Non- Epileptic Theta Band EEG Patterns Characterized in Canines

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BACKGROUND

• In humans, non-epileptic EEG patterns are well-documented and described. These patterns are clinically insignificant, however may be misinterpreted as epileptic patterns.

• These non-epileptic patterns are found within the theta range (4-7 Hz) and are often misinterpreted as 6 Hz spike and wave epilepsy patterns.¹

• Common theta band non-epileptic patterns in hypnagogic hypersynchrony, hypnopompic hypersynchrony, B(1)RDS, Cingagek rhythm, hedonic hypersynchrony, and 6 Hz spike and wave complex.

PURPOSE

Below is a flow chart describing several of these patterns in the theta range. Theta patterns are slow wave patterns associated with sleep or drowsiness in the 4-7 Hz range.

The objective of the study is to classify non-epileptic theta band patterns in canines. The prediction prior to the study was that these patterns were the result of hypnagogic hypersynchrony.

Inclusion Criteria

• Any dog with EE in archive which transitions between sleep and wake.

Exclusion Criteria

• Any dog with structural or metabolic brain disease.

MATERIALS AND METHODS

Data Collection

This is a retrospective study, using dog scans from the OVC Archives, as well as from the University of Helsinki, Ludwig-Maximilian-Munich University, Seattle veterinary specialist, and clinics in West LA and San Diego.

Analysis of Data

EEG scans were read and analyzed using persyst software and insight. Visual pattern recognition method was used to identify non-epileptic theta patterns. Characteristics such as pattern frequency, pattern amplitude, background activity and state of dogs were recorded into excel spreadsheets for dogs which met the inclusion criteria.

RESULTS

• 6/108 dogs found benign rhythms. All 6 cases, the dogs were non-epileptic.

• 5 of the cases of non-epileptic theta patterns occurred in a state of drowsiness. These were identified to be theta bursts.

• One of the case of non-epileptic theta patterns resembles sawtooth pattern, which is a benign pattern found during REM sleep.

Figure 1: Flow chart of definitions for human theta band non-epileptic patterns patterns

Figure 2: OVC EEG medical recording, using subdermal wire electrodes

Figure 4: analysis of a theta burst in a canine using persyst software(left) and sawtooth pattern (right)

CONCLUSION

• These patterns in canines represent generalized theta patterns, rather than specific mimicker patterns, as described in humans.

• Limitations of this study include some technical issues with persyst software, resulting in some of the patient videos to not be present.

• Next steps: look into other epileptic patterns which are classified rather than specific mimicker patterns, as described in humans but not yet in dogs.

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REFERENCES