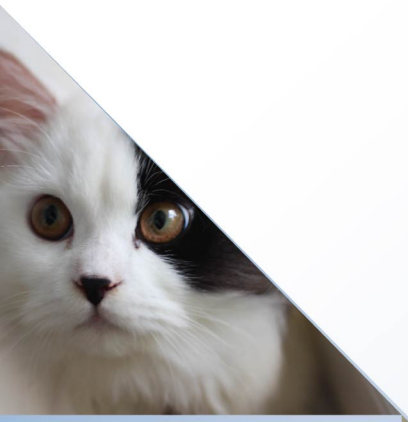
DKSH

Vetz Petz Antinol

2018 Antinol®
Cat Case Study Contest



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The 2018 Antinol® Cat Contest Committees

No.	Committees	University
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3	Assistant Professor Dr.Walasinee Sakcamduang	Veterinary Science Mahidol University
4	Assistant Professor Dr.Kumpanart Sundaravibhata	Veterinary Science Chulalongkorn University
5	Dr.Chaiyot Tanrattana	Veterinary Science Chulalongkorn University
6	Assistant Professor Dr.Tassanee Jaroensong	Veterinary Medicine Kasetsart University

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Pharmalink and Vetz Petz® would like to thank everyone involved with the Antinol® research competition

At Pharmalink and Vetz Petz® we have a passion for Scientific Research and know that only this type of scientific proof is good enough to prove the benefits of ANTINOL® to the Veterinary community and owners alike. We also share the Vets passion for providing the best care for companion animals. This level of care and the credibility that goes with a Veterinarians recommendation cannot be achieved in good conscience if we do not have the participation and co-operation of the scientific community and Veterinarians alike. So we will continue to provide funding for projects that help companion animal owners and their Veterinarians to provide the best care for our beloved companion friends.

We would also like to offer a special thanks to ALL the committee members, Dr. Achinee and DKSH for their hard work organizing and hosting this very and unique event. You have graciously PROVIDED your time and vast experience and for that we thank you VERY much.

This project is the first of its kind for Pharmalink and Vetz Petz® and we are very excited about the research opportunities that have been shown as result of this competition. The future of Antinol® research is very bright and we are very thankful to everyone in loved.

John Dennis Waitzer
Director
Pharmalink International Limited

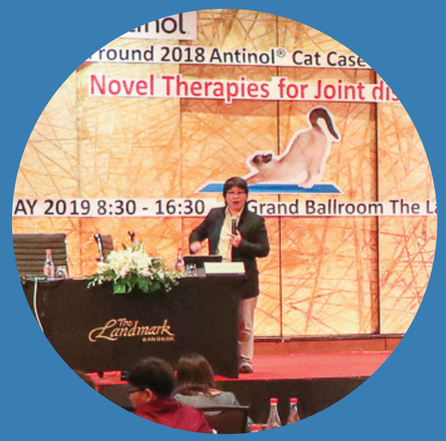
Nathan Mclean
Director
Pharmalink International Limited

Kevin Cook
President
Vetz Petz® group

Antinol® Contest has been organized successfully for 3 years since 2016 in Thailand. The key objective of this scientific contest is to encourage knowledges sharing amongst the Vet practitioners on how to treat the companion animals inflammatory cases safely & effectively by using Antinol® in conjunctive with others medicines especially the NSAIDs (Non Steroidal anti-inflammation drugs) which is the drug of choices of anti-inflammatory problems. However as we know apart from the high efficacy of NSAIDs it also can cause serious side effects such as renal or liver damage if it's used too long or no close monitoring when applied in animals.

Recently we have seen the increasing trend of cats populations adopted as the companions ; Cat is the specie that has quite limited type of anti-inflammatory drug with safely applied. Therefore 2018 Antinol contest would like to promote the Vet practitioners to share their knowledges and experiences of using Antinol® as the drug of choices of anti-inflammatory cases in cats to demonstrate the option of safe and effective treatment which has been very successful applied as the combined therapy from different cases study in this contest resulted Antinol® is become commonly used as the safe choice of anti-inflammation in cats.

Dr. Achinee Runcharoen
DVM
CEO ASIA



University

NO. 1st, POPULAR VOTE Piyathida Ardaum, DVM Napapon Senarat, DVM	**VMX 2020, HUAHIN 2019** NUTRACEUTICAL TREATMENT OF FELINE FHNE AND HIP DYSPLASIA IN AN 8-MONTH OLD CAT
NO. 2nd Pemika Dulyapraphant, DVM	**WVC 2020** CLINICAL EFFECT OF PCSO-524® ON 3 OSTEOARTHRITIC CATS ASSOCIATED WITH CHRONIC KIDNEY DISEASE
NO. 3rd Nuanwan Rujirekasuwan, DVM	**KOREA TRIP 2019** USE OF PCSO-524® FOR CONTROL OF INFLAMMATION CAUSED BY IRIS TUMORAND UVEITISIN CATS WITH LYMPHOMA AND CHRONIC KIDNEY DISEASE

Private Animal Hospital

NO. 1st Mananya Danpitakkul, DVM Pitcha Pornmingmas, DVM Supattra Yongsiri, DVM	**VMX 2020** USE OF PCSO-524® ALONG WITH PHYSICAL THERAPY FOR CONTROLLING PAIN AND INFLAMMATION IN A CAT SUFFERING FROM OSTEOARTHRITIS, CHRONIC KIDNEY DISEASE AND TRIADITIS
NO. 2nd Sopon Sornsanit, DVM	**WVC 2020** USE OF PCSO-524® (ANTINOL®) AND ANTIPRURITIC DRUG FOR TREATMENT OF ITCH CAUSED BY FLEA ALLERGYDERMATITIS (FAD) ANDPSYCHOLOGICAL ALOPECIA IN DOMESTIC SHORT HAIR CAT
NO. 3rd Kanok Bamrungsri, DVM	**KOREA TRIP 2019** PCSO-524® (ANTINOL®) USE IN PERSIAN CAT WITH DYNAMIC HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY (HOCM)

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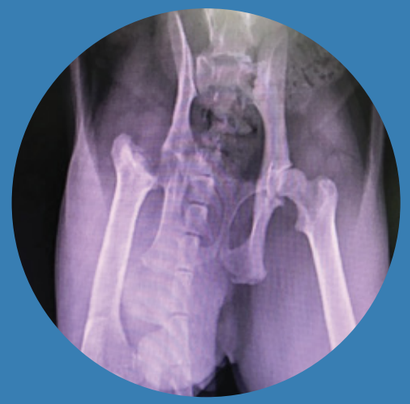

NUTRACEUTICAL TREATMENT OF FELINE FHNE AND HIP DYSPLASIA IN AN 8-MONTH OLD CAT

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Abstract

A Persian male cat named KaoMalt aged 8 months and 20 days and 2.8 kg body weight had a high fall injury that resulted in lameness. It was diagnosed with right hip luxation and left hip injury. While waiting for surgical treatment, the cat was treated with NSAIDs to control pain and inflammation. After the operation on the right femoral head (right FHNE), the cat received antibiotics and NSAIDs for 10 and 3 consecutive days, respectively. Two weeks after the operation, the lameness and pain of the right hip, as observed from palpation, still remained, but the cat began to bear partial weight. PCSO-524® was then prescribed and the gait analysis was performed to measure the angle of joint movement. The monitoring showed increased angle of joint movement and decreased lameness score. This was consistent with the owner report that described less hiding behavior of the cat and improved high jump performance and better quality of life.

Keywords:

Femoral head and neck excision, cat, PCSO-524®, lameness, hip dysplasia

Introduction

Hip luxation is usually caused by traumatic injury, for example, car accident (Andy Moores, 2006). Animals with osteoarthritisor hip dysplasia are also at risk of hip luxation, since the femoral head and acetabulum do not fit well. The unfitted joint results in movement deterioration, chronic pain and inflammation.

Hip luxation is the condition that the femoral head is dislocated from the acetabulum. The common form of dislocation is craniodorsal luxation (Andy Moores, 2006). Treatment of hip luxation includes relocation of the femoral head in the correct position, with or without operation, and closing suture of the joint capsule, stabilization of femoral head and acetabulum using external materials, replace the joint with an artificial joint, and femoral head excision.

Open reduction operation in animals with osteoarthritis or hip dysplasia may not be appropriate. The alternative treatments are replacement with artificial joint or femoral head excision. The femoral head excision is aimed for reducing pain caused by hip trauma. There has been reports of femoral head excision in cats suffering from femoral head and neck fractures, femoral capital physeal fractures, coxofemoralluxations, acetabular fractures and osteoarthritis. Some clinical reports showed satisfactory results, however,dorsal dislocation of the femur after the operation has been found(Fui W Yap, et al., 2015).

The femoral head excision can restore the hip joint movement, of which after the operation, uses muscle surrounding the hip to stabilize the femur. Later the scar tissue is formed between the femoral head and acetabulum, called false joint. Although the physical structure of the false joint is different from the normal joint, it does not cause pain while animals move. In case of significant muscle atrophy or chronic trauma, this surgical technique may not be able to restore the full function of the leg. In this case, physical therapy, medication, and nutraceutical treatment are necessary. Methods for monitoring of symptoms, pain and leg movement are various and can be different in detail between dogs and cats.

Pain assessment in cats with lameness or osteoarthritis is more complicated than in dogs since cats do not express pain as much as dogs. To evaluate pain in cats, the owner can help by observing daily activities of the cat, for example, high jumping ability can be used to assess the lameness score in cats (Fui W Yap, et al., 2015). There are tools to increase accuracy of pain assessment in cats with lameness or osteoarthritis; FMPI questionnaire by NC State University and gait analysis, for example.

There are reports of clinical monitoring that use clinical and radioactive examination and gait analysis in dogs and cats that had femoral head operation. The average time for recovery after the operation was 4-6 weeks in cats and small dogs (W. Off; U. Matis, 2010). Although some cats are able to bear partial weight on the legs after the operation and the owners are satisfied with the results, there may be some pain that still remains. Pain medication is therefore necessary. However, long term use of NSAIDs is not appropriate since they can have adverse effects on kidney and gastrointestinal tract.

Nutraceutical treatment such as essential fatty acid, one of which is the extract from New Zealand Green-lipped mussel, is recommended for treatment of inflammation in cats. The extract is consisting of several essential fatty acids that can reduce intra-articular pain or pain that remains after the operation. It is appropriate for reducing pain and improving quality of life in animals that continuous use of NSAIDs is prohibited

Case history

A Persian male cat named KaoMalt aged 8 months and 20 days and 2.8 kg body weight had a high fall injury during the morning. Later that day, the cat was submitted to the animal hospital at Kasetsart University, Bang Khen campus. The cat refused to walk, had no urination and elimination, was depressed but able to eat.

Examination

Physical examination of the cat showed normal mucous membrane, no sign of dehydration, normal heart and lung sound. Palpation found enlarged urinary bladder, with clear yellow-colored urine when squeezed. Neurological examination did not find any abnormality. Orthopedic examination found that the cat refused to walk, the right hind limb did not bear body weight and showed sign of pain when standing was assisted. Grinding noise was noticed at the right hip and the thumb test indicated that it was not normal. Pain was identified at the left hind limb when the hip was stretched but the leg could bear body weight. The two front legs were normal.

Hematological test

The test done before surgical treatment showed only slightly high white blood cell count. Ten days after the surgery, the blood count was normal.

Table 1. Hematological test results

Parameter	Before surgery 13/11/2018	After surgery 30/11/2018
PCV (%)	34.80	35.80
RBC ($\times 10^6$/cu mm)	8.72	8.87
MCV (fl)	39.91	40.36
MCHC (gm%)	35.63	35.47
MCH	14.22	14.32
WBC ($\times 10^3$/cu mm)	19.70	13.40
SEGS	87	66
LYMPH	8	30
MONO	1	2
EOS	3	0
BASO	1	2
PLATELETS ($\times 10^3$/ul)	337.00	458.00
PROTEIN (gm%)	6.00	7.00
BUN (mg%)	-	19.00
CREATININE	-	0.95
Blood Mor.	normal	normal
Blood Parasite	negative	negative

Radiographic examination

The x-ray examination of the hip showed dislocation of the right hip joint in craniodorsal direction. The left femoral head did not have round shape but fitted in the acetabulum.

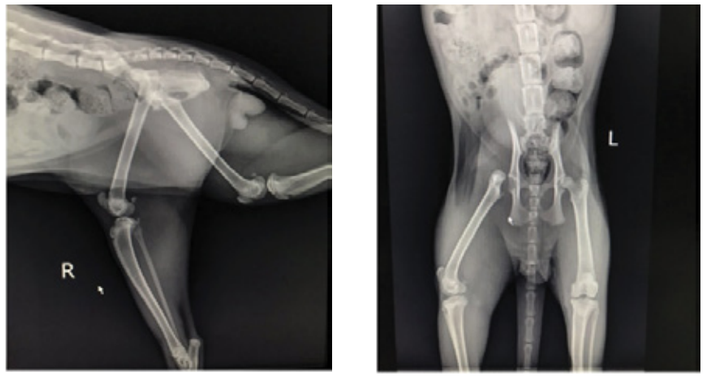

Figure 1. Craniodorsal luxation of the right hip

Treatment and outcome

The cat was treated in the first day of hospital visit with NSAIDs injection (Tolfenamic acid, Tolfedine® 4 mg/kg) for pain and inflammation control. The medication was prescribed for oral administration for another 3 consecutive days. After the treatment, the right leg remained unable to bear weight but the left leg was fine. Surgical treatment, femoral head excision, was then recommended and was performed on day 7 after the injury.

Figure 2. Radiographic image after the surgery

Oral administration of antibiotics (Amoxiclav, Clavamox® 20 mg/kg) for 10 consecutive days and NSAIDs (Tolfenamic acid,Tolfedine® 4 mg/kg) for 3 consecutive days was prescribed after the surgery. Cold pressure was applied 2-3 times per day. The cat roaming was restricted for at least 1 month. The cat returned 10 days after the surgery for monitoring and suture removal. The surgical wound was in good condition. The right leg, which was operated, could bear some weight but the lameness remained at 3/5 score. Grinding sound was not detected from palpation of the right hip. However, the cat showed pain when the right hip was stretched.

Two weeks after the surgery, gait analysis was used to evaluate the weight bearing of the legs. Lameness score 3/5 of the right leg was identified. No grinding sound but slight pain, limited joint movement angle, muscle atrophy, and inability to jump was detected. The movement range of the right hip was 76/148. The weight bearing of the left leg was normal and no signs of pain was shown. Administration of FMPI questionnaire resulted in 63.53% score.

Since transportation of the cat for follow-up and physical therapy was not convenient, oral administration of PCSO-524® 1 capsule per day for 1 month starting 2 weeks after the surgery was prescribed. The follow-up was schedule 2 and 4 weeks after finishing PCSO-524®.

Gait analysis examination and questionnaire administered on the owner 2 weeks after finishing PCSO-524® treatment showed that there was improvement on weight bearing of the operated leg and the cat's daily activities. The second follow-up scheduled 1 month after finishing PCSO-524® treatment found that the weight bearing was slightly improved. The questionnaire administration showed better performance of daily activities. Lameness score of the right hind limb was 2/5 and no grinding sound from the right hip palpation. Lameness score of the left hind limb was 0/5, however, the cat showed some avoidance when left hip was palpated. PCSO-524® 1 capsule per day for 2 weeks was prescribed again. Two weeks later, the lameness score of the right and left leg was 1/5 and 0/5, respectively, and there was no sign of pain during palpation. Movement angle of the hip joint and score from the questionnaire was shown in Table 2.

Table 2. Percentage of weight bearing on 4 legs, questionnaire score, joint movement angle, and the treatment

Date (Weight)	LH	RH	LF	RF	% Questionare	ROM RH	ROM LH	Antinol
6 Dec 2018 (2.76 kg)	39.13% (1.08)	23.19% (0.64)	80.43% (2.22)	79.71% (2.20)	63.53%	76/148	70/150	-
19 Dec 2018 (2.80 kg)	35.36% (0.99)	29.26% (0.82)	81.07% (2.27)	77.5% (2.17)	74.12%	-	-	After 2 weeks administration
15 Feb 2019 (2.9 kg)	31.03% (0.9)	31.71% (0.92)	74.48% (2.16)	72.41% (2.1)	76.47%	-	-	1 month after termination
1 Mar 2019 (2.94 kg)	33% (0.97)	35.03% (1.03)	76.19% (2.24)	79.59% (2.34)	78.82%	70/154	68/154	After 2 weeks administration

Figure 3. Radiographic image 14 weeks after surgery

of weight bearing performance using gait analysis

Conclusion and Discussion

Hip luxation in cats usually caused by injury. The most common hip luxation is the craniodorsal luxation. Clinical signs of hip luxation include hip joint pain, lameness, poor weight bearing, and grinding of the hip joint (Harry W Scott, 2006). Animals with hip dysplasia are at high risk of hip luxation. In this case, the hip luxation was caused by accident, but the cat may be at risk due to prior hip dysplasia as indicated by dysplasia of the left hip. Diagnosis of hip luxation was done by radiographic examination, identification of luxation position, and other assessments, for example, fracture of acetabulum, femoral head and neck, and hip dysplasia (Harry W Scott, 2006).

Conservative treatment of hip luxation can be successful in some cats with pseudoarthrosis but chronic lameness may occur in cats that do not recover within 2 weeks after the occurrence. Close reduction treatment is successful in about 50% of cases, while the other 50% can have recurrence of the incident. When recurrent hip luxation occurs, open reduction or FHNE is necessary. The prognosis of the surgery is good if done as soon as possible after the injury. Osteoarthritis is a possible complication after the surgery since the joint surface is disturbed from the injury or the surgery (Harry W Scott, 2006). FHNE surgery is recommended when there is recurrence of hip luxation, fracture of acetabulum, fracture of femoral head and neck, and hip dysplasia. It can be used as treatment of choice for hip luxation in cats. Prognosis after the surgery is good in cats. Most cats can recover and walk within 5 weeks after the surgery and can resume normal hip function within 5 months after the surgery (Harry W Scott, 2006).

The right hip luxation in this case was caused by injury in an accident. Pain of the left hip was detected. Surgical treatment was performed at 1 week after the luxation on the right femoral head. NSAIDs and cold pressure for pain control was applied by the owner at homeduring 3 days after the surgery. Monitoring at 10-14 days after the surgery found lameness, limited movement angle of the hip joint, muscle atrophy, refusing to jump, and less interaction with the owner. Nutraceutical treatment using PSCO-524® consecutively was then prescribed with the termination of NSAIDs and other physical therapy due to inconvenience of transportation. The follow-up showed promising response and improved performance and quality of life. The tools for monitoring included gait analysis, joint movement angle assessment, and administration of questionnaire for the owner. By the end of 2 week-administration of PSCO-524® alone, the cat had improved weight bearing and leg function. This was consistent with the owner report that the cat performed better daily activities such as high jumping, more energetic and playful.

Most of the cats that receive femoral head and neck excision show improved clinical signs in the long term, depending on the severity of the injury prior to the surgery. Complications after the surgery include alteration of movement angle of the joint, of which the most common is increased angle of hip stretching and slightly reduced leg length. The complications can lead to joint degeneration which requires regular monitoring after the surgery. The monitoring of this case found deterioration of the left hip from gait analysis assessment. The left hind limb showed less weight bearing when compared to the right hind limb at the 14th week after surgery when the right leg showed improved weight bearing after administration of oral medication. When the cat returned from 1 month of loss to follow-up, the left leg showed less weight bearing starting from the 12th week after surgery. When oral medication was administered for 2 weeks, the weight bearing of the left leg was improved, however still not as good as the right leg.

Treatment of hip dysplasia in cats using administration of non-steroidal anti-inflammatory drugs (NSAIDs) is not appropriate for long-term treatment due to adverse effects on kidney and gastrointestinal tract. Kidney disease is common in senile cats with osteoarthritis, therefore NSAIDs must be avoided in these cats. Nutraceutical substances used for medication usually consist of essential fatty acid, especially omega-3, which has anti-inflammatory effect (Zawadzki M, 2013). The cat in this case received oral PCSO-524®, of which omega-3 is the main active ingredient, resulting in improved body movement and quality of life. The cat also showed improvement of high jump performance. This is consistent with a study of omega-3 fatty acid efficacy in osteoarthritic dogs that reported better movement and increased blood omega-3 and decreased blood omega-6 in dogs fed high omega-3 diet (James K, 2010).

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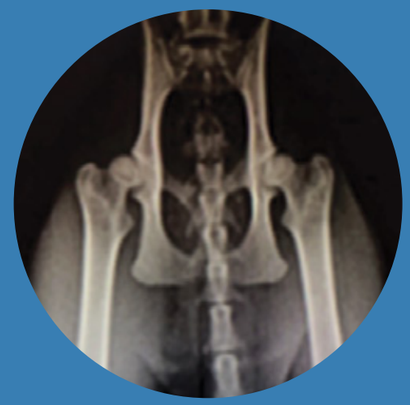

CLINICAL EFFECT OF PCSO-524® ON 3 OSTEOARTHRITIC CATS ASSOCIATED WITH CHRONIC KIDNEY DISEASE

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Abstract

Three cats suffering from chronic kidney disease were admitted to animal hospital. The first cat showed sudden onset of right hindlimb pain without apparent cause. Bladder stone was found in the second cat while the third cat was admitted for nursing care. Caging was applied and fluid therapy were administered for the third cat. All 3 cats had never been diagnosed with arthritis prior to the admission. X-ray examination showed symptoms of arthritis at hip and stifle joints. PCSO-524® was then administered daily for 60 days. Pain evaluation using Feline Musculoskeletal Pain Index (FMPI), which is a reliable and effective method for pain evaluation in cats (Benito et al., 2013), showed that, after the treatment, chronic pain was decreased in all of the cats (Appendix 1). The cats' behavior was nearly normal compared with the behavior before the treatment. Interaction between the cats and owners was improved as well. By the end of the experiment, UP/C ratio was not altered and blood creatinine tended to decrease.

Keywords

Cats, Chronic kidney disease, Osteoarthritis, PCSO-524®

Introduction

Feline arthritis is often overlooked because cats tend to hide their pain due to their defensive instinct. This makes it difficult for the owners and attending veterinarians to observe clinical signs of diseases. During the past 10 years, study of feline arthritis has been more common. High prevalence was reported in feline population (Lascelles et al., 2010, Drensler, 2013, Tomas et al., 2015, Rodan, 2016). One of random studies conducted in cats of various ages found that 91% of cats were affected with arthritis as identified by radiographic examination. The disease can start since 6 months of age and the severity is increased over time (Lascelles et al, 2008).

Arthritis can cause chronic pain in cats similarly to what occurs in humans. The pain leads to peripheral and central sensitization of the nervous system,and eventually results in alteration of usual behavior. FMPI is a reliable and effective method for chronic pain evaluation in cats (Benito et al., 2013). Evaluation of behavior in daily life is included in the system in order to assess the pain and consequently prescribe appropriate pain control medication.

NSAIDs and long-term pain medication are usually drugs of choice for treatment of pain caused by either central or peripheral sensitization. Although NSAIDs are effective for controlling inflammation and pain, cats are at risk of the adverse effect. One of the most common adverse effects is renal disorder (Marcum and Hanlon, 2010). Therefore, restriction of NSAIDs use is concerned in patients with kidney disease. Arthritis may occur in as high as 44% of cats with chronic kidney disease, especially in senile cats (Lascelles et al., 2008).

Nutraceutical is one of alternative medicines to manage pain caused by arthritis (Ameye and Chee, 2006, Akhtar and Haqqi, 2012, Loseli et al., 2015). It is considered an appropriate choice when the effects of long-term use of NSAIDs need to be avoided (Akhtar and Haqqi, 2012). PCSO-524® (Antinol®, DKSH, Thailand), extracted from Green-lipped New Zealand mussel, was used in this study to observe improvement of clinical changes and quality of life in cats affected by arthritis and chronic kidney disease. There are several previous studies that also use PCSO-524 but the studies were conducted in dogs for observation of clinical changes and owner satisfaction (Mongkon and Soontornvipart, 2012, Soontornvipart et al., 2015, Kwananocha et al., 2016). There is no study of PCSO-524 that is related to this problem in cats to the present.

Patient History

Three cats were diagnosed with Chronic Kidney Disease (CKD). The first cat was a male, 4 years old Scottish fold with CKD that showed sudden onset of right hind leg pain without known cause. The cat was then submitted to surgical ward for further examination.

The second case was a female, 11 years old domestic shorthair cat that suffered from CKD for a long time without any complications. Prior to this admission, the cat was treated with PCSO-524® for one month in April and loss to follow-up until September. The cat returned due to increased creatinine and blood urea nitrogen, intermittent urination and bladder stone. Feline lower urinary tract disease; FLUTD, was diagnosed. The cat was submitted to surgical ward for cystectomy.

The third cat was a female 5 years old domestic shorthair cat also suffered from CKD without any complications. It was admitted for nursing care in a private animal hospital. Most of its activities were inside a cage, except for relaxation time outside the cage twice a day, half an hour each time.

Table 1. History of feline patients

	1st Cat	2nd Cat	3rd Cat
Age	4 years	11 years	5 years
Gender	Male	Female	Female
Breed	Scottish fold	DSH	DSH
Underlying disease	CKD stage 2	CKD stage 2	CKD stage 2
BCS	3.5/5	3.5/5	1.5/5
CC	Lameness	CKD (follow up)	CKD (follow up)

The three cats were monitored closely and followed-up for azotaemia and urinalysis. The cats were categorized as IRIS stage 2 (Figure 1). Diet specially formulated for cats with kidney disease and treatment for dehydration were given as appropriate.

Figure 1. IRIS staging of CKD (Source: International renal interest society http://www.iris-kidney.com/pdf/IRIS_2017_Staging_of_CKD_09May18.pdf)

Stage	Blood creatinine µmol/l mg/dl		Comments
	Dogs	Cats	
At risk	<125 <1.4	<140 <1.6	History suggests the animal is at increased risk of developing CKD in the future because of a number of factors (such as, exposure to nephrotoxic drugs, breed, high prevalence of infectious disease in the area, or old age).
1	<125 <1.4	<140 <1.6	Nonazotemic. Some other renal abnormality present (such as, inadequate urinary concentrating ability without identifiable nonrenal cause, abnormal renal palpation or renal imaging findings, proteinuria of renal origin, abnormal renal biopsy results, increasing blood creatinine concentrations in samples collected serially).
2	125 – 180 1.4 – 2.0	140 – 250 1.6 – 2.8	Mild renal azotemia (lower end of the range lies within reference ranges for many laboratories, but the insensitivity of creatinine concentration as a screening test means that animals with creatinine values close to the upper reference limit often have excretory failure). Clinical signs usually mild or absent.
3	181 – 440 2.1 – 5.0	251 – 440 2.9 – 5.0	Moderate renal azotemia. Many extrarenal signs may be present, but their extent and severity may vary. If signs are absent, the case could be considered as early Stage 3, while presence of many or marked systemic signs might justify classification as late Stage 3.
4	>440 >5.0	>440 >5.0	Increasing risk of systemic clinical signs and uraemic crises

All of the cats had never been diagnosed with arthritis. During the past 3 months, they had not been treated with PCSO-524®, NSAIDs, calcium antagonist, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB), any type of steroidal drugs, antibiotics, beta blockers, or omega-3 supplementation.

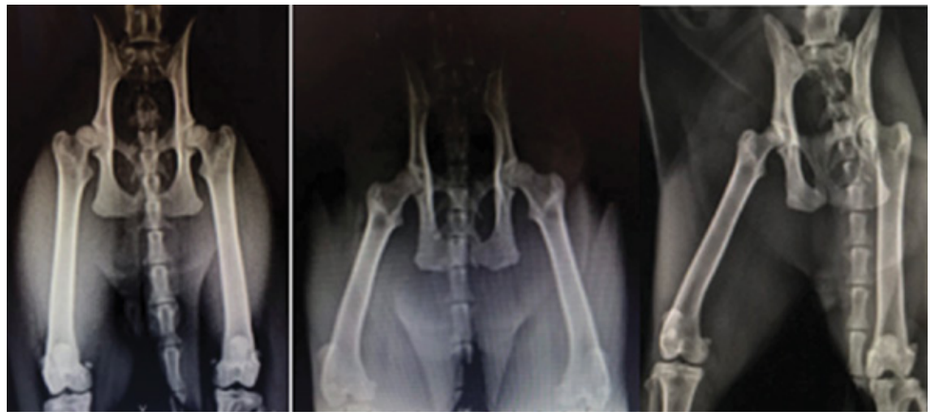
Physical examination and diagnosis plan

Table 2. Physical examination results

Day 0	1st Cat	2nd Cat	3rd Cat
X-rays	OA at both hip and stifle joints		
Lameness score	2/5	0/5	0/5
Range of Motion (ROM)	-	55-105 (hip)	55-105 (hip)
		45-110 (stifle)	45-110 (stifle)
Quadriceps circumference measurement	16 cm	15 cm	11cm
Hydration status	Well hydrated	<5% dehydrated	5-7% dehydrated
Blood creatinine (mg/dl)	2.5	2.6	2.8
Blood urea nitrogen	72	73	72
RBC ($x10^6$)	6.5	5.6	5.3
HCT (%)	32	25	22
Urine specific gravity	1.009	1.007	1.01
UP/C ratio	< 0.2	< 0.2	< 0.2
Urine sediment	Inactive sediments	Inactive sediments	Inactive sediments
Blood pressure (mmHg)	< 180	< 180	< 180

None of the cats showed any symptoms of disorder during the physical and orthopaedic examination, except the first cat that showed sign of lameness. After the consent was permitted by the owner, the cats were examined with X–ray imaging and all of them were diagnosed with arthritis at the hip and stifle joints.

Figure 1. X-ray image on day 0 of the first, second, and third cat, respectively



Limitation of NSAIDs use due to chronic kidney disease in all of the cats and senility in one cat was concerned. Continuous administration of PCSO-524® was prescribed as a substitute of NSAIDs for inflammation control. Follow-up was scheduled every 2 weeks. After the cats were familiarized with environments in the examination room, lameness score was evaluated according to criteria from Impellizeri, et al., 2000 (Table 3).

Table 3. Lameness scoring criteria (Impellizeri et al, 2000)

Lameness score	Walking	Running
0	Without lameness	Without lameness
1	Subtle lameness	Without lameness
2	Obvious lameness	Without lameness
3	Difficult walking	Lameness can be detected
4	Non-weight bearing	Lameness can be detected
5	Non-weight bearing	Non-weight bearing

Pain score was recorded using Colorado State University Feline Acute Pain Scale (CSU-FAPS) (Appendix 2) and Glasgow Feline CompositeMeasure PainScale (CMPS-Feline) (Appendix 3). The movement was video recorded when the cats jumped from 40 and 80 centimetres height (Jump test). The only evaluation done by the owner was evaluation of chronic pain using FMPI, except for the first evaluation that the attending veterinarian and the owner perform the evaluation together. The owners were assigned to be the same person every time the pain evaluation was performed in each cat.

Treatment plan

One capsule of PCSO-524® was administered daily for 60 days. Monitoring during the treatment on day 0, 14, 28, 42, and 60 included the followings;

- Blood profile consisting of creatinine and blood ureanitrogen
- Urinalysis
- Lameness score
- Jump test
- Blood pressure measurement

The monitor was done for the followings on day 0 and 60 during the treatment of PCSO-524;

- X-ray
- Range of motion (hip and stifle joints)
- Quadriceps circumference measurement
- Pain score assessment

Results

The monitoring in 3 cats (Appendix 4, 5, and 6) from day 0 to day 60 did not find any progression of arthritis as examined by radiographic image.

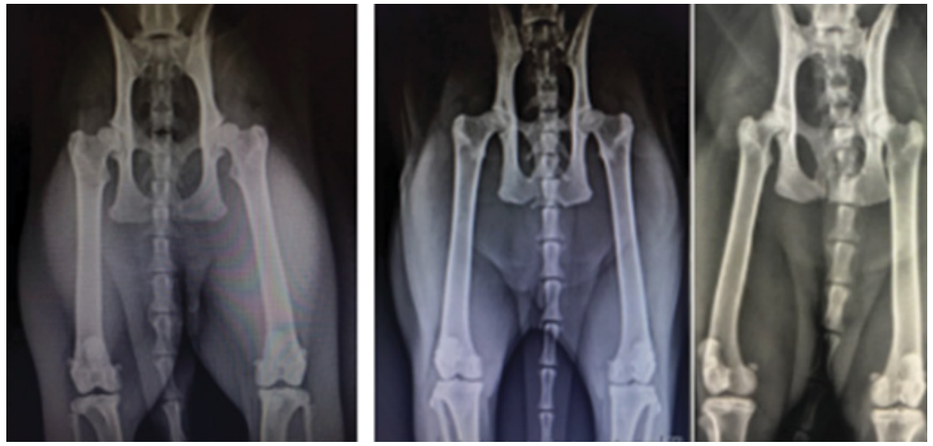


Figure 2. X-ray image in the first, second and third cat on day 60, respectively

On day 60 after starting daily treatment of PCSO-524®, blood profile and urinalysis, respectively, showed that creatinine was decreasing and UP/C remained normal throughout the treatment. The first cat showed improvement of lameness score after day 28. The jump test results in all cats were improved as compared with the performance prior to the treatment. Quadriceps circumference and range of motion of hip and stifle joint did not change.

Table 4. Pain score on day 0 and day 60

Day	Measurement	1st Cat	2nd Cat	3rd Cat
Day 0	CSU-FAPS	2	1	0
	CMPS-Feline	12	3	4
	FMPI	28	28	11
Day 60	CSU-FAPS	1	0	0
	CMPS-Feline	6	2	2
	FMPI	9	7	10

The data showed that pain scores as measured by 3 systems were decreased, especially the FMPI score, which indicated chronic pain. The owners of the 3 cats reported that the cats were more active and less aggressive, and the high jump performance the interaction with owners were also improved.

Discussion

All the 3 cats had never been diagnosed with arthritis and the owners also had never observed any sign of pain in the cats. This may due to the fact that cats tend to hide their pain, resulting in difficulty for clinical detection. Observation of changes in daily activity is crucial for the detection, for example, less playful, poor high jump, less grooming, and changes of litter box behavior (Bennett and Morton, 2009, Lascelles and Robertson, 2010). The FMPI is also useful for detection of chronic pain (Benito et al., 2013). In this study, daily treatment of PCSO-524® for 60 consecutive days was prescribed and the positive clinical outcome was observed in all of the cats.

Since arthritis and chronic kidney disease cause constant mild inflammation and PCSO-524® is effective for systematic control of inflammation, the cats showed recovery of normal activities. The owners were additionally educated for the adjustment and enrichment of environments for the cats during the study period. The owner of the second cat reported that after 1 month of the beginning of treatment, the cat's behavior changed from lethargy to performing low jump more often. However, the treatment was paused due to the owner's decision and the cat's performance remained unimproved. Later the cat showed signs of lower urinary tract infection and bladder stone was found and the cat was subsequently operated. After the operation, approximately 6 months of PCSO-524® discontinuation, PCSO-524® treatment was resumed again. The response was excellent as the cat showed increased appetite, less aggression, and performed higher jump.

Arthritis is a developmental disease so it is possible that central sensitization mechanism is stimulated. Long-term use of serotonin and norepinephrine re-uptake inhibitors or NMDA antagonists can be considered for reduction of neuropathic pain (Woolf, 2011, Nijs et al., 2014)

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Appendix 1

Feline musculoskeletal pain index (FMPI) from North Carolina State University
Source:https://journals.plos.org/plosone/article/file?type=supplementary&id=info:doi/10.1371/journal.pone.0131839.s001

NAME: DATE:

FELINE MUSCULOSKELETAL PAIN INDEX

Please take some time to complete the following questions.

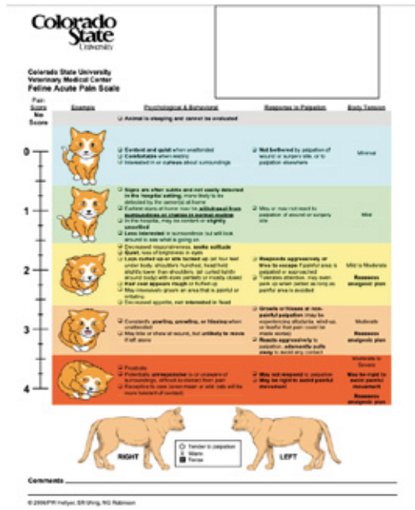
Please mark the circle that best describes your cat's ability to perform the following activities.

	Normal	Not quite normal	Somewhat worse than normal	Barely, or with great effort	Not at all	Don't know or not applicable
1. Walk and/or move easily?	○	○	○	○	○	○
2. Run?	○	○	○	○	○	○
3. Jump up (how well and how easily)?	○	○	○	○	○	○
4. Jump up to kitchen-counter height in one try?	○	○	○	○	○	○
5. Jump down (how well and how easily)?	○	○	○	○	○	○
6. Climb up stairs or steps?	○	○	○	○	○	○
7. Go down stairs or steps?	○	○	○	○	○	○
8. Play with toys and/or chase objects?	○	○	○	○	○	○
9. Play and interact with other pets?	○	○	○	○	○	○
10. Get up from a resting position?	○	○	○	○	○	○
11. Lie and/or sit down?	○	○	○	○	○	○
12. Stretch?	○	○	○	○	○	○
13. Groom himself or herself?	○	○	○	○	○	○
14. Interact with you and family members?	○	○	○	○	○	○
15. Tolerate being touched and/or held?	○	○	○	○	○	○
16. Eat?	○	○	○	○	○	○
17. Use the litter box (get in and out, squat, cover waste?	○	○	○	○	○	○

Appendix 2

Colorado State University Feline Acute Pain Scale (CSU-FAPS)

Source:
http://www.vasg.org/pdfs/CSU_Acute_Pain_Scale_Kitten.pdf



Appendix 3

Glasgow Feline Composite Measure PainScale (CMPS-Feline)
Source: http://www.aprvt.com/uploads/5/3/0/5/5305564/cmp_feline_eng.pdf

Glasgow Feline Composite Measure Pain Scale: CMPS - Feline

Choose the most appropriate expression from each section and total the scores to calculate the pain score for the cat. If more than one expression applies choose the higher score

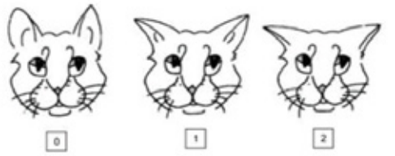
LOOK AT THE CAT IN ITS CAGE:

Is it?
Question 1
- Silent / purring / meowing 0
- Crying/growling / groaning 1

Question 2
- Relaxed 0
- Licking lips 1
- Restless/cowering at back of cage 2
- Tense/crouched 3
- Rigid/hunched 4

Question 3
- Ignoring any wound or painful area 0
- Attention to wound 1

Question 4
a) Look at the following caricatures. Circle the drawing which best depicts the cat's ear position?



b) Look at the shape of the muzzle in the following caricatures. Circle the drawing which appears most like that of the cat?

APPROACH THE CAGE, CALL THE CAT BY NAME & STROKE ALONG ITS BACK FROM HEAD TO TAIL

Question 5
Does it?
- Respond to stroking 0

Is it?
- Unresponsive 1
- Aggressive 2

IF IT HAS A WOUND OR PAINFUL AREA, APPLY GENTLE PRESSURE 5 CM AROUND THE SITE. IN THE ABSENCE OF ANY PAINFUL AREA APPLY SIMILAR PRESSURE AROUND THE HIND LEG ABOVE THE KNEE

Question 6
Does it?
- Do nothing 0
- Swish tail/flatten ears 1
- Cry/hiss 2
- Growl 3
- Bite/lash out 4

Question 7
General impression
Is the cat?
- Happy and content 0
- Disinterested/quiet 1
- Anxious/fearful 2
- Dull 3
- Depressed/grumpy 4

Pain Score ... /20

Appendix 4

Results of examination in the first cat

	Blood work				UA		
	Blood Creatinine (mg/dl)	Bun	RBC ($x10^6$)	HCT (%)	SG	UP/C	Sediment
Day 14	2.6	67	6.6	34	1.009	<0.2	Inactive
Day 28	2.3	48	6.5	36	1.01	<0.2	Inactive
Day 42	2.2	31	6.4	36	1.01	<0.2	Inactive
Day 60	2	42	6.4	35	1.01	<0.2	Inactive

	Lameness score	Blood pressure measurement (mmHg)	Quadriceps Circumference		Range of motion	
			left	right	Hip	Stifle
Day 14	2	< 180				
Day 28	2	< 180				
Day 42	1	< 180				
Day 60	1	< 180	17	17	x	x

Jump test

At 40 cm.	1	2	3	4	5
	not willing to jump	strong hesitation (take time and climbing)	hesitation (climbing)	mild hesitation (take time to look around)	Jumping without doubt
Day 0		2			
Day 14			3		
Day 28			3		
Day 42				4	
Day 60					5

At 80 cm.	1	2	3	4	5
	not willing to jump	strong hesitation (use steps or chair to help jumping)	hesitation (climbing> 2steps)	mild hesitation (climbing< 2steps)	Jumping without doubt
Day 0			3		
Day 14			3		
Day 28			3		
Day 42				4	
Day 60				4	

Appendix 5

Results of examination in the second cat

	Blood work				UA		
	Blood Creatinine (mg/dl)	Bun	RBC ($x10^6$)	HCT (%)	SG	UP/C	Sediment
Day 14	2.7	62	5.5	26	1.009	<0.2	Inactive
Day 28	2.2	44	4.8	23	1.008	<0.2	Inactive
Day 42	2.2	31	4.7	24	1.008	<0.2	Inactive
Day 60	1.9	32	4.8	24	1.009	<0.2	Inactive

	Lameness score	Blood pressure measurement (mmHg)	Quadriceps Circumference		Range of motion	
			left	right	Hip	Stifle
Day 14	0	< 180				
Day 28	0	< 180				
Day 42	0	< 180				
Day 60	0	< 180	17	17	55-110	45-110

Jump test

At 40 cm.	1	2	3	4	5
	not willing to jump	strong hesitation (take time and climbing)	hesitation (climbing)	mild hesitation (take time to look around)	Jumping without doubt
Day 0			3		
Day 14			3		
Day 28				4	
Day 42					5
Day 60					5

At 80 cm.	1	2	3	4	5
	not willing to jump	strong hesitation (use steps or chair to help jumping)	hesitation (climbing> 2steps)	mild hesitation (climbing< 2steps)	Jumping without doubt
Day 0			3		
Day 14			3		
Day 28				4	
Day 42				4	
Day 60				4	

Appendix 6

Results of examination in the third cat

	Blood work				UA		
	Blood Creatinine (mg/dl)	Bun	RBC ($x10^6$)	HCT (%)	SG	UP/C	Sediment
Day 14	2.3	67	5.1	25	1.009	<0.2	Inactive
Day 28	1.8	48	5.1	22	1.009	<0.2	Inactive
Day 42	1.6	31	3.5	20	1.009	<0.2	Inactive
Day 60	1.2	42	3.8	20	1.01	<0.2	Inactive

	Lameness score	Blood pressure measurement (mmHg)	Quadriceps Circumference		Range of motion	
			left	right	Hip	Stifle
Day 14	0	< 180				
Day 28	0	< 180				
Day 42	0	< 180				
Day 60	0	< 180	11	11	55-110	45-110

Jump test

At 40 cm.	1	2	3	4	5
	not willing to jump	strong hesitation (take time and climbing)	hesitation (climbing)	mild hesitation (take time to look around)	Jumping without doubt
Day 0		2			
Day 14			3		
Day 28			3		
Day 42				4	
Day 60					5

At 80 cm.	1	2	3	4	5
	not willing to jump	strong hesitation (use steps or chair to help jumping)	hesitation (climbing> 2steps)	mild hesitation (climbing< 2steps)	Jumping without doubt
Day 0			3		
Day 14			3		
Day 28			3		
Day 42				4	
Day 60				4	

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03

USE OF PCSO-524® FOR CONTROL OF INFLAMMATION CAUSED BY IRIS TUMORAND UVEITIS IN CATS WITH LYMPHOMA AND CHRONIC KIDNEY DISEASE

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Abstract

A neutered male Domestic Shorthair cat aged 8 years was infected with FIV and diagnosed with nasal submucosa-T-cell lymphoma that was positive to CD3. After the chemotherapy, the cat showed improvement of respiration. However, azotemia and leukopenia were detected, so the therapy was discontinued after the second session. Leukopenia and high creatinine were treated until the normal conditions were resumed. Four months later, tumor of iris and uveitis were found in the left eye. Treatment of inflammation of the left eye included prednisolone acetate 1% eye drop (Inf-oph® 1 %, Seng Thai company; Thailand) qid, doxycycline (Siadocin®, Siam Bheasach; Thailand) PO at the dose 10 mg/kg/day, prednisolone (Prednisolone GPO; Thailand) PO0.36 mg/kg bid. Two weeks later, the size of tumor remained constant, the inflammation degree was reduced but creatinine level was increased. Administration of oral prednisolone, not the eye drop, was then terminated. Uveitis of the right eye was diagnosed and also fibrin in the anterior chamber and tumor of the iris were found in the right eye. Prednisolone acetate 1% eye drop was prescribed for both eyes. The inflammation of both eyes still existed after 1 month of the prednisolone treatment. Green Lipped mussel extract, PCSO-524®(VetzPetzAntinol®, DKSH, Thailand), 1 capsule per day was then prescribed as an alternative of steroidal medication for control of inflammation, together with the prednisolone acetate 1 % eye drop in both eyes. After 30 days of the start of PCSO-524® treatment, the tumor of iris disappeared and the severity of uveitis was reduced in both eyes.

Keywords:

Cat, uveitis, lymphoma, azotemia, PCSO-524®

Introduction

Uveitis is an inflammation of iris, ciliary body or choroid. Approximately 70% of uveitis in cats is caused by bacterial infection, such as Bartonella spp., viral infection, such as FIP, FIV, and FeLV, protozoa infection, such as Toxoplasma gondii, fungal infection, such as Cyptococcus, Blastomyes, Aspergillus and Histoplasmosis. Other causes include inflammation of lens, corneal laceration, traumatic, neoplastic causes, etc.(1). Uveitis may result in pain, blepharospasm, photophobia, aqueous flare,swollen or dull appearance of the iris and inflammation, keratic precipitates, hypopyon, and hyphema .Uveitis consequently leads to loss of vision, glaucoma, cataract, and retinal detachment or degeneration (2).

Diagnostic examination of uveitis usually consists of physical and ophthalmological examination, history taking, assessment of anterior chamber, intraocular pressure measurement, and examination of the retina. Collection of aqueous humor using anterior centesis for cytological and PCR examination can be done for evaluation of uveitis (3, 6).

Metastasis of lymphoma to the eyes is common. When uveitis is found under this condition, chemotherapy in concurrent with systemic anti-inflammatory drugs andadministration of eye drop such as corticosteroid or non-steroids, and prevention undesirable sequelae such as synechiae formation, secondary glaucoma with mydritic and cycloplegics drugs and antiglaucoma drugs (3).

This case report focuses on the effect of using anti-inflammatory eye drop and PCSO-524® (VetzPetzAntinol®, DKSH, Thailand) concurrently. PCSO-524® is Green-lipped mussel extract that contains essential fatty acid of which the main ingredient is omega-3, substance that is effective against inflammation (4). It was found in this study that PCSO-524® was able to reduce the severity of inflammation of the anterior chamber while systemic corticosteroid or non-steroid medication was omitted. The treatment had no adverse effects on the cat's well-being in general.

Case history

A neutered male Domestic Shorthair cat aged 8 years and weighed 3.4 kg was infected with FIV andalso diagnosed with chronic rhinitis. Tumor was found at the left nasal pharynx. Pathological examination found nasal submucosa-T-cell lymphoma that was positive toCD3. Chemotherapy, consisting of vincristine, cyclophosphamide (COP) and prednisolone, was administered weekly for 2 weeks. After the treatment, leukopenia and azotemia were detected and then treated at the animal hospital, Faculty of Veterinary Medicine, Bang Khen campus. It took 4 months of treatment until the white blood cell count and creatinine resumed normal level. During the treatment, the cat showed sign of depression and loss of appetite, but no nasal discharge. The cat developed disorders of left anterior chamber including iris edema and uveitis and then was submitted to eye department of the animal hospital at the Faculty of Veterinary Medicine, Bang Khen campus.

Physical examination

Physical examination found normal respiration, no nasal discharge, normal lung and heart sound, no enlargement of lymph node, loss of appetite and depression, body condition score 2.5/5, narrow left eye, tumor of left iris, fibrin in left anterior chamber, and normal right eye.

Diagnosis plan and results

Table 1. Hematological test results

Hematology	Treatment time						
	Day 0	2 weeks	2 months	3 months	4 months	5 months	Normal range
HGB	5.71	6.05	9.6	9.83	10.9	9.62	10-15 gm%
PCV	17.7	18.7	30.3	31.2	32.7	30	30-45%
RBC	4.4	4.59	9.66	10.4	11.5	10.3	5- 10 $x10^6/mm^3$
WBC	5.37	6.4	7.0	4.99	4.24	4.72	5.5-19.5 $x10^3/mm^3$
SEGS	95	81	78	76	NA	74	45-64%
LYMPH	4	10	10	15	NA	22	1.5- 7.0%
MONO	1	6	9	4	NA	3	0-5%
EOS		3	3	5	NA	1.0	0-4%
PLATELETS	141	210	1491	440	600	480	300-800 $x10^3/ul$
PROTEIN	7.0	7.4	7	7.4	7.2	6.4	6-7.5 gm%
BUN	33	43	45	55	48	66	15-34 mg%
CREATINE	1.99	2.61	2.55	3.03	3.16	4.26	1.0-2.2 mg%
ALT			24	27	3.4		28-76 IU/L
TP				7.4			5.8-7.8 gm%
ALBUMIN		3.2	3.2	3.4	3.4		2.6-4.2 gm%
PHOS	3.8	6.0	4.8	5.6	6.3	5.1	2.5-5.0 mg%
RETICS		0.0					1-5 %

NA: Not available

Table 2. Results of eye examination

Parameter	Day 0		2 weeks		1 month		2 month		3 month		4 month		5 month	
	OD	OS	OD	OS	OD	OS	OD	OS	OD	OS	OD	OS	OD	OS
IOP (mmHg)	16	9	17	18	13	10	13	12	12	14	13	13	16	16
Fluorescein	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Menace	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Dazzle	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PLR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Aqueous flare	-	++	-	+	-	+	+	+	++	++	++	+	-	-
Fibrin	-	++	-	-	-	-	-	-	++	-	++	-	+	-
Iris mass	-	++	-	++	-	++	-	+	++	-	++	-	-	-
Rubeosis iridis	-	+	-	+	-	+	+	+	++	+	+	+	-	-
Keratic precipitate	-	-	-	-	-	-	-	-	++	+	+	+	+	-
Fundus	N	N	N	N	N	N	N	N	N	N	N	N	N	N

OD: right eye, OS: left eye, IOP: intraocular pressure, PLR:pupillary light reflex, Fibrin: fibrin in anterior chamber, N: normal

Treatment and outcome

The eye examination found normal right eye and that the left eye was narrow and showed tumor of the iris, aqueous flare, low ocular pressure and anterior uveitis (Table 2). Ultrasonic image identified tumor of left iris (Figure 1). Anterior centesis of the left eye was not performed since the owner did not allow anesthesia. The owner decided to discontinue the chemotherapy, therefore, supportive therapy was recommended. The treatment of left eye included prednisolone acetate 1% eye drop qid, doxycycline PO at the dose 10mg/kg/day, prednisolone PO dose 0.36 mg/kg bid, immune enhancer (Immuplex Bgold®) ½ tab/day, feline interferon omega (Virbagen® omega). 10^4 U sid, hematonic (Ferric plus-K®) 1.5ml/day. Treatment for azotemia consisted of subcutaneous administration of electrolyte 150-200 ml/day and erythropoietin injection every other day. The monitoring during the following 2 weeks found edema of iris but no fibrin in the anterior chamber. The owner made a request that only the eye could be treated and the monthly monitoring was scheduled. One month later, it was found that the size of left eye tumor was decreased but the degree of uveitis of the right eye was more severe. Prednisolone acetate 1% eye drop was used bid. Three months later, uveitis, fibrin in the anterior and corneal ulcer were detected in the right eye (Figure 3).

So the eye drop was discontinued and replaced with doxycycline 10 mg/kg sid, oxytetracycline hydrochloride ointment (Terramycin®) tid, and artificial tear (Hialid®0.1%) qid for 1 week. After the treatment, the corneal ulcer was resolved but the iris edema and fibrin in the anterior chamber of the left eye still remained, in addition to the occurrence of mild keratic precipitates (figure 4). Prednisolone acetate 1% eye drop was administered qid to the right eye, and bid in the left eye. Oral administration of PCSO-524®1 capsule per day for 1 month was prescribed for systemic treatment of inflammation. The follow-up monitoring did not find tumor of the right iris and inflammation of the left iris but keratic precipitates of the right eye persisted (Figure 5). The cat was loss to follow-up since then.

Discussion

Uveitis in cat caused by metastatic intraocular tumor or intraocular tumor usually shows symptoms of iris hyperpigmentation, intraocular fibrin exudation and hemorrhage (5). The diagnosis can be obtained by anterior centesis of the aqueous humor for cytological or PCR examination. The etiology of uveitis is not limited to the eye problems but can be disorders of the other systems (6). Since the anesthesia was not permitted, the sample collection for diagnosis was not performed. The most common metastatic intraocular tumor in dogs and cats is lymphoma and the most common intraocular tumor is melanoma (7). Uveitis caused by lymphoma usually occurs as anterior uveitis with subacute inflammation, hypopyon or hyphema, aqueous flare, iridal thickening, iridal nodules, rubeosis iridis, and iris bombe that may lead to secondary glaucoma (1).

Uveitis treatment requires elimination of the cause, for example, chemotherapy of the lymphoma and radiotherapy of the nasal lymphoma. Regular hematological test must be scheduled during the therapy for evaluation of the treatment outcome and the uveitis treatment is needed concurrently (8). Control of inflammation can be done by administration of eye drops that are corticosteroid or nonsteroid anti-inflammatory drugs. The corticosteroid drugs are usually more effective thannonsteroidal anti-inflammatory drugs. Systemic anti-inflammatory medication is also necessary for control of pain and inflammation with using eye drop for anti-inflammation (3). Iris synechia that may lead to secondary glaucoma can be prevented by using pupillary dilation medication.

Since the cat was also having kidney failure, systemic anti-inflammatory drug was not prescribed. Anti-inflammatory drugs, either corticosteroid or nonsteroid agents can prohibit the function of cyclooxygenase (COX), the enzyme that maintains electrolyte and pH balance, blood circulation through kidney, and glomerular filtration for sodium and water at the kidney. Anti-inflammatory drugs therefore can be harmful for the kidney in this case. PCSO-524® contains essential fatty acid consisting of omega-3 that is effective for inflammation control by inhibiting COX and lipoxygenase (LOX) mechanism. It is reported that the extract can prohibit the migration of neutrophils and relieve pain and edema in chronic hip dysplasia animals and can be used for long-term treatment without side effects (9). PCSO-524® consists of ETA, EPA, and DHA, which are known to have anti-inflammatory, gastroprotective, antihistamine, antioxidant, anticytokines and antiarthritis effects (10, 11). Daily single dose of PCSO-524® for 30 consecutive days in concurrent with anti-inflammatory eye drop therefore is an alternative choice for control of pain and inflammation caused by uveitis in cats compared with anti-inflammatory eye drop alone.

Conclusion

Uveitis treatment requires elimination of the cause and control of inflammation by using eye drop and systemic medication. The cause of uveitis in this cat was unknown since anterior centesis, essential for identification of the cause, was not permitted. Anti-inflammatory eye drop alone was not as effective as using the eye drop in concurrent with systemic anti-inflammatory medication. Steriod and non-steroid drugs were not appropriate in this case due to azotemia of the cat. Daily single dose of PCSO-524® for 30 consecutive days resulted in decreased degree of inflammation and resolved intraocular tumor. Effects of PCSO-524® for uveitis treatment is satisfied in this case, even though the etiology is unknown. As extracted from natural material that has no adverse effects on the kidney, PCSO-524® is an interesting alternative for uveitis treatment.

Acknowledgement

The author would like to thank Assoc.Prof.Dr. Aree Thayananuphat, PhD, DVM, for advice on preparing the manuscript and Dr. Vipavi Treesaksri, DVM, who was the co-attending veterinarian in this case at the feline division, animal hospital, Kasetsart University, Banh Khen campus.

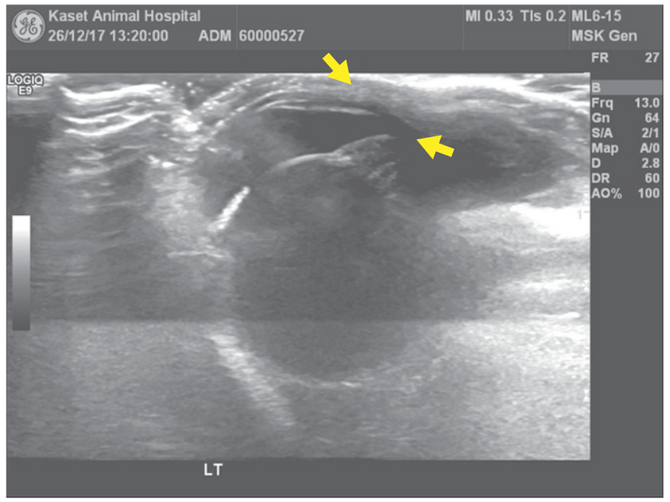

Figure 1. Ultrasound image of the left eye shows tumors at the iris area (arrows)

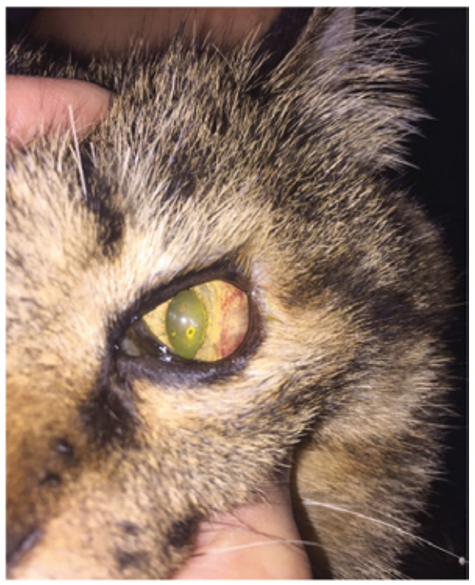

Figure 2. The left eye after treatment with prednisolone acetate 1% eye drop and oral prednisolone for 2 weeks with intraocular tumor at 1-5 o'clock of the iris

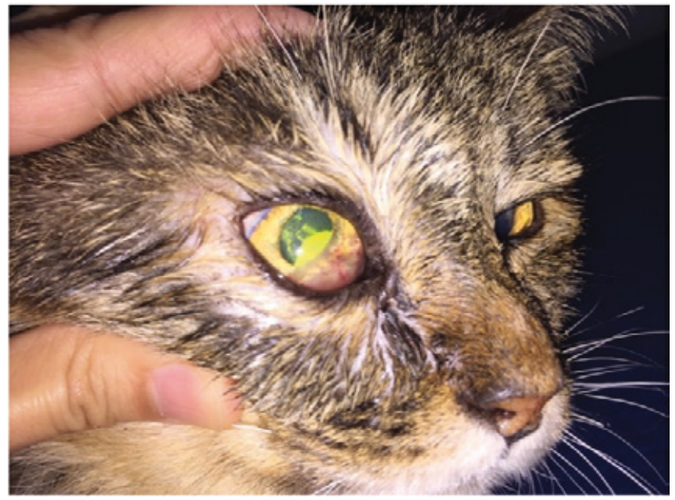

Figure 3. Photo taken at the 3rd month of the treatment showing anterior chamber fibrin, uveitis and corneal ulcer of the right eye

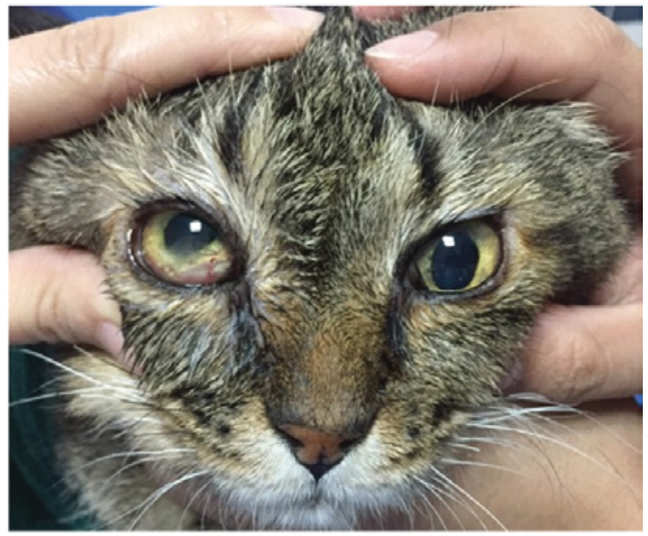

Figure 4. Photo taken at the 4th month of the treatment showing iris edema and anterior chamber fibrin of the right eye and mild keratic precipitates of the left eye

Figure 5. Photo taken at the 5th month of the treatment and 30 days after daily administration of PCSO-524® showing disappearance of intraocular tumor and mild keratic precipitates of the right eye

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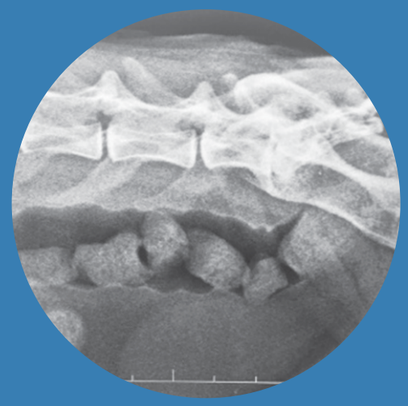

USE OF PCSO-524® ALONG WITH PHYSICAL THERAPY FOR CONTROLLING PAIN AND INFLAMMATION IN A CAT SUFFERING FROM OSTEOARTHRITIS, CHRONIC KIDNEY DISEASE AND TRIADITIS

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Abstract

A spayed female domestic shorthaired cat aged 21 years and weighed 4.2 kilograms with history of chronic kidney diseaseand triaditis was referred to Suvarnachad Animal Hospital. The cat showed signs of both hind limb weakness, limp tail and pain around posterior body part. Other signs included polydipsia, polyuria, and diarrhea. Radiographic examination revealed osteoarthritis at lumbosacral joint, elbow and both stifle joints. Hematological and blood chemistry tests showed mild anemia, neutrophilic leukocytosis, increased serum amyloid A and Increased Feline pancreatic lipase.Administration of PCSO-524® and physical therapy were provided to reduce systematic and local pain and inflammation. The supportive treatment was continued for 15 months, during the first 2 months of which, the lumbosacral joint painwas reduced and then disappeared after 5 months. The control of elbow and knee joint pain was satisfied for the whole treatment period. The cat was able to move the tail and resume normal walking after the 1st and 5th month of the treatment, respectively. Ability to jump and climb returned in the 5th and 8th month. However, the cat had improved defecation within 3 months. Testing of feline pancreatic lipase and serum amyloid A showed normal levels after 7 months of the treatment.

Keywords

chronic kidney disease,osteoarthritis, PCSO-524®, triaditis

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Introduction

PCSO-524® is extracted from greenshell mussel (GSM) orGreen Lipped Mussel (GLM) known as Perna canaliculus. It is consisted of several fatty acids, including EPA (eicosapentaenoic acid), DHA (docosahexaenoic acid), furan fatty acid (F-acid), sphingolipids, phytosterols, diacylglycerols, diterpenes, sesquiterpenes and saponin. Other components are anti-oxidants such as carotenoids, xanthophylls and anthocyanins. The active ingredients that have anti-inflammatory effects are EPA and DHA, which are omega-3 fatty acids.

Use of PCSO-524® has been known since 1970. There are more than 150 research publications about PCSO-524®, especially its effect on improving clinical signs of osteoarthritis in humans, dogs, and cats (Eason et.al., 2018; Kwananocha et.al., 2016 and Soontornvipart et.al., 2015), and reduction of inflammation caused by acute myositis and muscle pain in humans after 30 km. running (Eason et.al., 2018). There are studies using omega-3 fatty acids and PCSO-524® for treatment of inflammation, particularly that caused by diseases related to immunological function such as asthma and inflammatory bowel disease (Eason et.al., 2018 and Mickleboroughet.al., 2013). PCSO-524® also has anti-cancer effect but its mechanism is still unknown (Eason et.al., 2018).

Physical therapy in animals has increased its popularity during the past years, but not very common in cats due to limitation of cooperation of cats. Veterinarians who provide physical therapy need to have professional skill and understanding of feline behavior and must be able to plan the physical treatment that is least invasive, taking time the least and appropriate for each individual cat (Drum et.al., 2015 andSharp B, 2012).

Osteoarthritis is abnormality of cartilage, subchondral bone, synovium, ligament and capsule. Abnormality of one or more components can cause osteoarthritis. Osteoarthritis can occur only at synovial joints and cartilaginous joints, but never occurs at fibrous joints. Synovial joints can be found in appendicular skeletal such as stifle joint, elbow joint, tarsal joint, and hip joint. Clinical signs of osteoarthritis include synovial thickening, articular cartilage degeneration, subchondral bone sclerosis, osteophyte formation, and joint capsule thickening. Cartilaginous joint is the junction between vertebrae which is axial skeletal. When degeneration of intervertebral disk occurs, there is stenosis of intervertebral space and thickening of sclerosis of body end plate and osteophyte called spondylitis deformans. Prevalence of feline osteoarthritis has increased 13.6% each year (Epstein et.al., 2015). The disease is common in elderlycats as 90% of cats in this age group are affected (Clarke et.al., 2006).

Triaditis is inflammation of gall bladder, pancreas, and intestine. Chronic kidney disease is a common disease in old cats and caused by deterioration of internal organs. Since the cat in this case study is senior and affected with many systemic diseases, use of NSAIDs to reduce pain and inflammation caused by osteoarthritis is not appropriate due to severe adverse effect found in long term use. Therefore, PCSO-524® was selected as alternative to NSAIDs and used concurrently with physical therapy to reduce inflammation and pain.

Case history

A spayed female domestic shorthair (DSH), 21 years old, and weighed 4.2-kilogram cat was referred to Suvarnachad Animal Hospital. The cat had history of chronic kidney disease andtriaditis and the body condition score was 3/5. The cat showed signs of both hindlimb weakness, limp tail, and pain around posterior body part. Other signs included polydipsia, polyuria, and diarrhea. Prior to this visit, the cat was treated with oral prednisolone, tramadol and gabapentin for over 1 month.

Physical examination

Physical examination found that the cat was alert and responsive. Her body temperature was 101°F. She had pink mucous membrane, normal heart and lung sound. Her capillary refilling time (CRT) was 1-2 seconds. Her heart rate and respiratory rate were 196 beat/min and 34 per min, respectively. Abdominal palpation did not find cramping pain and peripheral lymph nodes were within normal size. Fresh fecal smear did not find significantly increased number of pathogens. Hematology and blood chemistry tests showed mild anemia, neutrophilic leukocytosis, increased serum amyloid A and increased feline pancreatic lipase.

Orthopedics and neurological examination

The cat showed signs of plantigrade stance (Figure 1) and pain around posterior body part. She was unable to move the tail. When elbows and knees were palpated, sound of crepitation was detected. Proprioceptive reflex and flexor reflex test were normal. Spinal reflex test showed decreased degree of response indicating that the cat had lower motor neuron disorder of both hind limbs.

Figure 1. Plantigrade stance walking posture

Radiographic examination

Radiographic image of lumbar spinal vertebrae in lateral view (Figure 2) showed osteophyte and stenosis of lumbosacral space.

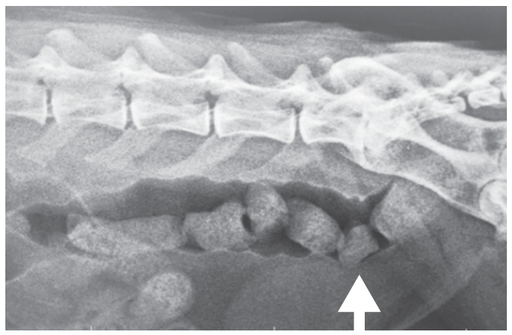

Figure 2. Radiographic image of lumbar vertebrae, lateral view, showed osteophyte and stenosis of lumbosacral space (white arrow)

Radiographic images of all limb in lateral and ventrodorsal view showed osteophyte and subchondral bone sclerosis at both side of elbows and knees (Figure 3).

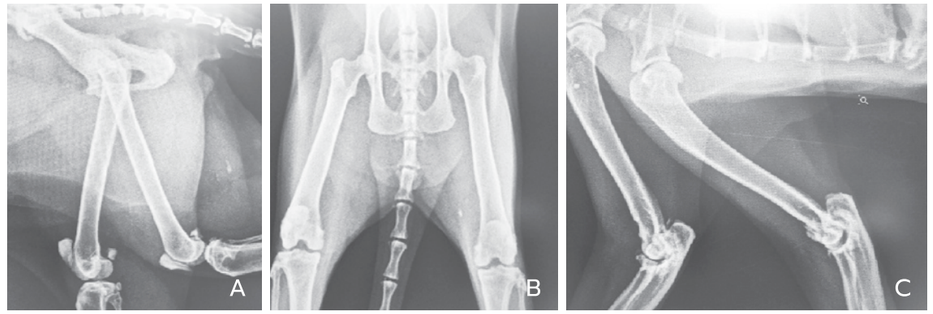

Figure 3. Radiographic image of both hindlimb, lateral view (A) andventrodorsal view (B) and elbow joints, lateral view (C) showedosteophyte and subchondral bone sclerosis

Abdominal ultrasonography

Abdominal ultrasonography found enlarged liver with homogenous hyperechogenicity. Sludge was found inside gall bladder and gall bladder wall thickness was 2 mm. Kidneys size was normal but heterogenoushyperechogenicity was found with unclear corticomedullary junction. There was mixed-echogenicity of parenchyma at the right lobe of pancreas and mild hyperechoic of peripancreatic tissue. Muscularis layer of duodenum was thickenening and the peristalsis of duodenum was decreased.

According to the history, physical examination and further investigations of the cat, the diagnosis included osteoarthritis, chronic kidney disease and triaditis.

Treatment

The cat was treated with PCSO-524® (VetPetz,Antinol®) 1 capsule PO every 24 hours for 15 months starting month 2 to month 15 of the treatment. Prednisolone 1 mg/kg/day PO was prescribed for 5 months, during which the dosage was tapering down to 0.5 and then 0.25 mg/kg/day. Gabapentin 10 mg/kg was administered every 12 hours during the first month of the treatment then every 24 hours for the next 3 months.The cat received tramadol at the dosage of 2 mg/kg PO every 12 hours in the first month. Hematic drug and vitamin B12 were given during the early treatment for anemia. Other supportive treatment included subcutaneous fluid therapy 1-2 times per week, medication for liver enhancement, and specific diet formulated for treatment of digestive tract. Physical therapy was applied 1-2 times per week, then reduced to 1-2 times per month until the end of treatment, in order to control pain and restore limb function (Table 1).

Table 1. Fifteen-month Treatment plan

Treatment \ Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PCSO-524®		x	x	x	x	x	x	x	x	x	x	x	x	x	x
Physical therapy	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Subcutaneous Fluid	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Prednisolone	x	x	x	x	x										
Gabapentin	x	x	x	x											
Tramadol	x														

Treatment follow-up

Treatment of osteoarthritis was evaluated from 1) Pain score, 2) Tail movement, 3) plantigrade stance, 4) Jumping, and 5) Climbing ability. Pain score was classified using simple destructive scale (SDS) as 0: no pain, +: mild pain, ++: moderate pain and +++: severe pain (Mathews K.et.al., 2014). Pain score at the cat's spinal cord was decreased continuously and reached 0 score in the 5th month. Moderate pain in the elbows and knees was reduced to slightly pain and remained throughout the treatment. Tail movement was described as +: Movement detected and -: No movement. The cat was able to move its tail within 1 month of the treatment. Plantigrade stance, + if detected and – if not, disappeared within 5 months of the treatment. Jumping ability, + if able to jump and – if not, recovered also within 5 months of the treatment. Climbing ability, + if able to climb and – if not, was observed again within 8 months of the treatment (Table 2). The cat had improved defecation in the third month, in which fecal score was 3 (Table 2).

Pancreatitis was evaluated using feline pancreatic lipase test kit (snap fPL®: IDEXX laboratories, U.S.A.) and the normal result was detected in the 7th month. The test for serum amyloid A (V-check: Bionote Inc., Korea) which is an indicator for inflammation, was within normal range in the 7th month (Table 3). Ultrasonography examination in month 10 of the treatment found that severity of lesion at the liver, pancreas and gall bladder was decreased. However, duodenum wall thickening and heterogenous hyperechogenicity and unclear corticomedullary junction of the kidney still remained. Hematology and blood chemistry test in month 7 and 15 found only neutrophilic leukocytosis (Table 3).

Table 2. Evaluation of treatment outcome during 15-month treatment

month / evaluation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pain score: Lumbosacrum*	+++	+++	++	+	–	–	–	–	–	–	–	–	–	–	–
Pain score: elbow and stifle*	+	+	++	+	+	+	+	+	+	++	+	+	+	+	+
Tail movement	–	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Plantigrade stance	+	+	+	+	–	–	–	–	–	–	–	–	–	–	–
Jumping	–	–	–	–	+	+	+	+	+	+	+	+	+	+	+
Climbing	–	–	–	–	–	–	–	+	+	+	+	+	+	+	+
Fecal score**	6	4	3	3	3	3	3	3	3	3	3	3	3	3	3

* Mathews K. (2014) **Deborah SG.(2011)

Table 3. Hematology and blood chemistry test results before, at month 7 and month 15 of the treatment

Parameter	Normal range	Before	Month 7	Month 15
RBC (x10^6/μl)	5.92-9.93	6.02	7.10	7.16
Hct (%)	29-48	27.9	37.9	36.5
Hb (g%)	9.3-15.9	9.5	12.3	11.6
WBC (μl)	3,500-16,000	20,140	25,890	22,150
Neutrophils (μl)	2,500-8,500	15,105	20,712	19,270
Eosinophils (μl)	0-1,000	604	258	443
Lymphocytes (μl)	1,200-8,000	4,430	4,919	5,094
Monocytes (μl)	0-600	0	0	0
Platelets(x10^3/ μl)	200-500	219	286	233
SGPT(IU/L)	10-100	58	69	52
Creatinine(mg/dl)	0.6-2.4	1.7	1.4	1.4
BUN (mg/dl)	14-36	31.3	32.1	30.8
fSAA** (μg/ml)	< 0.5	38.7	< 0.5	< 0.5
Snap fPL	Normal	Abnormal	Normal	-

Ref.NorsworthyGD. (2016) *Bionotelnc., Korea ** IDEXX laboratories, U.S.A.

®

Discussion

Spondylitis deformans in cats was commonly found at 7th-10th thoracic vertebrae. However, the severe form usually found at lumbar and lumbosacrum. Incidence of osteoarthritis is associated with old age, therefore, monitoring for the disease in elderly cats is crucial. Cross breed,domestic shorthaired cats and overweight cats are at risk, but some published articles reported that age, body weight are not associated with the disease (Lascelles, 2010; Baltatanu and Tudor, 2016).

Osteoarthritis can occur at appendicular skeletal, especially hip, elbow, knee and tarsal joint (Lascelles, 2010). Clarke et al. (2006) reported that feline osteoarthritis was common at the elbows. The diagnosis in this case agreed with what was previously reported as the cat showed severe neurological signs and the lesions were found at lumbosacrum of axial skeletal and elbows and knees, which are appendicular skeletal.

Treatment outcome was evaluated using subjective assessment consisting of pain score, which was measured by degree of lameness, gait disturbances, and behavior changes, such as hiding, loss of or reduced ability to jump, less grooming, and increased aggression. Subjective assessment is more appropriate than objective assessment, which is more common and a standard measure in dogs and humans (Lascelles, 2010). The disadvantage of subjective assessment is due to limitation of the use of some equipment such as kinetic force plate and accelerometer.

Study of osteoarthritis in cats is limited and etiology of the disease is still unknown. Accepted treatment is to use NSAIDs to reduce pain and inflammation. Surgical treatment of osteoarthritis is not common in cats. There are reports of joint arthrodesis performed in cats that severely suffer from pain and endoscopic surgery used to remove bone fragment in case of osteoarthritis with bone fracture, but no reports on total joint replacement. There are a few medical reports that use decompression surgery in case of spinal cord compression and entrapment neuropathy at the lumbosacrum. There are no other medical evidences of effective treatment for osteoarthritis (Lascelles, 2010 and Epstein et. al., 2015). GLM is proved that it has positive effect on mobility of the body and can be used in case of rheumatoid arthritis and osteoarthritis in humans, dogs and horses (Bui, 2001 and Eason et. al., 2018). The only study of GLM in osteoarthritic cats belongs to Lascelles et al (2010), in which supplement consisting of EPA, DHA, glucosamine and chondroitin sulfate was effectively used to improve mobility. Objective assessment using accelerometer to evaluate the effects of supplement consisting of EPA ad DHA on pain caused by osteoarthritis indicates that omega-3 fatty acid is effective for reduction of topical pain and pain of central nervous system. However, Lascelles et al (2010) reported that GLM had very little of omega-3 and mechanism of GLM is still unknown perhaps due to unidentified etiology of osteoarthritis in cats. Further study on active ingredient of GLM extract, its concentration and mechanism is necessary. Additional studies on comparison of the effect of GLM, NSAIDs and other medications for osteoarthritis treatment are also important (Eason et. al., 2018 and Lascelles, 2010).

Physical therapy is not very common in cats because osteoarthritis in cats is less prevalent than in dogs, lack of understanding of the disease, and cat behavior that tends to resist physical restraint. The success of physical therapy in cats therefore highly requires cooperation of the cat (Drum et.al., 2015). The cat in this case cooperated most with low level laser therapy, which is supportive therapy and acts more like pain reducer that anti-inflammatory treatment or joint strengthener, therefore other type of treatments are also necessary (Pryor et.al., 2015).

Conclusion

PCSO-524® has been proved to be effective for systemic treatment in concurrent with physical therapy for local treatment of pain and inflammation caused by osteoarthritis in senile cats, cats with limitation of surgical treatment and long-term use of NSAIDs. The cat has improved clinical signs and quality of life without any adverse effects. Although using of PCSO-524® and physical therapy does not result in fully recover from the disease, it is supportive therapy and prevents the progression of the disease. PCSO-524® may reduces the degree of inflammation in some other diseases, such as enteritis, chronic pancreatitis, hepatitis and cholecystitis and may inhibit development of chronic renal failure in cats. A further study on this issue needs to be explored.

Acknowledgement

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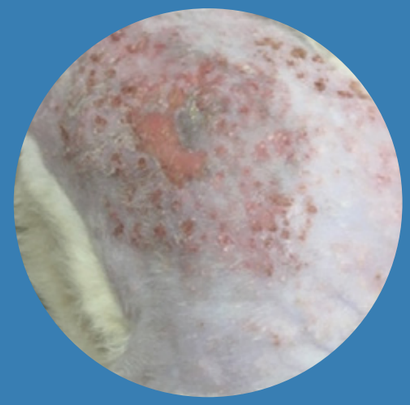

USE OF PCSO-524® (ANTINOL®) AND ANTIPRURITIC DRUG FOR TREATMENT OF ITCH CAUSED BY FLEA ALLERGY DERMATITIS (FAD) AND PSYCHOLOGICAL ALOPECIA IN DOMESTIC SHORT HAIR CAT

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Abstract

Etiology of skin disease in cats is various and including internal and external factors. The cat in this case was affected with skin disease caused by flea allergy dermatitis (FAD) and psychological alopecia. Skin examination found flea and secondary bacterial infection of the skin which was constantly licked by the cat. Holistic treatment was the choice of treatment in this case. Medical treatment was applied to the cat and environments surrounding the cat was managed. PCSO-524® (Antinol®) in combination with other antipruritic drugs was used to relieve itch and inflammation of the chronic skin disease and to strengthen the skin. During 210 days of the study, environment was managed and intensive parasitic control was applied to every cat in the house in order to control flea. The study showed efficacy of PCSO-524® (Antinol®) for treatment of skin inflammation, strengthening the skin, and itch relief. During day 160-210 of the treatment, administration of other anti-itch drugs was terminated due to psychological alopecia that caused constant licking by the cat.PCSO-524® (Antinol®) was recommended in this case since it can be used for long-term treatment without adverse effects. The study concluded that PCSO-524® (Antinol®) in combination with other antipruritic drugs and environmental management is effective for treatment of flea allergy dermatitis in cats affected with psychological alopecia.

Keywords:

Flea allergy dermatitis (FAD),Psychological alopecia, antipruritic drug, PCSO-524® (Antinol®)

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Introduction

Pruritus and alopecia in cats are skin diseases caused by various factors including internal and external factors. Both factors are important for diagnosis, treatment and prevention of the disease. This case study demonstrated integration of management of internal and external factors for the best treatment effect.

Internal factor is the cat itself and its behavior. Stress is an influential factor that induces over-grooming behavior of cat and results in psychological alopecia. This behavior can be found in 14% of the cats affected with immune-related skin disease (Waisglass et al., 2006). Stress can increase secretion of cortisol and consequently cause immunity imbalance and increased inflammatory response of the wound. External factors are disease, environment, diet, and care provided by the owner.

Skin disease causing itch and alopecia in cats can be classified by etiology into 3 groups; infectious disease, immunocompromised disease, and genetic and hormonal disorder. The most common skin disease in cats is the immunocompromised disease, which can cause alopecia in 76% of cases (Waisglass et al., 2006). Flea allergy dermatitis (FAD) accounts for 20% of cases in this group (Hill et al., 2006).

Flea is the most common external parasite that is found worldwide and more common in cats compared to dogs (Bond et al., 2007). Pathological mechanism of flea allergic dermatitis is initiated by the secretion of flea saliva during the bite. The secretion is an allergen that causes hypersensitivity (Wilkerson et al., 2004) resulting in itch and skin inflammation. Constant licking at the lesion as a result of increased stress and secondary infection may occur.

Objective of this case study is to demonstrate the treatment effect of PCSO-524® (Antinol®) in combination with other systemic antipruritic drugs for reducing skin inflammation and strengthen the skin in domestic short hair cats suffering from flea allergy dermatitis (FAD) and psychological alopecia.

Case history

Kanchon is a domestic short hair cat aged 4 years, weighed 4 kg, that lives in plant farm habitat with the other 3 cats. He is submissive and occasionally bitten by other cats outside the house. All the cats spend time 20% inside the house and the other 80% outside the house. Sometimes the cats are kept in restricted area which is an outdoor cage. The cats never miss annual vaccination, which include feline panleukopenia, flu, leukemia and rabies. The cats also receive regular deworming and occasional flea control every 2-3 months. The cats eat regular cat diet. The only cat that was sick was Kanchon, of which the owner noticed constant itch and licking at the wound for about 1-2 months prior to the visit.

Prior to this hospital visit, the cat was having chronic skin disorder that caused intermittent incident of pustule. Chlorhexidine scrub, topical betadine, oral and injection of antibiotics was administered before but the response was poor.

Examination

Physical and hematological examination on day 0 of the treatment found following results.

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane and CRT < 2 sec - Pain at right hind limb lesion - Mild fever (102.8 °F) - Flea dirt and flea on the back	 day 0
CBC and Biochemistry profile	- Normal (blood profile in Table 1 and 2)	
Dermatological examination	- Eosinophilicplaque with purulent exudate, pustule and erythema on right hind limb - Pruritus score 8/10	
Cytology	- impression smear showed pyogranulomatous infection with cocci bacteria at right hind limb lesion (degenerative neutrophil and macrophage) - Deep and superficial skin scarping did not find abnormality - Ear cytology examination did not find abnormality	1. Bacterial culture and drug sensitivity 2. Fungal culture

Note: Bacterial culture and drug sensitivitytest are for identification of bacterial species since several antibiotics were administered for a long time period and the most appropriate drug must be selected based on the test. Fungal culture is for identification of infection caused by fungi

Physical and cytological examination on day 0 detected fever, flea and flea dirt at the back of the cat and pyogranulomatous infection with cocci bacteria. Differential diagnosis includes the followings;

	Differential diagnosis	Supportive reason or Evidence
1	Deep pyoderma	Pyogranulomatous infection with cocci bacteria was found by cytological examination
2	Flea allergy dermatitis	Flea and flea were found on the cat. Flea control was not applied regularly.
3	Mosquito bite hypersensitivity	The owner interview on house environment indicated high number of mosquito and the lesion was found only in the area not covered by hair
4	Self-induced alopecia or Psychological alopecia	The owner informed that the cat was submissive and occasionally bitten by other cats when leaving the cage or the house. The cat always licked bitten wounds and groomed himself.

Treatment provided on day 0 are as follows;

Drug	Dosage	Duration
Tolfenamic acid (Tolfedine® 60mg) for fever and inflammation control	1/4 tab (2.2-4.4mg/kg) sid po pc	3 days
Amoxicillin clavulanic acid (Amoclavmed® 62.5 mg) for control of bacterial infection prior to completion of bacterial culture and drug sensitivitytest results	1 tab bid (15-25mg/kg) po ac	21 days
Fipronil 74.7 mg/(S)-methoprene 90.0 mg/ Eprinomectin 3.60 mg/Praziquantel 74.6 mg (Broadline® spot-on solution for cats) for flea control	For 2.5-7.5 kg	Every 1 month

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

Cytological examination and differential diagnosison day 21 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane, CRT < 2 sec - BAR - Flea dirt was found but no flea	 day 21
Dermatological examination	- Papuleanderythema of right hind limb - Pruritus score 5/10	
Cytology	- Scotch tape technique found pyogranulomatous infection with cocci bacteria at right hind limb	

Bacterial culture, drug sensitivitytest and Fungal cultureshowed negative results which may due to error in sample collection or transportation. Cytological examination and response to antibiotic indicated that the cat had bacterial infection.

Response to treatment including antibiotic, flea control, mosquito net use, and Elizabethan collar use to prevent licking was satisfied.

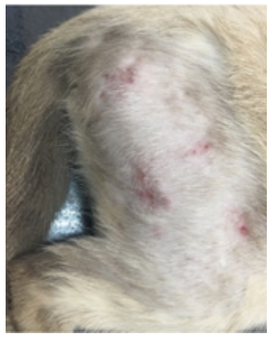
Differential diagnosis
1. Deep pyoderma
2. Flea allergy dermatitis
3. Mosquito bite hypersensitivity
4. Self-induced alopecia

Treatment provided on day 21 are as follows;

Drug	Dosage	Duration
Prednisolone (5mg) for pain relief and control of inflammation	½ tab (0.5-1.0mg/kg) sid po pc	30 days
PCSO-524(Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	21 days
Amoxicillin clavulanic acid (Amoclavmed® 62.5 mg) for bacterial control	1 tab bid (15-25mg/kg) po ac	30 days
(Broadline® spot-on solution for cats) for flea control	For 2.5-7.5 kg	Every 1 month

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

Cytological examination and differential diagnosison day 50 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane CRT < 2 sec - BAR - Flea dirt on the back but no flea	 day 50
Dermatological examination	- Erythema at right hind limb - Pruritus score 3/10	
Cytology	- Scotch tape technique did not find lesion at right hind limb	

Differential diagnosis

1. Deep pyoderma
2. Flea allergy dermatitis
3. Self-induced alopecia

At this step, mosquito bite hypersensitivity was excluded from the differential diagnosis list since the occurrence of lesion was not found after mosquito net was used to prevent mosquito bite. Control of infection was continued although bacteria was not detected at the lesion, antibiotic was maintained for another 1-2 months to eliminate pyoderma.

Treatment provided on day 50 are as follows;

Drug	Dosage	Duration
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
Amoxicillin clavulanic acid (Amoclavmed® 62.5 mg) for bacterial control Note: After absence of bacteria at the lesion, antibiotic was administered for additional 1-2 months at least for treatment of deep pyoderma	1 tab bid (15-25mg/kg) po ac	30 days
(Broadline® spot-on solution for cats) for flea control	For 2.5-7.5 kg	Every 1 month

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

Cytological examination and differential diagnosis on day 80 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane CRT < 2 sec - BAR - Flea dirt and flea on the back	 day 80
Dermatological examination	- Erythema and papule at right hind limb Pruritus score 5/10	
Cytology	- Scotch tape technique found degenerative neutrophil with cocci bacteria at right hind limb	

Note: Flea infestation returned again so intensive parasite control program was applied to the other 3 cats in the house to replace the previous program that topical medication was applied once a month.

Differential diagnosis

1. Deep pyoderma
2. Flea allergy dermatitis (FAD)
3. Self-induced alopecia

Treatment provided on day 80 are as follows;

Drug	Dosage	Duration
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
Amoxicillin clavulanic acid (Amoclavmed® 62.5 mg) for bacterial control	1 tab bid (15-25mg/kg) po ac	30 days
Moxidectin+Imidacrid (Advocate®) for flea control in the other cats in the same house	4-8 kg	Every 2 weeks

Cytological examination and differential diagnosison day 100 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membraneCRT < 2 sec - BAR - No flea dirt and flea	 day 100
Dermatological examination	- Eosinophilic plaque with purulent exudate, pustule anderythema with salivary stain - Pruritus score 5/10	
Cytology	- Scotch tape technique at right hind limb found degenerative neutrophil with cocci bacteria	

Note: The owner informed that the cat was missing from the cage after a meal and did not return for a few days. The collar was also missing during that period and therefore the wound was licked almost all the time until a new collar was installed.

Differential diagnosis

1. Deep pyoderma
2. Flea allergy dermatitis (FAD)
3. Self-induced alopecia

Treatment provided on day 100 are as follows;

Drug	Dosage	Duration
Prednisolone (5mg) for itch relief since the inflammation and itch were severe	½ tab (0.5-1.0mg/kg) sid po pc	30 days
Cetirizine (10mg) for itch relief	5 mg/cat sid po pc	30 days
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
(Amoclavmed® 62.5 mg) for bacterial control	1 tab bid (15-25mg/kg) po ac	30 days
Moxidectin+Imidacrid (Advocate®) for flea control in the other cats in the same house	4-8 kg	Every 2 weeks

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

Cytological examination and differential diagnosis on day 130 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane,CRT < 2 sec - BAR - No flea dirt and flea	 day 130
Dermatological examination	- Erythema with salivary strain - Pruritus score 3/10	
Cytology	- Scotch tape technique did not find lesion at right hind limb	
CBC and Biochemistry profile	- Normal (blood profile is shown in Table 1 and 2)	Serum Fructosamine as measured to determine incident of diabetes mellitus since the wound healing was slow

Differential diagnosis

1. Deep pyoderma
2. Flea allergy dermatitis (FAD)
3. Self-induced alopecia

Treatment provided on day 130 are as follows;

Drug	Dosage	Duration
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
Cetirizine (10mg) for itch relief	5 mg/cat sid po pc	30 days
Amoxicillin clavulanic acid (Amoclavmed® 62.5 mg) for bacterial control	1 tab bid (15-25mg/kg) po ac	30 days
Moxidectin+Imidacrid (Advocate®) for flea control in the other cats in the same house	4-8 kg	Every 2 weeks

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

Cytological examination and differential diagnosis on day 160 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane, CRT < 2 sec - BAR - No flea dirt and flea	 day 160
Dermatological examination	- Erythema with salivary strain - Pruritus score 3/10	
Cytology	- Scotch tape technique at right hind limb found broken hair shaft	

Differential diagnosis

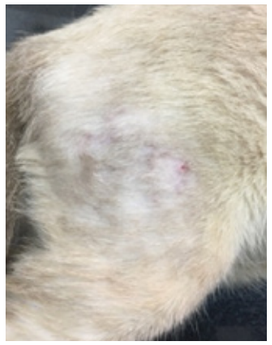
1. Flea bite hypersensitivity (FAD)
2. Self-induced alopecia

Treatment provided on day 160 are as follows;

Drug	Dosage	Duration
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
Moxidectin+Imidacrid (Advocate®) for flea control in the other cats in the same house	4-8 kg	Every 2 weeks

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

Cytological examination and differential diagnosis on day 190 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane CRT < 2 sec - BAR - No flea dirt and flea	 day 190
Dermatological examination	- Erythema - Pruritus score 1/10	
Cytology	- Scotch tape technique did not find lesion at right hind limb	

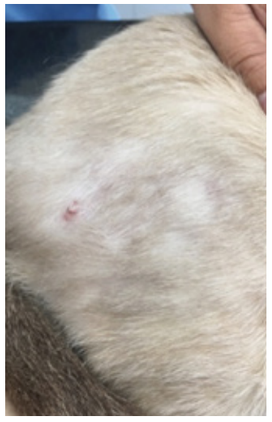
Differential diagnosis

1. Flea allergy dermatitis (FAD)
2. Self-induced alopecia

Treatment provided on day 190 are as follows;

Drug	Dosage	Duration
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
Moxidectin+Imidacrid (Advocate®) for flea control in the other cats in the same house	4-8 kg	Every 2 weeks

Cytological examination and differential diagnosis on day 210 of the treatment

Examination	Result	Diagnostic plan and picture
Physical examination	- Pink mucous membrane, CRT < 2 sec - BAR - No flea dirt and flea	 day 210
Dermatological examination	- Pruritus score 1/10	
Cytology	- Scotch tape technique did not find lesion at right hind limb	
CBC and Biochemistry profile	- Normal (blood profile in Table 1 and 2)	

Differential diagnosis

1. Flea allergy dermatitis (FAD)
2. Self-induced alopecia

Treatment provided on day 210 are as follows;

Drug	Dosage	Duration
PCSO-524® (Antinol®) for inflammation control and skin strengthening	1 tab sid po pc	30 days
Moxidectin+Imidacrid (Advocate®) for flea control in the other cats in the same house	4-8 kg	Every 2 weeks

Elizabethan collar was used to prohibit wound licking and the cage was covered with mosquito net.

The treatment at this step included environmental management and behavioral control. A collar was installed to prevent the wound from licking and intensive parasite control was applied for 3 months. Follow-up was scheduled to evaluate the progress of lesion and food elimination diet trial was recommended if the progress of lesion was detected

Discussion

This case study is focused on treatment of chronic skin disease caused by flea allergy dermatitis (FAD) in combination with self-induced alopeciaor psychological alopecia in cats. Both conditions are common problems in cats and complicated to control. The most interesting knowledge gained from this study is the step-by-step management strategy. The managed factor included internal factors such as itch, over-grooming, anti-itching and anti-inflammatory medication and external factors which are environments surrounding the cat.

Examination of internal factors from lesions of skin and hair using trichogram always found hair shaft split and salivary stain which indicated licking at the lesions. Therefore, psychological alopecia was diagnosed. The itch and licking later increased the degree of inflammation so the treatment was planned and included 1) Elizabethan collar to prevent the licking, 2) Keeping the cat in a cage at all time to prevent fighting with other cats and protect the lesion from licking by other cats, 3) Use itch relief and anti-inflammatory medication which included prednisolone cetirizine (Joya etal., 2012) and PCSO-524® (Antinol®). Each of the selected medication had different mechanism but the main focus was the use of PCSO-524® (Antinol®) for anti-inflammatory and antipruritic effects. The drug is rich in omega-3 and omega-6 thus effective for anti-inflammatory and antipruritic effects (S. Cerrato et al., 2013). The effect of the drug was apparent on day 160-210 of the treatment. In addition to the omega, another active ingredient is EFA, which is an essential element of epidermis and growth factor of hair shaft (Bensigner et al., 2008). PCSO-524® (Antinol®) is therefore enhance the treatment of skin disease and also can be used for long term without adverse effects (Pusoonthornthum, 2017). Blood chemistry and hematology test results are displayed in Table 1 and 2.

External factors, which include the disease and the environments, of this case are the flea and sensitivity to protein in flea saliva when the cat was bitten by the flea. The onset of mechanism of allergy depends on immunological response to allergen which is the protein in flea saliva (Wilkerson et al., 2004). The treatment principle is to eliminate exposure to protein in flea saliva by intensive parasitic control to reduce the number of flea using spot-on medication every 2 weeks and mosquito net. Recurrence of flea infestation can occur during the early treatment (R.G. Arther et al., 2005) because the other cats in the same house were not in the intensive control program and they were reservoir of the infestation. Later when the program was applied to the other cats in the house, the flea infestation disappeared for 2 months. Mosquito net prevented the cat from allergy to mosquito bite and also reduce the risk of flea transmission.

This case study has limitation in some aspects, for example, bacterial culture and drug sensitivity test that yielded negative results. The sample should be submitted again but was omitted since the antibiotic treatment result was satisfied. The flea allergy was also not confirmed by histopathology and intradermal skin test.

The further study should be focused on antipruritic and anti-inflammatory effect of PCSO-524® (Antinol®) in cases with other types of skin allergy. For example, a clinical experiment to evaluate the improvement of skin lesion before and after the treatment in a topic dermatitic cats.

Conclusion

The finding in this case study indicated that treatment of skin disease in cats needs integration of several factors. PCSO-524® (Antinol®) can be used with antipruritic drugs to treat flea allergy dermatitis (FAD). Ecological management is necessary for prohibition of the disease recurrence in psychological alopecia cats. During the early treatment in this case, the flea control was not intensively managed resulting in recurrence of flea infestation. Therefore, treatment of animal inconcurrent with environmental management is recommended.

Figures and tables showing hematological parameters before and after the treatment

Table 1. Hematological parameters before and after 100 and 200-day administration of PCSO-524® (Antinol®)

Parameter	Before	Day 100	Day 200	Reference
RBC (x10^6 cells/mm^3)	8.4	9.0	7.8	5-10
Hemoglobin (g/dl)	11.9	14.1	11.2	10-15
Hematocrit (%)	37	39	35	30-45
WBC (cells/mm^3)	8,800	7,600	8,600	5,500-19,000
Neutrophils %	68	57	76	35-75
Band %	0	0	0	0-2
Eosinophils %	9	8	6	2-12
Lymphocytes %	22	34	16	27-36
Monocyte %	1	1	1	0-5
Platelet (cells/mm^3)	206,000	294,000	360,000	200,000-600,000

Hawey, C. and Dennett, TB. (1983). Comparative Veterinary Hematology

Table 2. Blood chemistry before and after 100 and 200-day administration of PCSO-524® (Antinol®)

Blood chemistry	Before	Day 100	Day 200	Reference
SGPT (ALT) (U/L)	61	54	101	25-100
Creatinine (mg/dL)	1.3	1.4	1.5	0.9-2.2
BUN (mg/dL)	31	28	28	19-34
Alkaline phosphatase (U/L)	20	30	12	10-80

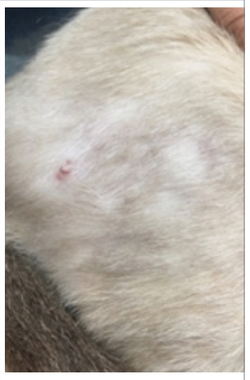
Hawey, C. and Dennett, TB. (1983). Comparative Veterinary Hematology

Table 3. Summary of lesion finding, diagnosis, and treatment on day 0, 21, 50, 80, 100, 130, 160, 190, and 210

Day	0	21	50
Lesion (picture)	 Eosinophilicplaque with purulent exudate, pustule and erythema	 Papule and erythema	 Erythema
location	Right hind limb		
cytology	Pyogranulomatous infection with cocci bacteria		Not found
Pruritus score (10/10)	8/10	5/10	3/10
Antipruritic drug	-	Prednisolone (5mg) ½ tab sid po pc (30d)	-
PCSO-524®	-	ON	
ectoparasite	Flea with flea dirt	flea dirt	flea dirt
Flea-control and behavior control	0nly 1 Cat Broadline® spot-on /1 month Elizabethan collar and mosquito net were installed		
Other treatment	Amoclavmed® 62.5 mg 1tab bid po ac (21d) Tolfedine® 60 mg ¼ tab sid po pc (3d)	Amoclavmed® 62.5 mg 1 tab bid po ac (30d)	Amoclavmed® 62.5 mg 1 tab bid po ac (30d)

Day	80	100	130
Lesion (picture)	 Papule and erythema	 Eosinophilic plaque with salivary stain (The cat was missing from home)	 - Erythema with salivary strain
location	Right hind limb		
cytology	Degenerative neutrophils with cocci bacteria		Not found
Pruritus score (10/10)	5/10	5/10	3/10
Antipruritic drug	-	- Prednisolone (5mg) ½ tab sid po pc (30d) - Cetirizine 5 mg/cat sid po pc	- Cetirizine 5 mg/cat sid po pc
PCSO-524®	ON		
ectoparasite	Flea with flea dirt	Not found	Not found
Flea-control and behavior control	All cats (Intensive control) (Advocate®/ 2 wk) Elizabethan collar and mosquito net were installed		
Other treatment	Amoclavmed® 62.5 mg 1 tab bid po ac (20d)	Amoclavmed® 62.5 mg 1 tab bid po ac (30d)	Amoclavmed® 62.5 mg 1 tab bid po ac (30d)

Table 3. Summary of lesion finding, diagnosis, and treatment on day 0, 21, 50, 80, 100, 130, 160, 190, and 210 (continued)

Day	160	190	210
Lesion (picture)	 -Erythema with salivary strain	 -	 -
location	Right hind limb		
cytology	Hair shaft broken	Not found	Not found
Pruritus score (10/10)	3/10	1/10	1/10
Antipruritic drug	-	-	-
PCSO-524®	NO		
ectoparasite	Not found		
Flea-control and behavior control	All cats (Intensive control) (Advocate®/ 2 wk) Elizabethan collar and mosquito net were installed		
Other treatment	-		

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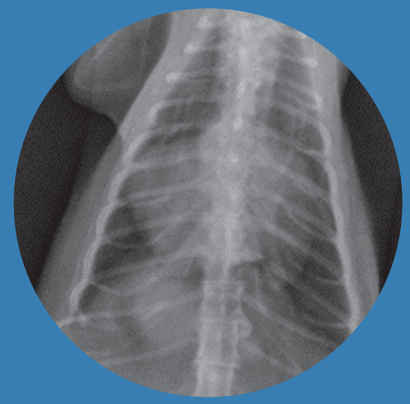

PCSO-524® (ANTINOL®) USE IN PERSIAN CAT WITH DYNAMIC HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY (HOCM)

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Abstract

A Persian cat aged 21 years was diagnosed with Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM) and treated with PCSO-524® (Antinol®) for 45 days. The cat regained quality of life and daily activities such as grooming and walking, increased appetite, ingestion and weight gain after the treatment. Serum Amyloid A (SAA), which is an inflammatory marker in cats, was reduced down to normal after 15 days of PCSO-524® (Antinol®) administration.

Keywords

PCSO-524® (Antinol®) Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM)

Introduction

Hypertrophic Cardiomyopathy (HCM)is the most common heart disease in cats. The clinical symptoms include hypertrophy of heart muscle at one or more spots and are usually found in left ventricle. Incidence of the disease is reported in Rag dolls, Maine Coon, Himalayan, Burmese, Sphynx, Persian and Domestic short hair cats. Genetic defects involving contractile protein, particularly Myosin binding protein C, was found in Rag dolls andMaine Coon cats. The disease is detected most in middle aged cats, however, it can be diagnosed in young cats, especially Rag dolls cats as well. The thickened muscle of right ventricle has various effects on function of the heart depending on type of hypertrophy. If it is mild or focal, the cat may not show any symptoms at all. When severe hypertrophy occurs, function of ventricles is disrupted causing intra-cardiac pressure and Congestive Heart Failure (CHF) with pulmonary edema or pleural effusion (Medron, 2014).

Hypertrophic Obstructive Cardiomyopathy (HOCM) is a category of Hypertrophic Cardiomyopathy(HCM) which interventricular septum is enlarged causing stenosis of ventricular outflow tract of left or right ventricle. In this condition, mitral valve may be sucked into outflow tract causing obstruction of the tract. The obstruction can be either dynamic or fixed obstruction (French, 2008). The pumping of left ventricle is disrupted since mitral valve is shifted further to the ventricle and obstruct the circulatory flow (Dynamic Obstruction of the Left Ventricular Outflow tract; DOLVOT). The occurrence of DOLVOT in humans can cause sudden death, cardiac arrhythmia, and blood clot in left atrium. If the blood clot detaches and circulates to aorta, it can obstruct arteries, especially iliac artery which transports blood to posterior appendices. The occurrence is named Feline Arterial ThromboEmbolism (FATE). FATE will eventually cause enlargement of left ventricle and myocardial infarction called remodeling (Medron, 2014).

Omega-3 Polyunsaturated Fatty Acid consisting of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) is commonly found in cell membrane in small amount. Increased amount is a result of ingestion of diet that support function of heart by reduce inflammation, increase appetite, and decrease the risk of arrhythmia, for example (Freeman, 2013).

Case history, Medical history and Underlying disease

A Persian intact female cat aged 21 years and weighed 2.75 kg was submitted to the hospital due to acute expression of dyspnea, staying in lateral recumbency posture, lethargy and dilated pupils. The cat was normal on the day prior to the admission. There is no history of accident. The owner adopted a 4-month old cat 2 days prior to the incidence and the cats got along well with each other. Within the past months, the cat was treated for anemia by receiving blood transfer. X-ray examination in the past 2 years showed cardiac enlargement. A diagnostic test using SNAP Feline proBNP was positive. The cat was never treated for any cardiac disorders. Blood pressure was normal. Taurine 250 mg per day was prescribed. The cat's weight was reduced from 4.5 kg to 2.75 kg.

Diagnostic Plan and Results

Physical examination

Physical examination found 98°F body temperature, 2/5 body condition score, dilated pupils, lethargy, pale mucous membrane, and dyspnea. Heart rate was 180 beat per min. Pulse was weak and CRT was greater than 2 seconds. Murmur sound was detected. Systolic and Diastolic pressure was 88 mmHg and 60 mmHg, respectively.

Hematology and blood chemistry examination

Hematology tests showed normal results (Table 2). Blood chemistry tests found that AST (SGOT) andSerum Amyloid A (SAA) was slightly above normal range (Table 3). Leukemia virus and Feline AIDS test kits showed negative results. Thyroid hormone and blood sugar was normal (1.5 mcg/dl and 82 mg/dl, respectively). Blood oxygen was slightly below normal level.

X-ray examination

X-ray images showed cardiac enlargement and space occupying lesion at the caudal lung lobe (Figure 1).

Ultrasonography examination

Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM) was detected from Ultrasonography examination (Figure2 and Table 1)

Treatment outcome and follow up

Hypoxic shock was treated with oxygentherapy, intravenous administration of acetate fluid, and thermotherapy to increase body temperature. The cat regained conscious and awareness after receiving oxygen therapy and was able to ingest food and water within 8 hours of the treatment. Symptoms and blood pressure were monitored closely for 24 hours and found that the blood pressure returned to normal level. Further diagnosis used x-ray and ultrasonography examination to refine medical treatment. The owner of this case did not agree with using cardiac medication, therefore PCSO-524® (Antinol®) 1 capsule bid was prescribed.

After 45 days of PCSO-524® (Antinol®) treatment, the cat successfully recovered. There were no signs of dyspnea and the cat regained more daily activities such as grooming, walking, and running. The cat increased appetite and body weight was increased from 2.75 kg to 2.95 kg within 45 days.

Hematology test results did not change after receiving PCSO-524® (Antinol®) for 45 days (Table 2). AST (SGOT) andSerum Amyloid A (SAA) was normal after 15 days of the treatment (Table 3).

Discussion

After 45 days of PCSO-524® (Antinol®) treatment, the cat successfully recovered. There were no signs of dyspnea and the cat resumed more daily activities such as grooming, walking, and running. The cat increased appetite and body weight was increased from 2.75 kg to 2.95 kg within 45 days. Omega-3 supplement is beneficial in case of Congestive Heart Failure (CHF) in humans and dogs as it reduces the risk of arrhythmia. The action of omega-3 includes reduction of cytokine and circulatory system and increasing appetite in dogs suffering from cardiac cachexia. Recommended dosage in dogs is 40 mg/kg EPA and 25 mg/kg DHA (Cunningham and Hall, 2011).

PCSO-524® (Antinol®) is supplement extracted from New Zealand green-lipped mussel (Perna caniculus) and mixed with olive oil and vitamin E. It is a rich source of sterol esters, sterols, polar lipids, triglycerides and free fatty acid including EPA and DHA. It prohibits function of proinflammatory leukotriene (LT) B4 in human monocytes and reduces Thromboxane B2, prostaglandin (PG) E2 andInterleukin (IL) 1β. This mechanism is similar to the function of omega 3 PUFA (Mickleborough, 2013). Its anti-inflammatory, gastroprotective, antihistamine, antioxidant, anticytokines and antiarthritis effects have been reported (Coulson et al.,2015).

Reduction of Serum Amyloid A (SAA), which is an acute phase protein used as inflammation marker, is consistent with the effect of PCSO-524® (Antinol®). As a supplement consisting mainly of Omega-3 Polyunsaturated Fatty Acid such as eicosapentaenoic (EPA) and docosahexaenoic (DHA), PCSO-524® (Antinol®) has cardio protective and anti-inflammatory effect and immunomodulatory activity. When compared to fish oil, PCSO-524® (Antinol®) is more effective for controlling inflammation (Jamikorn and Yibchok-auun, 2014). Taurine use is indicated for treatment of taurine deficiency and not for Hypertrophic Cardiomyopathy (HCM)(Etkin, 2004).

Conclusion and Take home message

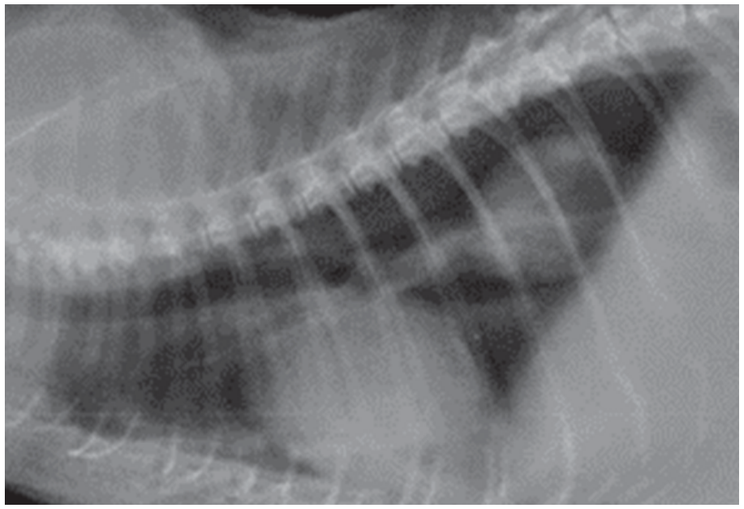
Use of PCSO-524® (Antinol®) in cats having Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM) in this case resulted in improvement of life quality and activities including appetite and weight gain. The effect of PCSO-524® (Antinol®) is due to main ingredient, Omega-3 Polyunsaturated Fatty Acid, that is consisting of eicosapentaenoic (EPA) anddocosahexaenoic (DHA). Decrease of Serum Amyloid A (SAA)which is an inflammatory marker in cats indicates that EPA and DHA have cardio protective and anti-inflammatory effect, and enhance immunomodulatory activity.

Cardiac cachexia is a condition that the body losses lean body mass. It can occur in humans who have heart failure. In animals, cardiac cachexia is found in case of Congestive Heart Failure (CHF) resulting in weakness, compromised immune, and decreased chance of survival. Cardiac cachexia syndrome is also induced by other conditions such as anorexia, increased energy demand, and change of metabolism. Inflammatory cytokines such as tumor necrosis factor and interleukin 1 are directly associated with cachexia since they cause anorexia, increased energy demand, and loss of body mass. Treatment of cachexia therefore requires inhibition of cytokines function. Fish oil supplement is effective for control of inflammatory cytokines as it has high Omega-3 Polyunsaturated Fatty Acid that can reduce the risk of having cachexia and Congestive Heart Failure (CHF). Fish oil supplement can also increase appetite (Freeman, 2013).

The cat in this case study was prescribed with PCSO-524® (Antinol®) which is highly consisting of Omega-3 Polyunsaturated Fatty Acid similarly to fish oil. Therefore, similar treatment effects such as increased appetite and reduced chance of cardiac cachexia was observed from improvement of ingestion and weight gain.

To treatment of Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM) in cats, veterinarians may have to consider medications that have effects on cardiac function, blood pressure, and anti-inflammation. Monitoring of any abnormal signs by the owner is also necessary since the disease may cause acute disorders at all time. In this case, only one cat with Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM) was treated and more cases should be explored for further study.

Figures and tables



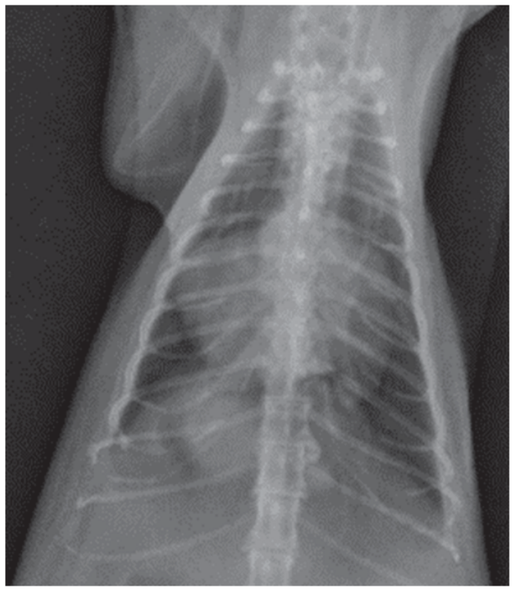


Figure 1. X-ray images showing heart enlargement and Space occupying lesion at the right lung lobe in female Persian cat aged 21 years

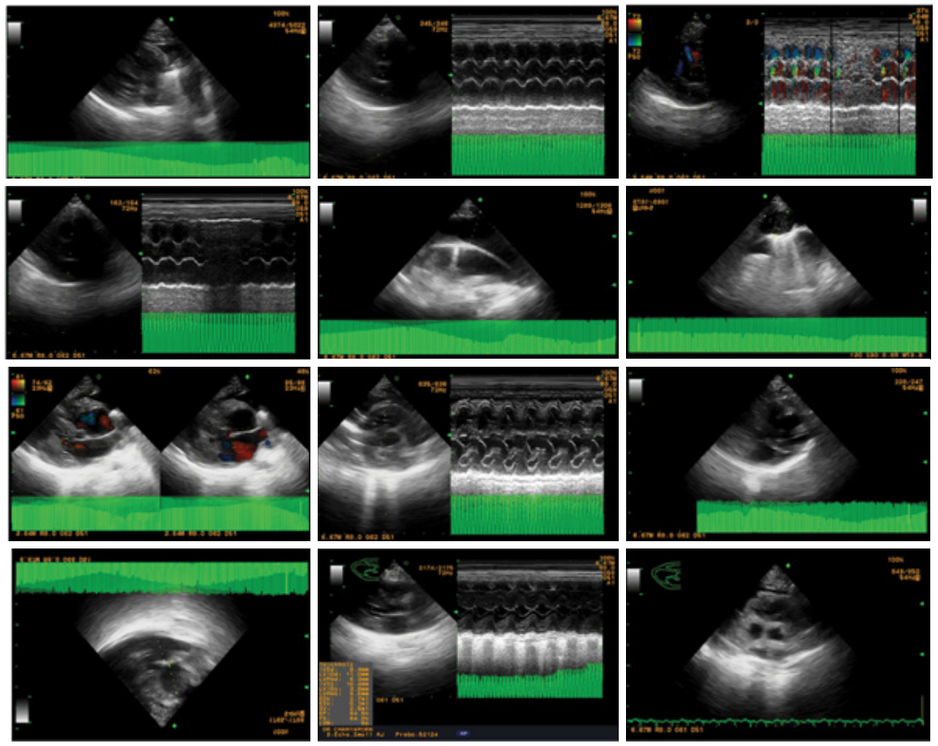


Figure 2. Results of M mode Echocardiography of the heart in female Persian cat aged 21 years showing IVSd (9.40 mm), LVDd (11 mm), PWd (6.30 mm), IVSs (10.40 mm), LVDs (3.9 mm),PWs (9.6 mm),LV mass (ASE) (15.37 g.), RWT (1.15), EDV (Teich) (2.66 ml), ESV (Teich) (0.1 ml), EF (Teich) AO (9.00). Dynamic Hypertrophic Obstructive Cardiomyopathy (HOCM) was diagnosed.

Table 1. Results of echocardiography examination in female Persian cat aged 21 years

1.General	No mass are noted.There is mild pleural effusion with pleuritis.
	Heart rate is normal and rhythm appeared LBBB throughout the examination.
	Blood pressure, Systolic 88 mmHg Diastolic 60mmHg MAP60mmHg Heart rate172bpm.
	The left and right atrial chambers appear mild dilated and wall thickness of IVS,LVW,RVW appears severe thickness(>6mm).
	Symetrical concentric LV hypertrophy without pericardial effusion.
2.Mitral Valve	Right parasternal long axis and Left apical 4 chamber view
	Normal appearance of mitral valve leaflet
	Mild to moderate function mitral valve regurgitation
3.Tricuspid Valve	Right parasternal long axis and Left apical 4 chamber view
	Normal appearance of tricuspid valve.
	Mild to moderate function tricuspid regurgitation
4.Aortic Valve	The aortic valve is normal in structure and function.
	The aortic valve is trileaflet and open well.
	No hemodynamically significant valvular aortic stenosis.
	Mild aortic regurgitation is present.
5.Pulmonic Valve	The pulmonic valve is normal in structure and function.
	The pulmonic valve is trileaflet. The pulmonic valve open well.
	No hemodynamically significant valvular pulmonic stenosis.
	No pulmonic regurgitation is present.
6.Pericardium	Normal
	No pericardium effusion was seen.
Diagnosis	Dinamic Hyperthrophic Obstructive Cardiomyopathy (HOCM)

Table 2. Hematological test results during 45 days of PCSO-524® (Antinol®) administration

Hematological parameter	Unit	Normal range	Day 0	Day 15	Day 30	Day 45
CBC	X106 cells/mm³	5-10	8.5	10.9	10.1	7.6
Hemoglobin	g/dl	10-15	12.7	14.2	12.3	12.6
Hematocrit	%	30-45	37	42	35	38
WBC	cells/mm³	5,500-19,000	10,600	9,100	9,500	10,300
Neutrophils	%	35-75	59	65	84	76
Band	%	0-2	0	0	0	0
Eosinophils	%	0-4	11	4	1	5
Lymphocytes	%	27-36	29	29	14	18
Monocytes	%	0-5	1	2	1	1
Platelet	X109 cells/mm³	300-600	355	358	386	338

Table 3. Clinical blood chemistry test results during 45 days of PCSO-524® (Antinol®) administration

Clinical Blood Chemistry	Unit	Normal range	Day 0	Day 15	Day 30	Day 45
SGPT(ALT)	U/L	10-100	89	54	62	55
SGOT(AST)	U/L	10-100	117	98	102	86
Creatinine	mg/dl	0.6-2.4	1.6	1.4	1.4	1.6
BUN	mg/dl	14-36	31	24	20	29
AlkalinePhosphatase	U/L	10-50	68	49	52	44
Cholesterol	mg/dl	75-220	149	120	125	119
Triglyceride	mg/dl	29-291	112	98	68	51
SerumAmyloidA(SAA)	Ug/ml	< 5	10.5	< 5	< 5	<5

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