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1 **EDITORIAL**

2 **Survival in feline epilepsy: the long and short of it**

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6 Both quality and quantity of life are of importance to the owners of companion animals (Sandøe and
7 Christiansen 2007), and in ideal circumstances, each veterinary treatment would ensure high quality of
8 life *and* increase longevity (Oyama and others 2008). Understanding which disease and treatment
9 related factors influence survival in diseased animals may help guide their management, for example,
10 whether a treatment that compromises quality of life provides sufficient additional lifespan to justify its
11 use. In animals with life-limiting diseases, mismatches may exist between owners' expectations of
12 survival versus reality. For example, in a study of dog and cat owners' perceptions of medical treatment
13 for cancer, a mismatch was observed between the number of owners expecting treatment to extend their
14 pet's lifespan (87.0%) and the actual number that experienced this (60.9%) (Brønden and others 2003).
15 As such, robust estimates of survival time are potentially valuable statistics for guiding owner
16 expectations post-diagnosis. Indeed, in a study of owner perceptions of quality versus quantity of life
17 for dogs with heart disease, owners' reported high levels of concern regarding their inability to know
18 how long their pet was going to live (Oyama and others 2008).

19
20 Survival analysis was developed to examine mortality data and risks associated with time until death,
21 and allows for censoring where the outcome (usually death or euthanasia) is not recorded at a point in
22 time for a particular subject. Canine epilepsy is a common, chronic neurological disorder in dogs and
23 survival analyses have demonstrated that it can significantly reduce lifespan (Berendt and others 2007).
24 Epileptic seizures are also a common presenting complaint in cats, affecting 1-2% of the general feline
25 population (Schriefl and others 2008). Seizure manifestations may be different to those typically seen
26 in dogs, but the underlying causes of seizure activity appear to be similar, with both idiopathic and
27 structural epilepsies described (Pákozdy and others 2010; Stanciu and others 2017). Of those cats
28 presenting with seizures, between 22-54% are classified as idiopathic (also termed 'epilepsy of
29 unknown cause', or EUC) (Pákozdy and others 2010; Schriefl and others 2008; Wahle and others 2014).
30 To date, little data have been published documenting survival in feline EUC. In a recent small-scale
31 study of n=18 cats with EUC, the 1-year survival rate was 73%, which was significantly higher than the
32 survival rate of cats with structural epilepsy or acute symptomatic seizures (35%; 22/63 cats) (Wahle
33 and others 2014). A new study is summarised on pX of this issue of *Veterinary Record* (Szelecsenyi
34 and others 2017) which builds upon these findings in a larger population of 76 cats with EUC.

35

36 In a retrospective study of cats presenting with seizures over a 15 year period, Szelecsenyi and others
37 explored the effects of seizure semiology and type upon treatment outcome and survival. The authors
38 demonstrate that of 76 cats with EUC, the majority were alive at follow up (68%), with a median follow
39 up time of 3.2 years. The longest follow up of a live cat with EUC was 11 years, and from Kaplan-
40 Meyer analysis, the median survival time of cats with EUC was 4.9 years. This is markedly higher than
41 studies of canine epilepsy, where in a multi-breed study, the median lifespan with epilepsy was 2.3
42 years (Berendt and others 2007), and in a study of Border Collies with EUC was 2.07 years (Hülsmeier
43 and others 2010). Szelecsenyi and others report that of the cats that died during the study period (24/76),
44 the majority were epilepsy-related (66.6%, n=16). This was defined as the authors as euthanasia
45 motivated by circumstances directly associated with seizures. Similar findings have been reported in
46 canine epilepsy, for example more than 60% of Irish Wolfhounds (Casal and others 2006) and 70% of
47 Belgian Shepherds with idiopathic epilepsy were reported to die of epilepsy-related reasons (Gulløv
48 and others 2012). Whether euthanasia was elected for by the cat owners in this study due to uncontrolled
49 seizures, intolerable side effects of AEDs or other factors perceived to impair cat and/or owner quality
50 of life was not investigated in this study, but exploring where owners' 'limits' lie for these factors *a*
51 *priori* may aid in the management of owner and feline quality of life. As attitudes to companion animal
52 euthanasia may be culturally driven (Miura and others 2000), and all cats in this study were derived
53 from a hospital population in Switzerland, similar studies from other countries may provide further
54 insights into end of life decision-making in feline epilepsy.

55

56 Szelecsenyi and others identified two major risk factors that predicted survival in cats with EUO: age
57 at time of seizure onset and remission. In contrast, AED treatment, seizure semiology and seizure type
58 were not associated with survival. Seizure freedom is considered the primary treatment goal in the
59 therapeutic management of canine and feline epilepsy patients (Potschka and others 2015), and data
60 suggests that seizure control is also beneficial for survival in canine epilepsy (Weissl and others 2012);
61 although remission rates are generally low in the dog at ~14-15% (Berendt and others 2007; Packer and
62 others 2014). In contrast, Szelecsenyi and others report relatively high rates of remission in their feline
63 study; complete remission (defined by a seizure-free period of at least one year with or without AED
64 therapy) was achieved in 34% of cats with AED therapy and 79% of cats without AED therapy. In a
65 previous study, 40-50% of phenobarbital treated cats with EUC were reported to become seizure-free
66 (Pakozdy and others 2012), and in a second population of treated and untreated cats, 44% of cats (8/18)
67 became seizure-free (Wahle and others 2014). From these data it appears that feline EUC is manageable
68 and may have a more favourable outcome than canine epilepsy. Remission rates being higher in the
69 untreated group was initially considered unexpected by Szelecsenyi and others; however, a previous
70 canine study did not identify positive effects of AED treatment on remission (Berendt and others 2007).
71 It is likely that untreated animals of both species have a less severe epileptic phenotype and thus a better
72 prognosis for survival compared to those whose epilepsy phenotype necessitated treatment.

73

74 Szelecsenyi and others' data add to our understanding of survival and treatment outcomes in feline
75 EUC; however, unknown variation in survival remains, and further research is necessary to understand
76 animal, disease and treatment-related risk factors. Clinical variables including a history of status
77 epilepticus (SE) and cluster seizures (SE) have previously been associated with reduced survival time
78 in canine epilepsy patients (Arrol and others 2012; Berendt and others 2007; Fredso and others 2014;
79 Monteiro and others 2012; Saito and others 2001). Several other signalment-based risk factors for
80 survival have been identified in dogs that could be further explored in cats, including sex (bitches lived
81 longer than dogs) (Berendt and others 2007) and neuter status (intact dogs are at an increased risk of
82 epilepsy-related euthanasia compared to neutered) (Berendt and others 2008).

83

84 As recently stated by the International Veterinary Epilepsy Task Force, no information is available yet
85 about SUDEP (sudden unexpected death in epilepsy) and life expectancy in feline epilepsy patients
86 (Potschka and others 2015). Cases of presumed SUDEP have been reported in dogs (Berendt and others
87 2007; Gulløv and others 2012) and life expectancy has been estimated to be around 7 years (Berendt
88 and others 2007; Proschowsky and others 2003). Similar data for cats could aid clinicians in the
89 management of EUC patients, and in managing client expectations of their animal's disease.

90

91 **Clinical importance for practitioners**

- 92 • Epilepsy of unknown origin exists in a proportion of cats with seizures and has a good long-term
93 prognosis for many cats, with complete remission in 42% and a median survival time of 4.9 years
- 94 • Cats that achieve complete remission (at least 1 year seizure free) have an increased survival time
- 95 • Epilepsy follows a self-remitting course in a proportion of cats without the use of AEDs, with long
96 (1 year+) seizure free periods; however, previous studies indicate anti-epileptic therapy should be
97 continued to avoid seizure recurrence (Pakozdy and others 2012)

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