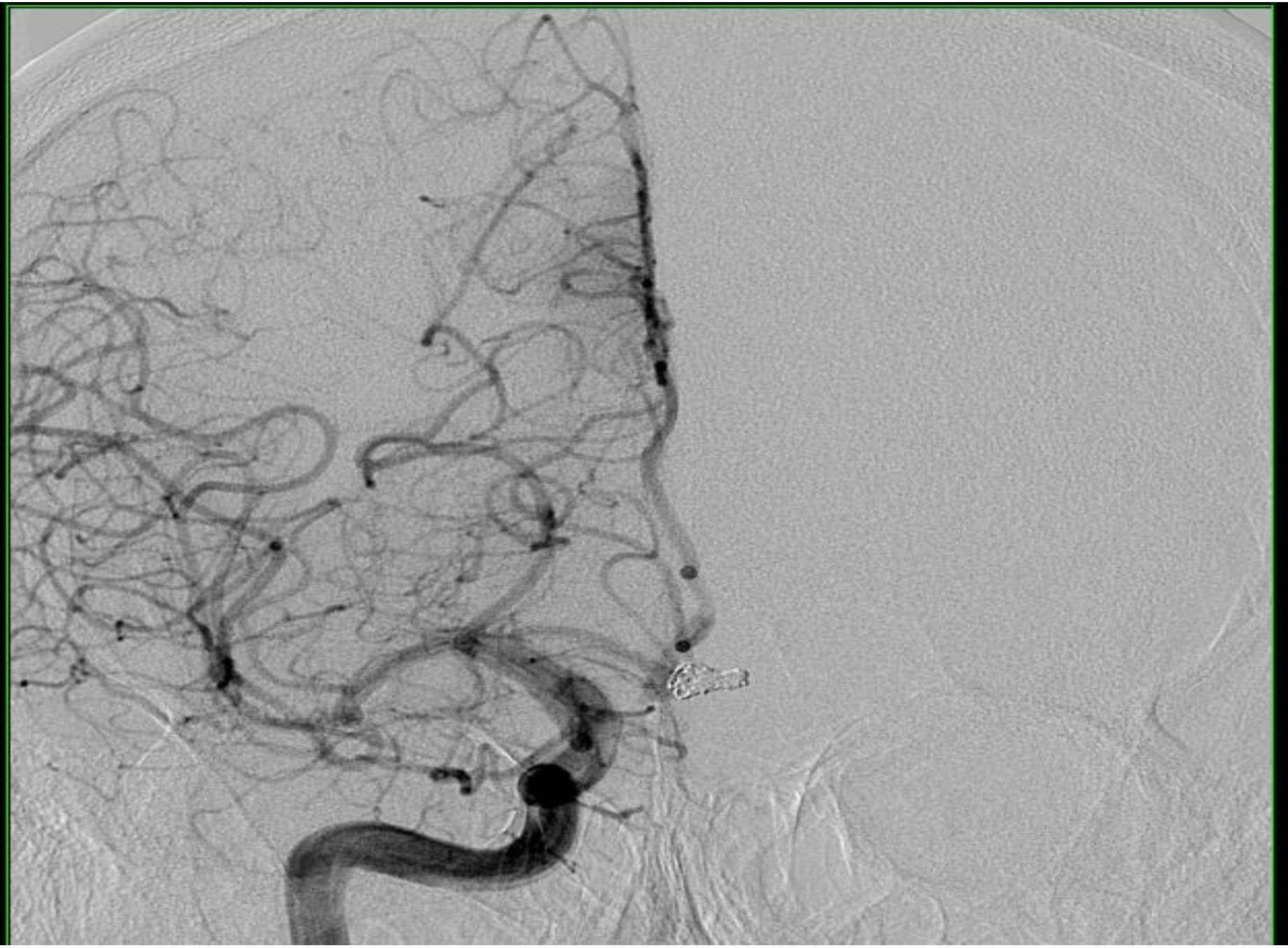
CTA head demonstrated 3.5mm anterior communicating artery aneurysm

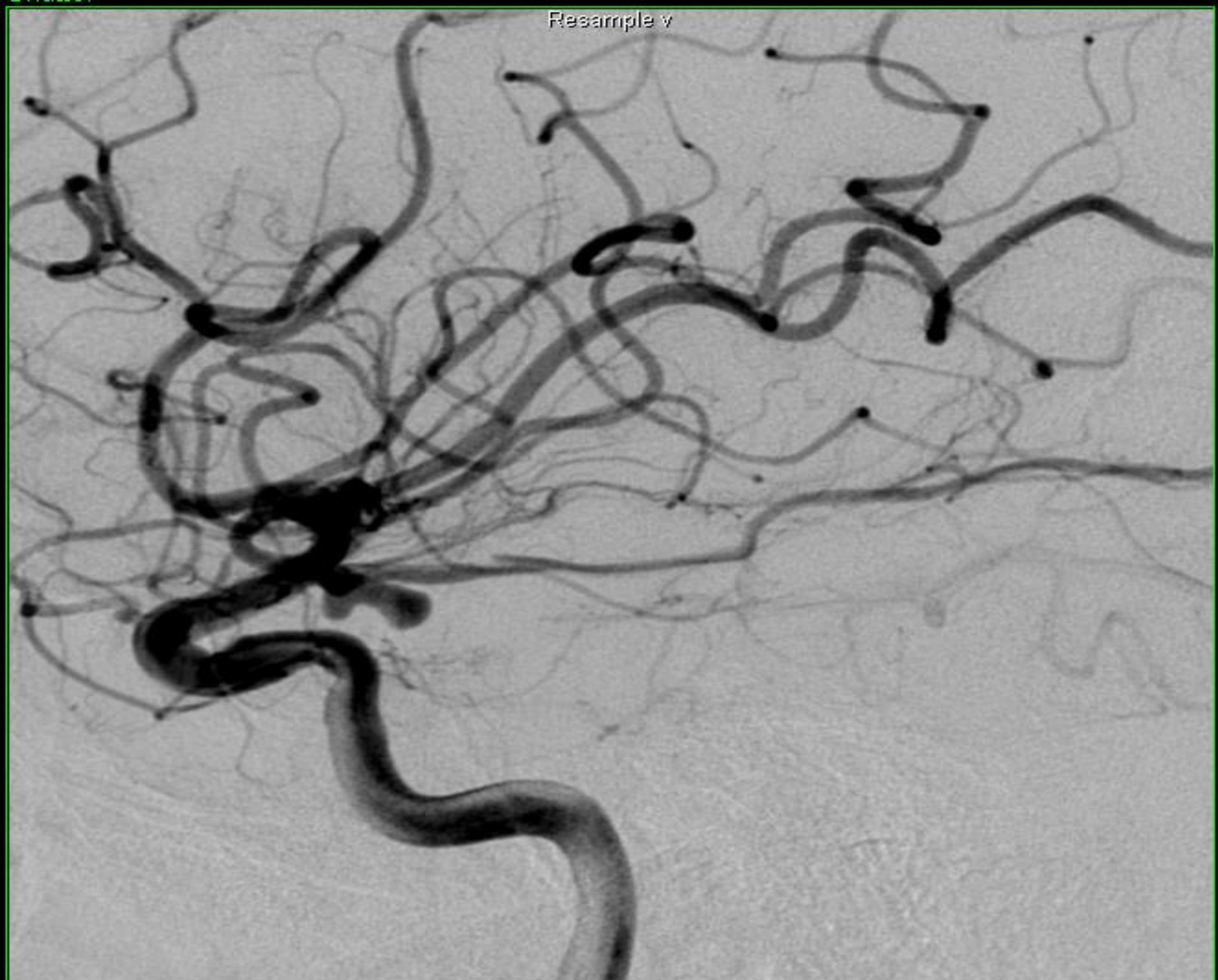


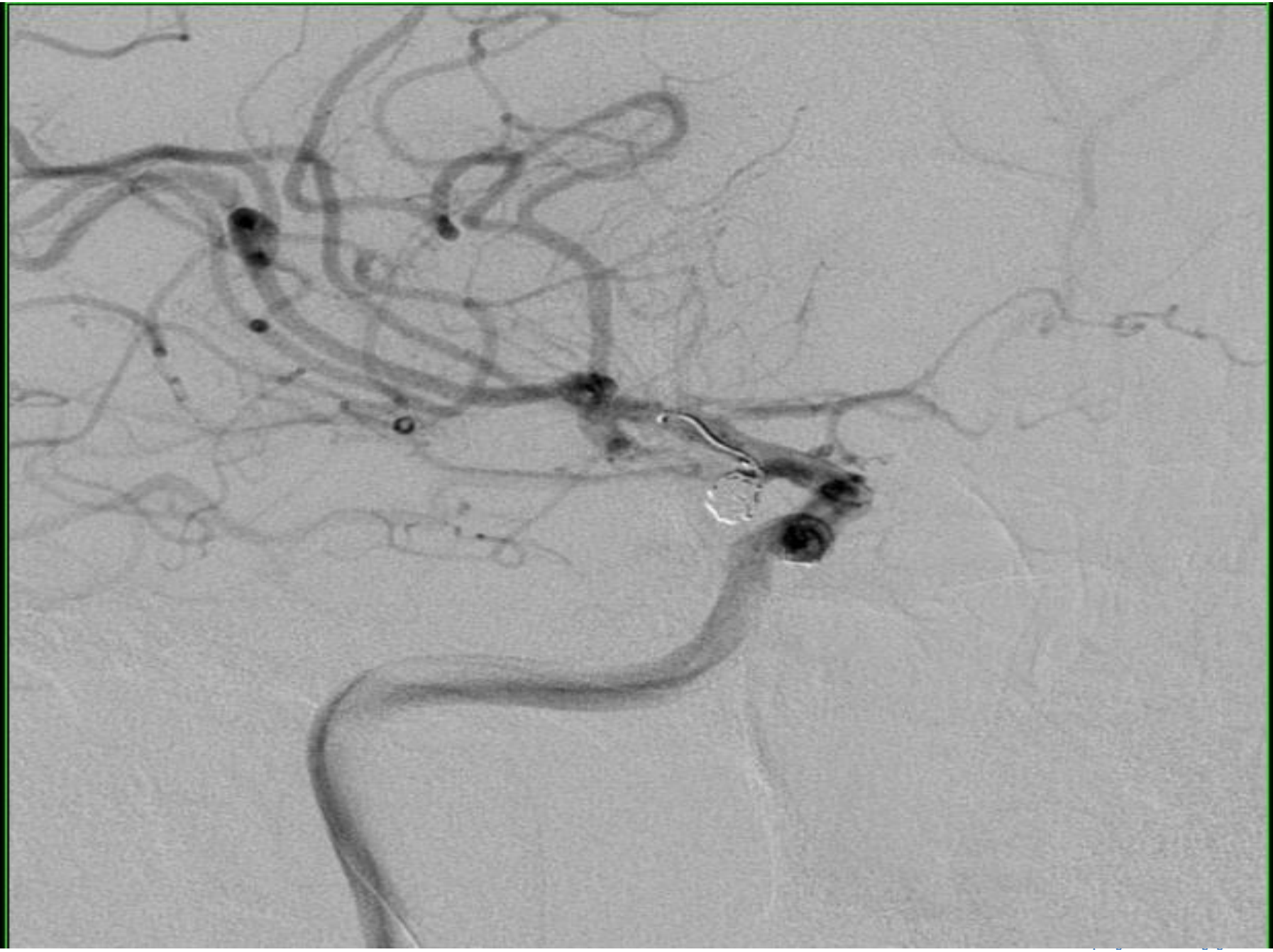


Thrombus formation

- ReaPro (Abciximab) - platelet aggregation inhibitor, bolus intra-procedure 0.25mg/kg, followed by infusion post CT head 0.125ug/kg/min
- Heparin – anticoagulant, dosage per physician, IA bolus or infusion
- Mechanical thrombectomy

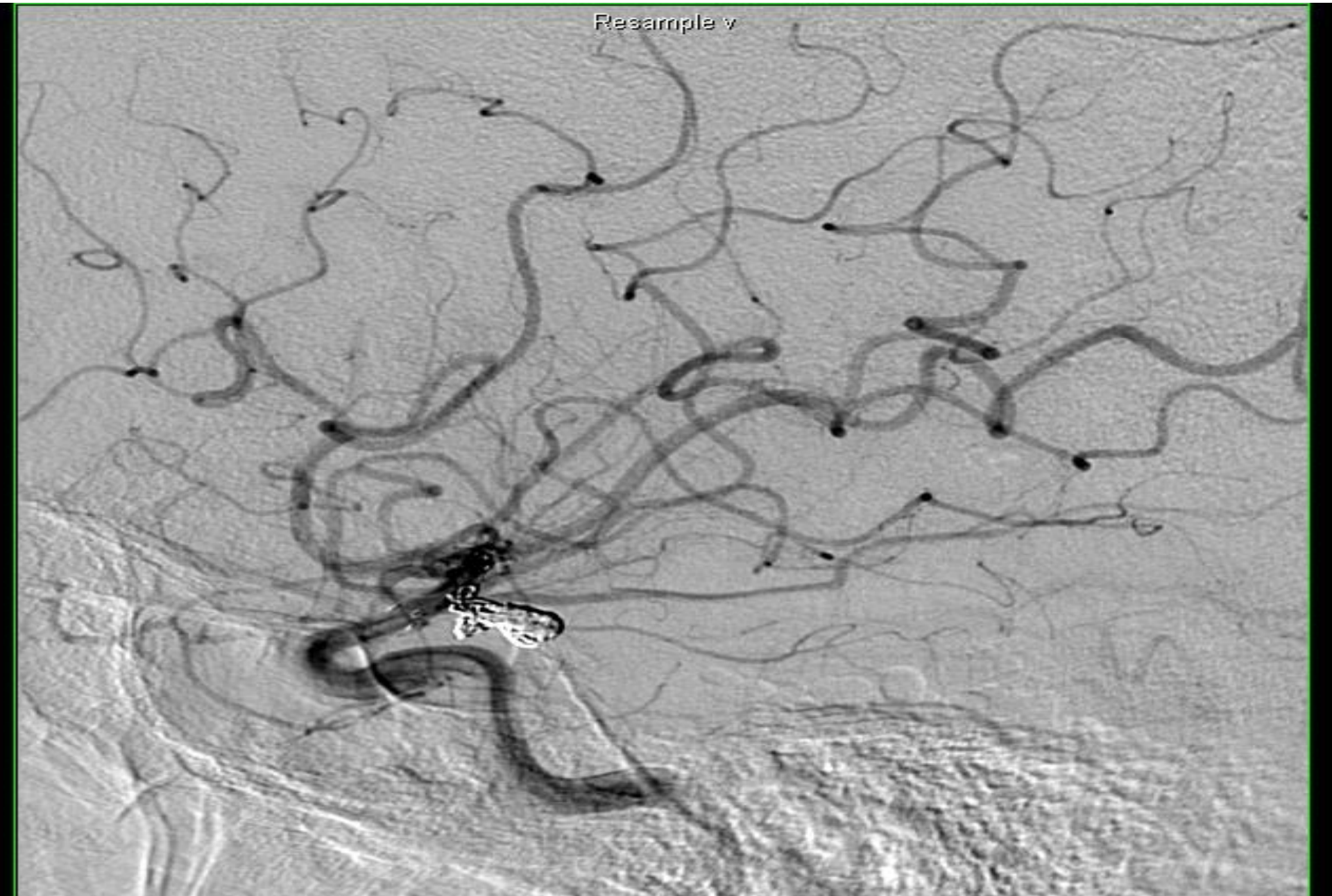



Resample v



Coil Migration

- Reapro or Heparin bolus
- Snare devices
- Potential stenting (Aspirin and Plavix considerations)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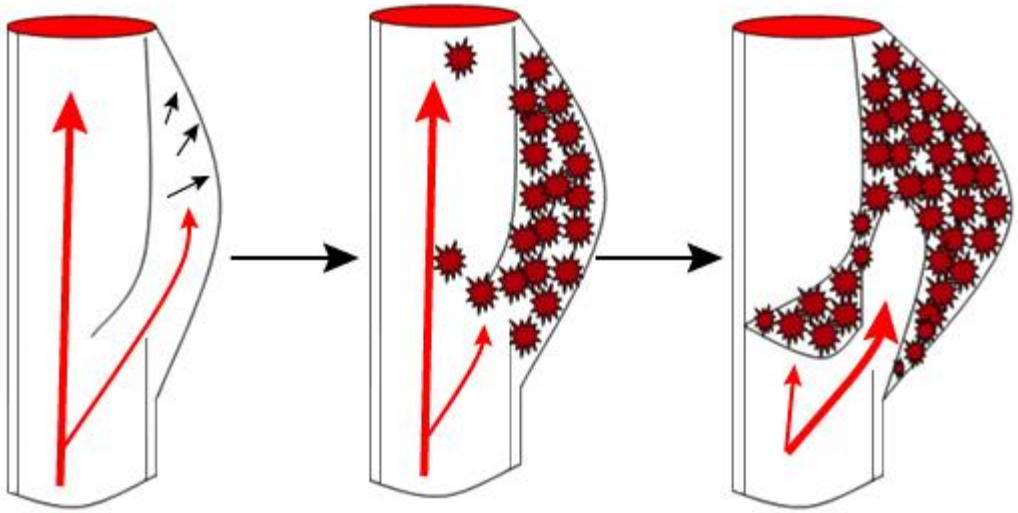
Vessel dissection

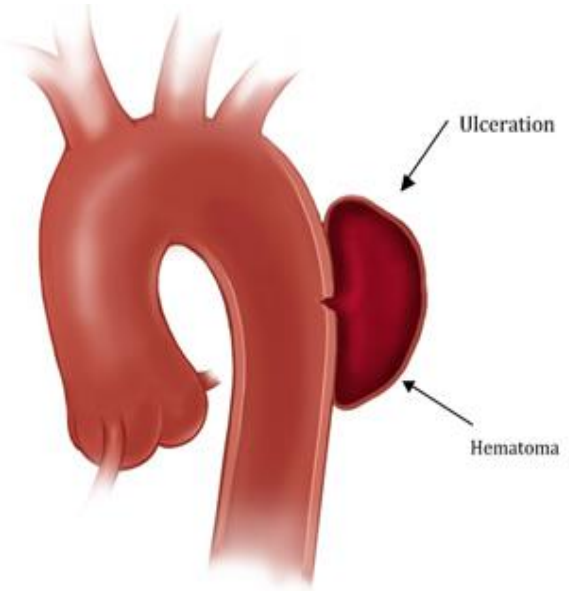
- Heparin infusion
- Possible stenting
- Initiate Aspirin therapy

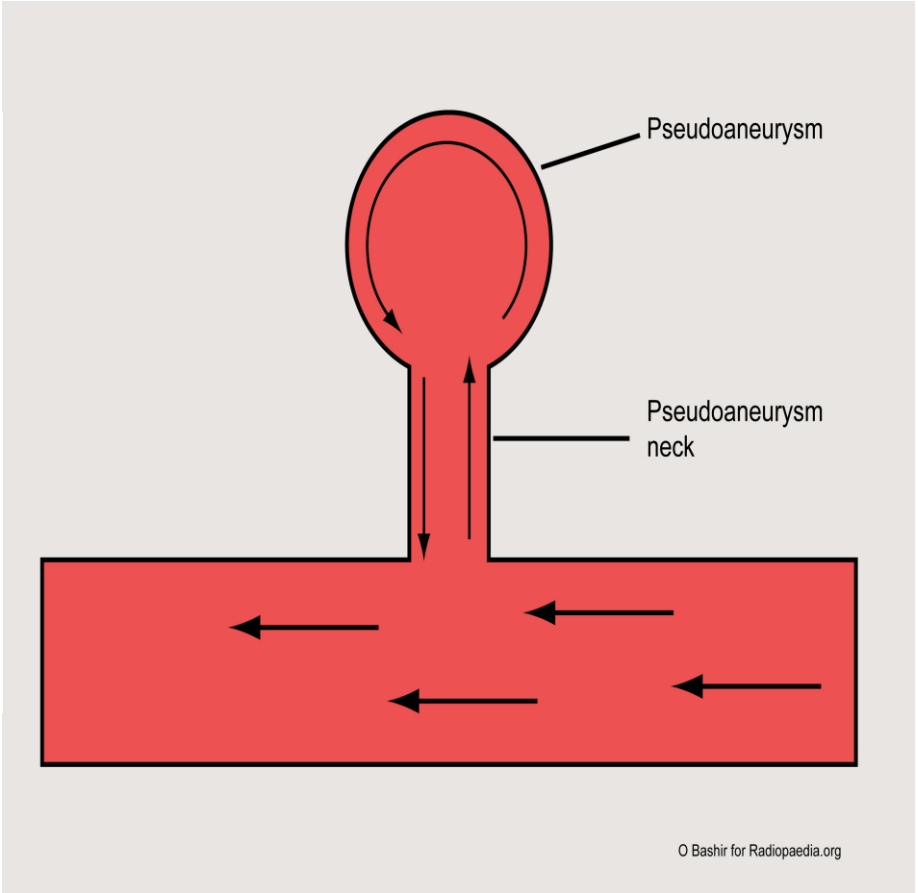


Post procedure complications

- Femoral hematoma
  - Apply manual pressure
  - Monitor vital signs
  - Outline with marker and monitor for progression
  - Strict bed rest
  - Notify physician
  - Can form immediately, hours, or days later

- Femoral pseudo aneurysm
  - Is a bleeding track into the tissue with flow
  - Pulsatile mass, +thrill/bruit, pain, diagnosed with ultrasound
  - Can rupture, cause nerve compression and damage
  - Management similar to hematoma but can require thrombin injection, surgical repair


Ulceration
Hematoma


Pseudoaneurysm
Pseudoaneurysm neck
O Bashir for Radiopaedia.org

- Femoral occlusion
  - Assess vitals, distal pulses, color/temperature of extremity
  - Surgical intervention
- Retroperitoneal hemorrhage
  - Hypotension, tachycardia, pallor, abdominal/low back/pelvic pain, decrease in Hgb(rapid), anxious
  - Hold pressure, CT abdomen, transfusion, fluid resuscitation

- Hemorrhagic conversion
  - Blood pressure control
  - Monitor for cerebral edema
- Infection
  - Sterile techniques, groin care providing instructions upon discharge

Post procedure considerations

- Blood pressure control
  - Goals of therapy
- Swallow evaluation
  - Place NG for medications if not completed
  - Start nutrition within 24 hours
- Emotional support
  - Patient and family education
- Follow up

"A mind that is stretched by a new experience can never go back to its old dimensions."

— Oliver Wendell Holmes, Jr.