1. Preexisting White Matter Disease Burden Impacts Cognitive Outcome after Inpatient Rehabilitation for Ischemic Stroke
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Background and Purpose: White matter hyperintensities (WMH) have been shown to impact functional outcomes after ischemic stroke. However, their role in cognitive recovery after ischemic stroke is unclear. Therefore, it is important to evaluate if WMH can predict the degree of cognitive recovery after inpatient rehabilitation.

Methods: We retrospectively studied 162 patients admitted to inpatient rehabilitation after an acute ischemic stroke. We reviewed patient demographics, presence of comorbidities, WMH, and Functional Independence Measure (FIM) scores at admission and discharge from rehab. WMH were graded according to the Fazekas scale based on visual assessment in both periventricular and subcortical areas.

Results: Of the 162 patient charts reviewed, 53 were excluded due to primary intracerebral hemorrhage and insufficient imaging. Total of 109 patients were included in the final analysis. Multiple linear regression analysis revealed that, when adjusted for intracerebral volume, pre-CAS NIHSS Scale, and age, severity of WMH as graded on Fazekas scale independently predicted FIM cognitive scores at discharge (P < .0004). WMH severity did not predict FIM motor scores.

Conclusions: In this retrospective analysis, we found that severity of WMH hyperintensities as graded by Fazekas scale is an independent predictor of cognitive FIM scores after inpatient rehabilitation for acute ischemic stroke.

Presenter: Marge Hutchinson
Mary Beth Farrell, Corey Mabry, Nancy Merrill, Mary Lally
Intersocietal Accreditation Commission, Ellicott City, USA

Background and Purpose: MRI is considered one of the safest diagnostic imaging tests; that is until something goes wrong. Serious accidents are rare, but the risk of injury from the magnet is real. Experts estimate that 85% of injuries are preventable. MRI accidents can be avoided by strict adherence to safety standards. In the past, there have been calls for accreditation mechanisms to be involved in compelling facilities to follow MRI safety standards. The IAC Standards and Guidelines for MRI Accreditation State that “The IAC Accreditation Commission (IAC) accreditation process. To become accredited, facilities must have written policies and procedures that ensure patient and personnel safety.

3. Improved Quality at Intersocietal Accreditation Commission Carotid Artery Stenting Facilities
Mary Beth Farrell,1 Nancy Merrill,1 Mary Lally,1 Barry Katzen,2 David Sacks3
Presenter: Marge Hutchinson
1Intersocietal Accreditation Commission, Ellicott City, USA, 2Miami Cardiac & Vascular Institute, Miami, USA, 3Reading Hospital and Medical Center, West Reading, USA

Background and Purpose: The Intersocietal Accreditation Commission (IAC) began accrediting carotid artery stenting (CAS) facilities in the year 2011. The accreditation process rigorously evaluates staff qualifications, facility operation, equipment quality, appropriateness of patient selection, procedure performance, clinical outcomes, and quality improvement. Accreditation is determined based on compliance with the IAC Standards and the IAC Accreditation program. To date, a small number of facilities performing CAS have achieved accreditation. The aim of this study is to report findings of the first facilities applying for IAC CAS accreditation.

Methods: The IAC database was used to extract the peer review findings and quality improvement of facilities applying forCAS accreditation and subsequent reaccreditation 3 years later. Eight neurologic testing issues and five procedure performance issues were assessed. The number and percentage of facilities with issues at the time of first accreditation and reaccreditation was compared. Results: Between the year 2012 and 2013, eight facilities applied for IAC CAS facility accreditation with six facilities receiving initial accreditation and two facilities receiving reaccreditation. At the time of initial accreditation, 85% of facilities had an anterior thalamus infarction. Anterior thalamus is supplied by the thalamocortical artery (TTA) which also feeds the hypothalamus. We believe that our patient’s presentation was a result of concomitant insult to the thalamus and hypothalamus for the TTA territory infarction, which mimicked the Benedikt syndrome. His right-sided ptosis was secondary to a partial Horner’s syndrome from the hypothalamic injury and his left-sided choreoathetosis was from right thalamus involvement. Our case is highlighting that TTA territory infarction, including anterior thalamus and partially hypothalamus can also mimic the Benedikt syndrome and, to our knowledge, this is the first case report of this mimicked syndrome in the thalamus lesion.

4. Benedikt’s Mimic Syndrome in Thalamic Infarction
Reza Bavarsad Shahrpouri, Ali Kerro, Payam Moein, Andrei Alexandrov
University of Tennessee, Memphis, USA. 2018 Resident Travel Award Recipient
“Benedikt syndrome” by definition is typically caused by a pathology in the tegumentary system, axons, and hippocampus with an ipsilateral ptosis. We present a 63-year-old right-handed African American male who had an acute onset involuntarly left upper extremity choreoathetosis and a right-sided ptosis; however, the MRI showed a right anterior thalamus infarction. Anterior thalamus is supplied by the thalamocortical artery (TTA) which also feeds the hypothalamus. We believe that our patient’s presentation was a result of concomitant insult to the thalamus and hypothalamus for the TTA territory infarction, which mimicked the Benedikt syndrome. His right-sided ptosis was secondary to a partial Horner’s syndrome from the hypothalamic injury and his left-sided choreoathetosis was from right thalamus involvement. Our case is highlighting that TTA territory infarction, including anterior thalamus and partially hypothalamus can also mimic the Benedikt syndrome and, to our knowledge, this is the first case report of this mimicked syndrome in the thalamus lesion.

5. Neuromuscular Ultrasound in the Evaluation Peripheral Nerve Sheath Tumors in Neurofibromatosis Type 1
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Background and Purpose: Neurofibromatosis type 1 (NF1) is a neurogenetic disorder in which individuals may develop a variety of benign and malignant tumors. Peripheral nerve sheath tumors are encountered most frequently in this patient population. Previous literature has proposed whole body MRI as the reference standard to identify nerve sheath tumors in NF1. Evaluation of peripheral nerve with high resolution ultrasoundography (HRUS) has been explored in asymptomatic or minimally symptomatic individuals with NF1. Our study is a series of four individuals with NF1, all with varying phenotypic presentations to determine neuromuscular findings, who had relatively unremarkable electrophysiologic studies. HRUS was used to visualize peripheral nerves in these patients. The objective of this study is to determine the presence of neurogenic peripheral nerve involvement in patients with NF1.

Methods: Four patients with NF1 were included in this study to detect asymptomatic abnormalities of the upper and lower extremity nerves. Patients underwent clinical examination, nerve conduction studies with needle electromyography, and with HRUS using a Tescan 15L4 linear array transducer at the highest frequency (15-19 MHz), with nerve visualization in both the transverse and coronal planes. Power Doppler was applied to evaluate for any vascular anomalies and/or hyperemia within the nerve. Results: We present the ultrasoundographic imaging findings of peripheral nerves anomalies in a series of four patients with NF1. All patients underwent ultrasound examination of the median, ulnar, radial, brachial plexus, sciatic, tibial, etc.
6. Neurosonographic Diagnosis of Luckenschädel and Lemon Sign in Neonates
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Lückenschädel and lemon sign are thought to result from intracranial hypotension with subsequent dysplasia of the membranous skull. Both conditions have been described in neonates but rarely in infants and children. The lemon sign typically lies in the thickest part of the frontal, parietal, and upper occipital bone forming groups of round, oval, or finger-shaped pits on the inner surface of the cranial vault. Lemon sign is an inward scalloping of the frontal bone resulting from abnormal frontal bone development. Both conditions are self-limiting with the lemon sign disappearing typically after 6 months of age.

7. The Breath Hold Acceleration Index: New Index to Evaluate Cerebrovascular Reactivity
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1University of Nebraska-Lincoln, Lincoln, Nebraska, USA, 2Children’s Hospital & Medical Center, Omaha, USA, 3Qassim University, Buraidah, Saudi Arabia, 4University of Nebraska Medical Center, Omaha, USA

Background and Purpose: Cerebrovascular reactivity (CVR) is an ideal biomarker to detect cerebrovascular damage. CVR can be quantified by measuring changes in cerebral blood flow velocity (CBFV) in response to a CO2 challenge. These changes are detected using transcranial Doppler (TCD) in the middle cerebral artery (MCA), often during breath-holding (BH). The BH index (BHI) is the maximum percentage increase in CBFV divided by BH time. Because of the convenience of BH methodology, BHI has high variability. In addition, changing body position may change CVR. It is important to determine if CVR changes in different body positions are meaningful. The aims of this study were: first, to propose an alternative method to evaluate CVR using the BH maneuver; and second, to assess the effect of body position in CVR. An alternative to using a head-up (HUT) and head-down (HDT) tilt table.

Methods: Ten healthy young volunteers (21 ± 1.7 years) held their breath for 30 seconds on a tilt table. CBFV data were collected using the MCA using TCD at five body positions: (1) supine; (45, 90, 135, and 180 deg HUT); and (5 deg HDT). The mean velocity (Vm) was calculated by averaging the CBFV representation of the most linear portion of the CVR curve using two methods: the standard BHI, and the BH acceleration index (BHA). A new index was obtained by using the linear regression of the most linear portion of the CVFV envelope during the BH maneuver. The regression represents acceleration as it is the change in blood flow velocity over time.

Results: The mean coefficient of variation was 82.5% lower in BHA in comparison with BHI. Values of BHA and BHI were not statistically significant between body positions (P = 0.14 and P = 0.05).

Conclusions: In this study, we proposed a new index (BHA) to assess CVR. Compared to the BH index, this index has considerably less variability in comparison with the conventional standard BHI. Additionally, we demonstrated that CVR does not change significantly from body position to body position. This is interesting considering cerebral perfusion pressure may be higher in HDT due to induced gravity-dependent changes in blood volume distribution.

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Background and Purpose: Transcranial Doppler (TCD) is an important tool in monitoring carotid interventions. One of the limitations is the need of a neurosonographer expert during procedures. This observational study is intended to address two issues: (1) can the TCD headframe be placed by a nonexpert with remote advice from an expert; and (2) can the remote expert observe the monitoring and communicate with the surgeon effectively.

Methods: With the use of teleproctoring technology (Karl Storz Endoscopy, Tuttlingen, Germany), a neurosonologist in a remote place, and a nonexpert physician in the operating room monitored 10 carotid procedures with TCD. We registered if the nonexpert was able to place the headframe and obtained a proper middle cerebral artery signal. We classified interactions of the remote expert as (1) major, if the interaction influenced in technical aspects of the surgery; and (2) minor, in the rest of the cases. As safety endpoint, we registered stroke or death of any cause until the patient was discharged. Besides, we asked the participants to complete an experience survey.

Results: The monitoring was conducted in 9 of the 10 cases. Mean value of major interactions per procedure was 1.22 (range, 0–2) and mean value of minor interventions was 6.78 (range, 1–15). No stroke or death of any cause was registered. The participating parties evaluated the experience survey with an overall grade of satisfaction from 90% to 100%.

Conclusions: Remote TCD monitoring proved to be a useful modality. This technology demonstrated that it can be used to teach the basic skills to conduct TCD monitoring. This study also showed that is a safe alternative when a neurosonographer is not available to perform an onsite TCD monitoring in the operating room.

9. Role of Thin-Sliced Reformatted CT Imaging for Acute Ischemic Stroke Patients: Do We Need CT Angiography before Acute Neurointervention?
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Background and Purpose: Thin-sliced reformatted noncontrast CT head are not considered sensitive enough for thrombolysis detection. CT angiography is done to confirm large vessel occlusion. CTA adds extra radiation and contrast. Through this study, we want to investigate if thin-sliced reformatted noncontrast CT scans could be reliably used to detect and measure size of the thrombus in patients with large vessel occlusions (LVOs).

Methods: Retrospective analysis of patients who underwent acute endovascular intervention for LVOs at a community-based, university-affiliated comprehensive stroke center during 2 years (January 2016–December 2018) was done. The raw data of nonenhanced CT scans and CTA were collected. All 2D images were registered with thin slices of 0.625 mm using standard general electric software. Vessel diameter and clot length were measured on both CT and CTA (5-mm maximum intensity projections of the thin slices on CT and axial/coronal projections on CTA). Each patient’s CT and CTA were paired for length and diameter in millimeters. Paired two-sample hypothesis test was run on SPSS.

Results: A total of 926 patients presented with acute ischemic stroke during the specified time period. Of those, 99 were LVOs that received endovascular treatment of which, 37 had both CT and CTA done and had intracranial lesions. Mean clot length was 13.98 (SD 5.34) on thin slices CT and 14.18 (SD 5.64) on CTA. Vessel diameter was 2.83 (SD 0.44) on thin slice CT and 2.55 (SD 0.54) on CTA. There was no significant difference in clot length on CT as compared to CTA (P = 0.018). There was significant difference in estimated vessel diameter on CT as compared with CTA (P = 0.031).

Conclusion: Thin-sliced reconstructions of standard cranial nonenhanced CT raw data can be reliably used to detect and measure the thrombus size in LVOs. It does slightly overestimate the vessel diameter but still making intervention planning possible. Larger multicenter trials are needed to validate our data.

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East Texas Medical Center Neurological Institute, Tyler, TX, USA

Background and Purpose: Transcranial Doppler (TCD) is a noninvasive bedside tool for evaluating in real time the cerebral circulation in the large arterial vessels in the Circle of Willis. Mechanical embolectomy for intracranial clot retrieval is an emerging therapy for large vessel occlusion in acute ischemic stroke patients that are becoming tools for rapid therapy in Code Stroke patients. This study looks at TCD findings in Code Stroke patients that underwent emergent mechanical artery retrievals are becoming tools for rapid therapy in Code Stroke patients. This study looks at TCD findings in Code Stroke patients that underwent emergent mechanical artery retrievals.

Methods: Twenty-four patients with focal neurologic deficits were studied between 1 and 5 hours postmecchanical embolectomy with betic TCD. Moyamoya arteries were measured in the large arteries of the Circle of Willis, with analysis of the waveform shapes, and the presence or absence of microcuff was documented. A RI was categorized as: (1) rapidly improved, (2) minimal improved, (3) no improvement, and (4) cerebral circulatory arrest.

Results: Ten (42%) patients showed rapid improvement. Three of these patients had both stented extracranial internal carotid artery stenosis and embolectomy in the ipsilateral
middle cerebral artery. All 10 patients had mean flow velocities within the normal range. Five of the 10 patients had microembolic events detected flowing through the repaired arteries. Six (25%) patients showed minimal improvement. All had normal TCD studies except for microembolic events detected in 4 of the 5 flowing through the repaired arteries. Five (21%) patients showed no improvement with 2 having normal TCD studies and 3 showing restenosis. Three (12.5%) patients had reverberatory TCD waveforms, relatable to cerebral circulatory arrest.

Conclusion: TCD following emergent embolectomy is an excellent tool for assessing postprocedure outcomes. Rapidly improving patients had normal TCD studies. The presence of microembolic events in this patient group was surprising and supports the importance of intensive follow-up medical management.

12. Multifocal Recurrent Strokes in Cerebral Vasculitis and Intravascular Large B-Cell Lymphoma

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Cerebral vasculitis or primary angitis of the central nervous system (PACNS) is a rare disorder affecting both medium- and small-sized vessels. In our center of 700+ cases, it has been published worldwide. Major symptoms of PACNS are stroke, headache, and encephalopathy. Neither neuroradiological findings nor laboratory tests allow a definitive diagnosis of the disorder. PACNS can be mimicked closely in its clinical presentation as well as neuroradiological manifestations by a group of disorders and also neoplasms including intravascular lymphotic B cell lymphoma (IVLBC). IVLBC is a poorly understood and nonspecific presentation, and lacks specific noninvasive diagnostic tests. It is often not considered in vivo and usually diagnosed on autopsy. This is the diagnostic procedure of choice in suspected IVLBC affecting the CNS, as cerebrospinal fluid analysis, brain MRI/CT scans, MR angiography, and even conventional cerebral angiography lack specificity to differentiate IVLBC from cerebral vasculitis. We report four cases, two of which are biopsy-proven primary angitis of CNS and two cases of IVLBC, diagnosed through biopsy in vivo. All four cases had similar clinical presentation and mimicked similar radiographic findings. Our case series implies that it is integral to differentiate PACNS and consider IVLBC in differentials early on, because treatment with steroids or immunosuppressant and hemodynamic augmentation delay the diagnosis of IVLBC due to transient remission of neurological symptoms and result in fatal outcomes.

13. Safety and Clinical Outcomes after Transverse Venous Sinus Stenting for Idiopathic Intracranial Hypertension: Single Center Experience

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Background and Purpose: Idiopathic intracranial hypertension (IIH) is characterized by symptoms and signs of increased intracranial pressure without structural cause seen on conventional imaging. Unilateral or bilateral transverse sinus or transverse-sigmoid junction stenosis is a very common finding in these patients. There is ongoing debate whether venous sinus stenosis is the cause of IIH or result of it. Multiple case reports and case series have proven venous sinus stenting to be very effective in medically refractory IIH. Through this study, we want to share our experience with venous sinus stenting in patients with IIIH who had transverse sinus or transverse-sigmoid sinus junction stenosis.

Methods: All patient with medically refractory IIH who underwent venous sinus stenting (VSS) at our university affiliated community comprehensive stroke center in 2017 were analyzed.

Results: Our neuro-ophthalmology services identified four patients that had medically refractory IIIH and underwent VSS or angioplasty. Mean age was 47. Seventy-five percent of patients were women (n = 3). Headache was the most common symptom (100%) followed by transient visual obscurations (75%; n = 3) and pulsatile tinnitus (25%; n = 1). All patients were found to have bilateral papilledema. Mean lumbar opening pressure was 65.2± SD; 4.65; 95% CI = 30.98-41.5). All patients were on maximum doses of acetazolamide and diuretics. Half of the patients had right transverse sinus stenosis with hypoplastic left transverse sinus stenosis (n = 2) and other had bilateral transverse sinus stenosis (n = 2). Mean pressure gradient across the transverse sinus was 17 ± 32 (%). Three patients were treated with transvenous angioplasty with balloon and 1 with angioplasty. All patients were able to come off their medications with significant improvement in symptoms and visual field.

Conclusion: Transverse sinus angioplasty = stenting is a safe and effective means of treating IIH. Larger studies are required to support our results.

14. Perfusion Imaging in the Management of Delayed Cerebral Ischemia after Subarachnoid Hemorrhage

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Perfusion imaging by CT or MR has been proven to be useful for prediction of early detection of delayed cerebral ischemia (DCI) after subarachnoid hemorrhage, attributed to vasospasm. Only recently have systematic reviews differentiated a delay partly detectable by subclinical ischemia. Here, we distinguish the value of perfusion imaging in (1) prognostication of DCI, (2) early detection of DCI, (3) guiding imaging to gauge therapeutic response to hemodynamic augmentation, (4) targeting regions at higher ischemic risk for angioplasty or intraventricular treatments, (5) to ensure that blood brain barrier leakage is effectively preventing reperfusion injury and hemorrhagic insult, and (6) identifying blood brain barrier dysfunction responsible for edema and perfusion metabolic decoupling. We use an alarm system based on age, clinical status, and clinical measures including blood/myocardial inflammatory response syndrome, salt wasting, transcranial Doppler, and intracranial pressure. When suspicion of ischemia is raised we perform to confirm and characterize the lesion–including focal versus global, proximal versus distal, acute versus territorial, cortical versus subcortical ischemia–and guide therapeutic management. For example, only ischemic foci with risk of imminent infarction and proximal narrowing will undergo angioplasty. This protocol leads to (1) less premature recourse to prosaic management with intravenous fluids, hemodynamic monitoring, and neuroimaging, (2) judicious use of neurocognitive scales, quantitative EEG, and intracranial monitoring, and (3) tailored treatment between hemodynamic augmentation and endovascular therapy based on severity of DCI. Perfusion imaging is not the panacea for DCI detection if used indiscriminately, as poor hemodynamic augmentation and endovascular therapy are associated with poor outcomes. However, angioplasty is a tremendously useful tool when used discriminately along with other modalities for evaluating DCI.

15. Carotid Ultrasound with Concurrent Transcranial Doppler in Risk Stratification of Carotid Artery Stenosis

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Background and Purpose: Patients with transient ischemic attack (TIA) require carotid imaging to evaluate for symptomatic internal carotid artery (ICA) stenosis. This can be performed with carotid ultrasound (CUS) or CT angiography (CTA). The decision to proceed with carotid revascularization can sometimes be challenging, especially in cases where the degree of stenosis falls within the “moderate range” (50-69%).

Case: A 71-year-old male on aspirin presented with recurrent episodes of transient right-sided numbness and weakness during insonation. The patient was referred for left carotid endarterectomy. Following successful intervention, the patient has not experienced another episode consistent with TIA.

Conclusion: The use of CUS with concurrent TCD has, to our knowledge, not been previously reported. Our case raises considerations of a novel approach to stratifying the risks of recurrent stroke in symptomatic patients with moderate ICA stenosis using TCD.

16. Lateral Projection is Superior to Oblique Groin Projection in Femoral Angiography for Identification of Arteriography Sites

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Background and Purpose: Femoral arteriography is the critical initial conduit for catheter-based cerebral angiography. After securing access, an arteriogram is performed over the groin in oblique projection through sheath to evaluate for desired arteriography site below the inguinal ligament and above the common femoral artery bifurcation. Knowledge of site insertion is needed to determine suitability of closure device. However, the exact entry point may not be frequently visualized due to catheter- vessel or vessel- vessel overlap. Hardware and implants may also obscure the field. We investigated whether lateral projection was superior to oblique projection in the groin for accurate identification of the arteriography site.

Methods: We performed groin angiography in oblique and lateral projections after securing femoral access in patient undergoing cerebral angiography procedures. Best representative images of angiography were in oblique and lateral projections from 115 patients were interpreted in blinded fashion by an interventional neuroradiologist. Data were recorded whether insertion site was precisely identified in oblique and lateral projections. The reason for inability to identify site of insertion was also identified.

Results: Precise site of sheath insertion was identified in 111/115 (96.5%) lateral projection angiograms compared to 87/115 (75.6%) oblique projection femoral angiograms (χ² = 20.90, P < .05). Oblique projection was more accurate in identifying the arteriography site: catheter- vessel overlap (18.2%), vessel- vessel overlap (3.4%), or hardware obscuration of field (2.6%). In lateral projection, we encountered only 2 cases (1.7%) catheter- vessel overlap and vessel- vessel overlap. None of the lateral projection angiograms were obscured by hardware and implants. In lateral projection, common femoral artery (74.7%) was the most common site of insertion followed by femoral bifurcation (10.4%), superficial femoral artery (9.3%), and deep femoral artery (5%).

Conclusion: Lateral projection is superior to oblique projection in femoral angiography for accurate assessment of arteriography site and entry of sheath.

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17. Per-ictal Neuroimaging Changes during Seizures May Mimic Stroke
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Background and Purpose: Neuroimaging plays an important role in the diagnosis of many neurological conditions, including stroke and epilepsy. Stroke is often described as hypodensity or hypointensification of signal on CT head, or as a diffusion restriction lesion with T2 fluid attenuated inversion recovery (FLAIR) hyperintensities on MRI brain. In epilepsy, neuroimaging is often used to identify brain pathologies that lead to a seizure focus. During seizures, per-ictal changes on neuroimaging have been described, including effacement of gyral markings that may be confused as brain tumors, stroke, or encephalitis. The current case study shows per-ictal changes on neuroimaging that mimicked stroke in a patient that presents with stroke-like symptoms.

Case: This is a 59-year-old female with history of epilepsy, hypertension, dyslipidemia, and hyponatremia deficiency, and type A aortic dissection status postrepair with replacement of the ascending aorta, resuspension of the aortic valve, and bypass to the innominate artery who was admitted for redo of aortic repair with preceding subclavian-carotid transposition. During the surgery, pump time was 188 minutes, and clamp time was 122 minutes. No complications were noted during surgery. Postoperatively, the patient developed sudden onset of left hemiplegia concerning for stroke. Initial CT of the head imaging showed subfalcine effacement of the right frontoparietal cortices. CT angiography of the head and neck was also performed which showed a large arterial dissection involving the right common carotid artery but no evidence of large vessel occlusion. Given her recent aortic repair surgery, the patient was maintained on low-dose aspirin for vessel occlusion, and her last known well time was beyond the 4.5-hour window, patient was not a candidate for IV tissue plasminogen activator or mechanical thrombectomy. MRI head, or as a diffusion restriction lesion with T2* FLAIR signal abnormalities support the possibility of seizure activity. Repeat CT of the head 2 days later showed persistent effacement of the right temporal lobes. Patient was started on Versed drip and started on Keppra and Vimpat. Electroencephalogram (EEG) showed diffuse slowing along with prolonged periodical discharges and epileptiform discharges suggestive of electrographic seizure activity. Doses of Keppra and Vimpat were increased. EEG eventually improved with no focal neuroelectrical deficits after seizures were treated.

Conclusion: Per-ictal imaging findings are important to know as it may point towards pathologies that may lead to different treatment and work up.

18. Variability of Extracranial Flow Velocity Measurements in Sonographic Vasospasm Screening
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Background and Purpose: Transcranial Doppler (TCD) is routinely used to monitor changes in vasospasm in subarachnoid hemorrhage (SAH). The diagnosis of sonographic vasospasm relies in part on velocity measurements in the extracranial internal carotid arteries (eICA) and vertebral arteries (eVA) in order to determine intracranial/extracranial velocity ratios (such as Lindegaard and Source) and hyperintensity in vessel tortuosity between individuals may impact these measurements. We sought to determine the variability of extracranial mean flow velocity (MVV) in a large cohort of patients with SAH at two depths (5-10 mm apart) were available. Most patients had at least three measurements, and the average MVV was computed for the analyses. We calculated the mean absolute and percentage difference between the MVVs at the two depths in the eICA and eVA, respectively, as well as the average absolute and average percentage deviation from the mean. We used Pearson’s test to determine the normality of MVF distribution and two-tailed Student’s t-test to determine the mean values.

Results: We included 25 patients (mean age 59 years, 69.2% female) with serial TCDs for vasospasm screening. SAHs etiologies included aneurysm (80.7%), trauma (14%), and unknown etiology (15.3%). There was no significant difference between the two-depth MFVs for the eVA [3.3 cm/s (1.7, 8.3); t = 52, P = 0.59] or eICA [40 cm/s (3.2, 2, 4); t = 50, P = 0.8]. Mean absolute and percentage deviation between the two depths were normally distributed (P > 0.47). There was a significant difference between the left and right eVA [0.51 cm/s (–9, 1.9); t = 47, P = 0.47] and, respectively, left and right eICA [–0.06 cm/s (–1.2, 1.1) df = 48, P = 0.39] show mean percentage differences between the two and eVAs and eICAs was statistically significant [–1.43 cm/s (–2.3, –0.5), t = 47, P = 0.03]. There is a significant mean percent difference between the two depths in eICA and eVA was also significant [–7.95 (–11.1, 4), t = 48, P = 0.001]. Average absolute decrease from the two depths in eICA and eVA was noted [–1.4, t = 47, df = 48, P = 0.02] and average percent deviation from the mean [–5.28 (–7.8, 3.1), t = 47, df = 48, P = 0.001] to significantly less in mean absolute.

Conclusion: We found that eVA velocities were significantly more variable than eICA velocities. The commonly used intracranial/extracranial MFVs ratios to screen for vasospasm might be subject to this variability. Our study suggests that multiple sampling of extracranial vessels might be important in evaluating vasospasm monitoring, especially in the vertebral arteries.

19. Functional Neurocognitive Imaging to Assess Concussion Biomarkers to Treat Dysregulation of Neurovascular Coupling in Postconcussion Syndrome
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Background and Purpose: We assess these concussion “biomarkers” using Functional Neurocognitive Imaging (fNCI) and compare them to a healthy control to compute a pathology. Additionally, fNCI-derived SIS scores direct pathology. Furthermore, advanced MRI imaging techniques with the current diagnostic criteria of MNDs might increase the sensitivity and specificity of both help in providing an earlier and more confident diagnosis of the disease.

20. The Role of MRI in the Diagnosis of Motor Neuron Disease
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Background and Purpose: Motor neuron diseases (MNDs) are a group of devastating neurological disorders that cause specific damage to motor neuron cells. The possibility of primary lateral sclerosis superimposed on other medical conditions was raised clinically, but difficult to tease out given the confounding variables of the case.

Results: Conventional MRI T2 susceptibility image of the first case showed a hypointense rim in the right precentral gyrus. The diffusion tensor imaging (DTI) showed a fractional anisotropy in Brodmann area 4 (motor) on the left as well as decreased motor fibers in the body of corpus callosum bilaterally with bilateral corticospinal tracts on T1 three-dimensional reconstruction. The conventional MRI of the second case did not show any abnormality, but the advanced imaging of this patient shows diffuse cortical thinning on T1. Additionally, tectography showed asymmetric truncation of motor fibers. Based on the advanced MRI findings, the diagnosis of amyotrophic lateral sclerosis in the first patient and primary lateral sclerosis in the second became more likely.

Conclusion: Incorporating advanced MRI imaging techniques with the current diagnostic criteria of MNDs might increase the sensitivity and specificity of both help in providing an earlier and more confident diagnosis of the disease.

21. Not All That is Bright is an Abscess and Not All That Enhances is a Lymphoma: Biopsy Proven Acute Hemorrhagic Leukoencephalitis
Robin Wright, Haris Kamal
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Background and Purpose: We present the evolution of neuroimaging findings from diagnosis to treatment in a rare case of biopsy proven acute hemorrhagic encephalomyelitis.
that originally raised concerns for an intracranial abscess and later in the hospital course, a central nervous system (CNS) lymphoma.

Case: A 52-year-old Vietnamese male presented to the emergency department with a 2-week history of left-sided weakness, numbness, headache, and dizziness. On exam, the patient had left-sided hemiparesis and left facial droop. MRI brain revealed a 3.4-cm peripherally enhancing lesion at the right thalamus, consistent with peritumoral edema and mass effect with leftward midline shift. Diffusion-weighted imaging showed restricted diffusion with an apparent diffusion coefficient correlate of 1.8. On MRA brain, the lesion was seen extending to the right middle cerebral artery. CBCT did show an earlier occlusion of 9. Three (75%) MCA occlusion had early ischemic changes in deep structures. CBCT did show hypodensity based on CT head. None of the CBCT showed evidence of a lymphoma. MRI brain done after five cycles of plasmapheresis and methotrexate infusions over 6 months showed significant reduction in the lesion size and enhancement.

Conclusion: AHEM is a rare condition with a high mortality and morbidity if not diagnosed and treated early. Neuroimaging can be effectively utilized to narrow the diagnosis in this high acuity illness.

22. Fetal MRI, MRA, and Ultrasound in Facial Hemangioma

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At 33-week gestation, multplanar fetal MRI was performed to evaluate a very large facial mass contiguous with the orbit noted on ultrasound. At delivery, repeat fetal MRI and MR angiography confirmed the clinical diagnosis of a large congenital facial hemangioma. The imaging will serve as the basis for development of a plan for the treatment of fetal MRI as well as the optimal techniques to achieve diagnostic images. Correlation will be made with the ultrasound as well as the postdelivery photographs. The MRI and ultrasound differential diagnosis will also be discussed.

23. Tarlov Cysts: The Underlying Etiology of Persistent Genital Arousal Syndrome

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Background and Purpose: Persistent genital arousal syndrome (PGAS), a newly recognized condition, can be described as persistent physiological arousal in the absence of conscious feelings of sexual desire. PGAS consists of extended penile or clitoral engorgement that either diminish on their own or resolve with ordinary orgasmic experiences. The majority of PGAS cases have been identified in women, 73.9% of whom had a Tarlov cyst in correlation with their symptoms.

Method: A 52-year-old woman presented with perineal pain and was unable to void. She was a 3-year smoker and had normal pelvic exam. Needle electromyography showed abnormal spontaneous activity in the right S1 and S2 paraspinal muscles. CBCT

Conclusion: We concluded that the CBCT could provide useful information for early referrals in M1-M6 areas of MCA. Early deep cortical infarcts can be easily missed. A large population-based prospective study is needed to analyze future use of CBCT to expedite decision making.

26. Dysphagia and Tongue Deviation: Collette-Sicard Syndrome after Blunt Head Trauma

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Background and Purpose: The jugular foramen and the hypoglossal canal are both contained within the skull. The jugular foramen contains the cranial nerves, IX, X, and XI, involved in normal cough and gag reflex. The hypoglossal nerve, XII, is responsible for movements of the tongue. Therefore, multiple lower cranial nerve palsies tend to occur with injuries to these structures. The pattern of injuries tends to correlate with the combination of nerves damaged.

Case: A 28-year-old male was involved in an AVP injury while crossing the highway. Patient was brought to a local Level I Trauma Center. On admission, he was complaining of a headache and inability to swallow his own saliva. Exam showed a Glasgow coma scale of 14 and a nonfocal neurological exam. Lumbar puncture was performed to reduce the intracranial blood burden and alleviate the obstructive hydrocephalus. CT angiography head was negative for arteriovenous malformation or aneurysm. Neurosurgery declined EVD placement due to Glasgow coma scale of 14 and a nonfocal neurological exam. Lumbar puncture was performed to reduce the intracranial blood burden and alleviate the obstructive hydrocephalus. Cerebrospinal fluid (CSF) opening pressure was 34 cm H2O and after removal of 28 mL of bloody CSF the closing pressure was 17 cm H2O. A second lumbar puncture was performed on the following day and 15 mL of bloody CSF was removed. Ultimately, the patient improved and was transferred out of the intensive care unit and later to home with home health.

Results: This patient’s overall good neurological exam did not justify EVD placement but the patient was placed him at risk for worsening obstructive hydrocephalus and possible shunt placement. Serial lumbar puncture was able to reduce the intracranial blood burden while minimizing the procedural risk to the patient.

Conclusion: Treatment of patients with large IVH and good neurological exam remains unclear. Serial lumbar puncture may serve as option in patients in whom the procedural risk of EVD placement would not be justified due to the patient’s good neurological exam.

25. Flat-Panel Cone Beam Computed Tomography is Not a Reliable Predictor of Early Changes in Ischemic Stroke with Large Vessel Occlusions

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Background and Purpose: ASPECTS is a standardized tool to quantify the core infarct in middle cerebral artery (MCA) territory stroke. CBCT (Cone Beam CT) is a new C-arm system with 3D functionality that extends the capability of C-arm imaging to include soft-tissue applications by facilitating the detection of contrast objects. Through this study, our goal was to evaluate for early ischemic signs on CBCT.

Method: All acute ischemic stroke patients who had CBCT prior to intervention at our university affiliated community-based stroke center were retrospectively analyzed from the years 2011–2016.

Results: A total of 221 patients, 5 (females; n = 3) received CBCT prior to intervention. Four out of 5 patients had proximal MCA occlusion and one had distal vertebral artery occlusion. Mean age was 82.2 years. Note that 60% were females. All patients had CT head prior to CBCT. Separate ASPECTS were calculated and compared based on CT head and CBCT head. Only 1 (20%) of all MCA occlusion was 9. Three (75%) MCA occlusion had early changes in deep structures (caudate, internal capsule, lentiform and putamen cortex) and 1 (20%) M3 hypodensity based on CT head. None of the CBCT showed early ischemic changes in deep structures. CBCT did show the M3 M6 hypodensity.

Conclusion: We presented this challenging case of a 49-year-old female with history of systemic lupus erythematosus (SLE), chronic migraines, and depression. She presented with a stroke in 2000 and was later discovered to have basilar artery stenosis. A follow-up CT angiogram in 2015 showed a very small caliber right posterior inferior cerebellar artery. CT perfusion showed hyperperfusion with prolonged time to peak enhancement, bilaterally in the posterior inferior cerebellar artery territory. The superior cerebellar 2018 Annual Meeting Abstracts 229
28. Recurrence of Pineal Germinoma with Drop Metastasis

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Background and Purpose: Pineal tumors are rare and account for <1% of intracranial neoplasms. The majority of these tumors have a germ cell line origin. These tumors generally present due to mass effect with headache, nausea, vomiting, lethargy, and a dorsal midline Parinaud syndrome. Treatment includes radiation, to which pineal tumors are exquisitely sensitive. Prognosis is good with 5-year survival >80%. Rates of recurrence intracranially or spinally are dependent on pathology but spinal progression of disease is relatively uncommon.

Case: This is a 36-year-old male with a history of treated SLE-induced antiphospholipid antibody syndrome (APS) and underlying lupus nephritis. He had a left internal carotid artery and posterior cerebral artery dissection at age 24 and remained asymptomatic until age 34 when he presented to our clinic with a syncopal event.

An MRI of his lumbosacral spine showed an enhancing mass that filled the entire thecal sac to about lambar vertebra L2. He received radiation therapy and subsequently chemotherapy due to inadequate response.

Conclusions: This case reiterates drop metastases as an important, though rare complication of pineal tumors.

29. The Road Less Traveled: Unusual Trajectory of Intracardiac Thrombi with Bilateral Common and Internal Carotid Artery Occlusion

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Background and Purpose: Among all incidents of ischemic stroke, cardioembolic phenomena are responsible for approximately 14–30% of the cases. This etiology of stroke is especially challenging owing to its associated increased risk of early and long-term stroke recurrence, persistent neurologic sequelae at hospital discharge, and high mortality rate. We present a unique case of cardioembolic stroke in a patient with bilateral carotid artery occlusion.

Method: Case report and review of the literature.

Results: A 56-year-old female with history of mitral valve prolapse and antepartum infarct was admitted due to acute 4-day history of slurred speech, left-sided facial droop, and confusion. Neurological examination was remarkable for dysarthria and left-sided facial paralysis. Unenhanced MRI of the brain demonstrated multiple small infarcts in the right cerebral hemisphere, and CT angiography of the brain and neck showed complete occlusion of the common and internal carotid arteries bilaterally. Transesophageal echocardiogram revealed a vegetative presentation wall akinness, a left ventricle thrombus measuring 1.7 x 0.8 cm, and ejection fraction of 30–35%. Warfarin was initiated and bridged with intravenous low-molecular weight heparin, with no planned intervention. On day 5 of hospitalization, the patient experienced a new onset of left sided hemiparesis and visual neglect. CT head revealed no new acute finding, and CT angiogram was unchanged. No additional treatment was initiated beyond continued anticoagulation. The patient was subsequently transferred to inpatient rehabilitation and eventually discharged on day 21 of hospitalization with lifelong warfarin therapy to a skilled nursing facility due to persistent neurologic deficits.

Conclusions: Imaging findings such as combined anterior and posterior circulation infarcts are highly suggestive of cardioembolic stroke. The current case illustrates a unique presentation of cardioembolic ischemic stroke in a patient with complete blockage of the carotid arteries. Prompt diagnosis via TEE examination and neuroimaging is imperative in determining the most appropriate treatment for optimal clinical outcome.

30. Postpartum Bifrontal Intracerebral Hemorrhage: Where’s the Thrombus?

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Pregnancy-associated stroke affects approximately 34 of 100,000 pregnancies. The delivery and postpartum period confer the greatest risk of pregnancy-associated stroke, with a higher number of hemorrhagic than ischemic strokes. Intracerebral hemorrhage (ICH) accounts for approximately 7.1% of all pregnancy-related maternal deaths. Pregnancy-related ICH that is bilateral or multifocal is even more rare.

We report a case of a postpartum 23-year-old previously healthy: African American of bifrontal ICH of unclear etiology. A 25-year-old African American female who was 1 week postpartum was found unconscious after complaining of a sudden onset headache hours prior to arrival, patient was Glasgow comascale 4T with extensor posturing. Noncontrast CT of the head showed large bifrontal parenchymal and subdural hematoma with pronounced mass effect. CT angiography was negative for vascular abnormalities. She underwent an emergent right hemicraniectomy. Diagnostic cerebral angiogram and venogram were performed, showing narrowing of the anterior segment of the superior sagittal sinus (SSS). Clot retriever device was used to clear the thrombus; however afterwards, SSS appeared to be widely patent. Repeat imaging 2 days later again demonstrated filling of the anterior SSS without residual clot after a shorter period, however now also noted diffuse vasospasm. Therapeutic anticoagulation was deferred since no definitive dural sinus thrombosis was identified. Urine toxicology screen was negative. There was no clear hematologic or rheumatologic pathology though her von Willebrand factor levels were mildly elevated.

Throughout her hospital stay, she was noted with episodes of hypertension and sinus tachycardia, which were attributed to sympathetic storming and improved with clonidine patch. She underwent tracheostomy and percutaneous endoscopic gastrostomy placement. Her condition gradually improved. She completed acute rehabilitation and was discharged home, communicating, and performing most activity of daily living. Nearly 6 weeks after discharge, she presented again with pulseless electrical activity arrest and subsequent diffuse anoxic brain injury in the setting of a possible seizure without convulsions. She was resuscitated to a 5T with return of spontaneous circulation and was transferred to a rehabilitation hospital.

Conclusion: This case is educational by way of:

1. the extreme rarity of ruptured aneurysms in this age,
2. the presentation with subdural hematoma (in addition to subarachnoid hemorrhage), and
3. the rapid multimodality imaging evaluation prior to emergency surgery that did NOT include a catheter angiogram.

32. Neuroimaging Outcomes of a Cognitive Rehabilitation Training Program

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Cognitive training has shown promise in the remediation of cognitive skill deficits resulting from injury or neurodegeneration. It is presumed that robust cognitive training can drive neuroplasticity and thus is the mechanism underlying associated gains. MRI is a noninvasive technique by which the manifestation of neuroplasticity can be assessed, and while most MRI studies assessing cognitive training outcomes are group studies, MRI techniques may be sensitive enough to assess effects of a robust cognitive training program, such as ThinkRX, at the single subject level. ThinkRX (LearningRx™) is an intensive, 60+ hour, one-on-one, clinician-delivered cognitive training program based on the Cattell-Horn Carroll theory of cognitive abilities, and targets multiple cognitive skills including attention, working memory, processing speed, logic and reasoning, auditory processing, and visual processing. Observational results in a traumatic brain injury (TBI) population (n = 273) found a mean increase of 10 points in intelligence quotient score, and a retrospective chart review of 11 soldiers with brain injury found a mean increase of 23 points, as well as subjective clinically significant change. To investigate if aberrant brain connectivity and changes in brain connectivity (a neuroimaging marker of neuroplasticity), were evident prior to and after completion of a robust cognitive training program, a series of case studies were carried out in subjects with varying degrees of traumatic brain injuries (n = 5) and cognitive impairment (n = 5). An MRI image acquisition protocol optimized for single subject imaging and sensitive enough to allow for repeat visualization of the resting-state default mode network (DMN) was developed on a 3T Siemens Skyra MR system and included acquisition of the following: a T1-weighted sequence for high resolution anatomical imaging, a diffusion-weighted sequence for identification of white matter regions, a planar imaging blood oxygen level dependent sequence (repetition time = 3 seconds, 240 acquisitions, scan time = 12 minutes) for assessment of regional cerebral blood flow and connectivity. MR exams were acquired on all subjects prior to and upon completion of the cognitive training program. MRI data were processed and analyzed using FreeSurfer and the CONN toolbox. In addition to MR exams, all subjects completed pre-/postcognitive psychological testing (WAIS and condition-specific rating scales). For each and a control subject, the DMN was visualized and within network connectivity quantified. Pretraining scans of the more severely impaired cases showed evidence of aberrant DMN connectivity, including hyperconnectivity, hypoconnectivity, and a loss of anticorrelated (or negative) connectivity. Pretraining scans of the more cognitively impaired cases did not suggest the involvement of the DMN as v asymptomatic or brain connectivity. As such, pre-/postscans of the more homogeneous least impaired cases were analyzed at...
33. A Space-Occupying Lesion in the Brain Associated with Testicular Carcinoma

Sufana Shikdar, Oumoul Barry, Eugene Choi
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Background and Purpose: Encountering space-occupying lesions (SOL) poses a diagnostic challenge clinically, radiologically, and pathologically; hence, it is often misdiagnosed. We report a case of SOL of the brain in a patient with a recent history of testicular cancer posed an intriguing diagnostic dilemma.

Case: A 38-year-old male with a past medical history of testicular seminoma (2015) status postright orchiectomy and chemotherapy with bleomycin presented with cough and shortness of breath for 2 days. Physical examination was unremarkable. CT chest revealed ground glass infiltrates on both upper and lower lobes, and patient was started on levofloxacin for atypical pneumonia. In the emergency department, he had a period of mild confusion prompting a CT brain which showed small enhancing lesion. MRI brain which showed extensive bilateral infiltrates. Infectious disease was subsequently treated with pyrimethamine for toxoplasma encephalitis. SAH patient’s CT revealed worsening diffuse SAH with hydrocephalus. All patients had thin sliced CT head and subsequent protocol for comparison of intracranial hemorrhage with CT. These findings were confirmed on thin sliced CT.

Conclusion: We report a case of implementation of CBCT was successful in detecting intracranial hematomas. Our study was limited due to small population. Given the opportunity for expediting decision making in this critical setting, the use of intraoperative CBCT for inclusion or exclusion of hemorrhage warrants further large population-based prospective trials.

35. Copper Deficiency Myelopathy: A Penny for Your Thoughts

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Background and Purpose: We present a case of copper deficiency myelopathy of the clinical and imaging findings associated with different etiologies of long segment T2 hyperintense dorsal column lesions.

Methods: Case report and literature review.

Results: We present the case of a 41-year-old female with history of hyperthyroidism and anxiety presenting with vague complaints of transient episodes of numbness particularly affecting the right upper extremity. MRI revealed a discrete T2/hypointense T1 inversion recovery hyperintense lesion involving the cervical vertebral C1-C7 posterior column bilaterally, without enhancement or cord edema. Labs were sent to evaluate for vitamin deficiencies, autoimmune, and postinfectious etiologies. Results included an undetectable copper level and low normal B12 level. On return visit 6 months later both B12 and copper levels had normalized with symptom improvement. In the interim, patient had been taking both oral supplementation and over the counter multivitamins, thus the underlying etiology was still unclear. Ultimately, close examination of the imaging characteristics played a significant role in diagnosing the patient with copper deficiency myelopathy.

Conclusion: The underlying etiology of long segment T2 hyperintense dorsal column lesions associated with imaging, can classically determined on serum testing. Confounding variables, however, such as lab error, replacement of multiple nutrients simultaneously, or insufficient history can occasionally make identifying an underlying etiology difficult. This case illustrates the importance of understanding the subtle clinical and imaging findings associated with different etiologies of long segment T2 hyperintense dorsal column lesions when serum testing is not clearly diagnostic.

34. Role of Flat Panel Cone Beam CT in Detecting Intracranial Hemorrhage: Single Center Experience

Amrinder Singh, Ashish Kullhari, Sridhhat Mehta, Briana Decarvalho, Anna Barminova, Hemal Patel, Spozhmy Panzejai, Jawaf F. Kirmani
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Background and Purpose: Symptomatic intracerebral hemorrhage occurs in about 6–10% of thrombectomy cases. Intracranial hemorrhage is a known complication of other neuroendovascular procedures like aneurysm embolization. Conventionally, a CT head is done postprocedure especially thrombectomy to rule out postprocedural hemorrhage. A CT head postprocedure functionality extends the capability of C-arm imaging to include soft-tissue applications by facilitating the detection of low-contrast objects on Cone Beam CT (CBCT). Our goal was to evaluate the application of this technology in detection of intracranial hemorrhage in patients undergoing neurointervention.

Methods: Between the years 2011 and 2016, CBCT was performed in 8 patients during neurointervention procedures at our university affiliated community-based comprehensive stroke center, for early detection of intracranial hemorrhage.

Results: Of a total 221 stroke patients that received acute stroke intervention, a total of 8 patients received CBCT. Six of 8 patients (75%) were male with acute ischemic stroke, 1 with cerebral aneurysm, and 1 with subarachnoid hemorrhage. Mean age was 73 years (range 49-93); 62.5% (5/8) were females. A new C-arm system with 3D functionality was utilized. The Tolosa Hunt syndrome is a classic differential diagnosis. Cerebral air embolism is most often associated with invasive procedures or surgery. Symptoms of cerebral air embolism are uncommon.

Methods: A 64-year-old female with a history of coronary artery disease, chronic obstructive pulmonary disease, hypertension, diabetes mellitus II, and tobacco abuse presented to the emergency department after being discovered comatose by her family with last known well 1 hour prior. Head CT showed subarachnoid hemorrhage with cerebral air embolism. CT angiography of the chest revealed 7 x 8 cm mediastinal mass, with supradiaphragmatic lymphadenopathy. Biopsy of the mass confirmed the diagnosis of squamous cell carcinoma. Neurological examination continued to decline as the patient had a ST-elevation myocardial infarction and repeat head CT revealed diffuse cerebral edema. Family chose to pursue comfort care.

Results: Cerebral air embolism is often quickly considered in the periprocedural period when acute neurological change is noted. In patients presenting with acute neurological change in which there is no antecedent procedure, pulmonary vascular imaging should be considered to identify the source of the cerebral air embolism.

Conclusion: Primary pulmonary sources of cerebral air embolism are rare and should be considered when there is no antecedent procedure.

38. Tolosa Hunt Syndrome: Important Diagnosis Often Missed with Incorrect MRI Sequences

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Background and Purpose: The Tolosa Hunt syndrome is defined as unilateral orbital pain associated with paresis of
one or more of the IIIrd, IVth, and/or VIth cranial nerves caused by a granulomatous inflammation in the cavernous sinuses or orbit.” The estimated prevalence of Tolosa Hunt syndrome is one in a million. When the disorder involves the orbital apex without the cavernous sinus, it is sometimes referred to as “orbital pseudotumor.” It usually presents as retro-orbital pain radiating to the back of the head. Neurologists often do not suspect Tolosa Hunt as the cause of the headache until ophthalmoplegia develops a few days later. A new onset of a severe headache in these patients usually leads to an MRI of the brain and orbit. However, this study often misses the inflammation in the small region of the orbital apex and/or cavernous sinuses, leading to false reassurance to clinicians and patients about the benign nature of headache. Special MRI sequences, which may not be available in all hospitals, show improved sensitivity in detecting Tolosa Hunt syndrome. The objective is to review the clinical presentation, radiographic features, and treatment response of two patients with Tolosa Hunt syndrome.

Methods: Case series from a tertiary medical center.

Patient 1: A 28-year-old woman presented to an emergency department for headache and diplopia. A 70-year-old man presented to movement disorders clinic with multiple cranial nerve palsies. The establishment of a Comprehensive Stroke & Neuroscience Center, Atlanta, GA Medicine, Atlanta, USA

Research and physicians led to a major growth in our service line, while also increasing our service line representation approximately 2% of all central nervous system (CNS) malignancies. Macroscopic evaluation and management of this condition are crucial. Establishing this diagnosis is often challenging to the diverse clinical presentation. We present an unusual case of a patient with PCNSL exhibiting prominent abulia and falls.

Methods: Presenting with Abulia and Falls

Tannor Anderson, Sunil Mutgi

Ventricle

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Background and Purpose: Primary central nervous system lymphoma (PCNSL) is a rare malignancy representing approximately 2% of all central nervous system (CNS) malignancies. PCNSL accounts for one-third of all primary CNS tumors, with a median survival of 9-24 months. PCNSL demonstrates high rates of recurrence and/or dissemination, leading to suboptimal survival outcomes. Therefore, the objective of this case report is to highlight the importance of multidisciplinary care, including radiation therapy and chemotherapy, to improve outcomes for patients with PCNSL.

Case:

A 70-year-old male presented with a 6-month history of headaches, vision problems, and dysarthria. MRI of the brain showed a mass in the left temporal lobe, extending to the thalamus, with enhancement. The patient was referred for further evaluation, and a repeat MRI was performed, which showed no change in the size of the lesion. The patient was then referred to the Department of Radiation Oncology, where he underwent radiotherapy.

Results:

The patient completed six cycles of chemotherapy with R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone). His symptoms improved significantly, and his MRI showed a decrease in the size of the lesion.

Conclusion:

PCNSL is a rare and aggressive type of lymphoma that requires a multidisciplinary approach for optimal management. The use of chemotherapy and radiation therapy, along with early detection and prompt intervention, can improve outcomes for patients with this condition.

40. Primary Diffuse Large B-Cell Lymphoma of the CNS in an Immunocompetent Patient Presenting with Abulia and Falls

Tammer Anderson, Sunil Mutgi

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Background and Purpose: Primary central nervous system lymphoma (PCNSL) is a rare malignancy representing approximately 2% of all central nervous system (CNS) malignancies. PCNSL accounts for one-third of all primary CNS tumors, with a median survival of 9-24 months. PCNSL demonstrates high rates of recurrence and/or dissemination, leading to suboptimal survival outcomes. Therefore, the objective of this case report is to highlight the importance of multidisciplinary care, including radiation therapy and chemotherapy, to improve outcomes for patients with PCNSL.

Case:

A 70-year-old male presented with a 6-month history of headaches, vision problems, and dysarthria. MRI of the brain showed a mass in the left temporal lobe, extending to the thalamus, with enhancement. The patient was referred for further evaluation, and a repeat MRI was performed, which showed no change in the size of the lesion. The patient was then referred to the Department of Radiation Oncology, where he underwent radiotherapy.

Results:

The patient completed six cycles of chemotherapy with R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone). His symptoms improved significantly, and his MRI showed a decrease in the size of the lesion.

Conclusion:

PCNSL is a rare and aggressive type of lymphoma that requires a multidisciplinary approach for optimal management. The use of chemotherapy and radiation therapy, along with early detection and prompt intervention, can improve outcomes for patients with this condition.
43. Marchiafava–Bignami Disease. A Rare Cause of Callosal Damage
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Background and Purpose: Marchiafava–Bignami (MB) disease is characterized by demyelination and later necrosis of the corpus callosum; however, cases have been reported with lesions in the genu and splenium. About 8% of cases are fatal; with prompt treatment there is recovery to some degree, but with majority of patients showing some long-term disability. MRI findings in MB include T1-weighted hypointensity and T2-weighted and fluid-attenuated inversion recovery (FLAIR) hyperintensity within the corpus callosum; acute cases show restricted diffusion on diffusion-weighted imaging sequence.

Methods: A case report of a 38-year-old woman without stroke risk factors presents after being discharged from another hospital without a clear diagnosis; she has several months of declining cognition and appetite, and 2 weeks of impaired speech and gait. She is cachectic, with dysarthria, spasticity, and ataxia.

Results: MRI of the brain shows restricted diffusion in the splenium with a corresponding hypointense region on apparent diffusion coefficient sequence. T1 sequence shows hypointensity in the splenium with corresponding hyperintensity on T2 and FLAIR sequences. A contrasted study did not show enhancements. Serum studies revealed low B1 level, otherwise no gross abnormality, likewise, cerebrospinal fluid evaluation was unremarkable. She was diagnosed with MB disease, treated with high dose intravenous vitamins, and over a course of several weeks regained her speech and gait, and was discharged home.

Conclusion: Although MB disease is rare, with only several hundred reported cases, it is imperative to consider it in the differential diagnosis of the encephalopathic patient with a callosal lesion as early diagnosis and treatment may decrease mortality and lead to better recovery.

44. Superior Sagittal Sinus Thrombosis Initially Misdiagnosed as an Ischemic Stroke
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Background and Purpose: Cerebral venous thrombosis (CVT) is an infrequent diagnosis made in the emergent hospital setting. The presentation of CVT widely varies, with common symptoms of headache, seizures, motor/sensory deficits, and encephalopathy to name a few. This requires the provider to take a careful history and exam with supplementary diagnostic imaging to exclude common mimickers of this disorder. We report the case of a postmenopausal woman with Superior Sagittal Sinus Thrombosis (SSST), who was initially misdiagnosed with an ischemic stroke for a questionable focal hypodensity in the right frontal lobe on noncontrast CT that was later again reviewed by radiology and confirmed to have a hyperdensity of the Superior Sagittal Sinus.

Methods: A 69 year-old-woman presented with progressive worsening headache. Her headache began following 2 days of diarrhea while returning from vacation on a cruise. She was brought in a stroke-alert after she was found down, unresponsive, with left-sided gaze preference, and right-sided weakness with a National Institute of Health Stroke Scale of 23. A CT scan revealed a hyperdensity of the superior sagittal sinus, however, was overlooked and was otherwise read as an acute infarct in the right frontal lobe.

Results: Further work-up for her presentation with CT angiography/CT perfusion, did not reveal stenosis, aneurysm, ischemic core, or penumbra. Emergent electroencephalogram did not show patient in status epilepticus. Additionally, lumbar puncture performed at the bedside was unremarkable. MRI with and without contrast revealed abnormal signal in the sagittal sinus consistent with SSST. After formal review of the case, it was disclosed that the diagnostic imaging and studies were excessive following the initial noncontrast CT, which indicated hyperdensity of the sagittal sinus to confirm immediate diagnosis. The patient subsequently improved back to her baseline following anticoagulation and thrombolysis.

Conclusion: SSST can be an elusive diagnosis given the variability in clinical presentation. Noncontrast CT can present a dense triangle sign as was seen in this case, however, initially missed by on call radiologist. Postcontrast CT scan additionally demonstrates an empty delta sign. CT venography, MRA, and MR venography are extremely sensitive for diagnosis of SSST. Medical management with anticoagulation is first-line treatment and can be complemented with thrombolysis in medically refractory cases.