The Effectiveness of Marine Based Fatty Acid Compound and NSAIDs for the Treatment of Canine Osteoarthritis: a preliminary study

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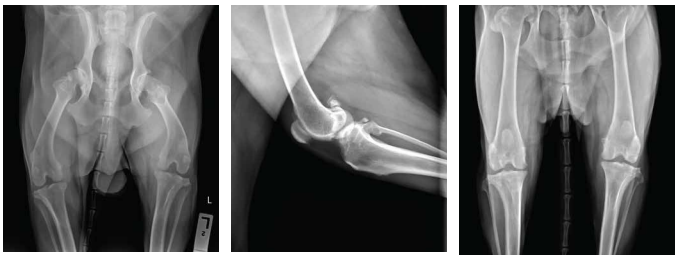
INTRODUCTION

The incidence of osteoarthritis (OA) has been reported to be as great as 20% among the canine population that is more than one year old.[1] Nonsteroidal anti-inflammatory drugs (NSAIDs) have been use widely for decades to treat osteoarthritic pain, however the long-term administration of NSAIDs may induce undesirable side effects. Recently, the potential benefits of a marine based fatty acid compound (PCSO-524), derived from *Perna canaliculus*, known commonly as the New Zealand green lipped mussel, have been studied in both human and animals. The contents of long chain omega-3 polyunsaturated fatty acids (PUFAs), including eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) as well as other novel omega PUFAs within PCSO-524, may possess anti-inflammatory properties. These PUFAs may decrease the synthesis of inflammatory prostaglandins and leukotrienes. Consumption of omega-3 PUFAs may alter the ratio of omega-6 : omega-3 fatty acid in the body, which may cause potent inflammatory mediators to be turned into other less potent forms[2-5], however the benefits of PCSO-524 in treatment of canine osteoarthritis are still controversial.

The Objectives of this study were to investigate the effectiveness of PCSO-524, NSAIDs and combination of NSAIDs and PCSO-524 in the treatment of canine osteoarthritis through the use of force plate gait analysis.



Picture 1. The radiographic changes of hip and stifle joint in osteoarthritis dogs.

MATERIALS AND METHODS

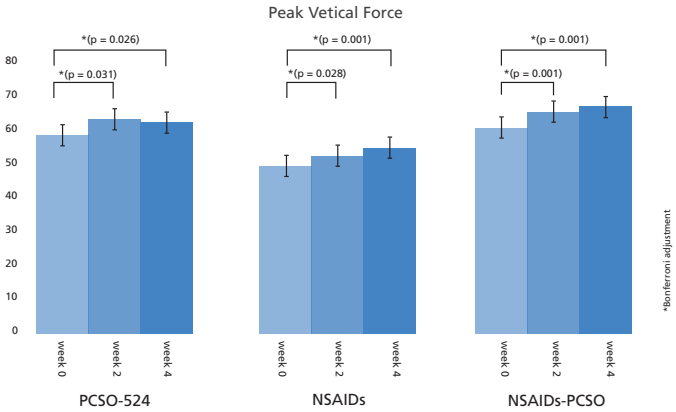
Study Design: A prospective block-randomized single-blinded study.
Animals: Thirty client-owned dogs that had clinical and radiographic evidences of hip or stifle osteoarthritis.
Method: Dogs were assigned randomly into 3 treatment groups of 10 dogs each; PCSO-524, NSAIDs and a combination of NSAIDs and PCSO-524 (NSAIDs-PCSO). Each group received the therapeutic agents orally for 4 weeks. Peak vertical force (PVF) was measured by force plate gait analysis. Hematology and blood chemistry values were evaluated prior to treatment and at the 2nd and 4th week post treatment. The evaluator was blinded for the treatment.
Computer-assisted force plate gait analysis: The PVF values were measured by dual force plates (model OR6-6; Advanced Mechanical Technology), permanently embedded at the same place on the 10-meter walkway. Six infrared video cameras detected the velocity of dog from a reflective target that was attached to each dog's collar. The dog was on a leash and performed trotting controlled by the same handler. The specific range of velocity for each dog was maintained throughout 3 evaluation times. (Maximum – Minimum velocity < 0.5 m/s).

Picture 2. PVF was measured by force plate gait analysis. The velocity of each dog was detected from a reflective target that was attached to each dog's collar (red circle).

Statistical analysis: Repeated measurement analysis was used to compare the effectiveness of each treatment. Bonferroni adjustment was used for multiple comparisons. Significant level was set at 5%.

RESULTS

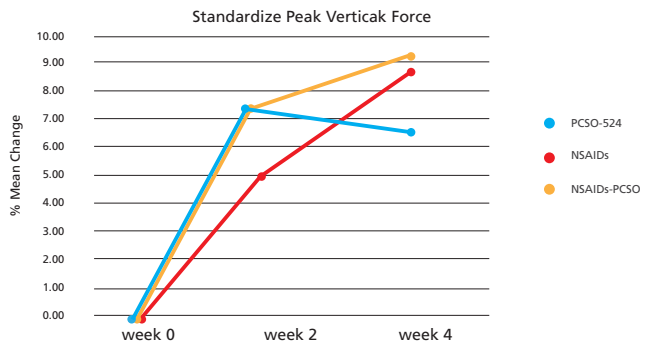
Comparisons between groups by repeated measurement demonstrated indifferences of PVF, hematology and blood chemistry values. Analyses within each group determined that the PVF prior to treatment and the second week of study and the end of study increased significantly in all groups ($p < 0.05$). The mean changes of PVF at the fourth week of treatment were; 3.88 ±1.35, 4.23 ± 0.74, 5.36 ± 0.94 % BW, in PCSO-524, NSAIDs and NSAIDs-PCSO groups respectively. The BUN value in NSAIDs group tended to increase when compared to baseline values ($p<0.05$), however all BUN values were within the normal range.



Picture 3. Multiple comparison of PVF in each group between prior to treatment, the second and forth week post treatment at p-value < 0.05.

DISCUSSIONS AND CONCLUSIONS

Force plate gait analysis is a gold standard for evaluation of lameness because it has 93% sensitivity and 94% specificity[6]. It may be detect changes in the levels of subclinical lameness that cannot be detected by human eye[7]. Even though increased PVF were demonstrated in all treatment groups, the highest change was demonstrated in the group to which a combination of NSAIDs and PCSO-524 was administered. This may imply that there are beneficial effects of PCSO-524 in combination with NSAIDs. Long- term aggregated data of the result of a higher dosage should be explored further.



Picture 4. Percent mean change of PVF in each group between prior to treatment, the second and forth week post treatment.

Acknowledgements

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