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Racial differences in Emergency Department visits for seizures

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ABSTRACT

Purpose: Seizures are a common reason for visiting the Emergency Department (ED). There is a growing body of literature highlighting disparities in seizure care related to race and ethnicity. Our goal was to identify racial and clinical characteristics of patients presenting to the ED with seizures and to determine factors associated with repeat ED visits for seizure.

Methods: This was a retrospective study evaluating patients presenting with seizure as the primary reason for their ED visit between 01/01/2008 and 12/31/2008. Clinical data were collected from the electronic medical record (EMR) and compared between black and white patients and between patients with single and repeat ED seizure visits. Statistically significant variables were introduced in a logistic regression analysis with repeat ED visits as outcome.

Results: Of 38,879 ED visits, 559 recorded 'seizure' as the primary reason for the visit. Compared to white patients ($N = 266$), black patients ($N = 102$) were more likely to have non-private insurance ($p = 0.005$), less likely to have evidence of regular ambulatory care ($p = 0.02$) and were more likely to have multiple visits within the calendar year ($p = 0.005$). Black patient visits were more likely to have missed or ran out of antiepileptic drugs (AED) as the precipitant for their ED visit ($p < 0.001$).

Conclusion: Clinical factors differed between black and white patients presenting to the ED for seizure care. Black patients were more likely to have multiple seizure visits to the ED when compared to white patients. This may suggest a disparity in access to care related to race between these two groups.

1. Introduction

Seizures occur in 9–10% of the population [1]. Seizures are a common reason for Emergency Department (ED) visits, accounting for approximately 1–2% of ED visits in the U.S [2]. There is a growing body of literature highlighting disparities in seizure care related to race, ethnicity and socioeconomic status (SES). Patients with low SES and seizures are not only more likely to utilize the ED for their seizure care when compared to those with high SES, but are also more likely to be black or Hispanic [3]. Furthermore, black patients are more likely to use the ED for seizure care than white patients [4]. A national survey designed to examine differences in healthcare utilization and seizure care in the ED found that blacks are less likely to be admitted to the hospital or to undergo urgent neuroimaging compared to whites, independent of insurance status. ED visits for seizures are also higher among blacks than whites in this study. The reasons for these disparities are not apparent from the data available in the survey and history of epilepsy was not identified [2]. We sought to identify racial, social and clinical characteristics for patients presenting with seizures in a tertiary ED and to isolate factors affecting return ED visits for seizures. We hypothesized that ED seizure management would not be different between racial groups but that black patients would be more likely to have repeat ED visits for seizure care than whites.

2. Material and methods

2.1. Patient selection

This study was approved by the local institutional review board. We retrospectively reviewed electronic medical records of all patients evaluated in a large urban tertiary academic hospital ED over a one-year period (1/1/2008–12/31/2008) with chief

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complaint of seizure. Our hospital is part of the Partners Healthcare Network and serves a diverse patient population in the heart of Boston, Massachusetts; it is located between high and low income status neighborhoods and is also located near a major tertiary oncological referral center. The ED department in our institution currently serves approximately 60,000 Emergency Department (ED) visits per year, of which we see an age breakdown of ages 0–17 (10%), ages 18–39 (31%), ages 40–64 (32%), ages 65–84 (21%), and ages 85 and older (5%). Overall, our patients are represented by a 40/60 male to female split. We see a patient population with varying primary languages, the top four of which are English (82%), Spanish (9.4%), Arabic (0.6%) and Haitian Creole (0.4%). Within the study year, 38, 879 total ED visits were made. 559 records were selected from administrative data using ICD-9 codes (epilepsy—345; seizure, and convulsions—780.3). All subjects were 18 years of age or older. Only those with an epileptic seizure as the precipitant for the visit were included, while those with probable psychogenic non epileptic seizures (PNES) were excluded. To ensure consistency in diagnosis, selected charts were reviewed by an experienced board certified epilepsy specialist, who reviewed the electronic medical record looking for evidence of prior psychogenic non epileptic seizures (PNES) diagnosis as well as prior video EEG monitoring admissions, and if the events did not appear to be consistent with epileptic seizures, subjects were excluded. Those with recurrent visits for seizure within the study period were also identified.

2.2. Variable definition and collection

Data were abstracted by chart review by a research assistant and focused on social determinants of health relating to epilepsy [5] and included: age, gender, race (self-identified), insurance type as well as history of prior seizures/epilepsy. Age was treated as a continuous variable. For race, patients were grouped as white, black or other; Hispanic patients were identified but were excluded due to missing self-identified ethnic information within the study period. As other races were too few to analyze, we focused our analysis on black and white patients only. Insurance was initially grouped into categorical variables (commercial, Medicare, Medicaid/Mass Health, Commonwealth Care, Uninsured or Self pay) then replaced as a dichotomous variable, either private or non-private (including Medicare, Medicaid, and affiliates). Marital status and education were not abstracted as these were inconsistently listed in the record and often missing. Income was also not available in our electronic health records however employment was recorded. As our goal was also to assess whether differences in clinical care were present between racial groups as well as identify clinical factors leading to repeat ED visits, we also reviewed individual charts for the following clinical data: seizure precipitant, medications, frequency of ED and ambulatory visits for seizures in the 6 months prior and following the selected visit, as well as basic ED management (labs, medications, neuroimaging, specialty consultations, admission to the hospital).

In particular, regular care was treated as a dichotomous variable and defined as whether or not subjects received either primary care or neurology care at least annually. Epilepsy history was treated as a dichotomous variable (prior history of seizure or on seizure medication = yes). If patients were prescribed an anti-epileptic drug ('Prescribed AED on arrival'), this was abstracted as a dichotomous variable. 'AED levels ordered' refers to whether or not serum levels of AEDs were drawn; similarly, if a toxicology screen was ordered as part of the ED assessment, this was recorded and treated as a dichotomous variable. If a specialty consultation, other than a neurology consultation, was ordered this was recorded and treated as a dichotomous variable. If the patient was ultimately admitted to hospital as a result of the seizure visit to the ED, this was abstracted and treated dichotomously. Patients with a new neurological insult seen on neuroimaging ('new neurologic finding') as a likely explanation for their seizure were also abstracted and treated as a dichotomous variable. Causes of seizure precipitant were also investigated and treated as dichotomous variables. This included collecting variables on whether or not seizures were provoked in the setting of epilepsy ('provoked, epilepsy') and if seizures were deemed to result from fever, infection, sleep deprivation, stress or psychological reasons. If seizures were the result of non-brain trauma or systemic illness ('provoked, not epilepsy') this was collected dichotomously. We also determined whether antiseizure medication levels were low ('Low AED levels'; outside the therapeutic range) in patients being treated and recorded this dichotomously. If it was recorded that subjects admitted missing or running out their medications as a possible seizure precipitant, this was also recorded dichotomously. Finally, if any neuroimaging was ordered ('neuroimaging ordered', CT or MRI Brain) during the ED visit, this was recorded dichotomously.

2.3. Theory/calculation

Chi square test was used for dichotomous demographic variables and Jonckheere-Terpstra test for trends in visit numbers. Odds ratios (OR) and 95% confidence intervals (CI) were reported for the analysis of ED visit presentation and management compared by race as well as repeat ED visits in a 12-month period. ED visit characteristics were analyzed by generalized linear mixed models accommodating multiple visits per patient (proc genmod, SAS version 9.4). Statistically significant variables were entered into a logistic regression model. SAS 9.4 was used for the statistical analysis.

3. Results

3.1. General cohort

Of 38, 879 total ED visits during 2008, 559 visits for seizure as the chief complaint were made by 442 unique patients in our hospital ED (among which 266 were made by white patients and 102 by black patients, with 74 patients excluded from the analysis). Fig. 1 highlights the flow chart of patients selected for the study. In our cohort of 442 patients, the mean age was 48.4 years and 50.9% were male. Overall, 66% had a prior history of epilepsy; the remaining demographic information for our cohort is summarized in table S1.

3.2. Patient demographics compared by race

Table 1 shows that black patients were more likely to have non-private insurance (74% vs 58%, $p = 0.005$) and more likely to have a documented history of epilepsy (74% vs 62%, $p = 0.04$). Black patients were also less likely than white patients to have regular ambulatory care documented in the medical record (77% vs 87%, $p = 0.02$). In addition, black patients had more frequent visits to the ED for their seizure care when compared to white patients (mean 1.4 vs 1.2 visits, $p = 0.005$, Table 2).

3.3. ED management of patients presenting with seizures as related to race/ethnicity

Among all 368 patients studied, there were 314 ED visits from white patients and 140 ED visits from black patients (Table 3). Black patient ED visits were more likely to have been precipitated by the patients missing or running out of their AEDs (21% vs. 8%, $p < 0.001$). ED visits by white patients were more likely to have