Epilepsy in the accident and emergency department—developing a code of safe practice for adult patients

John Ryan, Stephen Nash, Julia Lyndon, on behalf of the South East and South West Thames Accident and Emergency Specialty Sub-committees

Abstract

Objectives—To benchmark current practice in the management of adult patients presenting with seizures to the accident and emergency (A&E) departments by performing a comparative interdepartmental audit. To assess the quality and degree of completeness of documentation in A&E records and to develop a proforma for the documentation of any case presenting with a seizure which would incorporate management guidelines for use by A&E doctors.

Methods—This was a retrospective, criterion based audit carried out in 12 A&E departments in the South Thames region. It involved 1200 adult patients who presented to A&E departments after a seizure. The degree of completeness of A&E records was assessed using criteria identified by A&E consultants and neurologists. Guidelines for use in the management of patients with seizures have been produced. **Results**—Important aspects of the history and examination were frequently unrecorded in patients' notes. The recording of vital signs was particularly poor. A diversity of practice was shown between the departments that were audited and the number of investigations performed in each department varied considerably. Hospital admissions for patients with first seizures varied widely between departments, ranging from between 34.6% to 91.7% of cases. Documentation of advice given to patients about driving was evident in just 0.9% of cases.

Conclusions—Wide interdepartmental variation exists in both the quality of information recorded in A&E records and in the management of patients. Deficiencies could be minimised and potential improvements in the quality of documentation might be achieved by the introduction of a structured proforma incorporating pre-defined management guidelines.

(J Accid Emerg Med 1998;15:237-243)

Keywords: epilepsy; documentation; guidelines; proforma

Epilepsy is one of the commonest neurological conditions which presents to an accident and emergency (A&E) department. The almost uniform way in which the disorder presents to the A&E department makes it eminently

Table 1 Symptoms and signs, documentation rate, and interdepartmental variation in A&E notes

Examination	Mean (%)	Range (%)
GCS	58.4	17-78
Pulse	92.2	80-97
Blood pressure	92.4	82-97
Temperature	55.5	30-74
Respiratory rate	63.4	34-92
Pupils	78.3	67-98
Reflexes	48.8	25-76
Neck stiffness	14.0	2-34
Thoracic/lumbar spine tenderness	4.4	0-35
Shoulder/hip dislocation	5.0	0-36
Headache	21.8	11-34
Evidence of incontinence	40.3	22-59
Evidence of tongue biting	32.3	13-59

GCS=Glasgow coma score.

Table 2 Investigations performed in each department and the interdepartmental range

Investigation	Mean (%)	Range (%)
(1) Biochemistry		
Anti-convulsant	21.2	7.1-57.1
BM Stix	49	27-80
Glucose	24.4	10-39
Urea and electrolytes	35.7	18-55
Alcohol	0.8	0-4
Cardiac enzymes	1.9	0-6
Calcium	7.5	0-17
Liver function	5.8	0-19
Paracetamol/salicylate	0.7	0-3
Thyroid function	0.8	0-3
(2) Radiology		
Computed tomography	1.1	0-3
Radiography		
Chest	10.9	5-27
Skull	6	1-13
Shoulder	0.8	0-2
Cervical spine	0.7	0-2
(3) Other		
ECG	19	6-38
Full blood count	35.1	20-54
Urinalysis	5.7	1-12

ECG = electrocardiography.

Table 3 Working diagnosis recorded in A&E notes and the interdepartmental range

Working diagnosis	Cases (%)	Departmental range (%)
Neurological	49.8	35-63
Uncertain	20.1	13-25
Alcohol related	11.8	4-29
Compliance problems	8.5	3-13
Pseudoseizure	1.8	0-4
Hypoglycaemia	1.5	0-6
Recent changes to anti-convulsants	1.5	0-8
Drug related	0.9	0-2
Brain tumour	0.8	0-3
Cerebral metastases	0.8	0-4
↓Anti-convulsant levels	0.4	0-2
Cerebral haemorrhage	0.3	0-2
Alcohol and drug combination	0.3	0-1
Other/not recorded	1.7	0-9

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Figure 1 Treatment in the A&E department.

suitable for auditing. In particular the documentation and apparent quality of care provided in a variety of departments can be easily compared. The information obtained from auditing such a quantifiable disorder as epilepsy may be used to produce a proforma. This

proforma may be used as a tool for documentation in addition to providing junior doctors with ready made guidelines for the management of these cases which may improve clinical outcomes.

An audit of A&E department case notes of 1200 adult patients who had presented with an epileptic seizure was carried out in 12 hospitals in the South Thames region. A retrospective sample of 100 cases was audited from each hospital. The aims of the study were: (1) to benchmark current practice in the management of patients presenting with seizures to the A&E department; (2) to perform a comparative interdepartmental study of current practice; (3) to assess the quality of documentation in A&E records; and (4) based on the results of the audit, to develop a proforma for the documentation of any case presenting with a seizure

PROFORMA FOR ASSESSMENT OF ADULT PATIENTS WITH SEIZURES IN A&E																														
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> A&E Number Surname First Name </div>																														
PRE - A&E CARE ☐ None ☐ Oxygen ☐ Diazemuls ☐ Other	<div style="border: 1px solid black; padding: 5px; min-height: 40px;"> State details, dosage and who administered care </div>																													
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Figure 2 Proforma: 1st page.

which would facilitate the recording of frequently omitted important data and to incorporate management guidelines for use by A&E doctors.

Methods

Twelve computerised A&E departments in the South Thames region were recruited to participate in the audit. The numbers of new attendances at each of the participating departments varied from 32 000 to 75 000 per year.

A computer generated search identified 100 consecutive attendances from each department who were identified by a discharge diagnosis of epilepsy. Information from the 1200 sets of notes was collected into seven groups on a data collection form which included:

(1) demographic details such as age, sex, type,

and duration of fit; (2) pre-hospital details; (3) examination; (4) investigations; (5) treatment; (6) working diagnosis; and (7) discharge destination from the A&E department.

Where any patient attended more than twice during the audit period, data were collected only for the first two visits as documentation and management sometimes differed for patients well known to a department and these were considered by us to be a separate group.

Data were analysed by Epi-Info, a word processing database and statistics system.

Based on the results of the audit a proforma was designed to promote better documentation and to act as a guideline in the management of patients who have presented to the A&E department after a seizure.

EXAMINATION <i>Refer to guidelines</i>		Examination findings																													
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MANAGEMENT <i>Refer to guidelines for advice</i>																															
First-line ☐ Diazepam 10mg IV ☐ No further treatment required		Secondline ☐ Phenytoin IV 15mg/kg 50 mg/minute Third line ☐ Chloromethazole IV 0.8%mg 10 mls/minute																													
DRUGS <i>Indicate if drugs given as a stat dose (SD) or prescribed to take away (TA)</i>																															
Name / Dose frequency	SD TA	Route	Time	Doctor's Signature/Number	Given by	Time Given																									
			: hrs			: hrs																									
			: hrs			: hrs																									
			: hrs			: hrs																									
SOCIAL CIRCUMSTANCES																															
Details																															
DISPOSAL <i>Refer to guidelines</i>		Disposal Details. Include details of home circumstances if discharged.																													
☐ Admitted to General Ward ☐ Admitted to Obs Ward ☐ Referred to OPD <i>letter sent Y/N</i> ☐ Home ☐ GP follow-up ☐ Other																															
ADVICE GIVEN TO PATIENT <i>driving, medication, etc.</i>																															
☐ DVLA ☐ Advice sheet																															

Figure 3 Proforma: 2nd page.

Results

A number of important events were frequently unrecorded in the notes and complete data collection was not always obtained. This was invariably due to poor documentation.

DEMOGRAPHICS

The majority of patients were men, 62.5%, and 37.5% were women. Ages ranged from 16 to 92 years with a mean (SD) of 40.4 (17.4) years. Patients with a first seizure presented in 20.5% of cases. Single seizures featured in 77.5% of cases, recurrent seizures in 17.3%, and status epilepticus in 4.9% of cases. In 0.3% of cases this information was not recorded.

PRE-HOSPITAL CARE

Ambulances brought patients to hospital in 90% of cases, 7% of patients arrived by private transport, and 3% by a variety of other means.

In six hospitals ambulance records were not routinely filed with A&E notes. Where ambulance records were available ($n = 628$), only 10.7% of patients were documented to have received oxygen and 11.1% had received diazepam from the ambulance crew. A further 1.8% had diazepam administered by a carer or by a general practitioner. While these figures seem remarkably low they may reflect poor documentation rather than a lack of clinical need and it is possible that oxygen in particular was administered more often.

MANAGEMENT GUIDELINES FOR ADULT PATIENTS

• Status epilepticus and Recurrent seizures

Definitions

Status epilepticus: continuous seizures for more than 30 minutes or repeated seizures without the patient regaining consciousness
Recurrent seizures: 2 or more seizures in a patient who regains consciousness between seizures

• Examination

Perform a thorough general examination after a first seizure to exclude all reversible causes. e.g. Hypoglycaemia, Cardiac Arrhythmias

Check carefully for hip or shoulder dislocation or spinal tenderness in all patients who have had a generalised seizure.

• Investigations

All patients should have a BM, a laboratory blood sugar is not necessary.

Request Prolactin *within 30 minutes of seizure* if pseudoseizure is suspected.

Do not request anti-convulsant levels routinely.

Do not request FBC, U&E or calcium routinely in a patient who has fully recovered.

Perform an ECG if the patient presents with a first fit or if there is suspicion of an arrhythmia.

• Management

Isolated fits are usually self-limiting and do not require treatment: the patient should be protected from further injury during the seizure. Oxygen should be given by mask if possible.
 Children with febrile convulsions may be treated by tepid sponging and given antipyretic medication.

Drug treatment: For patients with recurrent seizures or status epilepticus give:

- First-line** Diazepam 10mg IV (adults)
 Repeat dose of Diazepam once if required
- Second-line** Titrate Phenytoin 15mg per kgm at 50mg per minute IV
- Third-line** Chloromethiazole 0.8% IV 10 mls/minute up to a maximum of 100 mls

Status epilepticus is a medical emergency and may require anaesthetic support

In Adults, if seizure does not respond to 20mg Diazemuls consider other anti-convulsant or diagnosis of pseudoseizure.

N.B. For head injury, Phenytoin is the anti-convulsant of choice.

• Disposal

Not all patients who have had a seizure require admission.

If a patient has not fully recovered within 4 hours of the seizure then admit to the obs ward or refer to the on-call team.

Ensure all patients being discharged following a first seizure have a neurology out-patient appointment arranged.

SEIZURE OBSERVATION

AT LEAST ONE FULL SET OF OBSERVATIONS FROM BOXES 1,2 AND 3 MUST BE RECORDED

TIME		hrs			
RESPONSE	EYES	spontaneously	4		
	OPEN	to speech	3		
		to pain	2		
		none	1		
	BEST VERBAL RESPONSE	orientated	5		
		confused	4		
		inappropriate words	3		
		incomprehensible sounds	2		
		none	1		
	BEST MOTOR RESPONSE	obeys commands	6		
localises pain		5			
normal flexion to pain		4			
abnormal flexion to pain		3			
extension to pain		2			
	none	1			
COMA SCORE			15		
PUPILS	RIGHT	size (mm)			
	LEFT	size (mm)			
LIMB MOVEMENT	ARMS	normal power			
		mild weakness			
		severe weakness			
		extension			
		no response			
	LEGS	normal power			
		mild weakness			
		severe weakness			
		extension			
		no response			
PUPIL SCALE (mm)	BLOOD PRESSURE mm Hg	230			40
		220			39
		210			38
		200			37 Temp°C
		190			36
		180			35
		170			34
		160			33
		150			32
		140			31
130			30		
PUPIL SCALE (mm)	PULSE RATE	120			
		110			
		100			
		90			
		80			
		70			
		60			
		50			
		40			
		30			
RESPIRATORY RATE					
NURSES INITIALS					

Figure 4 Proforma: 3rd and 4th pages.

HISTORY AND EXAMINATION

Where a seizure had been witnessed, the time of onset of seizure was recorded in only 28.9% of cases. The duration of a seizure was documented in 62.3% of cases. Documentation of witnessed events differed greatly between departments. A description of the seizure was not always recorded; in one hospital the type of seizure was described in only 67% of cases. For the time of onset of seizure there was a variation in reporting between departments from 15% to 50% and for the length of seizure from 48% to 85% of cases.

Documentation of the presence or absence of intercurrent medication was recorded in 83% of cases. Evidence of previous neurological illness was documented in 6.6% of cases, previous head injury in 6.5%, stroke in 6.2%, and alcoholism in 10.8% of cases. Other important information relevant to the history and examination was frequently unrecorded (table 1).

INVESTIGATIONS

A large range of investigations were performed with great interdepartmental variation (table 2). There appeared to be no logical reason as to why this large variation occurred. Serum prolactin, which can be a differentiating test in pseudoepilepsy, was requested very infrequently, although clearly it was not a relevant test in most cases.

DIAGNOSIS

In general, interdepartmental ranges varied greatly between all hospitals for diagnoses, particularly where an alcohol related problem was the working diagnosis. Table 3 lists the working diagnoses recorded in the notes. Neurological diagnoses were given in most cases.

TREATMENT

Treatment in the A&E department was recorded as oxygen, diazepam, no further treatment required in the A&E department, or other (fig 1).

In 90.5% of cases there was a mention of some form of a management plan, although the interhospital range varied from 69% to 99%.

DISCHARGE ARRANGEMENTS

Admission to hospital occurred in 36.7% of all attendances, varying between hospitals from 18% to 55% of all cases. This was highest for patients who presented with a first seizure, 52.8%, with a range from 34.6% to 91.7%.

Of those patients admitted to hospital 72.5% were admitted to a general ward and 27.5% were admitted to an A&E department short stay ward.

Documentation of advice given to patients relating to driving was present in only 0.9% of cases.

STATUS EPILEPTICUS

Fifty nine patients presented in status epilepticus. The majority of these patients (78%) received diazepam as first line treatment. In 11.9% of cases the seizure stopped before arrival. Altogether 18.6% of these patients were given intravenous phenytoin and 3.4% were given paraldehyde. Oxygen was documented as having been administered in only two cases.

Discussion

Epilepsy is the most common serious neurological condition affecting at least 420 000 people in the UK (personal communication, British Epilepsy Association, 1997). Lifetime prevalence is between 2% to 5% of the population.¹ Patients presenting to an A&E department after an epileptic seizure provide a significant workload for that department in terms of nursing care due to the care needed for patients with diminished conscious levels and possible impaired airways. In general these patients follow a common pattern and there is often marked similarity in their presentation. Thus a set of guidelines for the management of seizures in the A&E department may be highly appropriate. This study represents a large series of patients attending typical A&E departments throughout the South East of England. It shows the large variation that exists between departments in the documentation and management of epileptic patients.

We have encountered deficiencies in documentation in all A&E departments that took part in this audit. This is not a unique finding. A previous audit of documentation of head injuries revealed a similar poor level of documentation before the introduction of a proforma.² Others have shown that physician documentation in cases of epilepsy presenting to emergency departments was deficient even when there were clear clinical standards.³ It has been suggested that junior doctors are not given clear advice on the relevant documentation of patients presenting after an epileptic seizure.⁴ Although that comment was unreferenced, this paper now supplies evidence which supports that statement. This paper has not qualified the outcome of poor documentation but it may be reasonable to assume that there are potential ramifications for both the patient and doctor when important information goes unrecorded. In terms of risk management any system which allows for easier documentation must be seen to be worthwhile.

The importance of a good history is paramount. The patient's seizure will usually have resolved by the time the patient is medically assessed leaving the diagnosis to be made primarily on a witness's account. Further management may be straightforward or sophisticated depending on information obtained from a proper history. It may often be possible to distinguish a true seizure from syncope, hyperventilation, or psychogenic seizures. It is disappointing to find that important aspects of the history and examination were frequently unrecorded. Any guidelines therefore must include a trigger to the doctor to record this important information. We have proposed a set of guidelines in the form of a proforma which are included at strategic points in the documentation of patients who have had a seizure (this is shown in figs 2, 3, and 4).

Examination is no less important than history. We found that recording of vital signs either by the assessment nurse or the doctor were seriously deficient. In addition, evidence of head injury was poorly recorded. The importance of interpretation of these findings has been well described.⁵ Up to 13.8% of

attendances after a seizure have been shown to have sustained an injury with death occurring in an additional 1.2%. A policy paper from the American College of Emergency Physicians (ACEP) highlights the importance of appropriate interpretation of abnormal clinical findings in the examination of the epileptic patient.⁶ Minor seizure related head injury is relatively common, while severe head injury is rare. In one study only one in every 9311 seizures resulted in skull fracture, extradural or subdural haemorrhage.⁷ Thus patients who recover quickly after a seizure related head injury may not require imaging unless there are significant localised signs. All patients should have a close examination of the scalp to look for swelling or other evidence of a skull fracture. A patient with abnormal neurological findings or a fall in the Glasgow coma score (GCS) of 2 or more points can be used to decide when to evaluate a patient further with a computed tomogram. Senior staff should be consulted about any patient with a GCS of 13 or less whose level of consciousness fails to improve.

The Epilepsy Foundation of America recommends that patients with uncomplicated seizures need only first aid following a seizure and do not generally require transport to an emergency department.⁸ Others have shown that the extensive emergency department work-up often done for the evaluation of a new onset seizure is unnecessary.⁹ ACEP's clinical policy has also suggested that routine electrolytes, glucose, calcium, magnesium, and arterial blood gases are all of uncertain value and recommend that these tests are not required for patients whose mental status and physical examination are completely normal. Given the weight of support for not investigating the stable patient who has had a seizure it is remarkable that there was such a diversity of practice in requesting investigations between departments. Serum prolactin may be a helpful objective test in distinguishing a true seizure from a pseudoseizure if levels are found to be elevated, however it is of value principally in the 30 minutes after a seizure. It is not indicated where a definitive diagnosis is readily apparent.¹⁰ Anti-convulsant levels while generally agreed to be of value are fraught with interpretation difficulties when taken in the A&E department. The result may not be available on the day of attendance and the patient's doctor who supplies continuity of care will need to be well informed as to the timing of events on the day of the seizure. If the result is to be appropriately interpreted then the time of last dose, the time of the seizure and the time of phlebotomy all need to be recorded. The great interdepartmental range in requesting serum anticonvulsant levels reinforces the need for readily available guidelines for the examining doctor.

Other investigations which were requested suggested a lack of consideration as to the possible causes for a seizure. Hypotension, cardiac arrhythmias, and vasovagal episodes may be a primary problem in someone presenting with a seizure and the importance of electrocardiogra-

phy in these patients is invaluable. The range between departments of 6–34% in requesting an electrocardiogram reinforces yet again the need for triggers for the medical examiner to consider this aetiology when dealing with the patient.

Death or serious injury has been shown to occur in 15% of patients who sustain an epileptic seizure principally because of airway obstruction, head injuries, and drowning.⁵ Although most injuries are minor and occur in patients with known epilepsy, there is a substantial risk to patients during their lifetime of developing a serious problem as a result of a seizure. Interventions that can minimise complications include protecting the airway, adequate oxygenation, glucose for patients who are hypoglycaemic, thiamine for alcoholic patients with abnormal neurological findings,¹¹ and guarding against the complications of potentially serious injuries such as a fractured cervical spine or dislocated hip in the injured patient. Aborting status epilepticus is also important with 80% of episodes responding to intravenous or rectal diazepam. The majority of other cases will respond to intravenous phenytoin. On occasions intravenous chlormethiazole may be required but there is a significant risk of respiratory depression associated with its use.

Just as few patients require investigation in the A&E department, few patients also require active treatment, although some patients required treatment with diazepam and oxygen in the pre-hospital setting. Some patients however will require further medication, so it is important that guidelines are available for inexperienced or junior doctors.

Hospitalisation is not always necessary for patients who have had a first seizure and who have had a complete recovery.¹² In particular little may be gained from an admission for diagnostic evaluation of a patient who is a known epileptic and who has already had physician evaluation. Admission may be appropriate if the patient is still drowsy after a number of hours in the A&E department.⁴ It is not surprising that we found a greater percentage of patients with first seizures being admitted to hospital. The use of the A&E observation ward may be eminently suitable for the management of these patients where an admission is usually required only overnight or until the patient has recovered from a postictal state. It also provides a good environment for counselling and patient education.

More importantly perhaps than the decision to admit is the advice given to patients being discharged about avoiding driving or operating dangerous machinery. It is disappointing that no department in this study gave written advice to patients on discharge.

Cost savings from reduced numbers of admissions are a further potential benefit of the proposed guidelines. Indeed cost containment exercises such as physician education and the introduction of guidelines can lead to a reduction in laboratory and radiology costs of 10.2% and a reduction in 3.3% of overall emergency department visit costs, not just for patients with seizures.¹³

A&E medicine is a high volume specialty and as such allows nursing and medical staff only a very limited amount of contact time with patients. In high risk conditions where clinical outcome is highly dependent on following the correct line of patient management, it is imperative that nursing and junior medical staff have rapid and easy access to predefined management guidelines in order to make informed decisions as rapidly and efficiently as possible. Structured proformas offer one way of achieving a high quality of documentation of clinical findings and consequently a reduction of patient exposure to risk.

Conclusions

Epilepsy is a common condition presenting to A&E departments. In this study interdepartmental documentation and management of this common problem was found to be inconsistent. There were significant interdepartmental variations. We propose the introduction of a proforma for the management of this condition which incorporates guidelines and acts as an aide memoire for junior and inexperienced doctors who are often the first responders in dealing with a patient who has had an epileptic seizure. The proposed new proforma and management guidelines could be introduced without a significant change in work practice. They have the potential to improve quality of care for a patient attending

an A&E department after a seizure and also to decrease the unit cost per A&E attendance for that complaint. It is proposed that a similar study will be carried out once they have been introduced to see if the hypothesis suggested in the discussion of this paper has been fulfilled.

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