



Efficacy of medium chain triglyceride oil dietary supplementation in reducing seizure frequency in dogs with idiopathic epilepsy without cluster seizures: a non-blinded, prospective clinical trial (Molina, J. et al. 2020)¹

Introduction

Epilepsy is a chronic neurological disease common in dogs. It's diagnosed when 2 or more unprovoked epileptic seizures occur within at least 24 hours. The general dog population shows a prevalence of between 0.5 and 0.75%, being **idiopathic epilepsy (IE)** the most common form, especially in some specific dog breeds.

The disease often has an early onset, during the first years of life, and requires long term use of anti-seizure drugs. However, **20-40% of patients** do not respond adequately to medical management. Dogs with epilepsy suffer from a lower **quality of life (QoL)** and reduction in their lifespan. For these reasons, there is great interest in finding complementary treatments for canine IE.

Studies in epileptic people have shown some success under **ketogenic diets** (high fat, low carbohydrate and low protein), lowering the frequency of seizures. Recent studies have reported that 67.7% of owners have changed their dog's diet after being diagnosed with IE, providing alternative energy sources like derived **medium-chain triglycerides oil (MCTs)**.

The mechanism of action of MCTs is not clearly known, but as energy metabolism is insufficient in epileptic dogs, MCTs may play a role as an **alternative energy source to the brain**. MCTs are more efficient in crossing the blood brain barrier as they're directly oxidised in the brain. Different studies have evaluated the effects of supplementing diet with MCTs oil in epileptic dogs, showing a significant **reduced seizure frequency**.

MCTs diet has been shown to increase mitochondrial function and metabolic synthesis of **polyunsaturated fatty acids (PUFA)** in the canine brain. Additionally, MCT's metabolites, **decanoic acids (C10)**, can act as a **non-competitive AMPA receptor** promoting an anticonvulsant effect.

To expand the veterinary management options for IE canine patients treated with **antiseizure drugs (ASD)**, a commercially available diet (**PURINA® PRO PLAN® NC NeuroCare**) enriched with 6.5% MCTs oil, together with a blend of other nutrients, was offered to pet owners to prospectively evaluate the efficacy, palatability, tolerability and seizure outcomes resulting from dietary management as an adjunct to ASD treatment.

Study Design

A **90 days prospective open-label, single-arm food study** with no placebo was carried out across Europe (France, Italy, Poland, Portugal, Spain and Switzerland), including 10 veterinary practices.

22 dogs diagnosed with IE, without presenting antiepileptic drug resistances (cluster seizures), were recruited for the study with their owner's consent. Full history of seizures during the previous 30 days was established as a baseline.

The owners were requested to change their dog's diet into the study diet (**PURINA® PRO PLAN® NC NeuroCare**), gradually during 7 days with free-access water to drink. The feeding amount followed the feeding guidelines of the product label and was also adjusted, during the first month, by each clinician to ensure maintenance of the **body weight (BW) and body condition score (BCS)**.

Follow up visits took place at **day 28, 56 and 84**. Each visit included examination of BCS, BW, rectal temperature and general health status. Also, ASD dose and possible side effects were recorded.

Each month, the owners evaluated their dog's QoL (using a scale of 10 as a maximum score), ataxia, frequency and severity of seizures, and the diet's efficacy and tolerance.

Table 1. Effect of the diet in all dogs (n=21) and only dogs that experienced single seizure events per day (n=16) for each of the measurements (mean ± se) between baseline and the end of the study.

Parameter	N	Baseline	End of study	Wilcoxon rank-sum test p value
BW (kg)	21	22.6 (± 2.7)	22.0 (± 2.6)	0.26
BCS	19	5.4 (± 0.3)	5.2 (± 0.3)	0.75
Nº of seizures days/ months	21	2.5 (± 0.3)	1.4 (± 0.2)	<0.0001
Total nº of seizures/month	21	2.5 (± 0.3)	1.7 (± 0.4)	0.04
BW(kg)	16	22.3 (± 3.3)	21.8 (± 3.2)	0.27
BCS	14	5.3 (± 0.4)	5.1 (± 0.4)	0.50
Nº of seizures days/ months	16	2.4 (± 0.4)	1.0 (± 0.2)	<0.0001
Total nº of seizures/month	16	2.4 (± 0.4)	1.0 (± 0.2)	<0.0001

BCS, Body condition score, BW, Bodyweight; n°, number.

Results

Results demonstrated the clinical efficacy of a diet enriched with MCTs oil as an adjunct to ASD treatment (**Table 1**):

- **Acceptance of the food was good to excellent** in 19 of the 22 dogs during the whole study, although 1 dog was removed from the study due to lack of test food ingestion.
- **Mean seizure day rate** (1.4 seizure days/month) significantly **decreased by 42%** compared to baseline (2.5 seizure days/month) in all dogs.

• **Mean seizure frequency per month** (1.7 seizure days/month) significantly **declined by 32%** compared to baseline (2.5 seizure days/month).

• **Quality of life was reported as very good to excellent** (>8.5/10) in 20 dogs before starting the diet and remained unaffected during the diet trial.

Conclusions

This study demonstrates the clinical efficacy of a diet enriched with MCTs as an adjunct to ASD treatment in dogs diagnosed with IE. The diet significantly **reduced seizure frequency** while maintaining QoL of the canine patients, in accordance with previous studies^{2,3}.



¹Molina, J., Jean-Philippe, C., Conboy, L., Afior, S., de la Fuente, C., Wrzosek, MA., Spycher, A., Luchsinger, E., Wenger-Riggenbach, B., Montoliu, P., Gandini, G., Menchetti, M., Ribeiro, J.C., Varejão, A., Ferreira, A., Zanghi, B., Volk, HA. (2020). Efficacy of medium chain triglyceride oil dietary supplementation in reducing seizure frequency in dogs with idiopathic epilepsy without cluster seizures: a non-blinded, prospective clinical trial. Veterinary Record Published Online First: 12 June 2020. doi: 10.1136/vr.105410.

²Law TH, Davies ESS, Pan Y, et al. A randomised trial of a medium-chain tag diet as treatment for dogs with idiopathic epilepsy. Br J Nutr 2015;114:1438-47.

³Berk B, Law T, Wessmann A, et al. Investigating the short-term effects of medium-chain triglycerides (mct) supplement on canine epilepsy in drug non-responders. Proceedings of 31st ESNV-ECVN Symposium in Copenhagen 20 - 22 September 2018, abstract O23.