Resource Utilization in patients with suspected psychogenic non epileptic seizures and drug resistant epilepsy in the Harris County Health District between 2009 and 2012

Brian Wolf[1], Bonnie Hayashi [1], Ezekiel Sachs[1], Colin Van Hook[1], Corey Goldsmith[1,2] , Dona Kim Murphey[1]

[1]Department of Neurology, Baylor College of Medicine, Houston, Texas 77030 [2]Harris Health

Introduction

Psychogenic Non-Epileptic Seizures (PNES or psychogenic non-epileptic events, PNEE) manifest as episodes of altered movement, sensation, or experience similar to epilepsy but without any electrographic correlate on EEG. Prevalence approaches 2-33 per 100,000 and up to 10-22 % of referrals to Tertiary Epilepsy Centers. While there are no precise figures on the economic burden of PNEE, it is estimated that the annual cost of all medically unexplained symptoms exceeds $200 billion.

Distinguishing between medically intractable epilepsy (MIE) and PNEE can be clinically challenging. Video-EEG monitoring, the gold standard in establishing the diagnosis of PNEE, offers diagnostic as well as therapeutic benefit [1] and associated cost-savings [2]. Unfortunately, partly due to the limited availability of this resource, the average length of time to establishing a diagnosis of PNEE is about seven years. During this delay, patients are placed on several antiepileptic agents and receive substantial medical workup, all of which can incur significant cost and morbidity [3].

The purpose of this study was to determine whether in Harris County, the third largest county in the United States by population, an investment in video-EEG might reduce hospital resource utilization. In order to estimate the impact, we examined inpatient, outpatient, and ER admissions and visits as a measure of utilization. As patients with MIE and patients with PNEE commonly have co-morbid psychiatric disease, we wanted to examine whether seizure-related utilization and psychiatric utilization differed by diagnosis. Finally, given the known gender predilection of PNEE [4] and recent report of disparities in utilization by patients with epilepsy in the same primarily low income, minority patients in Harris County as in our study [5], we analyzed whether we observed differences in diagnoses by gender and race.

Patient selection and diagnoses

Patients in the Harris County Hospital District (Harris Health) who presented to clinics or hospitals within this system during the period between January 2010 and January 2012 were included in this retrospective chart review. An automated query using the following ICD codes was performed: 780.39, 345, 345.01, 345.1, 345.11, 345.2, 345.3, 345.4, 345.41, 345.5, 345.51, 345.6, 345.61, 345.7, 345.71, 345.8, 345.81, 345.9, 345.91. Only those encounters that included a note from an attending neurologist were included in further analyses.

MIE was defined as being on two more AED's and more than one seizure/year without mention of PNEE suspicion. PNEE suspicion was based on whether or not the attending or resident evaluating the patient mentioned suspicion for PNEE explicitly in their note. There were some patients with a mixed disorder of both suspected MIE and PNEE. Those who were evaluated and thought to have seizure disorder without mention of suspicion for PNEE or MIE were considered to be controlled epilepsy. The total number of inpatient, outpatient, and ER admissions/visits for seizures and psychiatric diagnoses were tabulated to estimate resource utilization for those diagnosed with putative PNEE, MIE, both, and controlled epilepsy. Visits and days were combined to analyze total utilization, total psychiatric utilization, and total seizure utilization. Psychiatric diagnoses were considered if they were Axis I or Axis II disorders. Demographic information included age, race, and gender.

Quantitative Methods

Kruskal-Wallis testing (Matlab R2013a, Natick, MA) was utilized for non-parametric analyses of non-normally distributed data. Only data for patients > 18 years of age was included in the analyses (416 patients). The patients were divided into the categories above. Any statistically significant relationships ($p < 0.05$ by kruskalwallis) for utilization by group membership were further analyzed to determine what percentage of patients in the group accounted for what percentage of category-specific utilization. To compare relative utilization across groups, the following figure was computed:

$$\text{relative utilization} = \frac{\#\text{ patients contributing to category-specific utilization}}{\text{total \# of patients (416)}} \; X \; \frac{\text{total \# of category-specific utilization}}{\#\text{ of utilization by this group of patients}}$$

relative utilization < 1 disproportionately more use

A similar calculation was performed to determine the proportionate designation of PNEE and MIE relative to race:

$$\text{relative race contribution to specific diagnosis} = \frac{\#\text{ race-specific patients with the diagnosis}}{\text{total \# of patients with the diagnosis}} \; X \; \frac{\text{total \# of patients (416)}}{\#\text{ of patients of that race}}$$

relative race contribution to specific diagnosis > 1 disproportionate representation

Greater total utilization by patients with MIE/mixed disorder

Figure 1. Clinical diagnoses

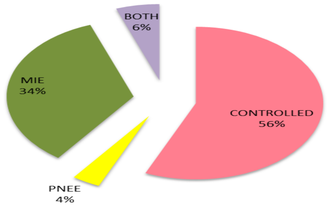
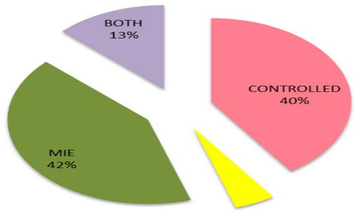


Figure 2. Total utilization



Greater psychiatric and seizure utilization in MIE/mixed disorder

Figure 3. Relative psychiatric utilization

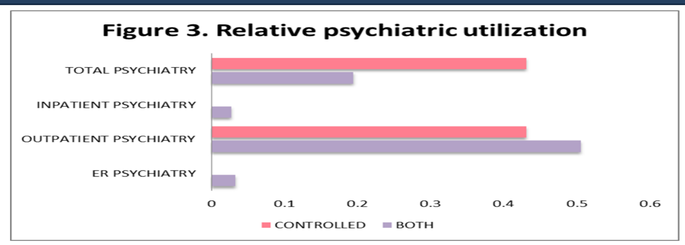
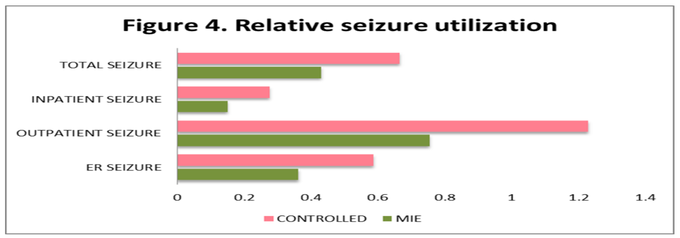


Figure 4. Relative seizure utilization



Psychiatric comorbidity and gender predilection

Figure 5. Axis I or II co-morbidity

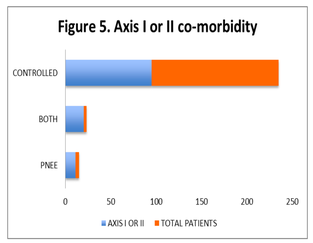
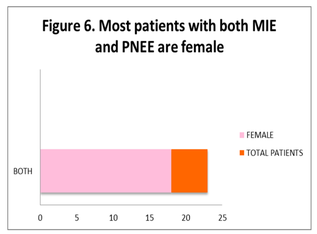
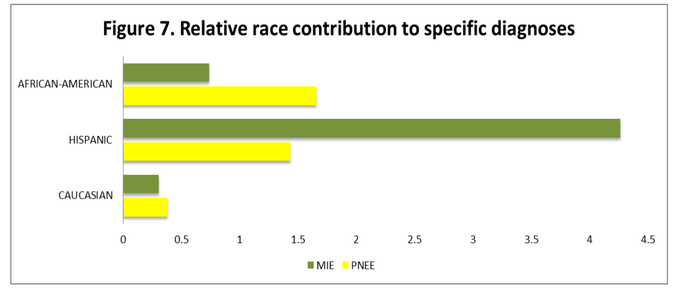


Figure 6. Most patients with both MIE and PNEE are female



Disproportionate diagnosis of PNEE among minorities

Figure 7. Relative race contribution to specific diagnoses



Conclusions

- There was disproportionately more total utilization of hospital resources for those diagnosed clinically with MIE or both MIE and PNEE.
- The diagnosis of PNEE alone did not relate to utilization in any individual or composite analysis for psychiatric or seizure related visits/admissions.
- Total psychiatric utilization was disproportionately greater for patients with both MIE and PNEE than for patients with controlled epilepsy, and seizure related utilization was disproportionately greater for patients with MIE than for controlled patients.
- Only those diagnosed with mixed disorder showed a significant effect of gender, with 18/23 patients being women. A greater percentage of women were diagnosed with PNEE (67%) than with MIE (48 %), but a low n for PNEE may have prevented a statistically significant relationship to emerge between PNEE and gender. No known gender predilection has been reported for MIE.
- Race had a significant effect on diagnosis of PNEE and MIE but not on diagnosis of both or of controlled epilepsy, with a disproportionate number of Hispanic and African-American patients diagnosed with PNEE.
- Further quantifying the relative overutilization by patients with MIE and mixed disorders can provide the initial data to project savings from implementing a surgical epilepsy program [6].

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D.K.M. – Study design, data collection, data analysis, figure preparation
B.W. – Study coordination, data collection, poster preparation
B.H., E.S., C.V.H. – data collection
C.E.G. – Advising, research protocol submission

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