Original Article

Journal of Epilepsy and Clinical Neurophysiology

J Epilepsy Clin Neurophysiol 2009;15(4):147-151

Long-term Evaluation of Physical Activity Habits After Epilepsy Surgery

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ABSTRACT

Objectives: Studies have shown that people with epilepsy have a low degree of participation in physical activities. The purpose of this study was to assess the physical exercise habits in patients after epilepsy surgery using a standardized questionnaire. **Methodology:** The study population consisted of 102 patients submitted to cortico-amigdalo-hippocampectomy. A questionnaire was designed to assess physical activities participation before and after surgery. Patients were classified as physically active, inadequately active or sedentary. The questionnaire was applied pre-operatively and after a mean of 47 months post-operatively. **Results:** Forty eight per cent of the patients participated in physical activities before surgery and 56% of them did so post-operatively. No considerable changes in physical activity participation were observed after surgery. Additionally, the frequency they needed supervision during exercise, were advised by a physician not to practice exercise or cautioned by a relative or friend against participation in sports did not change significantly after successful epilepsy surgery. Less exercise-related seizures occurred postoperatively. **Conclusion:** Difficulties adapting to seizure freedom and psychosocial and psychiatric co-morbidity might be important factors interfering in these physical activity habits. A multidisciplinary approach might be the only way to try to alter some aspects of these patients' postoperative life style.

Key words: Epilepsy, physical activity, exercise, epilepsy surgery.

RESUMO

Avaliação dos hábitos de atividade física de pacientes após cirurgia de epilepsia

Objetivos: Estudos têm mostrado que pessoas com epilepsia apresentam um baixo grau de participação em atividades físicas. O objetivo deste estudo foi verificar os hábitos de atividade em pacientes após cirurgia de epilepsia utilizando um questionário. **Metodologia:** A população estudada consistiu de 102 pacientes submetidos a cortiço-amigdalo-hipocampectomia. O questionário verificou a participação de atividades físicas antes e depois da cirurgia. Os pacientes foram classificados como ativos, inadequadamente ativos ou sedentários. O questionário foi aplicado antes da cirurgia e depois de um período médio de 47 meses da cirurgia. **Resultados:** Quarenta e oito por cento dos pacientes participaram de atividades físicas antes da cirurgia e 56% deles após a cirurgia. Não foram observadas alterações significantes na participação de atividades físicas após a cirurgia. Ainda, a frequência de supervisão durante o exercício físico, aconselhamento por um médico, familiares ou amigos em não praticarem exercícios físicos ou atividades esportivas não alterou significantemente depois da cirurgia bem sucedida. Menos crises induzidas por exercício ocorreram no período pós-operatório. **Conclusão:** Dificuldades em se adaptarem a ausência de crises ou co-morbidades psicosocial e psiquiátrica podem ser fatores importantes que interferem nos hábitos de atividade física. Uma ação multidisciplinar poderia ser uma estratégia importante para tentar alterar alguns aspectos do estilo de vida destes pacientes após a cirurgia de epilepsia.

Unitermos: Epilepsia, atividade física, exercício, cirurgia de epilepsia.

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Received Sept. 10, 2009; accepted Oct. 23, 2009.

INTRODUCTION

Health-related quality of life (HRQOL) has been more extensively studied in patients with epilepsy over the last decade. Several factors such as cognitive, emotional and behavioural conditions, ability to work, social functioning, family stability, self-esteem, stigma, and adjustment to seizures seem to be especially crucial to the quality of life of patients with epilepsy.[7,12]

A number of studies have assessed pre and post surgical HRQOL in patients with epilepsy.[7,17,26] A reduction in seizure frequency and, consequently, an improvement in HRQOL would be expected in patients with intractable epilepsy after successful surgery.[11] To this point, several studies indicated that complete seizure free status would be a strong positive predictor of psychosocial adjustment.[12,14,15] On the other hand, other reports showed a poor correlation with postoperative seizure freedom; even if surgery could completely suppress seizures, some patients had difficulty adapting to seizure freedom and might still suffer psychosocial and psychiatric problems such as depression, anxiety, and stigma.[21-23]

Some studies implicated seizure frequency as having a significant impact on multiple domains of HRQOL, with a particularly strong effect on physical role functioning.[15] Some reports showed a low degree of participation in physical activities among persons with epilepsy.[3,6] The notion that physical activity might provoke seizures or make patients prone to injuries represents an obstacle for some individuals with epilepsy who wish to live an active life.[13]

There are epidemiological data concerning the relationship between epilepsy and physical exercise in different populations from various countries. Bjorholt et al.[3] observed that patients with epilepsy from a Norwegian population were half as active physically as the normal population, and their physical fitness corresponded to their sedentary lifestyle. Other studies confirmed these findings showing that people with epilepsy have a low degree of participation in physical activities.[19,24] Recently, analyzing physical exercise habits in Brazilian patients with epilepsy, we observed that most of our patients did not regularly engage in physical activity.[2] Although the effect of epilepsy surgery on physical role functioning have already been analyzed,[15] the degree of participation in physical activities in patients after epilepsy surgery has not been fully examined. A reduction in seizure frequency after epilepsy surgery might make patients more confident to participate in physical activities. In our paper, we studied the physical exercise habits in Brazilian patients before and after epilepsy surgery using a standardized questionnaire.

METHODS

The study was approved by the Human Research Ethic Committee and all subjects signed an informed consent. The studied population consisted of patients submitted to cortico-amigdalo-hippocampectomy who were referred to Hospital Brigadeiro, São Paulo, Brazil. All patients underwent surgery for treatment of refractory seizures with the same neurosurgeon. All had a preoperative multidisciplinary evaluation, including history and physical examination, long-term video-EEG monitoring, magnetic resonance imaging and neuropsychological testing. Preoperative and postoperative data were recorded for each patient in a prospective database containing complete preoperative and postoperative clinical data. Information relevant to this study included gender, age at surgery, type of operation, date of operation, presence or absence of postoperative seizures, date of the first postoperative seizure (if one occurred) and postoperative seizure frequency (if any).

One hundred and two patients (49 male, mean age = 38.7 ± 9.9 years) that underwent epilepsy surgery participated in this study. Mean age at surgery was 34.0 ± 10.4 years; mean age at onset of epilepsy was 12.7 ± 7.6 years and mean time between seizure onset and surgery was 20.5 years. All patients were submitted to cortico-amigdalo-hippocampectomy (54% right and 46% left hemisphere). Surgical outcome was analyzed using Engel's modified classification scheme.[8] Mean follow-up time was 47 months. All subjects had completed elementary school level.

A questionnaire was designed to assess physical activity habits. Patients who could not read or comprehend the meaning of the questionnaire were excluded. Patients answered a 36-item questionnaire with simple close-end type responses. Questions concerning attitudes toward physical exercise and their degree of participation, and related to their epilepsy before and after surgery were asked. Regarding their physical activity habits, patients were asked: if they took part in any physical activity, in which one (if any), if that was supervised by a professional, for how long they have been engaged in this activity, where it was practiced, how often, which were the reasons for not practicing any physical activity, if they liked exercising, if they had spare time to practice it, with whom this activity was carried out, if they feared to feel unattractive or ashamed during a group physical activity, if they were tired after exercise, if they feel exercising could worsen their health or cause seizures, why they exercised, if they had any seizure during exercise, if they got injured during exercise, if they were advised by a physician or relative not to exercise and if they know any person who had seizures during exercise. None of them presented any physical disability which could have

contributed to patient's ability to participate in physical activities. Patients were classified as physically active, non-active or sedentary according to the guidelines of the American College of Sports Medicine:[1] active subjects were those who exercised at least three times a week for a minimum of 20 min at an adequate intensity; inadequately active patients exercised less than that and sedentary patients did not exercise at all. All questionnaires were applied by the same investigator. Self-administration of the questionnaire or any access to information concerning the subject during questionnaire application was not allowed. The questionnaire was applied preoperatively and after a mean of 47 months post-operatively. Statistical analysis was carried out using Q-square testing. Significance was established at the $p < 0.05$ level.

RESULTS

Eighty seven percent of the patients were classified as Engel I postoperatively; the remaining patients were rated as Engel II or III. Nine percent of the patients were on monotherapy before and 37% after surgery.

Patients (48%, active + inadequately active individuals) participated in physical activities but not all of them regularly. No significant changes in physical activity participation were observed after surgery (48% before and 56% after surgery). Twenty seven percent of patients were rated as physically active before surgery and 30% of them after surgery. All active subjects had been engaged in physical activities for at least 1 year before surgery and the majority (77%) continued with their physical activity after surgery. Twenty two percent of these patients classified as physically active were under supervision of an instructor during exercise before surgery and 16% after surgery. All patients who were involved in physical activities (48%) had frequent or very frequent seizures before surgery.

Sixty percent of the patients had never experienced seizures during physical exercise before surgery and 89% after surgery. Additionally, 24% of them reported the occurrence of a seizure-related injury during exercise before surgery and 5% did so after surgery. Among the physically active patients in our study (27%), all presented frequent or very frequent seizures before surgery. After surgery, 11% were rated as Engel II or III. Moreover, 10% of patients before and 5% after surgery were advised by a physician not to practice physical activities. The number of patients cautioned against participation in sports by relatives and friends did not change after surgery (19% before and 17% after surgery). Fifty-four percent of the patients before surgery and 28% after surgery were afraid of having seizures during exercise or attracting the attention of others and making fool of themselves (58% before and 44% after surgery) (Table 1).

Table 1. Patients' physical activity habits before and after epilepsy surgery (n=102)

	Before surgery (n)	After surgery (n)
Do not like to exercise	17	17
Do not have spare time to exercise	21	22
Afraid of looking stupid or unattractive	37	24
Nobody to exercise with	53	53
Tiredness after exercising	23	23
Afraid that exercise may lead to health problems	39	30
Fear that exercise will cause a seizure	55	29
Exercise-related seizure	24	5
Fear of being embarrassed after having a seizure while exercising	59	45
Advised to avoid most types of exercise by a physician	10	5
Discouraged from exercising by family or friends	19	17
Know other persons with epilepsy who wave had seizures while exercising	35	37

The sports more frequently practiced by the patients before surgery were walking (20%), soccer (12%), bicycling (7%) and gymnastics (5%). After surgery, soccer (24%) was followed by walking (14%), bicycling (5%) and gymnastics (4%). All patients were asked if they liked doing physical exercise; no differences were found after surgery (83% liked to exercise before and 83% after surgery).

DISCUSSION

This is one of the few studies specifically addressing physical habits in a very large series of patients submitted to epilepsy surgery and followed-up for a mean of 4 years post-operatively. This study assessed the degree of participation in physical activity among Brazilian patients with epilepsy before and after epilepsy surgery, applying a standardized questionnaire. This random sample from Sao Paulo's twenty million inhabitants very likely represented the average Brazilian population since data were collected from a public hospital treating individuals from different social strata and from all over the country.

Although only 27% of patients before and 30% after surgery were qualified as physically active, almost half (48%) of them participated in physical activities 1 or 2 times per week or in the weekends before surgery. We could expect that a seizure free status or a significant reduction in seizure frequency would be a strong predictor for making patients more confident and engaged in physical activities. Surprisingly, physical exercise participation did not change greatly after successful epilepsy surgery. Other reports also showed a poor correlation with postoperative

status regarding seizures; even if surgery could completely suppress seizures, patients might not become used to their seizure-free status and might still suffer psychosocial and psychiatric co-morbidity such as depression, anxiety, and stigma.[11,21,22] After epilepsy surgery, patients need to get rid of roles associated with chronic seizures and to learn how to continue life without seizures for a successful behavioural adjustment. As reported by Wilson et al.,[30] this complex process demands a reconceptualization of the patient's identity from chronically ill to "cured". However, we could not assume that the only reason these patients did not participate in physical activities was because they had seizures. Many healthy individuals do not participate in regular physical exercise. Maybe some of our patients never enjoyed physical activities and surgery would not change it.

We also observed, in agreement with previous findings, that the frequency they needed supervision during exercise, were advised by a physician not to practice exercise, or cautioned by their relatives and friends against participation in sports was not altered after successful epilepsy surgery. The likelihood that they would like exercising was not modified after surgery either. The most frequent sports practiced before and after surgery did not differ considerably. Walking and soccer were the most often chosen sports among the patients before and after surgery. People with epilepsy might prefer activities in which they did not have to join a team and that would not present an immediate danger (i.e., swimming).[11] Swimming was the most popular physical activity among epileptics in Steinhoff et al. study,[28] but Nakken[19] observed that swimming was less frequent among their patients and there was a trend towards exercising with friends, due to safety considerations. We found that among physically active subjects, 11/27% before and 19/30% after surgery participated in physical activities alone. In a previous study, we noted that soccer was the most popular sport among them.[2] Although there is a tendency for patients with epilepsy to choose individual sports or physical activities which do not involve a great number of persons, the preference for soccer was probably due to Brazilian's tradition in this field and individual preferences might follow national or local sport habits.

In addition to seizures themselves, worries about the reaction from others to seizures also contributed to the stressful nature of epilepsy. The amount of patients that feared they would feel embarrassed after having a seizure while exercising or afraid that exercise might lead to health problems did not modify considerably after surgery in our study. In addition, co-morbidity such as depression and general emotional distress are common in patients with epilepsy.[4]

Regular physical exercise has received considerable attention as a mechanism for enhancing resistance to negative effects of psychosocial stress in healthy adult populations. Physical exercise is generally accepted as contributing to general health and well-being,[5] positive changes in life style,[27] improved mood, life quality[10] and reduction of anxiety and depressive symptoms,[16] together with increased ability to cope with stress.[29] Although we did not show a relationship between post-operative seizure freedom or low number of seizures and any of the physical habits measures in our population, we did observe a positive change regarding the believes of being afraid of looking stupid or unattractive or to the fear of an exercise-related seizure.

Few studies reported patients who experienced exercise-induced seizures.[13,18,20,25] Seizures occurring during exercise were found in six out of 21 patients in the study of Bjorholt et al.[3] and in four out of 15 patients in another study.[30] In a previous study conducted by our group,[2] 16% of the patients presented seizures during exercise. In the present study, all physically active patients presented frequent or very frequent seizures before surgery and 40% of them reported seizures during exercise. After surgery, only 11% of them reported having seizures during exercise. In the present study, a reduction of seizures occurring during physical exercise and a reduction of seizure-related injury during exercise after surgery correlated well with a good postoperative outcome regarding seizures.

The outcome measures after surgical treatment in most studies have focused mainly on seizure relief, psychiatric co-morbidity and HRQOL. This is the first study that investigated physical exercise habits in Brazilian patients who underwent epilepsy surgery. We failed to demonstrate that patients who were seizure free after surgery participated more intensively in sports or physical activities. Most likely, difficulties adapting to seizure freedom or psychosocial and psychiatric co-morbidity, such as depression, anxiety, and stigma of epilepsy might be important factors interfering in these habits.

Now that the outcome regarding seizures is already well known in many epileptic syndromes, it is time to focus more on post-operative rehabilitation. A multidisciplinary approach might be the only way to try to alter some aspects of these patients' postoperative life style.

ACKNOWLEDGMENTS

Research supported by FAEP, CNPq, FAPESP and CAPES. Adriana Leite is fellow from CNPq.

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