Short communication

Do pets reduce the likelihood of sudden unexplained death in epilepsy?

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ABSTRACT

Purpose: To assess the relationship between the presence of pets in homes of epilepsy patients and the occurrence of sudden unexpected death in epilepsy (SUDEP).
Methods: Parents or relatives of SUDEP patients collected over a ten-year period (2000–2009) in a large epilepsy unit were asked if the patient lived together with any domestic pet at the time of death or not. Patients who did not experience SUDEP served as controls.
Results and conclusions: Eleven out of the 1092 included patients (1%) experienced SUDEP, all with refractory symptomatic epilepsy, but none of them had pets in their homes at the time of death. In contrast, the frequency of pet-ownership in the control group (n = 1081) was 61%. According to previous studies there are some indications that human health is directly related to companionship with animals in a way that domestic animals prevent illness and facilitate recovery of patients. Companion animals can buffer reactivity against acute stress, diminish stress perception and improve physical health. These factors may reduce cardiac arrhythmias and seizure frequency, factors related to SUDEP. Companion animals may have a positive effect on well-being, thus improving epilepsy outcome.

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1. Introduction

Sudden unexpected death in epilepsy (SUDEP) is one of the most important epilepsy-related modes of death in patients with long-standing uncontrolled epilepsy. The pathomechanism of SUDEP is unknown. Probable predisposing factors for SUDEP are long-standing epilepsy, the genetic background, antiepileptic drugs, cold temperatures, or unknown factors that transform a seizure into a fatal event, like lack of supervision.7,10 Strategies to prevent SUDEP comprise pharmacological measures, surgery, cardiac and respiratory interventions but their benefit has not been established yet.10

There are indications that epilepsy patients who live together with a dog have a better quality of life, lower seizure frequency, and a better global outcome than epilepsy patients without pets.5,9 In the light of the uncertainties about the pathogenesis and risk factors for SUDEP, it would be interesting to know if patients with epilepsy who live together with dogs develop SUDEP less frequently than epilepsy patients without dogs. Aim of the present study was to assess the relationship between the presence of pets in homes of epilepsy patients and the occurrence of SUDEP in children and adolescents with epilepsy in a large epilepsy unit over a 10-year period.

2. Methods

To examine the potentially beneficial role of pets for the occurrence of SUDEP we reviewed children and adolescents with SUDEP of our epilepsy unit over a 10-year period (2000–2009). A conversational interview with parents or relatives of SUDEP patients was carried out in July 2009 to investigate if the patient lived together with any domestic pet (such as dogs, cats, and birds) at the time of death or not. The 1081 patients who did not experience SUDEP served as a control group.

Included were all epilepsy patients, aged zero to 18 years, of the Clinical Hospital of Ribeirão Preto who died from SUDEP between January 2000 and June 2009. The Ribeirão Preto epilepsy center is a tertiary referral center in Brazil that provides services for pediatric patients from all over the country. The history of 1092 patients was retrospectively reviewed for the occurrence or absence of SUDEP. For the
retrospective analysis demographic and clinical data (age at onset of epilepsy, epilepsy syndrome, seizure frequency, antiepileptic drug (AED) therapy, course of neurological abnormalities, electroencephalographic (EEG) findings, neuro imaging findings, presence or absence of pets in homes of patients) were collected. Excluded were cases in which the diagnosis of epilepsy was uncertain. Families were contacted for elucidation of the cause of death, and autopsies that had been accomplished were revised. The etiology of epilepsy was classified as symptomatic in case of known cause of the seizure, cryptogenic in case the etiology was unknown, and as idiopathic in case clinical and EEG findings were clearly related to an idiopathic syndrome but the child did not present any developmental delay or associated neurological condition. Patients with exclusively febrile seizures or a single seizure were excluded from the study.

“Definite” SUDEP was diagnosed according to published criteria if a child with epilepsy and recurrent unprovoked seizures died unexpectedly while in a reasonable state of health, if death occurred suddenly during normal activities in benign circumstances, if no obvious medical cause of death could be identified, or if death was not directly caused by an epileptic state. SUDEP was considered “probable” in case all above-mentioned criteria were present, but post-mortem data were not available. SUDEP was considered “possible” when conclusive and post-mortem data were lacking.6

3. Results

SUDEP was diagnosed in 11 of the 1092 patients included in this study (1.01%). Clinical and demographic details of these 11 patients are presented in Table 1. All 11 SUDEP patients had symptomatic epilepsy (67% focal, 33% generalized) (Table 1). Almost all patients had at least monthly seizures (81% of the cases) (Table 1). According to their relatives, none of the patients had pets at home at the time of death or during the years prior to SUDEP. Among the 1092 included patients, 665 (60%) had a pet in their family. Excluding the 11 patients with SUDEP, who did not have a pet, the frequency of pets in the control group was 61%.

4. Discussion

This study in children and adolescents with SUDEP shows that pets were absent in all households or public surroundings when SUDEP occurred. In contrast, the frequency of pets among those who did not experience SUDEP was high. Whether the presence of pets at the time of the critical deterioration of health would have prevented the fatal outcome remains speculative.

Generally, there is increasing evidence that dogs have a beneficial effect on their owners' health by enhancing physical activity, social contacts, or by providing an anti-depressive effect.5 Additionally, service dogs have a positive influence on the well-being, self-esteem, and community integration of people with disabilities.1,2 Dogs may be preventive against SUDEP by reducing stress and sympathetic responses.1 Stress is a major risk factor for sudden cardiac death suggesting that stress may also play a pathogenic role in SUDEP. Stress in epilepsy patients may originate from insufficient seizure control, emotional stress related to seizure frequency, deprivation and stigmatization by the disease, AEDs or other drugs known to increase the sympathetic tone, or from uncertainties about future perspectives. Furthermore, dogs are reported to react to medical emergencies of their owners like hypoglycemia, ventricular fibrillation, or subarachnoid hemorrhage.12 It has been also reported that dogs are able to anticipate seizures of the owners and to react to seizures by searching for help.4,9 Though various speculative hypotheses have been raised to explain SUDEP, its pathogenic background remains elusive.11 A possible patho-mechanism to explain SUDEP is the development of a seizure-triggered Takotsubo-syndrome.3 Absence of pets at the time of SUDEP in any of the included patients could be explained by the fact that the risk of SUDEP is highest in patients with severe epilepsy not controlled by two or more AEDs or a low IQ,13 which may limit the ability of persons at risk for SUDEP to have pets.

Limitations of the study were that it had a retrospective design, that it was not assessed if the 11 SUDEP patients lived in a single individual household or together with others, that potential cardiac or pulmonary risk factors for SUDEP were not reviewed, and that stress was not quantified.

In conclusion, pet-ownership is infrequent in SUDEP cases, and living without a pet could be a potential risk factor for SUDEP. There is a need to re-evaluate already published case-control studies with respect to pet-ownership.6,10 The higher frequency of pet-owners in controls compared to SUDEP patients supports a possible protective role of pets against SUDEP. A lower prevalence of SUDEP in pet-owners with epilepsy living in single individual households than in non-pet-owners living in single individual households would emphasize that pets play a beneficial role as supervisors of epilepsy patients.

We confirm that we have read the journal’s position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.
Conflict of interest

None of the authors has any conflict of interest to disclose.

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