



Patients visiting the emergency room for seizures: Insurance status and clinic follow-up

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ABSTRACT

Purpose: Epilepsy is a chronic condition that is best treated in the outpatient clinic setting. However, many epilepsy patients use the hospital emergency room (ER) as a primary resource for seizure management. We studied characteristics of these patients in comparison with patients attending an epilepsy clinic.

Methods: We reviewed ER data of patients seen in 2002 and 2003 for seizures, in Vanderbilt University Hospital (VUH) and Metro Nashville General Hospital (MNGH), seeking to identify patients who had visited the emergency room more than once. We collected demographic and insurance information on these patients and identified those who followed up in the epilepsy clinic.

Results: There were 1005 patients who visited the VUH ER and 205 the MNGH ER for seizures. Patients visiting the ER for seizures were less likely to be insured than epilepsy patients followed in the clinic, in both institutions. The proportion of patients visiting the ER more than once was 15.2% at VUH and 29.2% at MNGH. Among these patients, 3.2% at VUH and 26.7% at MNGH were uninsured. Clinic follow-up occurred in 68.6% of VUH and 13.3% of MNGH repeat ER visitors. Combining institutions, insured patients were much more likely to follow-up in the clinic.

Discussion: Repeated use of the ER for seizures was more common in the county hospital, where the proportion of uninsured patients was also higher. Patients visiting the county hospital ER repeatedly tend not to follow-up in the neurology clinic. This element of disparity of care requires further attention.

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1. Introduction

Epilepsy is among the most common neurological disorders. More than two million individuals in the United States suffer from this chronic condition. The prevalence of epilepsy is estimated at 6.8 per 1000,¹ but a recent study in Tennessee and Georgia suggested that up to 2.1% of the population may be affected in these states.² Epilepsy is a chronic condition that has a considerable cost to society, particularly when seizures are poorly controlled.³ Optimal control of seizures is achieved through consistent outpatient management. Causes of poor seizure control include suboptimal treatment for epilepsy in uninsured patients, which is one aspect of disparity of care. One consequence of poor seizure control is frequent use of the emergency room (ER) for seizure care, and in particular repeated use of the ER.

We hypothesized that patients who use the ER for seizures (particularly if they do so repeatedly) are less likely to be insured

and less likely to follow-up in clinic. In this study, we assessed the number of patients who use the ER or use the ER repeatedly for seizure care and evaluated how many of these patients follow-up in the clinic. We studied patients visiting the ER for seizures in two institutions, and compared them to patients attending outpatient clinics for epilepsy care.

2. Methods

Data collected between the years 2002 and 2003 from the emergency rooms of two institutions in Nashville, TN – Vanderbilt University Hospital (VUH) and Metro Nashville General Hospital (MNGH) – was analyzed. Vanderbilt is an academic, tertiary care institution, while MNGH is the county hospital serving mainly the uninsured population. The two hospitals are in different parts of the city. The MNGH is in a predominant indigent locality while the VUH is in a high end locality. The data set included all patients who visited each ER with a primary diagnosis of seizures (ICD 9 codes 345.1 up to 345.9 and 780.39). Patients who visited the ER more than once were extrapolated from the data set. This was a retrospective data based on the clinical encounter forms from the

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Table 1

Characteristics of patients visiting the ER for seizures.

	VUH	MNGH
Total patients in ER	1005	205
Mean age	23.3 years (range 0.1–88)	40.2 years (range 2–84)
Number with >1 ER visit	153 (15.2%)	60 (29.2%)
Number with ≥5 ER visits	38 (3.8% of total)	9 (4.4% of total)
Gender of patients with >1 ER	92 Male (60.1%)	42 Male (70%)
	61 Female (39.9%)	18 Female (30%)
Mean age of patients with >1 ER visit	23.6 years (range 0.2–82)	40.6 years (range 3–84)

ER. It included encounter date, age, zipcode of the patient, gender, race and insurance of the patient at MNGH. It included encounter date, age, gender and insurance of the patient at VUH. Information about age, gender, ER visit dates and insurance type was collected for each patient at their ER visit. We excluded race as it was not available from VUH data. We focused on the group with repeat ER visits, and a chart review was performed to identify those patients from this group who were seen in the outpatient epilepsy or neurology clinic by the end of the study period, December 31st, 2003. We determined how many of multiple ER visitors followed up in neurology clinic. We calculated, in days, the time between the first ER visit and first clinic visit, with a cut-off date of June 2006. The usual waiting period in the outpatient clinics was about 2–3 months in MNGH and 1–2 months in VUH. Medicare and Medicaid covered epilepsy clinic visit, EEG and blood draw for AED levels at both places (i.e. VUH and MNGH).

As a control group we studied epilepsy patients attending the VUH epilepsy clinic of one investigator (A.A.) and the MNGH neurology clinic of another investigator (P.S.), for medical insurance coverage. At the time of the study there was one epileptologist at MNGH and three epileptologists in VUH. The overall proportion of patients with epilepsy in the neurology clinic was about 40 percent at MNGH and 45 percent at VUH.

Groups were compared with Chi Square or Fisher's exact test for categorical variable and Wilcoxon Rank-Sum test (Mann–Whitney test) for continuous variable.

3. Results

3.1. Patients visiting the ER for seizures

During the 2002–2003 period, a total of 1005 patients visited the VUH ER with a primary diagnosis of seizures while 205 patients visited the MNGH ER (Table 1). Of the 1005 VUH patients, 153 patients (15.2%) presented to the ER more than once for seizures, while 60 (29.2%) of the 205 MNGH patients made more than one visit to the ER. The difference between the two institutions was highly significant, with more patients in the county hospital visiting the ER repeatedly for seizures ($p < 0.000001$, Chi Square). Combining institutions, male patients were much more likely to come to the ER repeatedly ($p = 0.0073$, Chi Square).

Table 2

Overall health insurance of ER patients with repeat ER visits and control clinic patients (percentages).

Insurance carrier	VUH			MNGH		
	Repeat ER patients	Single ER patients	Epilepsy clinic	Repeat ER patients	Single ER Patients	Epilepsy clinic
Private or commercial insurance	50 (32.7%)	329 (38.6%)	1760 (69%) ^a	1 (1.7%)	3 (2.1%)	13 (2.5%) ^b
Medicare/Medicaid	98 (64.1%)	457 (53.7%)	765 (30%)	43 (71.6%)	95 (65.5%)	465 (88.9%)
Self-pay or no insurance	5 (3.2%)	66 (7.7%)	25 (1%)	16 (26.7%)	47 (32.4%)	45 (8.6%)

^a The group of patients visiting the VUH ER had a greater proportion of self-pay or uninsured than private or commercial insurance ($p < 0.0001$, Chi Square) or Medicare/Medicaid ($p < 0.0001$, Chi Square) in comparison with VUH clinic patients.

^b The group of patients visiting the MNGH ER had a greater proportion of self-pay or uninsured than private or commercial insurance ($p = 0.007$, Fisher), or Medicare/Medicaid ($p < 0.0001$, Chi Square) in comparison with MNGH clinic patients.

3.2. Comparison of ER users to clinic patients

Patients using the ER for seizures were much less likely to be insured than epilepsy patients followed in the clinic, in both institutions (Table 2). Therefore, we combined the data of the two institutions for this analysis. Among ER patients, 134 (11.1%) were uninsured, 383 (31.6% had private insurance, and 693 (57.3%) had Medicare/Medicaid, while among clinic patients only 70 (2.3%) were uninsured, 1773 (57.7%) had commercial insurance and 1230 (40.0%) had Medicare/Medicaid. The difference was highly significant, with ER patients much more likely than clinic patients to be uninsured ($p < 0.000001$, Chi Square). In addition, among those who are insured, ER patients were much more likely to have Medicaid/Medicare than clinic patients ($p < 0.000001$, Chi Square).

3.3. Patients visiting the ER more than once and insurance status

The insurance distribution of patients visiting VUH and MNGH emergency rooms and the respective clinics is described in Table 2. The difference between the two institutions in proportion of uninsured patients was significant ($p < 0.000001$, Chi Square).

Of the 1005 VUH patients, 153 patients (15.2%) visited the VUH emergency room more than once. Of these 153 patients, 148 patients (96.7%) carried insurance while 5 patients (3.2%) did not have any insurance (Table 3).

Of the 205 MNGH patients seen in the ER, 60 patients (29.2%) came to the MNGH emergency room more than once. Of these 60 patients, 44 patients (73.3%) carried insurance while 16 patients (26.7%) were not insured. Thirty-eight patients made 5 or more ER visits at VUH while 9 patients made 5 or more ER visits at MNGH (Table 3).

One medicaid VUH patient had come to the ER 23 times and one uninsured and one medicaid MNGH patient had come to the ER 25 times each. Combining institutions, there was no difference in insurance status between high ER repeat users (visiting ER 5 or more times) and low ER repeat users (<5 times) ($p = 0.51$, Fisher).

3.4. Follow-up in clinic

We determined how many of the repeat ER visitors followed up in a neurology clinic and calculated, in days, the time between the

Table 3
Patients with multiple ER visits.

Insurance carrier	VUH				MNGH			
	>1 ER visit (% of total number)	≥5 ER visits (% of repeat ER visitors)	Clinic f/u (% of repeat ER visitors)	Interval between ER and clinic visits (days)	>1 ER visit (% of total number)	≥5 ER visits (% of repeat ER visitors)	Clinic f/u (% of repeat ER visitors)	Interval between ER and clinic visits (days)
Private or commercial insurance	50 (32.6%)	10 (19.6%)	32 (64%)	149	1 (1.6%)	0	0	N/A
Medicare/Medicaid	98 (64%)	27 (27.5%)	71 (72.4%)	210	43 (71.7%)	6 (13.9%)	7 (16.3%)	103
Self-pay or no insurance	5 (3%)	1 (20%)	2 (40%)	140	16 (26.7%)	3 (18.7%)	1 (6.3%)	31
Total	153	38 (24.8%)	105 (68.6%)		60	9 (15%)	8 (13.3%)	

first ER visit and first clinic visit. A total of 105 patients (68%) who visited VU ER more than once followed up in the Epilepsy or Neurology clinic. Of the MNGH patients only 8 of the 60 patients (13.3%) followed up in the Neurology/Epilepsy clinic (Table 3). The average interval to follow-up was 186 days for VUH and 103 days for MNGH patients who followed up in clinic.

3.5. Factors associated with repeat ER visits and clinic follow-up

Combining institutions, we found a significant relationship between gender and repeat ER visits suggesting males being more likely to visit the ER more than once ($p = 0.0073$, Chi Square). We also found that patients who visited the ER more than once were significantly older than those visiting the ER once ($p = 0.0102$ Wilcoxon Rank-Sum test).

Repeat ER visitors were more likely to be insured than patients who visited the ER only once, contrary to our expectations ($p = 0.009$, Chi Square). Among patients visiting the ER with seizures at Vanderbilt, Medicaid/Medicare patients were more often repeat ER users compared to the uninsured or privately insured ($p = 0.01$, Fisher's exact). However, at the county hospital (MNGH), there was no difference in use of ER by insured/uninsured status ($p = 0.52$, Chi Square). The difference between the two institutions in proportion of uninsured patients using the ER was significant, with more repeat ER use by uninsured patients at the county hospital ($p < 0.000001$, Chi Square).

At Vanderbilt, we found that Medicaid/Medicare patients were also more likely to seek outpatient care, even though these patients tended to wait longer for a visit (mean 210 days). Combining institutions, we found no relationship between insurance and classification of patients as high ER users (5 or more ER visits) or low ER (<5 ER visits) users ($p = 0.99$, Chi Square). However, combining institutions, insured patients were much more likely to follow-up in the clinic than uninsured patients ($p = 0.03$, Chi Square).

4. Discussion

We conducted an exploratory study to assess the number and type of patients who are frequent users of the ER for seizure management, and how often the patients seek long-term management and treatment in a specialty clinic. We found that patients visiting the ER were much more likely than clinic patients to be uninsured and that the county hospital ER has a greater proportion of repeat ER visitors for seizure management than the tertiary care hospital ER. The findings reflect an aspect of disparity of care for epilepsy patients. Possible explanations may be that patients visiting the ER do not have a regular physician following their seizure disorder and come to ER or are brought to ER whenever they have a seizure. The county hospital caters to more indigent uninsured patients, who may use of ER for regular care because of lack of alternative source of care. The outpatient clinic follow-up rate was only ~2/3 in our academic tertiary care center and was much lower in our community hospital, regardless of insurance

type. As may be expected, we also found that uninsured patients were less likely to follow-up in clinic, in both institutions. The findings are consistent with a conclusion that patients visiting the ER for seizure care are overall underserved. The findings with respect to insurance coverage for patients with one versus more than one ER visit for seizures were counterintuitive, but we were not able to perform additional analyses to explain the findings.

The use of the ER as a substitute for primary care adds tremendous cost to society and needs to be addressed, particularly as the annual number of ER visits continues to rise in the United States.⁴ ER use in general has increased 14% from 1992 to 1999.⁵ A US study that surveyed a random ER sample of 351 adults found that at a 2-year follow-up the median number of subsequent ER visits was 2, while the median number of visits to a primary care appointment clinic was 0, with only 26% of the patients having any primary care clinic visits. In addition, 65.6% of all subsequent ER visits were accounted for by 16.6% of patients.⁶ According to a survey of US civilian, non-institutionalized, household population, 0.9% of American households named the ER as their usual source of care while 15% stated they had no usual source of care.⁵ Patients for whom the ER was the usual source of care were more likely to be aged 25–44, African-American or Hispanic, uninsured, rural dwellers, of lower education, and disabled.⁵ A recent study utilizing population-based clinical administrative database to study health resource utilization in epilepsy patients in Canada found that aboriginal status was a factor in ER use. Aboriginals were more likely to visit the ER or be admitted for epilepsy, and less likely to see a neurologist than nonaboriginals.⁷ Seizures are a common cause of ER visits, representing 1.2% of all ER patient visits.⁸ Emergency room care is certainly not sufficient for long term, effective management of epilepsy.⁹ It also results in significant economic burden on the healthcare system, as seizure patients in the ER often undergo expensive diagnostic studies that would not be ordered in the clinic setting.

Studies have tried to pinpoint specific factors that may make patients use the ER rather than follow-up with a primary care physician or specialist. Such factors have included lack of access to a telephone, self-reports of poor health, higher burden of illness, and lack of availability of a primary care practice or urgent care clinic.^{4,6,10} Indigent patients are more likely to be affected by these factors. Having access to a telephone is necessary for scheduling ambulatory visits and receiving health-related calls. More generally, access to a telephone may be a proxy for residential and economic stability. One Swedish study of patients with repeated ER visits found that this group had a heavier load of psycho-social problems than controls, including living alone, disability, and alcoholism.¹⁰ A US study also showed that 74.1% of patients with high rates of ER use had multiple chronic medical conditions, a chronic medical condition complicated by a psychiatric diagnosis, or substance abuse.⁶ Although these studies dealt with general ER patients, their findings may be relevant to epilepsy, and could give us an idea about factors that may lead to increased ER use in patients with seizure disorders. Insurance status did not distinguish high from low ER users in our study.

However, our ER patients were less likely to be insured than clinic patients.

Disparity of care is not just limited to the medical therapy of epilepsy and seizures but also affects the surgical therapy for epilepsy, which in selected cases is very effective. Burneo et al. suggested that epilepsy patients who are African-American were less likely to use epilepsy surgery as a treatment option.¹¹ In this retrospective study the authors evaluated the patient specific discharge data, from video-EEG unit, for the primary diagnosis of temporal lobe epilepsy in a tertiary care epilepsy center. A review of the database of the Epilepsy Center at the University of Alabama at Birmingham showed that 25% of the population of patients with TLE seen in the center was African-American, a proportion similar to that of the state of Alabama as a whole (26%). However, only 9% of the patients who received surgery at this center were African-American. African-Americans were significantly less likely than non-Hispanic whites to receive the surgical procedure. The authors found that racial/ethnic minorities have concerns about surgical outcomes and adverse events after surgical procedures and these concerns can influence the patients' willingness to consider surgical treatment. Other factors that may contribute to this pattern are income disparities and insurance difference (African-Americans were more likely to have Medicare and whites were more likely to have Blue Cross/Blue Shield).

Our retrospective study has some important limitations; one being the retrospective design of this study, second the use of ICD-9 code 780.39 that can be used for single unprovoked seizures, symptomatic seizures as well as spells of unknown nature, which do not reflect epilepsy. However we included ER patients in this study only when epilepsy/seizure ICD-9 codes were the primary diagnoses for the particular ER visit. When it came to neurological follow-up, only visits to neurologists at VUH and MNGH could be reviewed, while patients could have received neurology care elsewhere. The usual waiting period in the outpatient clinics was about 2–3 months in MNGH and 1–2 months in VUH. The study period ended on December 31st, 2003 and a patient visiting ER in the last week of November may have been counted as lost to follow-up but instead the patient may have been scheduled for follow-up appointment in the outpatient clinic later than the study end date. The control group was not matched by age, gender, or diagnosis. However, the control group played only a minor role, mainly to show the difference in insurance coverage between ER seizure patients and epilepsy clinic patients.

The current pilot study highlights that repeated use of ER services in lieu of a specialty clinic is an aspect of disparity of epilepsy care for which a solution is needed. In one study of frequent ER use in Sweden, a random subgroup of patients who had

visited the ER 4 times or more during the preceding 12 months were contacted by a social worker.¹⁰ Twenty-five percent of these patients received social intervention that included education and guidance with respect to the health care and social security systems. One year after the intervention there was a significant decrease in subsequent ER visits in the intervention group, as compared to patients who were not interviewed. Educational and social programs for patients with epilepsy could be arranged or facilitated at the time of presentation to the ER. The value of social and educational interventions should be formally assessed in patients with epilepsy who use the ER for their care. For example, these patients can be randomized to receiving social work intervention and epilepsy education or only medical and the outcomes of the two groups can be compared. In addition to educational and social intervention, improved epilepsy management may help reduce visits to the ER for epilepsy care and thereby decrease health care cost.

Disclosure

None of the authors has any conflict of interest to disclose.

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