BACKGROUND

Cancer is the number one cause of mortality in dogs.

Pain is a common clinical feature of cancer leading to stress, suffering and low scores of quality of life (QoL).

Knowledge about the nature and severity of cancer pain in dogs affected by osteosarcoma (OSA) is limited.

This study aimed to:

1. Characterize the nature and severity of bone cancer pain in dogs with appendicular OSA, compared with healthy dogs
2. Test a stepwise palliative analgesic treatment (without opioid) in dogs with appendicular OSA

MATERIALS & METHODS

Animals and Protocol

Phase I: The pain profile of client-owned dogs with OSA (n=13) was compared with healthy dogs (n=7).

Phase II: Dogs with OSA (n=13) were included in a prospective, open-label, clinical trial (Figure 1).

Evaluations were done at days: 0, 14, 21 and 28

Outcome measures:

- Quantitative sensory testing (QST)
  - Primary tactile threshold, primary and secondary mechanical thresholds (MTx) (Figure 2)
  - Brush allodynia
  - Conditioned pain modulation (CPM) (Figure 3)
- Stance asymmetry index
- Actimetry (most and least active)
- Scores of pain and QoL

Statistics

- Phase I: data were analyzed using t-tests, Mann-Whitney or Fisher exact tests
- Phase II: linear mixed models and the Cochran-Mantel-Haenszel test
- Adjustments were done with the Benjamini-Hochberg procedure

RESULTS

Phase I

- Centralized nociceptive sensitivity and asymmetry were recorded in OSA dogs (Table 1).
- Healthy dogs had responsive CPM, but CPM was deficient in most OSA dogs (Figure 2).
- Weight bearing left thoracic limb demonstrating the discomfort caused by the ischemia (Figure 4).

Phase II

- Primary tactile allodynia, primary and secondary MTs and brush allodynia did not improve with treatment.
- Rate of functional CPM was significantly increased at Day 14 (80.9%) when compared with baseline (38.5%).
- Asymmetry index, scores of pain (WAI, visual analog scale) and scores of QoL did not change with treatment.
- The most active actimetry significantly increased at Days 14, 21 and 28, when compared with baseline, indicating improvement in levels of activity.
- The least active actimetry significantly decreased at Days 14, 21 and 28, when compared with baseline, indicating improvement in night-time restlessness.
- Except for tactile threshold and actimetry, all outcomes worsened at Level 3 treatment.

 Outcome Status Mean (SD) Frequency p value

Primary tactile threshold (grams) Healthy 297.6 (65.4) 0.079
OSA 184.5 (64.5)
Primary mechanical threshold (Newtons) Healthy 8.9 (0.6) 0.012
OSA 6.6 (2.2)
Secondary mechanical threshold (Newtons) Healthy 9.8 (0.5) 0.001
OSA 5.7 (2.5)
Brush allodynia (grams) Healthy - 0.026
OSA 53.8
Delta CPM (Newtons) Healthy 0.6 (0.6) 0.014
OSA -0.5 (1.5)
Functional CPM rate (%) Healthy 85.7 0.005
OSA 38.5
Asymmetry index (%) Healthy 6 (2) 
OSA 30 (14)

CPM: conditioned pain modulation; p-values in bold are rejecting the null-hypothesis for the test (absence of difference between both groups)

REFERENCES


NOTES

- Study approved by the institutional Animal Care and Use Committee (IRB-1800)
- Studied registered on the American Veterinary Medical Association (AVMA) Animal Health Studies Database (AMHSD-030025011612016 to 04/17/2018)

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CONCLUSIONS

- Dogs with bone cancer (Figure 4) are affected by widespread somatosensory sensitivity characterized by peripheral and central sensitization and have deficient inhibitory system
- This severe pain is mostly refractory to palliative analgesic treatment and requires sensitive methods to detect changes
- A systematic use of multimodal analgesia is questionable