The role of patient companions in long-term video-EEG monitoring

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In developing countries it is difficult to have full-time dedicated nurses in Epilepsy Monitoring Units (EMU). Our one-bed EMU is within the Neurology Service and is adequately staffed during daytime working hours only. So we created a new model where the patient's companion was asked to press a nurse call button, allowing the examination of the patient by the nurse. In this study we aimed to understand how patient companions behaved and which factors influenced their behaviour.

Patients were allowed to choose a single companion who were educated by the specialist monitoring nurse according to a protocol. Only the first recorded seizures of the patients were included in the study. The seizures were reviewed from the video-cassette recordings and the behaviour of the companions was scored according to the results of the following three questions: (1) when was the seizure noticed?; (2) was the nurse call button pushed?; and (3) did the companion prevent the recording of the seizure by the camera? The companions were grouped according to the following criteria; age, sex, level of education, type of relationship. The scores were compared for each criterion separately.

The behaviours of the 50 companions (34F, 16M; age: 25–72) were studied. When statistically compared for age, sex and level of education, there were no significant differences between different groups. However, the mean score of the 47 companions who were immediate family members (3.72) was greater than those three who were not (1.66)

In one-bed EMUs, patient companions who are family members can help nurses in the early detection of seizures.

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INTRODUCTION

Long-term video-EEG monitoring is the only way to record seizures and simultaneous EEG changes in epileptic patients who are candidates for epileptic surgery[1]. It can also be used whenever the presence of psychogenic seizures cannot be ruled out. Although it is an unavoidable technique in the follow-up of certain epileptic patients, as mentioned above, its application is quite difficult and requires a special epilepsy monitoring unit (EMU) with trained staff (doctors, nurses, technicians, etc.). In EMUs, specialized nurses are of major concern. They prepare patients for monitoring, detect and correct electrode artifacts, change the video cassettes in time, examine the patients during and after seizures and try to prevent some complications such as aspiration or trauma.

EMUs in most developed countries are designed so that more than one patient can be monitored at a time. Besides, separate EEG and video screens for all the patients are kept behind a console that is staffed continuously by an EEG technician[2]. This method allows the early recognition of any technical problems and the immediate detection of the seizure onset. However, in developing countries it is hard not only to build EMUs, but to have full-time dedicated nurses as well. Our one-bed EMU is within the Neurology Service. A specialized nurse is present 5 days a week during the daytime working hours. At night and during the weekends when the specialized nurse is not present, the nurses in the service are obliged to take care of the EMU patient. She has taught them how to examine the patients during seizures, how to recognize and correct electrode artifacts and how to change the video cassettes and keep those in which seizures are recorded. Patients and accompanying EEG changes can be viewed from a separate monitor in the nurses'

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* Nurse in the Long-term video-EEG Monitoring Unit.

room. This allows the immediate detection of the seizure onset. However, all the nurses (including the EMU specialized nurse) have to deal with all the patients in the Neurology Service, so they cannot keep watching the monitor all the time. Therefore we created a new model where the patient companion was asked to push on the nurse call button at the first sight of a seizure, allowing the immediate examination of the patient by the nurse. In this study we aimed to understand how patient companions behaved and how different parameters (age, sex, level of education, kind of relationship) influenced this behaviour.

MATERIALS AND METHODS

The behaviours of the companions of 50 epilepsy patients who were admitted to the EMU of our department between September 1996 to February 1998 were studied. All the patients had to choose a single companion who accompanied him/her 24 hours a day during his/her stay in the EMU. On admission, information concerning the age, level of education and type of relationship of the companion were obtained by the specialized nurse who, just prior to monitoring, educated the companions according to a standardized protocol on the following subjects:

(1) To be aware of the fact that the patient may have a seizure at any time and to push on the nurse call button at the first sight of a seizure.

(2) To remove the patients' blanket in order to allow better visualization of extremity movements during a seizure.

(3) To focus the camera on the patient if he/she somehow gets out of focus, until the nurse arrives.

(4) To take sufficient care so as not to obscure the patients' view during the seizure and to warn anybody who does.

Twenty-one channel digital EEG recordings of all the patients were reviewed after each night of recording with the help of a 'spike and seizure detection' software, in case there were missing seizures.

Since the patients did not have the same number of seizures during monitoring, only the first recorded seizure of every patient was included in the study. Therefore 50 seizures were reviewed from the video cassettes paying attention to the behaviours of the companions that were scored according to the results of the following three questions:

(1) When was the seizure noticed?

(2) Was the nurse call button pushed? (companions might fail to do this despite noticing the seizure)

(3) Was the patient's view somehow obscured by the companion or not?

For noticing the seizure within 30 s or 30–60 s after onset, the companions were given 2 points or 1 point, respectively. They received 1 point if the nurse call button was pushed and another 1 point if the seizure was adequately recorded by the camera (i.e. the view of the patient was not obscured and he/she was in focus). The score was '0' for those who failed to do the above. The final score of each patient companion was obtained by adding the points that were received. So the maximum score was '4' and the minimum '0' for any given individual. The companions were divided into two groups according to sex (M, F); four groups according to age [(1) 20–30; (2) 31–40; (3) 41–50; (4) 51 and above]; four groups according to the level of education [(1) illiterate; (2) primary school graduates; (3) high school graduates; (4) university graduates] and five groups according to the kind of relationship [(1) mother; (2) father; (3) brother or sister; (4) husband or wife; (5) any other relatives or friends]. For each of the four parameters investigated, the mean score in all the different groups were calculated. The results were compared statistically to see whether a meaningful difference existed between the groups or not. A Mann–Whitney U-Test was used to statistically compare the difference between males and females, while the Kruskal–Wallis One-way Anova Test was used to compare the results between different groups for the rest of the independent variables.

Table 1: The age distribution of patient companions and their mean scores ($P = 0.39$).

Group	Age	n	Mean score
1	20–30	7	3.71
2	31–40	18	3.83
3	41–50	13	3.23
4	51 and above	12	3.58

RESULTS

Two companions failed to notice the seizure while 10 noticed it within 30–60 s and the rest within 30 s of onset. All the companions who noticed the seizure pushed on the nurse call button. Three companions obscured the view.

Sixteen of the 50 patient companions were males while 34 were females. The mean score of the male companions was 3.43 and that of the females was 3.67. The Mann–Whitney U-Test did not reveal a statistically meaningful difference between the two groups ($P = 0.40$).

Table 2: The distribution of patient companions according to their level of education and their mean scores ($P = 0.64$).

Group	The level of education	n	Mean score
1	illiterate	6	3.83
2	primary school	21	3.38
3	high school	15	3.73
4	university	8	3.75

Table 3: The distribution of patient companions according to their type of relationship and their mean score ($P = 0.42$, for the first four groups).

Group	Type of relationship	n	Mean score
1	mother	27	3.77
2	father	8	3.50
3	brother/sister	6	3.66
4	husband/wife	6	3.83
5	other[a]	3	1.66

[a] Aunt, uncle, cousin.

According to their age (range 25–72; mean 44.4), the patient companions were divided into four groups (Table 1). The difference between the groups was not significant when tested with the Kruskal–Wallis One-way Anova Test ($P = 0.39$).

The same statistical test failed to reveal a significant difference between the mean scores of the companions who were again divided into four groups (Table 2) according to their level of education ($P = 0.64$).

Finally the companions were divided into five groups where the type of relationship was concerned (Table 3). The 47 companions in the first four groups were immediate family members (mean score 3.72) while the three companions in the fifth group (aunt, uncle and cousin) were not (mean score 1.66). Since the number of individuals in the fifth group was too small, it could not be included in the statistical analysis with the above test. The difference between the first four groups was not significant ($P = 0.42$). Although not statistically proved, it was interesting to note that there was a considerable difference between the mean scores of the individuals who were immediate family members (3.72) and those who were not (1.66).

DISCUSSION

Long-term video-EEG monitoring is a valuable procedure in the diagnosis and treatment of epilepsy and certain paroxysmal events[3–8]. This technique can only be applied in special EMUs. However, in developing countries, usually due to insufficient financial support, it is hard to build EMUs and to have full-time dedicated staff. Dedicated staff are definitely a must and the ideal thing is to have the EMU occupied 24 hours a day. However, when the optimal conditions are lacking it might still be possible to apply long-term video-EEG monitoring by educating the nurses in the service and the patient companions. At the weekend and in the evenings when the specialized nurse is not present, the nurses in the service can correct the electrode artifacts and change the video cassettes in time. Besides, they can examine the patient with a doctor during and after the seizure until the patient regains consciousness. On the other hand, patient companions can help nurses by pushing on the nurse call button at the first sight of a seizure, thus allowing the immediate examination of the patient. They can also take part in the appropriate recording of the seizure by manipulating the camera, removing blankets, etc.

As far as the patient companions are concerned, age, sex and the level of education do not significantly affect outcome. Considering the type of relationship, again there is no difference between immediate family members. Though not statistically proved, however, there is great difference between the mean scores of the individuals who are immediate family members and those who are not. We speculate that the reason why immediate family members received a higher score might be the fact that they are more familiar with the type of seizures the patients have. We might have obtained a different result if the number of companions who were not immediate family members was much greater. The result might also change if we had studied all the recorded seizures, however, this was not possible since the patients had different numbers of seizures. The result might have also been influenced by the fact that patients have different types of seizures (some have nocturnal seizures while others have seizures that are hardly recognized, etc.). We would also like to emphasize one point. We have only used scalp EEG in all of our recordings and we do not think that this method would be suitable for patients who require invasive monitoring techniques.

As a result, in developing countries, in one-bed EMUs where the opportunity of having full-time dedicated staff is lacking, patient companions can be quite helpful in the appropriate management of epilepsy patients (who are not monitored with invasive techniques) or patients with certain paroxysmal events.

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REFERENCES

1. Kilpatrick, C., Cook, M., Kaye, A., Murphy, M. and Matkovic, Z. Non-invasive investigations successfully select patients for temporal lobe surgery. *Journal of Neurology, Neurosurgery and Psychiatry* 1997; **63**: 327–333.

2. Doni, M. Nursing care. In: *Epilepsy Surgery* (Ed. Hans Otto Lüders). New York, Raven Press, 1992: pp. 281–290

3. Boon, P., De Reuck, J., Drieghe, C., De Bruycker, K., Aers, I. and Pengel, J. Long-term video-EEG monitoring revisited. The value of interictal and ictal video-EEG recording, a follow-up study. *European Neurology* 1994; **34** (Suppl. 1): 33–39.

4. Mohan, K. K., Markand, O. N. and Salanova, V. Diagnostic utility of video-EEG monitoring in paroxysmal events. *Acta Neurologica Scandinavica* 1996; **94**: 320–325.

5. Chen, L. S., Mitchell, W. G., Horton, E. J. and Snead, O. C., 3rd. Clinical utility of video-EEG monitoring. *Pediatric Neurology* 1995; **12**: 220–224.

6. Logar, C., Walzl, B. and Lechner, H. Role of long-term EEG monitoring in diagnosis and treatment of epilepsy. *European Neurology* 1994; **34** (Suppl. 1): 29–32.

7. Lagerlund, T. D., Cascino, G. D., Cicora, K. M. and Sharbrough, F. W. Long-term electroencephalographic monitoring for diagnosis and management of seizures. *Mayo Clinic Proceedings* 1996; **71**: 1000–1006.

8. Binnie, C. D., Rowan, A. J., Overweg, J., Meinardi, H., Wisman, T., Kamp, A. and Lopes da Silva, F. Telemetric EEG and video monitoring in epilepsy. *Neurology* 1981; **31**: 298–303.