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2022 Alpers Day Neurology Residency Abstracts

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THE DEPARTMENT OF NEUROLOGY

presents

THE FIRST ANNUAL

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Thomas Jefferson University
HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

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Metabolomics in Epilepsy

Braslavsky M, Basovic L, Rehman M, Gal J, Kaushal G, Bhushan A, Nei M

INTRODUCTION/ PURPOSE

Excessive hypersynchronous activation in the cortex causes seizures, though precise biochemical mechanisms underlying seizure initiation, propagation and termination are unknown. Metabolomics, the study of small molecule chemicals involved in metabolic processes, can reveal novel and unexpected biomarkers in epilepsy. This pilot study looks to characterize metabolomic changes in focal epilepsy patients baseline and postictally, to understand corresponding changes in metabolism.

HYPOTHESIS

There are significant alterations in specific compounds after seizure, identified by targeted and untargeted metabolomics, including lactate, glyceraldehyde, trans-13-octadecenoic acid, glycine, and citrate, during the post-ictal period, compared with baseline, in patients with focal epilepsy.

METHODS

We expect to recruit 10 patients with refractory focal epilepsy admitted to the epilepsy monitoring unit. Nursing staff was trained on sample collection and storage. Clinical neurology providers were trained on informed consent, recruitment and sample distribution. Baseline (12 hours after seizure), post-exercise and post-ictal (each within 10 minutes) plasma samples are collected for metabolomics analysis. Pharmaceutical sciences team will analyze samples.

RESULTS/ PROGRESS/ DATA ANALYSIS

Despite initial delays relating to the COVID-19 pandemic and interdisciplinary coordination, staff training, recruitment and sample collection has now begun (Appendix I). Once equipment is installed, standardization and sample analysis will start. The amount (peak area) of each metabolite at baseline will be compared with post-ictal profile and differences analyzed via paired t-tests. Group data will be compared via t-tests evaluating peak area for identified metabolites for statistically significant changes ($p<0.05$).

CONCLUSION

Differences in metabolomics profiles specific to the post-ictal period and epilepsy may eventually help diagnostically. They could differentiate epileptic from non-epileptic seizures, avoiding unnecessary medications. In low-resource settings without EEG, a standardized blood test could provide an alternative. This could aide in assessing treatment response. Further like studies could also correlate with specific epilepsy types and elucidate drug targets.

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Exploration of Antipsychotic Prescribing Practices Among Movement Disorders Subspecialists for Patients with Parkinson's Disease Dementia and Dementia with Lewy Bodies

Burda KV, Selbst D, Margolis J, Heiry M

BACKGROUND/PURPOSE

Psychosis in Parkinson's Disease Dementia (PDD) and Dementia with Lewy Bodies (DLB) contributes to decreased quality of life and increased healthcare resource utilization. Many antipsychotic drugs (APDs) can worsen parkinsonian symptoms. Pimavanserin has been associated with superior outcomes and fewer adverse effects compared with other APDs. However, the prevalence of its utilization has not been well-studied. This study explored APD prescribing practices with a focus on Pimavanserin in the PDD and DLB population.

METHODS

Physician members of the International Parkinson and Movement Disorder Society (MDS) were surveyed regarding management of psychosis in PDD and DLB. Statistical analysis was performed using Excel and SPSS.

RESULTS

496 physicians completed the survey. Factors cited as most significant when initiating APDs included "severity of psychosis" (79.2%) and "side effect profile" (49.2%). Quetiapine was the most prescribed APD for both PDD (54.6%) and DLB (44.2%). Of the 149 respondents who had ever prescribed Pimavanserin, 65.8% reported using it only for escalation when other treatments failed. Commonly cited limitations in prescribing Pimavanserin included cost (80.4%) and availability (51.9%).

Pimavanserin use was higher among U.S.-based respondents compared to the international community [PDD OR = 4.52 (CI 1.68-12.15); DLB OR = 4.19 (CI 1.79-9.82)]. Among all prescribers of Pimavanserin, those from the U.S. and those predominantly in the academic setting were significantly less likely to use Pimavanserin first-line vs. after trialing other medications [U.S.-vs-Others OR=0.37 (CI 0.16-0.86); Academic-vs-Community OR=0.32 (CI 0.14-0.69)].

CONCLUSION

Quetiapine remains the most popular APD for both PDD and DLB. Pimavanserin use is significantly more common among U.S. respondents compared to the international community; however, U.S. respondents are more likely to use it as an escalation therapy rather than a first-line medication. In the U.S., use of Pimavanserin as a first-line APD is significantly more common among providers in the community setting vs. the academic setting.

Metabolomic analysis of extracellular vesicles in Multiple Sclerosis

Chuang TY, Kenkare A, Casella G, Sheehan L, Rostami AM

BACKGROUND/PURPOSE

Multiple Sclerosis (MS) is a progressive neurological disease which affects over 2.8 million people worldwide. MS-specific biomarkers predictive of disease exacerbation and outcome remain elusive. Extracellular vesicles (EVs) are potential sources of biomarkers, as they are a method of cell-cell communication and cargo delivery. There is growing literature regarding the role of EVs in multiple disease states, including MS. In this study, we elucidate the metabolomic profile of extracellular vesicles in the cerebrospinal fluid (CSF) and serum samples of MS patients versus controls.

METHODS

CSF and serum specimens were collected from MS (n=7) and control (n=6) patients. The extracellular vesicles were then isolated via filtration and ultracentrifugation using established methods. Samples were analyzed via Liquid Chromatography-Mass Spectrometry (LC-MS) at The Wistar Institute. Metabolomic data were filtered and normalized using Metaboanalyst 5.0.

RESULTS

We found that CSF metabolites differ between MS and control patients, specifically those of collagen component 4-hydroxyproline (p-value = 0.007) and linoleic acid derivative 9 Oxo-ODE (p-value = 0.007). In CSF EVs, 4-hydroxyproline was significantly increased (p-value = 0.02), while taurine was significantly decreased (p-value = 0.04). Serum metabolites involved in glycerolipid, glycerophospholipid, and nicotinate and nicotinamide metabolism are increased in MS patients. Serum EVs also contain significantly increased metabolites involved in purine and glycerolipid pathways in MS patients.

CONCLUSIONS

EVs are known to cross the blood-brain barrier and are potential biomarkers for disease state prognosis. Our analysis demonstrated that EVs in the CSF of MS patients have different metabolomic profiles compared to serum EVs. We also established that the EVs in MS patients have different metabolomics compared to control. Further studies are ongoing to dissect the details of these metabolic pathways in MS and their significance in immunopathogenesis.

The relationship between wearing-off between medication doses in patients with Multiple Sclerosis (MS) on disease modifying therapies (DMTs) and body mass index (BMI)

Gruder O, Devlin K, Leist T

BACKGROUND

Despite advancements in DMTs used for MS, there is only one standard dosing for DMTs. Some patients a wearing-off effect or worsening MS baseline symptoms shortly before their next infusion is due. We hypothesized that patients with higher BMI's have a greater frequency of wearing-off in between their infusion intervals and may need alternative dosing regimens.

OBJECTIVES

The aim of this study was to perform an institutional survey-based review to determine if the phenomenon of wearing off DMTs is related to BMI. Additionally, we will compare wearing off to additional demographics including age, recent weight loss or weight gain, type and duration of infusions. The purpose of the study is to utilize these demographics to determine if alternative dosing regimens for DMTs for certain patient populations are suggested.

METHODS

Patients with RRMS and PPMS who previously underwent at least one infusion of a DMT were included in the study. Prior to or during each infusion, patients completed the Multiple Sclerosis Impact Scale (MSIS-29), The Center for Disease Control and Prevention Health-Related Quality-of-Life 14-Item Measure (CDC HRQoL-14) and a general survey about wearing-off devised for this study. Height and weight were obtained on the day of survey completion to allow for accurate BMI calculation.

RESULTS

67 patients agreed to participate during the 3-month time period. The infusions received were rituximab, ocrelizumab and natalizumab. 80.6% of all patients reported at least one symptom of wearing off prior to their next infusion dose. There was no statistically significant relationship between wearing off and BMI, though there was with the MSIS Physical Impact Score. Each increased point on the MSIS scale was associated with an 8% increased odds of wearing off.

CONCLUSIONS

80.6% of MS patients surveyed reported wearing off prior to their next infusion which appeared to only be related to MSIS scale. This raises the question if these patients are reporting greater impact because they are wearing off or if they may have had a more severe form of the disease. In the future, we should evaluate the relationship between wearing off in certain MS subtypes, duration of infusions, and MRI lesion burden. Understanding proper dosing regimens may help us better serve our patients and improve their quality of life.

SETscore to Determine Prolonged Mechanical Ventilation Times and NICU-LOS for All NICU Patients with Brain Injuries

Lee E, Selbst D, Leist T, Shah S

Patients that are mechanically ventilated (MV) in the NICU differ from other ICU patients due to the nature of their injuries involving the brain. One study created the SETscore to predict which non-traumatic cerebrovascular patients would have prolonged MV times and thus promote early tracheostomies. Our study examines if the SETscore can be applied to all NICU patients with other brain injuries (non-CVA) besides cerebrovascular ones.

We retrospectively reviewed patients requiring MV within 48-hours of admission in the NICU from 2019-2022. We excluded patients intubated for a procedure, had withdrawal of care without an extubation attempt, or expired within 48-hours of admission. We compared the average MV time and NICU-LOS for patients using unpaired t-tests to see if SETscores would correctly predict those variables for our cohort. We also compared averages for non-CVA patients with CVA patients to see if it similarly predicted MV times and NICU-LOS.

CVA patients with SETscores > 10 did have longer average MV times (10.10+1.80) than CVA patients with SETscores < 10 (1.50+0.50), ($p=0.067$). Non-CVA patients with SETscores > 10 (13+6.30) had similar MV times to non-CVA patients with SETscores < 10 (12.3+1.82), ($p=0.89$). There was no significant difference in average NICU-LOS in both CVA ($p=0.64$) and non-CVA groups ($p=0.43$). When comparing CVA with non-CVA patients with SETscores > 10, the average MV times were similar ($p=0.58$). For patients with SETscores < 10, MV times between CVA and non-CVA patients were not significantly different ($p=0.074$).

Currently, our data doesn't show a significant difference in all groups based on their SETscores and injuries. This may be due to our cohort being from a tertiary care center with generally sicker patients. Our study also had an n=36. With the addition of more data, SETscores could predict prolonged MV times and NICU-LOS. This would encourage early tracheostomies, improving clinical outcomes, overall hospital LOS, and costs.

Effectiveness of in-patient implantable Heart Monitor in capturing afib in cryptogenic stroke patients

Lee H

INTRODUCTION

Atrial fibrillation (AF) is a recognized risk factor of ischemic stroke and AF-related stroke is twice more likely to prove fatal. Long-term cardiac rhythm monitoring has greater diagnostic yield compared to conventional monitoring in detecting AF. Utility of implantable loop recorder (ILR) in detecting AF was established not only in patients with cryptogenic stroke but more recently in strokes due large artery atherosclerosis and small vessel disease Stroke AF trial. We reviewed 3 years of data from patients who had both inpatient and outpatient ILR placement at a comprehensive stroke center.

METHODS

A review of prospectively collected registry of ILR implantations performed at a Comprehensive stroke center was conducted. Data from 2017–2019 of in-patient and out-patient implantation was analyzed. Eligible patients identified by vascular neurology (VN) underwent in-patient implantation primarily by interventional neurology (IN) and as out-patient by electrophysiology Cardiology. In-patient implant and programming were done on the day of discharge. Continuous monitoring was followed by EP Cardiology. AF detection was urgently communicated by EP Cardiology and anticoagulation initiated by VN. Patients lost to follow up or lacking information in medical records were excluded from analysis.

RESULTS

Total of 428 ILR implantations were performed over a period of 3 years (1/2017 - 12/2019) with majority implants as in-patient prior to discharge 290 (67.8%) and out-patient 78 (32.2%). Inpatient ILR placement was noted to be 75% in 2017, 78% in 2018 and 80% in 2019. 57.2% of in-patient ILRs were placed by IN and 42.8% by EP. Average time to in-patient ILR was 4.1 days with 77% within 5, 18.5% within 10, and <5% within 11 or more days post-stroke. Average time to out-patient ILR placement was 57 days with only 16% within 15, 29% within 30 day and 53% in more than 30 days from stroke. Over the course of 2 years of monitoring, AFib was detected in 33% with false detection in 1.5% (19.6% in 2017, 26% in 2018 and 36.5% in 2019).

CONCLUSIONS

A multispecialty collaborative care pathway to increase implantation rate in eligible patients is recommended. In-patient implantation allows establishing continuity of care, patient retention, prevents lost to follow-up, avoids delay in monitoring, and importantly decreases the risk of stroke recurrence by early initiation of anticoagulation.

Hypertonic saline use in post cardiac arrest patients for treatment of cerebral edema

Maguire L, Dolla A, Shah S, Thomas T

BACKGROUND

Hypoxic brain injury in cardiac arrest patients is a leading cause of mortality and long-term disability in its survivors. There are multiple mechanisms for secondary injury to the brain leading to cell death including reperfusion injury, microcirculatory dysfunction, and vasogenic or cytotoxic edema. The use of hypertonic saline (HTS) has been previously shown to reduce secondary injury in animal models by reducing inflammatory cascades, improving microcirculatory flow, and reducing cerebral edema. Thus far, evaluation of hypertonic saline use in humans post cardiac arrest has not been fully evaluated. *We hypothesize that cardiac arrest patients receiving HTS do not have worsened clinical outcomes or increased mortality due to complications secondary to HTS therapy.*

METHODS

This study is a retrospective feasibility study of adult cardiac arrest patients at TJUH who received HTS for reduction of cerebral edema and neuronal injury during their hospital course. Data was compared with age and gender matched cardiac arrest control patients. Primary and secondary endpoints include CPC score at discharge and in-hospital mortality, pulmonary edema and acute kidney injury (AKI). Statistical analysis was performed using Graphpad prism v9.

RESULTS

Retrospective chart review was performed on 17 cardiac arrest patients receiving HTS and 10 controls (Age 44.76$\pm$3.25 vs 48.50$\pm$4.67 respectively, p=0.5). Initial CT head revealed cerebral edema in 70.59% HTS and 20% control patients (p=0.018). HTS patients had higher numbers of AKI on presentation (p=0.049), however no difference was found in CPC scores at discharge and in-hospital mortality (p>0.05) between groups.

CONCLUSION

In conclusion, there were no significant changes in CPC score or in-hospital mortality for patients treated with HTS verses those who were not. Future studies should be performed to address whether these outcome measures can be improved by early initiation of HTS prior to development of cerebral edema on CT head.

Neurostimulant Medication Application in Acute Patients in the Neurocritical Care Unit

Kananeh M, Birkenstock L, Navarathna K, Sharma K, Shah S, Vibbert M

INTRODUCTION

Many patients admitted to the neurocritical unit (NCCU) are in a non-responsive state. Numerous reports have been published on the use of neurostimulant medications (NSMs) to help improve consciousness in brain injured patients. Most of these reports have been on chronic vegetative or minimally conscious state patients. There is limited prospective data on the use of NSMs in the acute setting.

METHODS

We prospectively collected data on patients admitted to Thomas Jefferson University Hospital's NCCU from 2/2019 to 3/2020. We collected demographic data, GCS on day one of starting NSMs and three days after, medications, infections and creatinine. Modafinil or Adderall were started on stabilized patients with persistent GCS $\leq$ 9. A positive response was defined as an improvement in GCS by 2 points within 3 days.

RESULTS

73 patients received NSMs (17 Adderall and 58 Modafinil). Patients admitted with stroke were unlikely to benefit from NSMs ($p < 0.001$). There was no significant relationship between NSMs and improvement in GCS in patients admitted with seizures, anoxic brain injury, brain trauma, tumors or CNS infections. There was no significant relationship between starting NSMs and improvement in GCS in patients with encephalopathy, interictal brain activity (GPDs or LPDs), systemic infections or on antibiotics or AEDs. Adderall was discontinued in 5 patients (4 tachycardia, 1 hypertension). Modafinil was stopped in 3 patients (2 seizures and 1 tachycardia).

CONCLUSION

Using NSMs for three days was insufficient to improve GCS in our patients. Longer durations of NSM use may be provide benefit but further research is needed.

A Review of Effect of Ticagrelor on Platelet Inhibition in Clopidogrel Non-responders Undergoing Neuroendovascular Procedure

Patel P, Herial N, Gooch M, Tjoumakaris S, Jabbour P

INTRODUCTION

Neuroendovascular procedures are routine in treatment of aneurysms, arterial stenosis, and ischemic stroke. Patients are treated with antiplatelets prior to procedure to prevent thrombotic complications. However, some patients may still experience post procedural thrombotic or hemorrhagic complications which may be related to platelet inhibition.

METHOD

A retrospective review of patients who underwent neuroendovascular procedure from 1/2017 to 12/2019 in Jefferson hospital. Patients undergoing elective procedure received DAPT daily. Patients undergoing emergent procedures received loading doses of Aspirin (650 mg) and Clopidogrel (600 mg). P2Y12 assay was checked prior to receiving Platelet inhibitor and 6 hours after loading dose. Optimal platelet inhibition was classified as reduction in P2Y12 assay by at least 60%. Patients with suboptimal platelet inhibition <60% were given Ticagrelor loading dose (180 mg) and assay was rechecked.

RESULT

Total procedures requiring stents were 687 over period of 3 years. These included aneurysm stenting 239, aneurysm stent-assisted coiling 112, intracranial stent for failed MT 62, carotid artery stent 108. Suboptimal platelet inhibition was noted in 54% after Clopidogrel. After Ticagrelor, optimal inhibition was noted in 80% of 282. Thrombotic complications were noted in 7, 6 were noted to have <50% platelet inhibition. Hemorrhagic complications were noted in 17, amongst them >70% platelet inhibition was noted in 14 patients.

CONCLUSION

Patients receiving P2Y12 ADP antiplatelet therapy may have suboptimal platelet inhibition leading to increased thrombotic risk. Patients who have >70% platelet inhibition are at increased risk for hemorrhagic complications. Better platelet inhibition was achieved with Ticagrelor in Clopidogrel hypo-response patients. In patients with Clopidogrel hyper-response, dosing was changed to half dose or alternate day to reduce hemorrhagic complications. As the use of endovascular therapies requiring DAPT becomes more established, there is an increasing need to develop titration protocols that minimize the risk of thrombotic and hemorrhagic events based on platelet inhibition.

Assessment of Outcomes for Acute Stroke Patients Boarding in Emergency Department

Porreca L

The management of patients with strokes or transient ischemic attacks during the acute phase requires vigilant, time-sensitive care. An emphasis on efficient disposition to the appropriate inpatient services for acute stroke patients can avoid crucial delays in this care and subsequent worse clinical outcomes. The Jefferson Neurology Acute Stroke Unit (ASU) is historically a high-volume service, leaving ample chance for such adverse results due to the not-infrequent scenario wherein patients admitted to the ASU must spend time boarding in the Emergency Department (ED) awaiting transfer to their room. Previous research has shown that the boarding of critically ill patients is associated with substandard results of hospitalization, that there is a dose-response increase in the incidence of pneumonia per day of delay in dysphagia assessment in acute stroke, and that patients receiving standard of care treatment of stroke with respect to earlier administration of dual antiplatelet therapy in patients with low NIH stroke score have better outcomes. We analyze data from patients admitted to the ASU who spent extended periods of time boarding in the ED prior to transfer to the ASU to assess for issues that could affect patient safety and outcomes and to gauge their frequency. While lengthy delay in the administration of antiplatelet agents was noted, overall delays in completion of aspects of workup including diagnostic testing and evaluations by rehabilitation services were less than anticipated. Our findings indicate that while increased time spent awaiting transfer can lead to adverse issues, the length of time boarding has not yielded a frequent number of delays in care.

A Review of Neurologic Complications from Cryptococcal Meningoencephalitis in the Previously Immunocompetent Patient after COVID-19 Infection

Pynes M, Azuma R, and Thaete L

Cryptococcus neoformans is a fungus that spreads to humans via aerosolized spores from exposure to bat guaiac, decaying wood, or disturbed soil. Once a fungal spore is inhaled, it may spread to the bloodstream. Then, it is capable of hematogenous spread to the brain leading to cryptococcal meningitis in some patients. Cryptococcal meningitis is an infection of the central nervous system that is associated with high morbidity and mortality. CNS infection with cryptococcus neoformans are reported most often in immunocompromised hosts. Globally, HIV/AIDs infection is the most common predisposing factor for the development of cryptococcal meningoencephalitis. Despite the preponderance for cryptococcus neoformans to preferentially infect immunocompromised hosts, many cases of infection have been reported recently in immunocompetent individuals.

The COVID-19 pandemic has been associated with increased rates of some systemic mycoses. Proposed etiologies for this connection include common associations with severe COVID-19 infection such as hypoxemia, steroids use, mechanical ventilation, and low CD4 count. Systemic fungal infections reported to occur simultaneously with severe COVID-19 infection include aspergillus, candida species, cryptococcus neoformans, and mucorales most commonly (Amin 2021). Of the fungal infections with positive cryptococcal isolates, CNS-infiltrative disease was rare. Anecdotally, more cases have been seen than have been reported. This paper also aims to introduce the case of a previously immunocompetent middle-aged man who developed COVID-19 which was treated with dexamethasone and remdesivir. His COVID-19 disease course was moderate without ventilatory requirement. However, several months later, he developed recurrent scattered cerebral infarcts and ICP crises, at which time he was found to have cryptococcal neoformans meningoencephalitis. This patient's case will seek to demonstrate the importance of early detection of cryptococcal meningitis/meningoencephalitis to reduce the morbidity and mortality associated with the condition.

Efficacy of the Implementation of Brain Herniation Codes at a Tertiary Medical Center

Lee E, Maguire L, Pynes M, Curran C, Hsu R, Buslov A, Lee H, Navarathna K, Vibbert M, Shah S

BACKGROUND/PURPOSE

Brain herniation is a life-threatening event that occurs when compensatory mechanisms are overcome by increasing intracranial pressure. We implemented a brain herniation code (BHC) emergency alert protocol at our institution to improve the time to intervention for these patients. Our purpose is to study the timing to intervention and clinical outcomes of BHC patients before and after teaching sessions with medical staff. We hypothesize that the implementation of BHC with focused clinical staff education at TJUH will improve efficiency of clinical care for the herniating patient as well as clinical outcomes.

METHODS

We retrospectively evaluated BHC patient charts at TJUH between 2019 to 2021. We then provided educational sessions to house staff with a 10 question pre and post lecture evaluation. Finally, we analyzed data from BHC occurring after our educational sessions to compare 'time to intervention' and 'clinical outcome' of BHC patients. Statistical analysis was performed using Graphpad Prism v9. Pre and post survey results were compared using paired analysis corrected for multiple comparisons.

RESULTS

Preliminary data found six BHC patients. The average time to obtaining CTH was 39.8 minutes and the average time to administering hyperosmolar therapy was 56.6 minutes. Most codes were called for changes in pupillary exam. Regarding our educational intervention, we found a statistically significant difference in pre and post test scores ($n=20$, $p<0.001$) following our teaching session. Providers scored significantly better on 3 questions directed at recognizing impending herniation and 1 question about brain herniation protocol ($p<0.05$, $n=20$).

CONCLUSION

We found focused teaching sessions had a significant impact on APPs and residents' comfort level at recognizing brain herniation, as well as general knowledge of the topic. We believe this will lead to increased recognition and initiation of BHC and therefore improved time to intervention and clinical outcomes for our patients.

Increasing Resident Funduscopic Examination Documentation and Knowledge with Educational Session

Gruder O, Azuma R, Liao L, Fox N, Burke R, Yang QZ, Ahmed E, Ambrose T, Berk M, McCall J

BACKGROUND

A full neurological history and physical classically involves a fundoscopic exam. However, it has been observed that this portion of the examination is rarely performed and documented in medical records on patients admitted to a neurology service at Thomas Jefferson University Hospital. Fundoscopic examination is also listed in Neurology Residency Core curriculum and is an ACGME milestone.

We hypothesized that lack of fundoscopic examination may be due to inexperience and discomfort with fundoscopic exams which motivated our project.

METHODS

We provided one hour of teaching and practicing fundoscopic examinations during resident conference. We reviewed documentation rates of fundoscopic examinations in the month prior to intervention (99 charts) of patients admitted prior to our intervention and compared them to the month following intervention (141 charts). Additionally, we surveyed residents with a quiz pre and post education to objectively measure learning from our teaching session.

RESULTS

Fundoscopic exam documentation increased by 300% post education session (7% to 21%). No significant difference in documentation rates 8% vs 6%) was found for history and physicals written by non-neurology residents (providers who did not participate in teaching session). The percent of respondents with correct answers to the quiz increased post education. 80% of residents reported the session helpful or very helpful and 20% mildly helpful. Prior to the session, 80% of residents reported feeling very unconfident or unconfident in performing fundoscopic exams, which decreased to 20% post education session.

CONCLUSION

The education session was successful in improving resident's conceptual knowledge and comfort level with performing the exam, as well as increasing documentation of fundoscopic exams in neurology history and physicals. Our results suggest that a fundoscopic education session should be provided for each cohort of residents. Future considerations include analyzing if the effect of the teaching session diminishes over time, such that repeat education is needed.

Improving Resident Continuity Clinic Efficiency

Wang V, Burda K, Super M, Chuang TY, Braslavksy M, Volski A, Yi J, Wong E, Heiry M, Miskin D, Martinez N, Vu AT

BACKGROUND/PURPOSE

The Department of Neurology Resident Continuity Clinic operates as a general neurology educational experience giving residents an opportunity to care for their own patients with a wide spectrum of neurologic conditions. The time spent providing care for patients varies and often extends beyond allotted encounter time due to time spent evaluating patients, staffing with rotating subspecialty providers, counseling, and use of interpreter services. The aim of this project was to improve the time to start staffing patients by 20%.

METHODS

A visible queue (white board) was implemented for resident provider staffing with an option to designate subspecialty attending preferences. Time sheets were completed by resident physicians over four months, before and after implementation of the intervention. These tracked the time to complete a history and physical exam, to staff with an attending, to have the attending evaluate the patient, and to wrap up the visit. Other variables assessed were interpreter use, white board use, visit type (in person, phone, telemedicine), and residency year. Basic descriptive data were analyzed (Mean, Median, Range, Standard Deviation, Interquartile Range) through IBM SPSS software.

RESULTS

White board use did not impact time to staffing with attendings (N – 4min vs Y – 5 min) nor total times spent on direct patient care (N – 39 vs Y – 37 min). Both staffing with a preferred subspecialist and interpreter use increased the total time spent on a patient visit by about 10 minutes.

CONCLUSION

There is room for improvement with respect to efficiency in the Neurology Resident Continuity Clinic. We will continue to evaluate our ability to provide neurologic care in a timely manner to improve clinic flow, patient satisfaction, and patient retention.

Risk Factor Evaluation for Aspiration Pneumonia at a Comprehensive Stroke Center

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BACKGROUND/PURPOSE

Aspiration pneumonia (AP) is a known complication in acute stroke patients, and is associated with increased hospital mortality, lengthening hospital stay and post stroke recovery. (Schwarz et al.) In fact in one study (Heuschmann et al.) highest post stroke in hospital mortality was attributed to AP compared to other medical complications. At the Jefferson Acute Stroke Unit, the average incidence of AP during hospital stay is noted to be 2.08%. We aimed to systematically review patients diagnosed with AP with ICD-10 code, admitted in Stroke Service from October 2017 to October 2021, to evaluate any precursors to developing Aspiration Pneumonia and factors upon which we could intervene.

METHODS

We performed a retrospective analysis on patients hospitalized in the JHN ASU between October 2017 and July 2021. Patients were included if admission coding included a diagnosis of aspiration pneumonia. Using a total of 55 patients based on inclusion criteria, we identified 17 different clinical questions to answer for each patient's hospitalization. These questions were analyzed for incidence in order to determine common characteristics and risks in our patients.

RESULTS

In our review, 45 (81.8%) patients were made NPO on admission, amongst these 75% of patients were noted to have aphasia, dysarthria or dysphagia, 13% had poor mental status, 7% patients were intubated on admission. SLP consult orders were placed on 35 (63.6%) patients in the first 24 hours of their admission. SLP consultants also noted to frequently follow-up with these patients, with 46 (83.6%) of these cases having had multiple SLP evaluations during hospitalization.

CONCLUSION

Patients with any speech deficits, difficulty swallowing, coughing, poor mental status, should be made NPO on admission until further evaluation of swallowing is conducted. Further research can assist with criteria to predict high risk groups based on routine care and patient features, along with modifiable risk factors.

Factors Associated with Morbidity and Mortality in Acute Ischemic Stroke in Patients With SARS-CoV-2 Infection

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BACKGROUND/PURPOSE

This retrospective, observational cohort study characterizes the factors associated with the development of acute ischemic stroke in patients with confirmed COVID-19 infection across the Jefferson enterprise. We compared patient characteristics, laboratory values and clinical outcomes for COVID-19 patients without stroke (n=1542) to those who were diagnosed with acute ischemic stroke (n=24) at our institution from March to November of 2020.

METHODS

COVID-19 patients admitted between March 10, 2020 and November 8, 2020 were identified using the Jefferson EMR with over a total of 42,481 hospital-based patient encounters (inpatient admissions), in collaboration with Jefferson Health Data Sciences. There was a total of 2,887 patients with COVID-19 diagnosed during an inpatient encounter during this period. Of 154 patients with confirmed COVID-19 and stroke listed by diagnosis codes, acute stroke was confirmed through independent review of MRI imaging reports. Chart reviewed showed that most stroke ICD-10 codes referred to remote diagnoses. A total of 24 patients (0.8% of COVID-19 patients) hospitalized with both COVID-19 and acute stroke were identified. All 24 COVID-19 and stroke patients were admitted through the emergency department.

RESULTS

The majority (70.8%) of patients with COVID-19 and acute stroke were admitted to the ICU and 50% were mechanically ventilated, compared to less than 50% of COVID-19 patients without stroke (p-value < 0.0001). Mortality was 37.5% in the COVID-19 and acute stroke group as compared to 8% in the COVID-19 without acute stroke group (p-value < 0.0001). The average inpatient length of stay, and the average ICU length of stay, for patients with COVID-19 and acute stroke group are longer than for those without COVID-19 (13.6 days vs. 7.9 days, p-value < 0.0088; 7.6 days vs. 1.6 days, p-value < 0.0001).

Only 0.8% of COVID-19 positive patients were identified to have acute ischemic stroke on ICD-10 principal discharge diagnosis with independent MRI confirmation. COVID-19 patients with acute ischemic stroke had a higher likelihood of facility discharge and increased inflammatory markers of D-dimer and white blood cells.

CONCLUSION

COVID-19 patients with acute stroke had significantly worse morbidity and mortality outcomes than COVID-19 patients without stroke. Acute ischemic stroke was infrequent in patients with COVID-19 (0.8%). Biomarker validation of these elevated laboratory results may provide future treatment guidance for COVID-19 patients with acute ischemic stroke.

Effectiveness, Safety, and Tolerability of Repetitive IV Dihydroergotamine in the Treatment of Refractory Chronic Migraine – Avv Retrospective Review

Wang V, Kosman J, Yuan H, Hopkins M, Lauritsen C, Silberstein S

BACKGROUND

Dihydroergotamine (DHE), an ergot alkaloid, is an effective acute treatment for migraine, approved since 1945. Given its vasoconstrictive property, DHE use is contraindicated in patients with significant cardiovascular diseases. To date, few studies have characterized the safety and tolerability of DHE in populations with elevated cardiovascular risk factors.

OBJECTIVES

To assess the safety, efficacy, and tolerability of repetitive intravenous (IV) DHE in our inpatients with cardiovascular risk factors.

METHODS

A single-center, retrospective chart review was conducted at the Jefferson Headache Center (JHC) inpatient unit for refractory chronic migraine patients treated with our IV DHE protocol between January 1, 2019 and October 15, 2019. We evaluated and compared key effectiveness and safety outcomes based on patient atherosclerotic cardiovascular disease (ASCVD) 10-year risk scores into low (< 5%) or elevated risk categories (≥ 5%).

RESULT

Among 227 patients (female 81.6%, age 53±15) with calculable ASCVD scores who received IV DHE, there was a significant reduction in pain intensity from admission to discharge (4.5±2.8, $p<0.001$), with a significantly higher reduction in patients with low compared to elevated ASCVD risk scores (4.7 vs. 3.9, $p=0.038$). Patients with low ASCVD risk had higher initial (0.43 vs 0.38mg, $p=0.010$) and final doses of DHE (0.84 vs 0.70mg, $p<0.001$). There were no clinically significant EKG abnormalities in either group. In addition, there were no clinically significant cardiovascular events between groups. Except for a higher rate of nausea in the low ASCVD group (31.9 vs 14.1%, $p=0.006$), there were no differences in patient-reported adverse events..

CONCLUSION

In this real-world study, patients receiving IV DHE by the JHC inpatient headache protocol had significantly reduced pain severity at discharge. No clinically significant cardiac or EKG abnormalities were detected in patients with elevated (or low) ASCVD risk. This suggests that repetitive IV DHE as part of the JHC inpatient headache protocol is safe in patients with refractory chronic migraine.