

Depiction of Seizure First Aid Management in Medical Television Dramas

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ABSTRACT: Objectives: The objective of this study was to investigate whether medical television dramas portray proper seizure first aid. **Methods:** Episodes of the four highest-rated US medical dramas ("Grey's Anatomy," "House M.D.," "Private Practice," and "ER") were screened for the presence of seizures. "Patient" age, sex, semiology, and etiology were recorded. The appropriateness of seizure first aid management was determined by comparison to the Epilepsy Foundation of America (EFA) guidelines. **Results:** Among 364 television programs, 65 seizures (in 59 individuals) were identified (30 males; 29 females). Seizures were primary or secondarily generalized tonic-clonic in 53 (81.5%) cases. Other seizure types included complex partial (5, 7.7%), simple partial (1, 1.5%), myoclonic (1, 1.5%), absence (1, 1.5%), and psychogenic (1, 1.5%). On 63 occasions (96.9%), first aid was performed by a health care professional. First aid management was judged appropriate in 21 (32.3%) seizures, inappropriate in 28 (43.1%), and indeterminate in 16 (24.6%). Inappropriate practices included holding the person down (17, 26.2%), trying to stop the involuntary movements (10, 15.4%) and putting something in the person's mouth (11, 16.9%). **Conclusions:** The first aid management of seizures performed by actors portraying health care professionals was inappropriate in nearly half of all cases. Inaccurate depiction of seizure first aid management may contribute to misinformation of the general public. The television industry could easily incorporate the simple first aid EFA seizure guidelines as a public service without sacrificing dramatic impact.

RÉSUMÉ: Description des premiers soins lors d'une crise convulsive dans les séries médicales télévisées. Objectifs : Le but de cette étude était d'examiner si les premiers soins à administrer lors d'une crise convulsive sont représentés correctement dans les séries médicales télévisées. **Méthode :** Nous avons recherché les crises convulsives dans des épisodes des quatre drames médicaux américains les mieux cotés ("Grey's Anatomy", "House M.D.", "Private Practice" et "ER"). L'âge, le sexe, la séméiologie du "patient" ainsi que l'étiologie ont été notés. La convenance des premiers soins administrés a été déterminée en se servant des lignes directrices de la Epilepsy Foundation of America (EFA) comme point de référence. **Résultats :** Nous avons relevé 65 crises convulsives (chez 59 individus - 30 hommes et 29 femmes) au cours de 364 émissions. Les crises convulsives étaient des crises toniques-cloniques généralisées primaires ou secondairement généralisées chez 53 individus (81,5%). Les autres types de crises convulsives étaient des crises partielles complexes (5 individus, 7,7%), partielles simples (chez 1 individu, 1,5%), myocloniques (1 individu, 1,5%), des absences (1 individu, 1,5%) et psychogéniques (1 individu, 1,5%). À 63 reprises (96,9%), les premiers soins ont été fournis par un professionnel de la santé. L'administration des premiers soins a été jugée appropriée dans 21 cas de crises convulsives (32,3%), inappropriée dans 28 cas (43,1%) et indéterminée dans 16 cas (24,6%). Voici quelques unes des pratiques inappropriées : maîtriser le patient (17, 26,2%), essayer d'arrêter les mouvements involontaires (10, 15,4%) et mettre quelque chose dans la bouche du patient (11, 16,9%). **Conclusions :** Les premiers soins administrés lors d'une crise convulsive par des acteurs qui jouent le rôle de professionnels de la santé étaient inappropriés dans presque la moitié des cas. Une représentation inexacte des premiers soins lors d'une crise convulsive peut contribuer à ce que le grand public soit mal informé. L'industrie de la télévision pourrait facilement inclure des premiers soins simples conformes aux lignes directrice de l'EFA comme service publique, sans sacrifier l'impact dramatique des émissions.

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Seizures and epilepsy have been depicted on film and television since the earliest days of each medium. Epileptic events are intrinsically dramatic, used to drive narrative, enhance character development and intensify the viewing experience¹⁻³. Inaccuracies continue to be depicted despite a long history of film and television producers seeking expert consultation for the portrayal of seizures^{4,5}. Some authors have argued that the depiction of seizures on film and television could be a significant contributor to public misinformation about the disease and how it is treated⁶.

There is significant lack of knowledge among the general public about how to respond to a seizure. One recent population-based survey in the United Kingdom revealed that approx-

imately half of respondents had seen someone having an epileptic seizure, and one-quarter had a relative or close friend with epilepsy, yet 90% of those responding said it was frightening to witness an epileptic seizure⁷. Only 30-40% of

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respondents to a population-based survey in the United States said they would know what to do if someone had an epileptic seizure⁸ and 30% of parents in a pediatric emergency department did not know the most basic elements of seizure first aid⁹. A survey of United Kingdom university staff and students disclosed that one-third of respondents believed that they should put something in the mouth of a convulsing person⁶.

We systematically examined the portrayal of first aid management of seizures in the most popular current American television medical dramas to identify possible sources of misinformation about seizure first aid.

METHODS

We reviewed all episodes of popular medical dramas in the United States broadcast between September 2004 and December 2009 (the last five seasons of "ER", and all episodes of "House M.D.", "Grey's Anatomy", and "Private Practice" from the series premieres up until the end of 2009). We chose those programs because they are set primarily in hospitals or medical practices, and provision of patient care is a major part of each episode.

One investigator (ADM) screened 364 episodes for the portrayal of seizures. A seizure was defined as any situation in which a character appeared to be convulsing or a character was said to be having a seizure. For each seizure the screening investigator documented the patient's sex, the immediate cause of the seizure (if any), and any known underlying illness of the patient. When possible, the apparent underlying cause of each seizure was identified and categorized by a second investigator (JJM).

A data sheet for each seizure was completed by the three independent reviewers (JJM, SRR, RMS). Data collected included the approximate age of the character having the seizure (infant <2 years, child 2-18 years, young adult 18-45 years, middle-aged 45-65 years and elderly > 65 years), location of seizure (in or out of hospital), whether the seizure was witnessed and whether first aid was performed by an actor playing a healthcare professional (doctor, nurse, paramedic, etc.) or a lay person.

The primary outcome of this study was the appropriateness of seizure first aid. The Epilepsy Foundation of America (EFA) guidelines for first aid of convulsive and non-convulsive seizures were used as the "gold standard"¹⁰ (see Appendix). For convulsive (primary or secondarily generalized tonic-clonic) seizures, the three co-investigators independently noted each of the inappropriate and appropriate actions portrayed. Inappropriate actions included: holding the person down, trying to stop the convulsive movements and putting something in the person's mouth. Appropriate actions included: timing the seizure, clearing the area around the patient of any harmful objects, putting something soft under the patient's head, and turning him or her gently onto one side. Each investigator made an overall judgment about the appropriateness of the seizure first aid (appropriate, inappropriate or unable to determine). In general, the first aid was judged inappropriate where there was a depiction of one or more of the inappropriate actions listed above. The first aid could also be judged inappropriate if no appropriate action was depicted. In the case of disagreement among the reviewers, the seizure was reviewed again as a group, and a consensus determination was made. A seizure was labeled

"unable to determine" if the seizure depiction was too brief, or if the view of seizure management was obstructed by other action on the screen.

The reviewers characterized semiology of each seizure using the International League Against Epilepsy (ILAE) Classification of Seizures¹¹. In the case of disagreement, the clip was reviewed again, and a consensus determination of seizure type was made. The three reviewers included an experienced neurologist and epileptologist (RMS), an epilepsy surgery program coordinator with over 20 years of experience (SRR), and a neurologist currently enrolled in clinical epilepsy fellowship training (JJM). All reviewers are experienced with the features of seizures captured during inpatient video-EEG monitoring.

RESULTS

We identified 65 depictions of seizures among 364 episodes. The demographic characteristics and seizure types are shown in Table 1. There was an approximately equal number of men and women, and 61.1% (36/59) of the characters were in the "young adult" age group, with only 6.8% (4/59) of seizures depicted at the extremes of age (two infants and two elderly characters). 81.5% (53/65) of seizures were most likely primary or secondarily generalized tonic-clonic seizures, with a few examples of complex partial, simple partial (including focal motor), myoclonic and absence seizures. There was one depiction of a psychogenic non-epileptic seizure.

In 96.9% (63/65) of cases, the first aid was performed by an actor portraying a health care professional (doctor or nurse). The appropriateness of first aid is shown in Table 2. Overall, 32.2% of seizure first aid was performed appropriately, 43.1% was performed inappropriately, and 24.6% of cases were indeterminate. Therefore, first aid was depicted inappropriately in 57.1% (28/49) of cases where an adequate judgment of seizure first aid could be made. The types of inappropriate and appropriate actions are shown in the Table 2.

The seizure etiology was identifiable in 96.6% of cases (57/59), and is listed in Table 3. In almost all cases, the seizures

Table 1: Baseline demographic characteristics and seizure type in depictions of seizures on TV medical dramas

	Number (percentage)
Female Sex	29 (49.1%)
Estimated Age	
Infant (< 2 years old)	2 (3.4%)
Child (2-18 years old)	10 (16.9)
Young adult (18-45 years old)	36 (61.0)
Middle-aged (45-65 years old)	9 (15.3)
Elderly (>65 years old)	2 (3.4)
Presumed seizure type	
Generalized tonic-clonic (primary or secondary)	53 (81.5%)
Complex partial	5 (7.7%)
Simple partial (including focal motor)	2 (1.5%)
Absence	1 (1.5%)
Myoclonic	1 (1.5%)
Psychogenic non-epileptic	1 (1.5%)
Unable to Assess (due to insufficient visualization of seizure)	2 (3.1%)

Table 2: Characteristics and appropriateness of seizure first aid as depicted on four US television medical dramas

	House M.D.	Grey's Anatomy	Private Practice	ER	Total
Number of episodes reviewed	120	105	31	108	364
Number of seizures depicted	33	16	2	14	65
First responder, number (percentage)					
Health care professional	31	16	2	14	63 (96.9%)
Lay person	2	0	0	0	2 (3.1%)
First aid appropriateness, number (percentage)					
Appropriate	5	10	2	4	21 (32.3%)
Inappropriate	20	2	0	6	28 (43.1%)
Unable to determine	8	4	0	4	16 (24.6%)
Specific appropriate actions, number (percentage of depictions)					
Timed the seizure	1	1	0	2	4 (6.2%)
Cleared the area of harmful objects	0	1	0	3	4 (6.2%)
Put something soft under the person's head	0	2	1	1	4 (6.2%)
Turned person gently onto one side	7	9	2	2	20 (30.8%)
Specific Inappropriate actions, number (percentage)*					
Put something in person's mouth	8	1	0	2	11 (16.9%)
Held the person down	14	0	0	3	17 (26.2%)
Tried to stop the seizing movements	10	0	0	0	10 (15.4%)

* In some instances, more than one specific inappropriate action was depicted.

were shown as secondary to an underlying medical disorder or to a structural brain lesion, such as trauma or neoplasm. There were only three depictions of seizures in patients with epilepsy of unknown cause (two seizures in one patient with temporal lobe epilepsy, and one patient with partial epilepsy of unknown cause).

The independent reviewers demonstrated 100% agreement concerning patient age, location of seizures, the type of character

performing seizure first aid (healthcare professional or not), and seizure type. There was 89.2% agreement about the appropriateness of first aid (58/65 clips) among the reviewers. Of the seven clips where there was disagreement, five were eventually determined to depict inappropriate first aid, one was determined to depict appropriate first aid, and in one case, the reviewers could not determine appropriateness. In 4/5 cases of inappropriate first aid, one of the reviewers failed to notice brief but definite depictions of inappropriate acts such as attempts to stop the convulsive movements or holding the person down. In one case, attempts were made to awaken a child with an "absence" seizure with a combination of verbal stimulation, shaking of the patient's head and then intravenous lorazepam within seconds of onset. These actions were determined inappropriate, as they were inconsistent with the EFA guidelines for first aid of non-convulsive seizures. In the case of the appropriate seizure depiction, one of the reviewers observed that a nurse placed a suction catheter in the person's mouth, but upon review, the catheter was clearly placed beside the patient's head, and the first aid therefore appropriate. The disagreement about the indeterminate depiction arose from the fact that the reviewers could not determine the type of seizure being depicted, and therefore it was not possible to apply specific first aid guidelines.

DISCUSSION

The Epilepsy Foundation of America guidelines for the first aid of generalized tonic clonic seizures are a simple, readable explanation for providers of first aid¹⁰. People with epilepsy are at risk of dental injury, burns, soft tissue injuries, bone fractures, submersion and head injury^{12,13} and attempts to mitigate these injuries are a focus of the guidelines. Most generalized tonic-clonic seizures stop spontaneously within two minutes^{14,15} and

Table 3: Presumed etiology of seizures depicted on television medical dramas

	Number of depictions (percentage of seizures)
Infection	9 (13.8%)
Metabolic disturbance	9 (13.8%)
Trauma	8 (12.3%)
Poisoning	6 (9.2%)
Tumour	5 (7.7%)
Cardiac	4 (6.2%)
Autoimmune	3 (4.6%)
Drug Toxicity	3 (4.6%)
Peripartum complication	3 (4.6%)
Primary epilepsy syndrome	3 (4.6%)
Iatrogenic	2 (3.1%)
Acute medical disorder	2 (3.1%)
Psychogenic non-epileptic seizure	1 (1.5%)
Other medical disorder*	5 (7.7%)
Unknown	2 (3.1%)

*Other medical disorders include: Male pseudohermaphroditism, amyloidosis, hemochromatosis, primary antiphospholipid syndrome, seizure disorder secondary to "stress".

the guidelines emphasize the maintenance of a calm, reassuring perspective, and refraining from attempts to stop the seizure movements. Inserting foreign objects in the mouth is to be avoided because of the risk of dental and oropharyngeal injury^{16,17}.

Despite the simplicity of these guidelines, in almost half of the depictions of epileptic seizures on popular US medical dramas there was an example of an inappropriate practice. Moreover, an actor portraying a health care professional, such as a doctor or a nurse, performed almost all of these inappropriate practices.

Television medical dramas are a potentially powerful method of conveying information, accurate or not, concerning health and first aid to the public. "House" and "Grey's Anatomy" are among the most-watched scripted programs on television, and the ratings of "ER" and "Private Practice" were almost as high during the study period¹⁸. Medical dramas are extremely popular among trainees in health care. In a 2007 survey of medical and nursing students at Johns Hopkins University, 81% of medical students and 84% of nursing students said that they watched medical dramas. The most popular drama among male medical and nursing students was "House, M.D." (83% watched), while 81% of female medical and nursing students watched "Grey's Anatomy." Approximate one-third of all medical and nursing students also watched "ER"¹⁹. In the 2001 Centers for Disease Control HealthStyles survey, over half of all respondents who were regular viewers of daytime or primetime dramas reported learning something about a disease or how to prevent it. Approximately one-third of regular viewers of television dramas report taking action as a result of the information they learned from a TV health storyline²⁰.

There have been previous studies documenting the inaccurate portrayal of medical disorders on film and television, including cardiac arrest²¹⁻²³ and coma^{24,25}. The authors of these studies raised concerns about the unrealistically high rates of complete recovery after cardiac arrest or coma, and proposed that film and television could be a source of unrealistic expectations of recovery from serious medical illness among the general public. The evidence that watching television dramas influences behavior in medical emergencies is sparse. In one small survey of Canadian critical care training program directors, less than 50% of trainees correctly positioned the head during endotracheal tube placement. The author reviewed 22 depictions of airway placement on "ER", and observed that only 4/22 demonstrated one of the three main components of airway positioning, and none demonstrated more than one of the three components²⁶. The author concluded that perhaps the trainees' faulty skills were partially influenced by the television program, although no direct evidence for a relationship between television viewing and incorrect practice was provided.

Although difficult to quantify, we observed a trend toward the depiction of seizures as an intense, chaotic event requiring immediate, decisive intervention. In reality, few seizures last longer than two minutes and the vast majority of seizures do not require medications or definitive airway management devices^{14,15}. This style of depiction may be necessary for dramatic purposes but it has the potential to mislead the public about the severity of seizures, and is contradictory to the EFA advice to "remain calm." There is evidence that many of the lay

public consider a seizure to be an emergency requiring immediate specialized medical care. In one survey within a university community, almost 60% of respondents said they would call an ambulance immediately if they witnessed a seizure⁶.

A gratifying observation of our study is that seizures were depicted as occurring at any age and resulting from a wide range of etiologies.

There are some limitations to this study. Our assessment of the appropriateness of first aid management was, in some instances, based on very brief scenes in which the seizure depiction might be partially hidden by other action within the television frame. We excluded depictions of seizures in which we could not adequately visualize either the seizure or its management by ranking them as "unable to determine."

On a few occasions, the depiction of an inappropriate response to a seizure was intentional, and important to plot or character development. In these circumstances, the viewer is unlikely to be influenced by the inappropriate behaviour. However, in our judgement, very few of the depictions of inappropriate behaviour were of this type, and a much larger number of the depictions of inappropriate behaviour involved characters playing confident health care professionals acting decisively in an emergency.

In conclusion, seizure first aid is depicted inappropriately almost half of the time on the most popular television medical dramas. There is significant discomfort among the general public about appropriate seizure first aid, and television dramas are a potentially powerful medium for conveying this information. Although the primary goal of producers of medical dramas is entertainment, we believe that appropriate first aid could be depicted without sacrificing drama. We do not believe that producers of television dramas are responsible for the accurate portrayal of complicated medical practices, such as administration of medications, as the general public will not be responsible for performing these actions. However, it is very possible that a layperson will be responsible for providing seizure first aid, and an accurate depiction of seizure first aid is essential.

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Appendix

Seizure First Aid Guidelines from Epilepsy Foundation of America

- Keep calm and reassure other people who may be nearby.
- Don't hold the person down or try to stop his movements.
- Time the seizure with your watch.
- Clear the area around the person of anything hard or sharp.
- Loosen ties or anything around the neck that may make breathing difficult.
- Put something flat and soft, like a folded jacket, under the head.
- Turn him or her gently onto one side. This will help keep the airway clear. Do not try to force the mouth open with any hard implement or with fingers. It is not true that a person having a seizure can swallow his tongue. Efforts to hold the tongue down can injure teeth or jaw.
- Don't attempt artificial respiration except in the unlikely event that a person does not start breathing again after the seizure has stopped.
- Stay with the person until the seizure ends naturally.
- Be friendly and reassuring as consciousness returns.
- Offer to call a taxi, friend or relative to help the person get home if he seems confused or unable to get home by himself.