5-2011

Development of a Clinical Assessment Tool for Seizure Observation

Sarah Koch Engkjer
St. Catherine University

Development of a Clinical Assessment Tool for Seizure Observation

Scholarly Project
Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Arts in Nursing
St. Catherine University
St. Paul, Minnesota

Sarah Koch Engkjer
May, 2011

ST. CATHERINE UNIVERSITY
ST. PAUL, MINNESOTA

This is to certify that I have examined this
Master of Arts in Nursing scholarly project
written by

Sarah Koch Engkjer

and have found that it is complete and satisfactory in all respects,
and that any and all revisions required by
the final examining committee have been made.

Graduate Program Faculty

____

Roberta J. Hunt, PhD, RN

____

Date

DEPARTMENT OF NURSING

Contents

Abstract

The utility of long term video-EEG monitoring is well established and has diagnostic, prognostic, and therapeutic functions. Patients are admitted to the Epilepsy Monitoring Unit (EMU) to have medications lowered for seizure provocation. Electrographic and clinical information from the seizures are analyzed for the purpose of classifying and treating epilepsy. Clinical or ictal assessment is an interactive and demanding skill. Factors inherent in the seizures often limit the accuracy and detail of an ictal assessment. The literature suggests that an observational tool for use during ictal assessment may help to improve accuracy. To date, a standardized tool for use in seizure observation or ictal assessment has not been developed. The purpose of this article is to synthesize the current recommendations regarding the components of seizure observation and describe how they can be organized to formulate a standardized assessment tool. An observation tool that was developed with these recommendations in mind and is currently being used on a 10-bed EMU is described.

Direct seizure observation and assessment is an essential role of the neuroscience nurse (Barry & Teixeira, 1983; Wulf, 2000). A standardized and widely accepted tool for seizure observation was not identified after an exhaustive literature review. The purpose of this article is to synthesize the current recommendations regarding the components of seizure observation and describe how they can be organized to formulate a standardized assessment tool.

Epileptic seizures present with a variety of symptoms or clinical features. Analysis of the clinical features or semiology of seizures is most often performed with long term video-EEG monitoring and direct observation in an Epilepsy Monitoring Unit (EMU). Information from long term video-EEG monitoring facilitates seizure classification and has etiological, diagnostic, therapeutic and prognostic relevance (Berg et al., 2010). Advancements in simultaneous video-EEG recording and seizure detection software have dramatically enhanced the process of seizure classification and the treatment of epilepsy however; they are not a substitute for direct observation of a patient during a seizure. Not all clinical components of a seizure can be assessed with video-EEG alone, without the use of an "observer" some clinical features of the seizure such as language and level of awareness cannot be reliably assessed. Information that is elicited through direct interaction, assessment, and observation during and after a seizure can provide the epileptologist with details that contribute to the classification and localization of the seizure. The National Association of Epilepsy Centers (2010) *Guidelines for Essential Services, Personnel, and Facilities in Specialized Epilepsy Centers* recommends that continuous observation of patients undergoing video-EEG monitoring in an EMU be performed by EEG technologists or epilepsy staff nurses. A study conducted by Bleasel et al. (1997) demonstrated that even individuals that were experienced in observing seizures the inter-observer reliability for subjective visual analysis of seizures was poor. Wulf (2000) concluded that no correlation existed between observer characteristics such as educational background and clinical experience, and the detail and quality of seizure observation. These findings would suggest that factors beyond experience and educational background limit the accuracy and quality of seizure observation. Wulf hypothesized that the unpredictable and variable nature of seizures and the need to provide safety during a seizure impacts the accuracy of the ictal assessment. As education and training alone may not help the observer achieve the sophisticated level of proficiency that is required for reliable ictal assessment and factors inherent to the seizure that make observation difficult are not modifiable, other means for improving accuracy and reliability of seizure observation must be examined.

Literature Review

The literature provides recommendations for improving the accuracy of seizure observation or ictal assessment. Factors that may enhance the accuracy of seizure observation include training and retraining of staff, as well as limiting the complexity of the information that is being coded and the format in which it is documented (Wulf, 2000). More specifically, Wulf suggested that the use of a straightforward tool that can provide direction for the skills of seizure observation and documentation can improve observer accuracy. Despite the fact that the National Association of Epilepsy Centers (2010) *Guidelines for the Essential Services, Personnel, and Facilities in a Specialized Epilepsy Centers* considers a protocol for ictal assessment to be compulsory, a single standardized tool for seizure observation or ictal assessment has not been created. Furthermore, a prevailing source that describes what should be included in an ictal assessment and how an ictal assessment should be conducted is not currently available. An extensive review of the literature and current practice guidelines available from the American Association of Neuroscience Nurses (AANN) and the National Association of Epilepsy Centers (NAEC) provide some guidance. The following section is a synopsis of the current guidelines and recommendations from the literature regarding the components that should be included in an ictal assessment and the format in which they should be organized in order to develop a tool that may improve the accuracy of seizure assessment.

The literature revealed that there is some agreement as to the predominant clinical features of that should be included in an ictal assessment. Generally, sources categorize the clinical features into 5-7 domains. The following domains were included in a majority of the literature that was reviewed (a) level of consciousness or responsiveness, (b) speech or language, (c) motor manifestations, (d) memory, and (e) post-ictal behavior (AANN, 2009; Barry & Teixeira, 1983; Bordson & Plueger, 2009; Noachtar & Peters,2009; NAEC, 2010; Perkins & Buchhalter, 2006).

Components

Level of consciousness or responsiveness. Within the literature the terms level of consciousness and responsiveness seemed to be used interchangeably and are equally acceptable. It is difficult to find a single definition of consciousness. Noachtar and Peters (2009) describe an alteration in consciousness as an episode of unresponsiveness or decreased responsiveness that is not caused by the related motor alterations that occur during a seizure. Wulf (2000) describes level of responsiveness as a person's observed response to their environment, themselves, and the observer.

Review of ictal assessment guidelines revealed that most place level of responsiveness as the initial step in ictal assessment (AANN, 2009; Barry & Teixeira, 1983). Although assessment of level of responsiveness is of primary importance in directing the nurse through the process of ictal assessment it may be overlooked. In a study that reviewed the frequency of documented seizure details, Wulf (2009) found that details related to assessment of responsiveness were significantly underreported compared to details related to description of movement. Several methods for assessing level of responsiveness have been suggested. Wulf recommended assessing response to tactile, auditory, and visual stimuli. Barry and Teixeira's recommendations include assessment of a persons' response to simple and complex commands, orientation, behavior, and affect. The literature would support that accurate and thorough assessment of a patient's level of responsiveness during a seizure may be achieved by utilizing an interactive process that details a patient's response to (a) tactile, auditory, and visual stimuli; (b) simple and complex commands; (c) assessment of orientation; and (d) observation of their behavior and affect during the seizure.

Details of a patient's level of responsiveness during a seizure have diagnostic and practical significance. Assessment of level of responsiveness or consciousness during a seizure can be fundamental to the classification process. Bell, Yong, Thompson, and Radtke (1998) found that a patient's level of responsiveness during a seizure could reliably distinguish complex partial seizures from nonepileptic seizures. Additionally a patient's level of responsiveness during a seizure is often the dominant factor for consideration regarding occupational and driving restrictions. It is for these reasons that level of responsiveness should be included as a component of ictal assessment.

Speech and language. Seizures that are characterized by an inability to speak or comprehend language reflect the epileptic activation of the cortical language areas in the speech dominant hemisphere (Noachtar & Peters, 2009). The inability to speak or comprehend language can occur during the seizure as well after the seizure has ended. Assessment of language can be incorporated as part of the assessment that targets level of responsiveness. An ictal assessment of language can be performed by giving a patient a word to remember and asking them to repeat the word, and assessing their ability to recall the word postictally. This assesses the patient's ability to respond to a command during the seizure, language ability, and verbal memory (Barry & Teixeira., 1983). In addition to interacting with the patient to illicit speech the nurse should also observe for the type and quality of any spontaneous speech that occurs during the seizure (Wulf, 2000). Assessment of language should be performed during the ictal phase as well as the postictal phase and can be accomplished by (a) giving the patient a word to remember during the seizure, (b) asking the patient to repeat the word, (c) assessing their ability to remember the word postictally, and (d) observing the quality of spontaneous speech.

A systematic review conducted by Noachtar and Peters (2009) demonstrated the positive predictive value of speech and language as a lateralizing phenomenon to be 80-100%. According to Noachtar and Peters preservation of speech during the ictal phase of the seizure lateralizes the seizure to the non-dominant hemisphere, whereas postictal aphasia lateralizes the seizure to the dominant hemisphere. This finding supports the inclusion of speech and language as an essential component of ictal assessment.

Motor manifestations. Motor manifestations of a seizure can involve musculature in any form and can involve an increase or a decrease in muscle contraction or tone (Berg et al., 2010). The motor manifestations of a seizure can be simple or complex in nature. Noachtar and Peters (2009) describe that simple motor phenomena can be characterized as unnatural and uncomplicated movements that occur as a result of activation of the primary and supplementary sensorimotor areas. Movements that arise from this area of the cerebral cortex manifest themselves as rhythmic muscle contractions that are short or sustained in duration. Simple motor symptoms are most often observed with generalized tonic-clonic, tonic, and myoclonic seizures. Complex motor symptoms imitate natural movements or automatisms. Automatisms are complex sequences of movements that are often associated with seizures that arise from the temporal lobe. They often appear as fumbling, lip smacking, swallowing, and chewing motions. Ictal assessment of the motor manifestations is largely accomplished through observation. Although most motor manifestations are observable with the use of video-EEG monitoring alone, nurses should give particular attention to specific characteristics such as the location, duration, and type of movement (Barry & Teixeira, 1983; Wulf, 2000). These particular details may provide supplementary information that may be useful for lateralization of the seizure. Noachtar and Peters identify motor symptomatology as an essential feature for distinguishing between different types of seizures. The highly correlative diagnostic value that can be provided from the analysis of elements of the motor manifestations of the seizure necessitates that it be included as a part of ictal assessment.

Memory. Ictal memory is the recall of various types of stimuli that are presented to a patient during a seizure (Bell et al., 1998). Assessment of ictal memory is conducted by introducing stimuli to the patient during the seizure or ictal phase and assessing for recall of the stimuli after the seizure has ended and patient has recovered to their pre-seizure baseline. Bell et al. categorize the types of stimuli that can be presented as aural-verbal and visual-pictorial. Presentation of stimuli during the seizure can be performed by giving a patient a command, word, or object to remember (Bell et al., 1998; Wulf, 2000). Bell et al. suggest that after the seizure has ended and patient is oriented the assessment is concluded by asking the patient to recall the command, visual, and spoken memory items. Preservation or recall of stimuli presented during a seizure can be an important distinguishing feature in determining if a seizure epileptic or nonepileptic (Bell et al., 1998). Assessment of ictal memory has the potential to provide valuable diagnostic information that cannot be obtained with video-EEG monitoring alone and therefore should be included as a part of an ictal assessment.

Postictal behavior. Postictal behavior is defined as transient clinical abnormalities of the central nervous system that appear or become accentuated when the ictus or clinical event has ended (Berg et al., 2010). Postictal behavior may include but is not limited to sleep, confusion, aphasia, paresis, psychosis or aggressive behaviors (Buelow, Long, Maushard Rossi, & Gilbert, 2004; Wulf, 2000). The common postictal manifestations of confusion, aggression, and lethargy place patients at risk for injury or harm (Tucker, 1985; Sanders, Cysyk, & Bare 1996). Confusion and disorientation places the patient at risk for falls, while uncontrolled behavior and aggression place both the patient and staff at risk for injury (Sanders et al., 1996). Detailed observation of postictal behaviors has diagnostic utility. Specific postictal features such as aphasia, coughing, paresis, and nose rubbing can provide important lateralizing information (Noachtar & Peters, 2009). While observation of postictal features can provide valuable lateralizing information, appropriate recognition and management of postictal behaviors such as confusion, aggression, and psychosis is essential for promoting patient safety on the EMU.

Assessment during the postictal phase involves simultaneously observing for features that have diagnostic relevance while actively promoting an environment of safety. The same methods that are used for ictal assessment of level of responsiveness, speech, language, motor function, and memory should also be included as a part of the postictal assessment. Additionally, the patient should be asked to describe their experience of the symptoms during the seizure as this information may have clinical and diagnostic relevance (AANN, 2009).

It is critical that the nurse observe and recognize precursory signs of aggression and psychosis such as pacing, agitation, threatening verbalizations, tense angry affect and paranoid expressions (Sanders et al., 1996). Interventions such as reduction of stimuli and environmental modifications to promote safety should be instituted when there is concern for a patient developing postictal aggression or psychosis (Sanders et al., 1996).

The *Seizure Assessment Algorithm* (AANN, 2009, p. 10) outlines a process for postictal assessment. The AANN advises that during the postictal phase the nurse should continue to check orientation, cognition, motor, sensory and autonomic function while promoting safety to prevent postictal injury. During the postictal period the emphasis remains on promoting safety, while astutely observing for important clinical details.

Organization of Tool

The NAEC (2010) *Guidelines for Essential Services, Personnel, and Facilities in Specialized Epilepsy Centers* indicate that a protocol for examination of speech, memory, level of consciousness, and motor function during and after a seizure is a mandatory requirement for EMUs. At present the NAEC has not made a recommendation as to the format or organization of this protocol. Wulf (2000) suggested that a design that includes categorization of seizure observation details and implementing a sequential or chronological arrangement of those details can improve observer accuracy. Wulf recommended that the tool's information be categorized according to the domains or spheres of ictal assessment such as (a) level of consciousness or responsiveness, (b) speech or language, (c) motor manifestations, (d) memory, and (e) post-ictal behavior. Additionally, ordering these domains or spheres in a sequentially beginning with assessment of details before the onset seizure, progressing through assessment during the seizure, and concluding with assessment following the seizure may be helpful in improving seizure observation patterns (Wulf, 2000).

Recommendations

Currently there are very few standardized or universal practices on epilepsy monitoring units (Buelow, Privitera, Levisohn, & Barkley, 2009). The available standards related to seizure assessment and observations are quite obscure. As a result most epilepsy programs have developed their own individual protocols or tools for seizure observation and assessment. The aforementioned recommendations were considered during the revision of one such tool that was being used on a 10 bed EMU in the Midwest. A need to revise the current tool arose from physician and nurse dissatisfaction with the original tool. The original tool (Figure 1) for seizure observation, assessment, and documentation contained 31components or details that nurses were expected to assess and document on for each seizure event. The original tool was considered by physicians and nurses to be cumbersome, lengthy and lacking format. As a result the original tool was not consistently being used by nursing staff and seizure observation, assessment, and documentation were often inaccurate.

The contextual environment in which the new tool would be used, current recommendations from the literature, and expert content were considered during the development process. A significant number of inexperienced and graduate nurses were beginning employment on the EMU during the time that the tool was being developed. The new tool was designed to be useable by both experienced and inexperienced staff, with the hope that it would help to develop clinical judgment in the less experienced staff and supplement the practice of the more experienced staff.

Using the recommendations from current literature the revised seizure observation tool (Figure 2) was organized to include the components of ictal assessment in a sequential and structured manner. Components that were deemed essential by the physicians were (a) level of responsiveness, (b) speech, (c) motor function, (d) postictal behavior, and (e) memory. When compared to the original tool, particular emphasis was placed on the components of ictal assessment that are not readily observable on video-EEG alone. These included the assessment level of responsiveness, language, ictal memory and postictal behavior. The option for a detailed description of the motor manifestations was incorporated into the new tool and corresponding documentation template but not emphasized as a majority of this information can be gleaned from reviewing the video-EEG recording. The tool is intended to facilitate the nurses' process of ictal assessment and also served as a framework for documentation. The corresponding documentation template is shown in Figure 3. It is structured to guide for ictal assessment by prompting the nurse to observe and assess each of the domains for each seizure event regardless of seizure type. The intent of the revised tool was to help nurses restructure their process of ictal assessment so that they were attending to the details of the seizure, rather than trying to categorize those details to determine the seizure type.

Limitations

The new tool specifically addresses the domains that are considered to be essential for inclusion in ictal assessment according to the NAEC (2010) guidelines (a) level of responsiveness, (b) speech, (c) motor function, and (d) memory. Other sources also suggest that assessment of autonomic and sensory symptoms should also be included as a part of an ictal assessment (AANN, 2009; Barry & Teixeira, 1983; Noachtar & Peters, 2009). These components are not specifically addressed in the revised seizure observation tool. Potentially there is opportunity for the patient to self report these symptoms as they are asked about any auras or precursory symptoms as a part of the revised tool.

The revised tool does not focus on patient safety during the ictal assessment. The results of the recent survey of current practices in epilepsy monitoring units suggests that although the need for universal safety standards in EMUs is well recognized, attempts at standardized safety practices have still not been developed (Buelow et al., 2009). The revised tool was not intended to serve as a replacement for safety guidelines and protocols. A specific protocol addressing the issues of patient safety during a seizure should be used in addition to the revised observation tool.

The promotion of excellence in neuroscience nursing is achieved in part by complementing nursing practice with research-based knowledge (AANN, 2005). In accordance with the fundamentals of evidence-based practice, future research should be directed at measuring the validity and reliability of the seizure observation tool.

Conclusion

Accurate and reliable seizure observation and assessment is a sophisticated, interactive process for which the nurse must combine efforts to maintain patient safety while thoughtfully observing and eliciting information that has diagnostic and therapeutic significance. The use of a standardized assessment tool has the potential to improve accuracy and reliability in seizure assessment. This article offers one suggestion for tool components and organization. It could easily be modified for use in settings outside of the EMU and for observers other than neuroscience nurses.

Figure 1: Original Seizure Observation/Documentation Tool

ASSESSMENT	DOCUMENTATION
1. How did the seizure event start?	
2. Time of seizure event:	
3. Duration of seizure event:	
4. Event observed or reported by:	
5. Was this a typical aura?	
6. Was this a typical seizure event?	
7. Responds to verbal command:	
8. Able to repeat word:	
9. Eyes open or closed?	
10. Pupil reactivity:	
11. Visual threat:	
12. Able to name object:	
13. Describe eye movement:	
14. Describe gross motor movement:	
15. Describe respirations:	
16. Describe skin color:	
17. Speech:	
18. Salivation:	
19. Bladder incontinence:	
20. Bowel incontinence:	
21. Postictal behavior:	
22. Duration of postictal state:	
23. Time to orient to person, place, time:	
24. Recall of seizure event:	
25. Recall of word:	
26. Recall of object:	
27. Recorded by video/EEG:	
28. Prolactins drawn?	
29. Prolactin times:	
30. Med load given?	
31. Vital signs after seizure:	

Figure 2: Revised Seizure Observation Tool

<table>
<tr><td rowspan="4">DURING THE SEIZURE</td><td>Safety</td><td>1. ENSURE PATIENT SAFETY!
2. Note time seizure event began.</td></tr>
<tr><td>Responsiveness</td><td>1. Give a simple command.
2. Show patient an object.
• Ask patient to name object.
• Tell patient to remember object.</td></tr>
<tr><td>Speech</td><td>1. Give patient a word.
• Tell patient to remember the word.
• Ask patient to repeat the word.</td></tr>
<tr><td>Motor</td><td>1. Observe location, quality, and duration of movements.</td></tr>
<tr><td rowspan="2">AFTER THE SEIZURE</td><td>Postictal</td><td>1. Note time seizure event ended.
2. Observe for postictal behaviors.
3. Note length of time to recover to baseline.
4. Ask patient if this was their typical seizure event.
5. Ask patient if they had aura or warning.</td></tr>
<tr><td>Memory</td><td>1. Ask patient to recall object.
2. Ask patient to recall word.</td></tr>
</table>

Figure 3: Corresponding Documentation Framework

1. Time seizure event began: 2. Did the patient have an aura or warning prior to the event?	1. (Document time of event) 2. (Choose: Yes/No)
During the seizure event: 1. Was the patient able to follow a command? 2. Was the patient able to identify an object? 3. Was the patient able to repeat a word? 4. Describe the location, type, and duration of any motor activity during the seizure:	1. (Yes/No) 2. (Yes/No) 3. (Yes/No) 4. (Free text description)
After the seizure event: 1. Time seizure event ended: 2. What was the length of time for the patient to recover to their preseizure baseline? 3. Was the patient able to recall the command? 4. Was the patient able to recall the object? 5. Was the patient able to recall the word? 6. Describe postictal behavior in detail:	1. (Time event ended) 2. (Length of time to recover) 3. (Yes/No) 4. (Yes/No) 5. (Yes/No) 6. (Free text description)

References

American Association of Neuroscience Nurses. (2009, December). *Care of the patient with seizures: AANN Clinical Practice Guideline Series* (2nd ed.). Retrieved March 24, 2011, from http://www.aann.org/pdf/cpg/aannseizures.pdf

Barry, K., & Teixeira, S. (1983). The role of the nurse in the diagnostic classification and management of epileptic seizures. *Journal of Neurosurgical Nursing 15,* 243-249.

Bell, W. L., Yong, P. D., Thompson, E. A., & Radtke, R. A. (1998). Ictal cognitive assessment of partial seizures and pseudoseizures. *Archives of Neurology, 55,* 1456-1459.

Berg, A. T., Berkovic, S. F., Brody, M. J., Buchhalter, J., Cross, J. H., Emde Boas, W. van., & Engel, J. (2010). Revised terminology and concepts for organization of seizures and epilepsies: Report on the ILAE Commission on Classification and Terminology, 2005-2009. *Epilepsia, 51,* 676-686.

Bleasel, A., Kotagal, P., Kankirawatana, P., & Rybicki, L., (1997). Lateralizing value and semiology of ictal limb posturing and version in temporal and extratemporal lobe epilepsy. *Epilepsia, 38,* 168-174.

Bordson, C., & Plueger, M. (2009, May). Industry trends: Seizure observation in the epilepsy monitoring unit. *Synapse: Newsletter of the American Association of Neuroscience Nurses.* Retrieved March 24, 2011, from http://www.aann.org/synapse/may09/trends.html

Buelow, J.M., Long, L., Maushard Rossi, A., & Gilbert, K. L. (2004). Epilepsy. In M. K. Bader & L. R. Littlejohn (Eds.), *AANN core curriculum for neuroscience nursing* (4th ed., pp. 586-618). St. Louis: Saunders.

Buelow, J.M., Privitera, M., Levisohn, P., & Barkley, G. L. (2009). A description of current practice in epilepsy monitoring units. *Epilepsy & Behavior, 15,* 308-313.

National Association of Epilepsy Centers. (2010, January 12). *Guidelines for essential services, personnel, and facilities in specialized epilepsy centers.* Retrieved March 20, 2011, from http://www.naec-epilepsy.org/spec_care/documents/NAEC-FinalGuidelineswithruralcenterrevision.pdf

Noachtar, S. &, Peters, A. (2009). Semiology of epileptic seizures: A critical review. *Epilepsy & Behavior, 15,* 2-9.

Perkins, A.M., & Buchhalter, J.R. (2006). Optimizing care in the pediatric epilepsy monitoring unit. *Journal of Neuroscience Nursing, 38,* 416-421.

Sanders, P. T., Cysyk, B. J.,& Bare, M. A. (1996). Safety in long-term EEG/Video monitoring. *Journal of Neuroscience Nursing, 28,* 305-313.

Tucker, C. (1985). Safety assessment for the postictal confusional phase following a complex partial seizure. *Journal of Neurosurgical Nursing, 17,* 201-208.

Wulf, J. A. (2000). Evaluation of seizure observation and documentation. *Journal of Neuroscience Nursing, 32,* 27-36.