



FERNE / AAEM
Neurology Case Conference
12th Scientific Assembly
San Antonio, TX
2006



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Improving the Care of
Patients with Emergent
Brain Illness and Injury




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Education
Pt Cases, Lectures, Learning Tools On-line

- 56 Meetings, 166 Lecturers, 334 Lectures
- MS Producer files, MP3 files
- MS PPS, PPT files
- PDFs of slides, handouts
- Case descriptions, ED management

• FERNE encourages free downloading, use



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Education
Handheld Software: HandiStroke Rx

HANDi Stroke Rx Available free from www.ferne.org

- Written at Mount Sinai, New York
- Funded by a FERNE grant
- NIH Stroke Scale
- tPA Inclusion/Exclusion criteria
- tPA dosage calculator
- Continuation of care orders




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Research

Directed Neurological Emergencies Grants


- \$ 25-50,000 per grant
- Emergency Medicine Foundation (EMF)
- Promotes new knowledge relating to the diagnosis and acute management of neurological emergencies
- Provided to Emergency Medicine researchers

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FERNE would like to thank Joe Lex, MD, Antoine Kazzi, MD, and the AAEM staff for the opportunity to be a part of these educational activities.

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**U of I & Resurrection Emergency
Medicine Residencies**

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Leg Weakness: History

- 27 year old male, 10 am on a weekday
- CC: Numbness, weakness in low extremities
- One week ago with exercise did back exercises...?? to stretch out back
- Next day had cold feet, numbness, tingling
- Now with progressive weakness, tingling parasthesias, difficulty with ambulation

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Leg Weakness: History

- Some trouble with initiating urine stream
- Bowel movements OK
- Left low extremity especially weak
- Yesterday was doing more forceful back stretching in order to improve his back and leg situation
- No trauma, infection, systemic (FCVD)

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Leg Weakness: Other History

- MVC 4 years ago with cervical fracture
- Anterior C6-C7 fusion
- Left upper extremity weakness at that time
- No symptoms in the upper extremities now
- Social history negative
- Family history negative

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Questions Based on History

- What is in the differential diagnosis?
- What are the life threats?
- What does the difficulty with urination suggest?
- Is the prior c-spine injury a factor?
- What do the prior upper extremity symptoms suggest?

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Leg Weakness: Physical

- VSS, afebrile
 - NAD, alert, Mental status OK
 - Head: Pupils, airway OK
 - Neck: Supple, NT; No bruit
 - Chest: Clear without BSBE
 - Cor: Reg s
 - Abd: Soft, NT s
 - Ext: NT to palpation
 - Skin: Feet cool, clammy bilaterally
- OK cap refill

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Leg Weakness: Neuro Exam

- Mental status OK
- Left thigh with weakness to hip flexion
- No foot drop, no other weakness noted
- Decreased light touch over feet, anterior calf and ant thigh bilaterally
- No saddle anesthesia
- Clonus bilaterally with forced dorsiflexion

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Questions Based on Physical

- What is in the differential diagnosis?
- What are the life threats?
- What does the weakness suggest?
- What does the sensory loss suggest?
- What does the clonus suggest?

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Leg Weakness: Diagnostics

- What lab tests are indicated?
- What plain xrays are indicated?
- What neuroimages are indicated?

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Leg Weakness: Treatment

- What immediate therapies are needed?
- What consults are indicated?
- Is hospitalization indicated?
- What long-term therapies are indicated?

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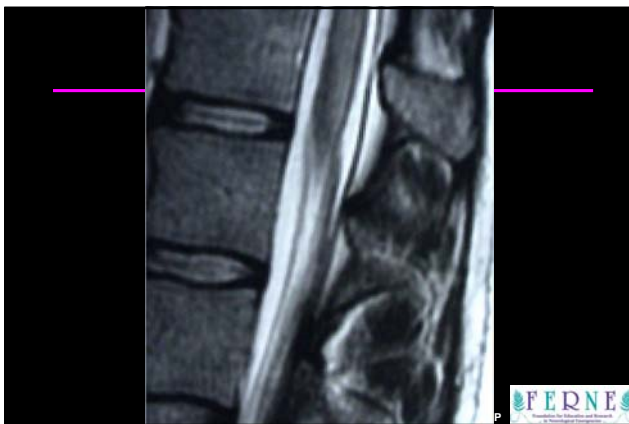


Leg Weakness: Working Dx

- Radiculopathy, weakness, parasthesias
- Rule out herniated disc low thoracic spine
- History MVC with anterior cervical fusion

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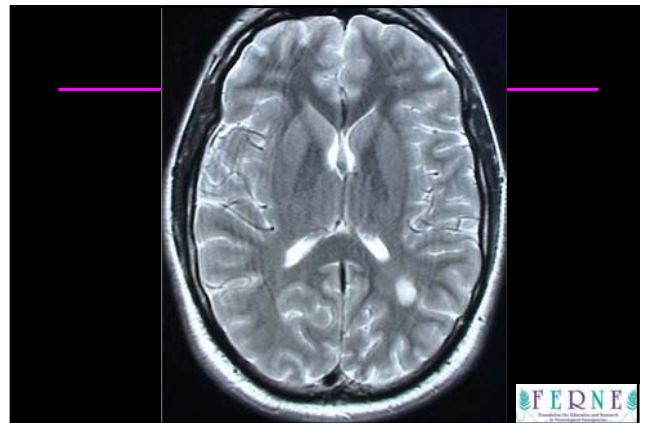




Questions Based on Diagnostics

- What is in the differential diagnosis?
- What are the life threats?
- What does the LSS suggest?
- What does the MRI suggest?
- Is a cranial MRI indicated?

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Leg Weakness: Treatment

- What is the diagnosis?
- What therapies are needed?
- What outcome is likely?
- What long-term therapies are indicated?

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Leg Weakness: Diagnosis

- Transverse myelitis of thoracic/lumbar cord
- Brain plaques consistent with multiple sclerosis

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Leg Weakness: Hospital Course

- Neurosurgery consult, admit to neurology
- LSS erosion noncontributory
- Labs noncontributory, no disc herniation
- Normal CT angiogram, cervical thoracic spine
- Worsening weakness in low extremities
- CSF positive with oligoclonal bands
- No response to steroids
- Plasmapheresis with improved sensory

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Leg Weakness: Hospital Course

- Persistent low extremity weakness
- Bowel incontinence
- Urinary retention
- Catheter-related UTI
- Gradual improvement in symptoms
- Home following rehab
- Steroid therapy at home
- L arm numbness months later, C4 MRI lesion

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Leg Weakness: Learning Points

- Symptoms in different areas at different times, think multiple sclerosis
- Past neurological history significant
- Physical exam will detect loss of UMN control
- MRI when patients have acute weakness, unable to ambulate, and/or exam consistent with cord compression, loss of UMN control
- ED diagnosis, treatment, documentation key
- We are lucky to be here, feeling well

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Sudden Weakness : History

- 22 year old male, 7 am on a weekday
- CC: Left sided weakness and poor speech
- Parents state pt awoke with twisting and weakness of extremities on left
- Left facial drooping and speech difficulty
- Presents with improving symptoms

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Sudden Weakness : History

- Unable to bear weight on L leg
- Unable to raise L arm prior
- No headache or neck pain
- No injury or past history seizures or neuro
- No trauma, infection, systemic (FCVD)
- Medical history negative
- Social, family history negative

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Questions Based on History

- What is in the differential diagnosis?
- What are the life threats?
- Why should a 22 yo have a CVA?
- Is the CVA likely toxic-metabolic
- What work-up is indicated?

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Sudden Weakness: Physical

- VSS, afebrile
- NAD, alert, Mental status OK
- Head: Pupils, airway OK
- Neck: Supple, NT; No bruit
- Chest: Clear without BSBE
- Cor: Reg s
- Abd: Soft, NT s
- Ext: NT to palpation
- Skin: No rash

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Sudden Weakness: Neuro Exam

- Mental status OK
- CN Left mouth droop
- Speech OK
- Left sided weakness 4/5 Right side ok
- No nystagmus, finger to nose OK
- No pathological reflexes noted
- Gait not tested...?? truncal ataxia

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Questions Based on Physical

- What is in the differential diagnosis?
- What are the life threats?
- What does the weakness suggest?
- What does the improving weakness suggest?
- What is the clinical significance of a RIND (rapidly improving neurological deficit) as opposed to a TIA?

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Sudden Weakness: Diagnostics

- What lab tests are indicated?
- What plain x-rays are indicated?
- What neuroimages are indicated?

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Sudden Weakness: Treatment

- What immediate therapies are needed?
- What consults are indicated?
- Is hospitalization indicated?
- What long-term therapies are indicated?

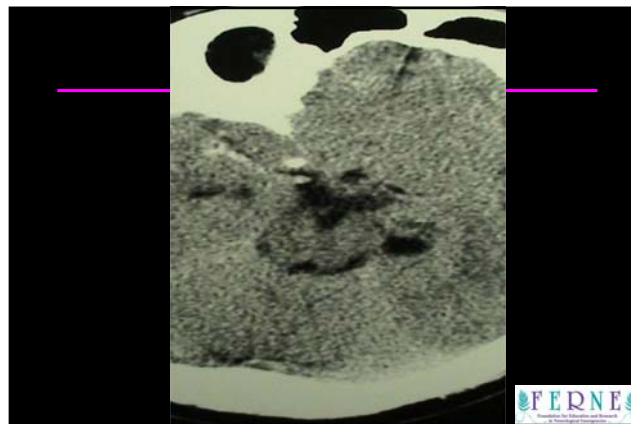
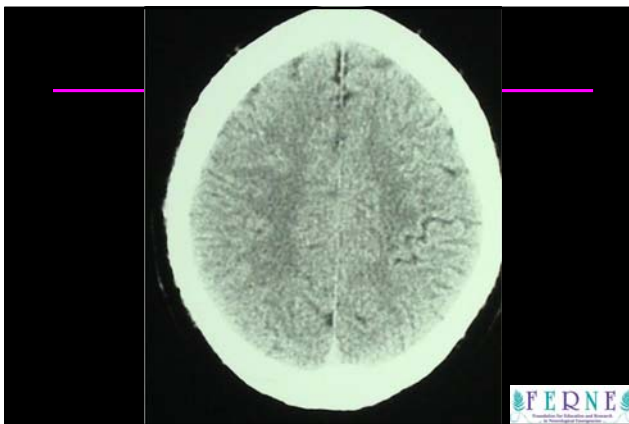
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Sudden Weakness: Working Dx

- TIA/CVA
- Rule out RIND, SAH, ICH

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Questions Based on Diagnostics

- What is in the differential diagnosis?
- What does the 1 cm peri-cistern left-sided low density area suggest?
- Is it the source of the weakness?
- Is a cranial MRI indicated?

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Sudden Weakness: Treatment

- If the time of onset was known to be clearly after the patient awoke, would you administer tPA?
- What does symptom improvement say about the etiology of the TIA/CVA?
- Is intra-arterial tPA indicated? Clot retrieval?
- Why isn't heparin useful? IIb/IIIa therapy?

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Sudden Weakness: Diagnoses

- Acute TIA/CVA
- Rule out RIND, SAH, ICH
- Left low density “mass” near cerebral peduncle
- Rule out arachnoid cyst, cistercercosis, or cystic tumor (less likely)

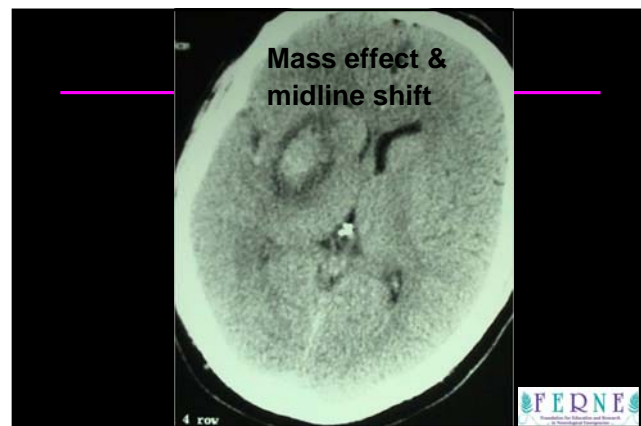
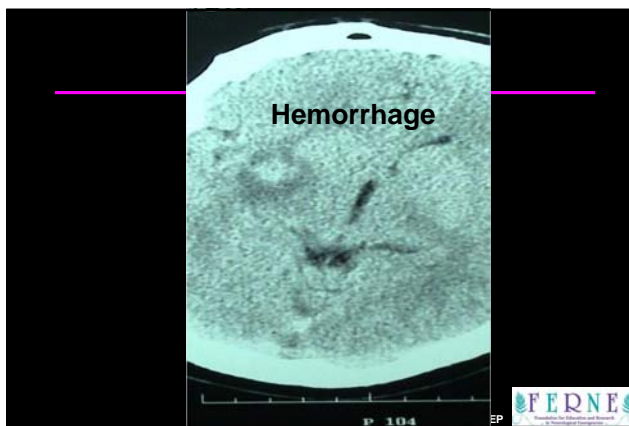
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Sudden Weakness: Hospital Course

- Neurology consult, admit to medicine
- Labs noncontributory, no toxic ingestion
- EKG normal
- Six hours later, patient required repeat CT scan for worsening mental status and weakness

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Sudden Weakness: Diagnoses

- Acute TIA/CVA
- Hemorrhage R basal ganglia
- Left low density “mass” near cerebral peduncle
- Rule out arachnoid cyst, cistercercosis, or cystic tumor (less likely)

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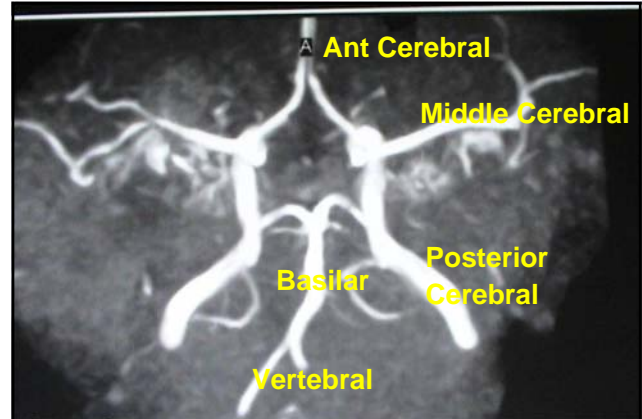
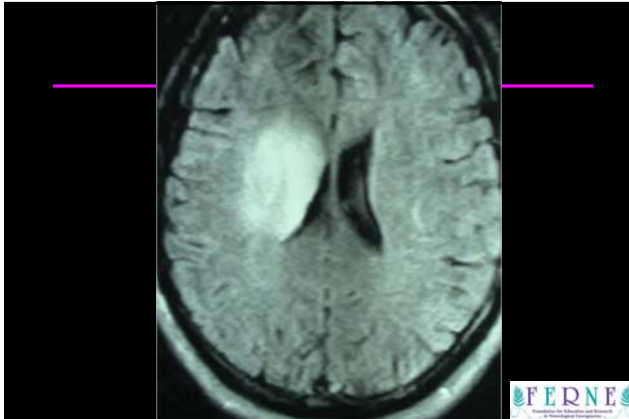


Questions Based on Diagnostics

- What is in the differential diagnosis?
- Why did an intracerebral hemorrhage occur? What is the likely etiology?
- Where is it located?
- How should the edema be treated?

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Questions Based on Diagnostics

- Why is there such a large lesion?
- What does the MRA show?
- Is a CT angiogram better than MRA? Why?
- Is further neuroimaging indicated?

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Sudden Weakness: Hospital Course

- Right basal ganglia , external capsule, caudate nucleus hemorrhage
- Ultrasound carotid Doppler negative for carotid obstruction
- Clonus on left ankle jerk, dysphasia noted
- Discharged to rehab with resolving deficit
- Rule out vasculitis as etiology
- Referral to university for neuro-immunology

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Sudden Weakness: Learning Points

- Stroke can occur in all demographic groups
- Symptom progression important to Rx plan
- Hemorrhage can occur in any ischemic stroke
- tPA may be impugned inappropriately
- MRI may not be superior in the setting of ICH for the detection of blood
- MRA, CT angiography preclude need for formal cerebral angiography
- Careful, timely documentation critical

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Severe Headache: History

- 36 year old male, 11 am on Sunday
- CC: Left sided severe headache, facial tingling
- Arrived by ambulance, sharp headache
- Heaviness in left hand and leg
- No other complaints

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Severe Headache: History

- Three weeks prior did neck exercises & maneuvers as a wrestling coach
- He noticed sharp left neck pain
- Saw PMD, Rx with nonsteroidals
- Diagnosis: musculoskeletal strain
- Neck pain progressed, with headache
- Worse over the past 24 hours

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Severe Headache: History

- History gastric reflux
- Family history of hypertension
- Aunt died from a cerebral aneurysm
- No trauma, neck injury, photophobia, or meningitis symptoms
- No history of migraine headaches
- Social history negative

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Questions Based on History

- What is in the differential diagnosis?
- What are the life threats?
- What does the remote neck pain onset and mechanism suggest?
- What work-up is indicated?

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Severe Headache: Physical

- VSS, afebrile
- NAD, alert, Mental status OK
- Head: Pupils, airway OK
- Neck: Supple, NT; No bruit or meningismus
- Chest: Clear without BSBE
- Cor: Reg s
- Abd: Soft, NT s
- Ext: NT to palpation
- Skin: No rash

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Severe Headache : Neuro Exam

- Mental status OK
- Face: decreased pinprick sensation on left
- Speech OK
- Left sided weakness 4/5 with hand grasp
Right side ok
- ?? Horizontal nystagmus
- Finger to nose past pointing with left hand
- No pathological reflexes noted
- Gait not tested, no truncal ataxia

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Questions Based on Physical

- What is in the differential diagnosis of a patient with severe headache and a neurological deficit?
- How do the facial ipsilateral facial numbness and extremity weakness correlate with one another?
- What does the weakness suggest?

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Severe Headache: Diagnostics

- What lab tests are indicated?
- What plain xrays are indicated?
- What neuroimages are indicated?
- Is a lumbar puncture indicated?

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Severe Headache: Treatment

- What immediate therapies are needed?
- What consults are indicated?
- Is hospitalization indicated?
- What long-term therapies are indicated?

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Severe Headache: Working Dx

- Cephalgia
- Rule out basilar migraine and CVA
- Rule out vascular etiology

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Severe Headache: Testing

- CT head showed atrophy only
- EKG, labs, CXR OK

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Severe HA: Hospital Course

- Neurology consult
- Nausea and vomiting
- Left upper extremity coordination worse
- Speech: dysarthria noted
- Immediate CT carotid angiogram

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Severe Headache: Testing

- CT head: atrophy
- CT carotid angiogram: suspected high grade stenosis at the origin of the R common carotid and subclavian
- R vertebral noted to be larger than L
- Both vertebrals with significant plaques

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Questions Based on Diagnostics

- What is in the differential diagnosis?
- What carotid stenosis suggest?
- What do the vertebrals findings suggest?
- Is it the source of the headache and neurological findings?
- Is other vascular imaging indicated?

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Severe Headache: Treatment

- If the time of onset was known to be less than three hours, would you give tPA?
- What does symptom worsening say about the etiology of the TIA/CVA?
- Is intra-arterial tPA indicated? Clot retrieval? Heparin? IIb/IIIa therapy?

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Severe Headache: Diagnoses

- Acute TIA/CVA
- Carotid artery stenosis
- Vertebral arteries plaques
- Nausea, vomiting
- Dysarthria, LUE lack of coordination

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Severe Headache: Hospital Course

- Neurology consult
- Seven hours into evaluation, pupils noted to be unequal: R 4 mm, L 2 mm
- No change in mental status or neurological exam
- Decision made to start the patient on heparin due to clinical findings

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Questions Based on Pt Status

- What is in the differential diagnosis?
- Why did the CVA occur? What is the likely etiology?
- What is the next best step?

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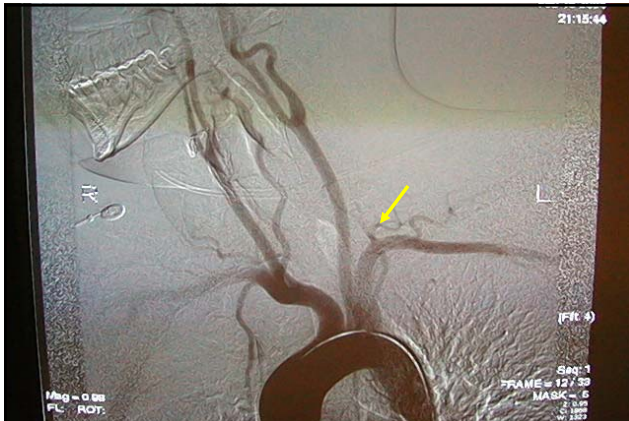


Severe Headache: Hospital Course

- Transfer for immediate 4 vessel angiogram based on availability
- Consideration of IA tPA or clot retrieval

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Severe Headache: Hospital Course

- Angiography showed a left vertebral artery dissection with thrombus
- Patient started on heparin
- Discharged to rehab with improvement

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Severe Headache: Diagnoses

- Acute TIA/CVA
- Carotid artery stenosis
- Vertebral dissection left with thrombus
- Left Wallenberg Syndrome
- Left Medullary Syndrome
- Left Horner's Syndrome
- Left hemi-ataxia, dysphagia

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Severe Headache: Learning Points

- Carotid, vertebral dissections common
- Subtle CN and motor symptoms
- Headache part of the presentation
- Progressing sx must be addressed
- One abnormal finding does not mean stop testing...correlate clinically
- Cerebral angiography most sensitive test

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New Onset Seizure in Pregnancy

- 32 year old Hispanic female
- 23 weeks pregnant
- G3P2 two live births, no complications
- New onset seizure at 530 am in bed
- Generalized tonic-clonic seizure
- Brief, self-limited, no Rx required
- EMS to the ED, no seizure recurrence

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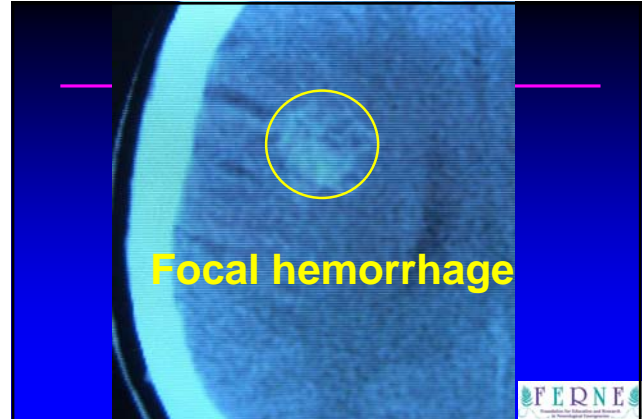
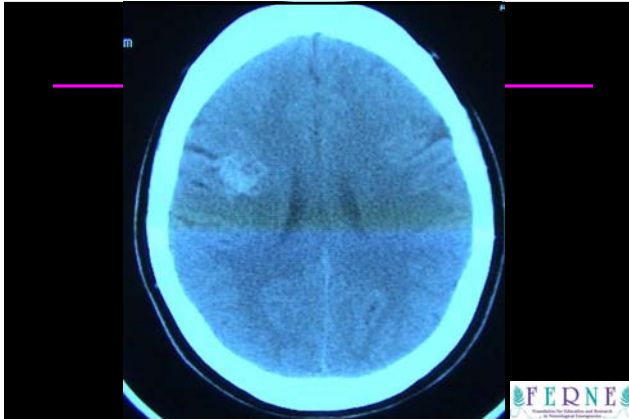


New Onset Seizure in Pregnancy

- No complaints
- No neurological or medical history
- No trauma or recent illness
- No apparent drug or alcohol use
- VS, physical exam, neurological exam OK
- Pt seemed a little pale, as if not feeling well
- Would you CT this patient acutely? MRI

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New Onset Seizure in Pregnancy

- Arranged transfer to the tertiary center
- OK per Labor and Delivery service to screen
- CT demonstrates small ICH
- Neurosurgery aware, will follow patient
- No recurrent seizure in initial ED

- Would you give any Rx prior to transfer ?

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New Onset Sz in Pregnancy

- Lorazepam prior to transfer
- Tertiary center diagnosis: cavernoma
- Started on an anti-epileptic drug
- No immediate need for operative intervention
- Neurosurgery to follow as pregnancy progresses

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Sz & Pregnancy: Learning Points

- New onset seizures require evaluation
- Seizures in pregnancy common
- Hemorrhage can occur in pregnancy
- CT neuroimaging appropriate (shield)
- MRI/MRA can be obtained electively
- Benzodiazepines, phenytoins prn

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Thank you!!

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