Abstract 18-1-01

Title: Preliminary investigation of neurology residency programs in U.S. to guide future quality advances, research and residency-application process

Authors: Carolina Temple[1], Maheen Humayun[2], Adeel Ali Memon, M.D[1], Ahsan Alam[3], Amy Willis Amara[1], M.D, PhD

Affiliation:
[1]University of Alabama at Birmingham
[2]University of Maryland, College Park
[3]Dow Medical College, Pakistan

Background: Neurology residency programs in the United States demonstrate variability in program features including the training format and the educational curriculum. Unlike other specialized residency programs such as neurosurgery, neurology residency programs are not well studied [1, 2]. Exhaustive data regarding prevalent program features is critical for evaluating the proficiency of residency programs.

Objective: To provide preliminary structured information regarding program features and curriculum of neurology residency programs across the United States, with a long-term goal of improving quality of patient care and professional growth of residents.

Methods: 140 neurology residency programs were evaluated for training format and educational curriculum using information available online. Data was collected for the type of program offered, size of the program based on the number of residency positions, presence of night float system, and educational curriculum for PGY1 and 2.

Results: 96% of the 82 programs for which information was available had night float systems in place, although for 41% of the total programs this information was not available. 53% of the programs were categorical while 35% were advanced. Analysis of the curriculum showed that 22 out of 36 (data was only available for 25% of the programs) programs for which data was available offered a cardiology rotation in the preliminary medicine year in categorical programs. The extent of inpatient and outpatient exposure during PGY-2 was also investigated, however, conclusive results could not be reported due to the lack of data available. Curriculum varies substantially across programs. The programs offer between 2-18 positions for residents, with a mean of 5.6 ± 2.6 residents per program. 59% of the advanced programs have 4-7 residents while 54% of the categorical programs also have 4-7 residents.

Discussion: Our descriptive analysis highlights the dearth of data available online for evaluating proficiency of neurology residency programs. Features regarding the night float system and educational curriculum spanning PGY1-2 are not reported by a

substantial proportion of the programs, calling for the need to make this essential information available for prospective applicants, medical researchers and educators. This data might empower prospective residents to make informed professional choices. Moreover, information regarding program features such as the presence of a night float system can help guide research on patient safety, resident burnout and disease outcomes. As the programs demonstrate considerable variation in terms of the program features and curriculum, studying the impact of these variations may lead to the identification of an optimum system which can be adopted nation wide.

References:
1. Mazzola, C. A., Lobel, D. A., Krishnamurthy, S., Bloomgarden, G. M., & Benzil, D. L. (2010). Efficacy of neurosurgery resident education in the new millennium: the 2008 Council of State Neurosurgical Societies post-residency survey results. *Neurosurgery*, *67*(2), 225-233.
2. Oni, G., Ahmad, J., Zins, J. E., & Kenkel, J. M. (2011). Cosmetic surgery training in plastic surgery residency programs in the United States: how have we progressed in the last three years? *Aesthetic surgery journal*, *31*(4), 445-455.

Abstract 18-1-02

Title: Epilepsy Neuromodulation Clinic-A Hub for Science and Fast-track Referral Service

Authors: Rabia Jamy, M.D., Harshad Ladha, M.D., Sandipan Bankim Behari Pati, M.D.

Affiliation: University of Alabama at Birmingham, Department of Neurology

Objectives: To demonstrate the benefit of a specialized neuromodulation clinic.

Background: A growing body of evidence suggests that neuromodulation therapies complement other medical and surgical interventions to improve seizures in people with epilepsy (POW). However, there is a significant service gap in integrating these neuromodulation devices in patient management including the availability of trained physicians to perform implantation safely, programming the device, appropriate patient selection and educating them for informed decision making. Additionally, there is a knowledge gap in understanding the therapeutic effectiveness and outcome with some of the newer approved therapies (like Neuropace and Medtronic DBS). To overcome these limitations, our level-IV epilepsy center has taken an innovative approach by establishing an epilepsy neuromodulation clinic (hub) that offers a full array of services and anchors a network of secondary establishments (spokes) distributed within the gulf coasts region. Herein, we report our outcome accomplished over a year in this highly specialized clinic.

Methods: A single-center, retrospective study. We reviewed the electronic medical records of all patients followed in the clinic from January 1, 2017, till Jan 1, 2018. Data regarding patient demographics, seizure characteristics, pre-surgical workup, time from referral to implantation, stimulation titration schedule, complications including side effects were collected.

Results: 23 patients with VNS and 17 patients with RNS were followed in the clinic over the span of 12 months. For VNS, mean age of patients 34.2 yrs (R= 19-60), meantime from referral to VNS surgery (implantation or battery replacement) was 4.07 mo (R= 2-15), first appointment post-implant was 2 wks (R= 1-3) , and time from first clinic visit to maximum tolerated dose (1.25-1.75 mAmp) was 6 wks (R= 4-15) weeks. 40% of the cohort were responders. Complications included stimulus-related temporary voice changes and cough. For RNS, mean age 38 yrs (R=21-60), eloquent cortex implant (N=5), a significant decrease in seizure over 75%. 26% of patients with VNS and 17% with RNS were followed in secondary centers (spokes). At any given time multiple research (N=2-4) were active with recruitment over 48%. Multiple residents, fellows, NP, medical students and junior faculty rotated in the clinic to gain hands-on experience.

Discussion: Neuromodulation clinic has shown to serve as an optimal solution for patients as well as providers due to easy access, improved care with the rapid titrating, prompt follow up appointments in case of complications and overall increased satisfaction. Physicians can closely monitor patient's clinical course, assess the efficacy of stimulator used, recruit appropriate patients for clinical trials to advance science, and use this clinic as a resource to educate and train future specialist related to this field.

Abstract 18-1-03

Title: What you need to know when applying to a neurology residency program in the United States

Authors: Rabia Jamy, M.D., Adeel A Memon, M.D., Raima A Memon, M.D., Marissa Dean, M.D.

Affiliation: University of Alabama at Birmingham, Department of Neurology

Objective: To evaluate and report adult neurology residency program requirement data that is available through United States (US) program websites.

Background: In 2018, 1143 students applied to a neurology residency program, but only 47% matched.[1] Out of those that matched, 35% were international medical students.[1] In order to improve an applicant's knowledge regarding requirements for neurology residency programs, we analyzed available website data for US and international applicants. This knowledge may serve as a model to prepare applicants and improve their chances of selection for residency.
Methods: We reviewed all ACGME-accredited neurology residency programs in the US to assess minimum prerequisites for prospective applicants. We evaluated USMLE (US Medical Licensing Examination) score cutoffs, years since graduation, and other requirements for US and international medical students. Descriptive statistics with percentages were used for analysis.

Results: We identified 136 neurology residency programs, and the two most common prerequisites listed on websites were USMLE Step 1 scores and years since graduation. For USMLE scores, 43% of programs reported a preferred cut-off score for applicants, with ≤ 220 (21%) listed most frequently. [Table 1] Years since graduation was mentioned on 46% of program websites, with 4-5 years (18%) being most common. [Table 2] For US applicants, there were no further consistent requirements reported. However, for international medical students, 91 (67%) programs mentioned special requirements, which included: US clinical experience, prior research/publications, and ECFMG certification.

Discussion: Based on content currently available on program websites, emphasis is heavily placed on USMLE scores and years since graduation for all applicants. However, the majority of programs did not report this data on their website (57% and 54%, respectively). In addition, there was no consistently reported prerequisites for US medical students, which was not the case for international medical students. Further requirements, including US clinical experience, prior research/publications, and ECFMG certification were frequently requested. Further information is needed to confirm whether this data is consistent with the current residents within neurology residency

programs. We hope this report will serve as a guide for future applicants interested in applying to a neurology residency program.

Reference:
[1] National Resident Matching Program, Results and Data: 2018 Main Residency Match®. National Resident Matching Program, Washington, DC. 2018.

Table 1: USMLE Step 1 Cut-off Scores

	Number of Programs (%)
Score ≤ 220	28 (21)
Score 220-240	12 (9)
Score > 240	3 (2)
No cut-off required	15 (11)
Not mentioned	78 (57)
Total	136

Table 2: Years since graduation

	Number of Programs (%)
Less than or equal to 3 years	16 (12)
4-5 years	25 (18)
Greater than 5 years	5 (4)
No cut-off required	16 (12)
Not mentioned	74 (54)
Total	136

Abstract 18-1-04

Title: The Clock Drawing Test Serves as a Time Saving Surrogate for the Alabama Brief Cognitive Screener as a Method to Distinguish Mild Cognitive Impairment and Alzheimer's Disease

Authors: John C. Hammond MD, PhD[1]; Giovanna Pilonieta DDS[1]; Marissa C. Natelson Love MD[1]; Sarah Perez MD[2]; David Geldmacher MD, FANA, FACP[1]

Affiliations:
1. Department of Neurology, University of Alabama at Birmingham, Birmingham, AL, United States
2. Tulane University, New Orleans, LA, United States.

Introduction: Cognitive screening tools are essential in assessing patients in busy clinics. The Alabama Brief Cognitive Screener (ABCs) was developed as an alternative to the now proprietary Mini Mental Status Exam (MMSE). The ABC is a 30 point instrument with a similar difficulty to the MMSE and preliminary data suggest the ABC performs similarly in detecting and quantifying impairment in mild cognitive impairment (MCI) and Alzheimer's disease (AD). The Functional Assessment Questionnaire (FAQ) is an informant reported questionnaire used to assess functional impairment in day-to-day living. In a clinic setting, these instruments may take 5-15 minutes to complete. With the rapid pace with which patients are seen in primary care and psychiatry clinic settings, it is essential to have quick screening tools for cognitive changes. Additionally, changes in mood in elderly patients may be the result of cognitive changes rather than a primary mood disorder. The purpose of this study was to determine if a specific portion of the ABC, the clock drawing test (CDT), could serve as a time-saving surrogate to the full ABC and provide helpful information about cognitive function. Further, the study was designed to determine if the CDT score would correlate to the FAQ similar to the full ABC score. If the CDT could serve as a surrogate to the full ABC, more providers may be able to use the CDT alone as a cognitive pre-screener, saving time in clinic. If the CDT were abnormal, further cognitive assessment may be warranted in a formal cognitive disorder clinic.

Methods: The ABCs, FAQ, and CDT were administered as part of the routine clinical assessment in the UAB Memory Disorders Clinic from 2012 to 2016. The CDT accounts for 3 of the 30 points of the ABC. A retrospective chart review of 153 patients with a diagnosis of MCI (ICD-9-CM – 331.83) and AD (ICD-9-CM – 331) was conducted. ABCs, CDT, and FAQ were available to review in 76 subjects; 47 women, 29 men; mean age 75.4 (SD 8.5) with a diagnosis of AD and 77 subjects; 48 women, 29 men; mean age 75.15 (SD 6.42) with a diagnosis of MCI. Clock drawings rendered from subjects' charts were masked for patients' personal information and diagnosis. Two blinded raters (one cognitive disorder trained and one psychiatry trained) independently rated the clocks

using a 10 point Revised Scale Used for Scoring the Clock Drawings (RCS) from Rouleau et al. Correlations between ABC and CDT as well as FAQ and CDT were calculated.

Results: The 10 point RCS CDT score had a strong positive correlation with ABC score (Spearman correlation coefficient 0.70) for all subjects. RCS CDT correlates with total ABC score in MCI at 0.46 and RCS CDT correlates with total ABC score in AD at 0.68. When the 3 point CDT score was extracted from the ABCs and compared to ABC without clock score, there was still a strong positive correlation for MCI (0.45) and AD (0.68). The RCS CDT negatively correlates with FAQ score for all subjects at -0.49 and for MCI subjects at -0.25 and AD subjects at -0.33. Further, ABC total score is higher in MCI compared to AD (25 and 17 respectively) and RCS CDT is significantly higher in MCI compared to AD (8.5 and 5.4; Kruskall-wallis Chi-square 43.9184, p<.0001). Conclusions: The CDT may serve as a possible surrogate for more complete cognitive screening tools like the ABC and for prediction of functional impairment as measured by tools like the FAQ. The CDT can be administered and scored in a relatively briefer period than the full cognitive screens. Impairment on CDT may serve as an indicator that more thorough cognitive screening is warranted. For patients in a geriatric primary care setting or patients in a geriatric psychiatry practice with mood complaints, a brief cognitive screener may be appropriate. Further study is required to determine if the results may generalize to other clinic settings including primary care and psychiatric clinics.

Abstract 18-1-05

Title: Neurology Residency Websites: A Critical Evaluation

Authors: Andrew Elson, Adeel A Memon, M.D., Rabia Jamy, M.D., Syed B Pasha, M.D., Manmeet Kaur, M.D., Marissa Natelson Love, M.D.

Affiliation*: University of Alabama At Birmingham Birmingham AL United States*

Objective: To evaluate comprehensiveness and recognize the gap in knowledge of neurology residency websites.

Background: Many prospective applicants go to the internet to assess residency programs, before they apply or interview for residencies. Thus, besides advice attained from mentors and colleagues, internet-based information plays a key role in aiding applicants to select where to apply. To the best of our knowledge, no study has been published to date, to evaluate completeness of neurology residency websites. The goal of this study is to evaluate the comprehensiveness of neurology residency websites and also to identify areas of improvement.

Methods: Comprehensive review of United States neurology residency programs, freely accessible online for information about training printed for prospective applicants. Websites of 136 programs were searched for the presence of 19 criteria.

Results: Among the 140 residency programs websites, a description of the following criteria was noted: Clinical sites (94.8%), program coordinator contact information (94.5%), didactics (91.9%), faculty listing (90.4%), current residents (83.8%), message from chair or program director (83.1%), graduate placement (61.2%), In house fellowship availability (83.8%), facilities (77.9%), visa information (77.2%), information about city (72.8%), ERAS (Electronic Residency Application Service) link (71.3%), salary (67.6%), educational Funds (59.5%), interview day details (57.3.6%), call system (50.1%), parking directly on site (43.4%) ,meal allowance (42.6%), and mentorship during residency (33.8%).

Conclusions: Although additional study of prospective applicants would be instrumental in determining which factors are of greatest interest, many residency websites appear to be inadequately comprehensive. Several important considerations, such as graduate placement, call system and formal mentorship program, as well as quality of life measures including call responsibilities, salaries, and other benefits, which are crucial aspects of training, were not addressed. Our findings provide valuable insight about the information available on the homepage of neurology residency programs. We hope this will encourage programs to update websites accordingly and attract best suited residents.

Abstract 18-1-06

Title: A Comparison of Clock Drawing Performance in PSP/CBS and AD in a Memory Disorders Clinic

Authors: B. Luke Smelser, MD, Giovanna Pilonieta, DDS, MPH, David S. Geldmacher, MD, FACP

Affiliation: Department of Neurology, University of Alabama at Birmingham School of Medicine

Main Body:
The clock drawing test (CDT) is commonly used to screen for cognitive impairment among patients with neurologic disease, but there is little published information on CDT performance among patients with progressive supranuclear palsy (PSP) and corticobasal syndrome (CBS). The CDT is incorporated in the Montreal Cognitive Assessment (MoCA), which is a recommended test for identifying cognitive impairment in movement disorders patients. The Alabama Brief Cognitive screener (ABCs) is a recently developed MMSE analog that also incorporates the CDT. We retrospectively identified 32 patients from the UAB Memory Disorders Clinic with clinical diagnoses of PSP or CBS who had undergone ABCs screening including clock drawing assessments. Given the significant overlap in their clinical syndromes, including recognized mixed PSP-CBS phenotypes, we grouped these patients as having "tauopathy" for analysis. When compared to patients with Alzheimer's disease (AD), the mean age of the tauopathy patients was lower than the AD patients (69.0 vs. 75.4, $p<0.005$). The age discrepancy between groups prevented matching of all 32 tauopathy patients to a comparable AD sample for analysis. Therefore, 28 of the tauopathy patients were matched by case-control protocols for cognitive performance (total ABCs score) and age with patients diagnosed with AD. CDTs on these patients were scored on the 10-point Rouleau Clock Scoring scale (RCS). RCS scores were significantly lower among the tauopathy group compared to the AD group (4.75 vs 6.5, $p < 0.05$). These results demonstrate that CDT abnormalities are a frequent occurrence in the PSP/CBS population and are more severe within this group as compared to an AD population matched for both age and overall severity of cognitive impairment. CDT performance provides useful information about cognitive impairment in these patient groups. Future studies may be tailored to identify specific patterns of CDT errors that are more indicative of CBS/PSP.

Abstract 18-1-07

Title: A Beginner's Guide to Orthostatic Vitals: Orthostat App That Records Orthostatic Vitals Based on Current Guidelines

Authors: Carolina Temple[1], Jitesh Kar[2]

Affiliation:
[1]University of Alabama at Birmingham
[2]Huntsville Hospital

Background: The financial burden for a diagnostic workup of dizziness and syncope is significant. Additionally, the steps involved to accurately measure orthostatic vitals is challenging to health care professionals (HCP) and is overwhelming for patients and their family members. This results in frequently inaccurate measurements. These inaccuracies are amplified by the fact that up until 2016 there was no agreed-upon guideline outlining the steps and interpretation. An accurate diagnosis of orthostatic hypotension depends on a consistent and well-established method. We have created an app that uses visual aids and timed voice commands to assist HCPs and patients in taking the steps to measure and record orthostatic vitals as outlined by the current consensus.

Methods: We prepared a survey of 18 multiple choice questions and distributed it among HCPs at Huntsville Hospital and medical students at UAB School of Medicine. The survey included questions about the setting in which they take orthostatic vitals, details about their training and experience, and includes a series of questions meant to assess their understanding and awareness of the current consensus. 124 responses were collected, the results were recorded in an excel spreadsheet and statistical analysis was performed. A subset of 20 of those that took the survey were introduced to our app, were taught how to use it, and were surveyed on their experience.

Results: Based on the results, only 6% of responders answered correctly on how to record orthostatic vitals based on the current guidelines. 5.7% of HCPs knew the correct sequence and time interval for recording orthostatic vitals. Only 14.6% of physicians could correctly interpret abnormal or positive result. 83.6% of HCPs reported that measuring orthostatic vitals is overwhelming. The top three challenges reported were that the process is time consuming, the time intervals are confusing, and concern that the patient would pass out. 88.5% of responders said that they would prefer to use an application that communicated with a blood pressure cuff that takes users through the steps of measuring orthostatic vitals with visual and voice command. Post-interventional analysis is currently ongoing, but preliminary data shows that 90% of users reported that having technology like app will help them to obtain the correct recording and interpretation of orthostatic vital measurement without any error.

Discussion: Many HCPs may not be updated with current guidelines for recording and interpreting orthostatic vitals. This causes inconsistencies in results and decreases the sensitivity of this test. The ability to correctly identify patients presenting to the ER or clinic as having orthostatic hypotension may help decrease the amount spent on working up other potential causes of dizziness and syncope. Not only can this be useful in a clinic setting, but could also be helpful at home for patients whose doctors ask them to keep a log of their blood pressure or orthostatic vital measurements. This app will not only help save time, but will also help standardize the method of recording, interpreting results correctly, and providing clear and consistent results.