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Therapeutic Effect of Oyaksungisan in Dogs with Facial Nerve Paralysis

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Abstract : Herbal medicines are widely used to treat a variety of human diseases. However, therapeutic effect of herbal medicine on the canine facial nerve paralysis (FNP) has not been investigated. This study examined therapeutic effects of Oyaksungisan on the canine FNP. Ten dogs with the induced canine FNP were equally divided into the control and an herbal medicine-treated groups (5 dogs, Oyaksungisan-treated group), respectively. No treatment was given to the control group. In the Oyaksungisan-treated group, Oyaksungisan was administered orally, twice per day for 2 weeks (50 mg/kg) after inducing FNP. Significant differences in the clinical scores were detected between the Oyaksungisan-treated and control groups on day 14 ($p < 0.05$). The serum creatine kinase (CK) activities in the Oyaksungisan-treated group showed a tendency to decrease but there was no significant difference compared with those of the control group. In conclusion, Oyaksungisan was effective for the induced canine FNP.

Key words **:** Oyaksungisan, canine, facial nerve paralysis.

Introduction

Facial nerve paralysis (FNP) is a disease resulting from an abnormality of the facial nerve in humans and animals. Canine and feline FNP can be caused by trauma, neoplasia, otitis media/internaand hypothyroidism (10,21). However, in western medicine, most causes are considered to be idiopathic (1,8). FNP results in a loss of facial muscle function. The most obvious signs are an inability to blink the eye on the ipsilateral side, an abnormality of the palpebral and corneal reflex, and a drooping of the ear. Symptomatic therapy is commonly used to treat human and animal FNP in western medicine (17).

According to the theory of the traditional oriental medicine (TOM), FNP in human is considered to be a disease of the stomach meridian and gall bladder meridian, and is caused by deficiency of qi and xie (15).

Herbal medicine have been used to treat a variety of diseases including FNP in human diseases (3,4,13,18,22). However, there are few reports aboutthe effects of herbal medicine in veterinary field (11,12,16). As for treatment of canine FNP, only the therapeutic effect of bee-venom and dexamethasone (9) and needle-acupuncture (AP) (8) were reported in canine FNP.

It is known that Oyaksungisan is commonly used to enhance the flow of "qi" for the treatment of paralysis in human (20). However, resarch about therapeutic effect of Oyaksungisan was not performed in treatment of canine FNP till now. In this study therapeutic effect of Oyaksungisan on the induced canine FNP was investigated.

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Materials and Methods

Experimental animals

A total of 10 clinically healthy mongrel dogs (2 to 3 years old, 2.0 to 5.6 kg BW) were used in this study. The experimental dogs were fed commercial dog food (Sun-Jung Co., Korea) for 2 weeks before the experiment. This study was performed in accordance to the rules of the Ethics Committee for Experimental Animals, Chungnam National University.

Division of experimental groups and treatment in each group

The experimental animals were divided into 2 groups: control group (5 dogs) and herbal medicine-treated group (5 dogs, Oyaksungisan-treated group). No treatment was given to the control group. In the Oyaksungisan-treated group, Oyaksungisan (Han Pung Pharmaceutical Co., Korea) was administered with 50 mg/kg, BID for 2 weeks after inducing FNP.

Induction of FNP

The induction of FNP was performed by clamping the facial nerve using 3 straight hemostatic forceps for 20 minutes under tiletamine-zolazepam anesthesia (Zoletil®, Virbac, France) according to the method reported by Jun *et al.* (9).

Assessment in changes of clinical symptoms of FNP

The changes in the clinical symptoms (symmetry of lips and sialosis) of FNP during the experimental period were made using the clinical scores (normal. 0 mild. 1 moderate. 2 and severe. 3), respectively (Table 1).

Table 1. Assessment of the clinical signs in the experimental groups

Clinical signs	Score	Definition
Mouth	0	Normal
	1	Mild, slight asymmetry
	2	Moderate, slightly weak with a maximum effort
	3	Severe, asymmetry with a maximum effort
Sialosis	0	Normal
	1	Mild, some saliva at end of the lips
	2	Moderate, drooping at times
	3	Severe, always drooping
Eye	0	Normal
	1	Mild, complete closure with minimal effort
	2	Moderate, complete closure with maximum effort
	3	Severe, incomplete closure

Determination of serum creatine kinase (CK) activities

Changes in serum CK activities were determined using an autoanalyzer (VETTEST, IDEXX, USA)

Statistical analysis

Statistical significance was determined by student t-test using the SPSS 12.0 K for Windows package ($p < 0.05$).

Results

Changes of clinical symptoms

The clinical scores in the Oyaksungisan-treated group decreased after treatment but were similar to the pre-treatment scores in the control group. At day 0, clinical symptoms such as asymmetry of mouth, salivation and inability of blinking were detected in all experimental animals. At day 7, improvements of asymmetry of mouth and salivation were

Table 2. The change in the clinical symptoms in the experimental groups

Groups	Days after induction of FNP			
	pre	0	7	14
Control	0.0 ± 0.0	7.5 ± 0.6	6.5 ± 0.6	7.3 ± 0.5
Oyaksungisan	0.0 ± 0.0	7.0 ± 1.4	5.8 ± 1.0	4.8 ± 0.5*

(Results are shown as the mean ± S.D. *significant difference between control and Oyaksungisan-treated groups, $p < 0.05$)

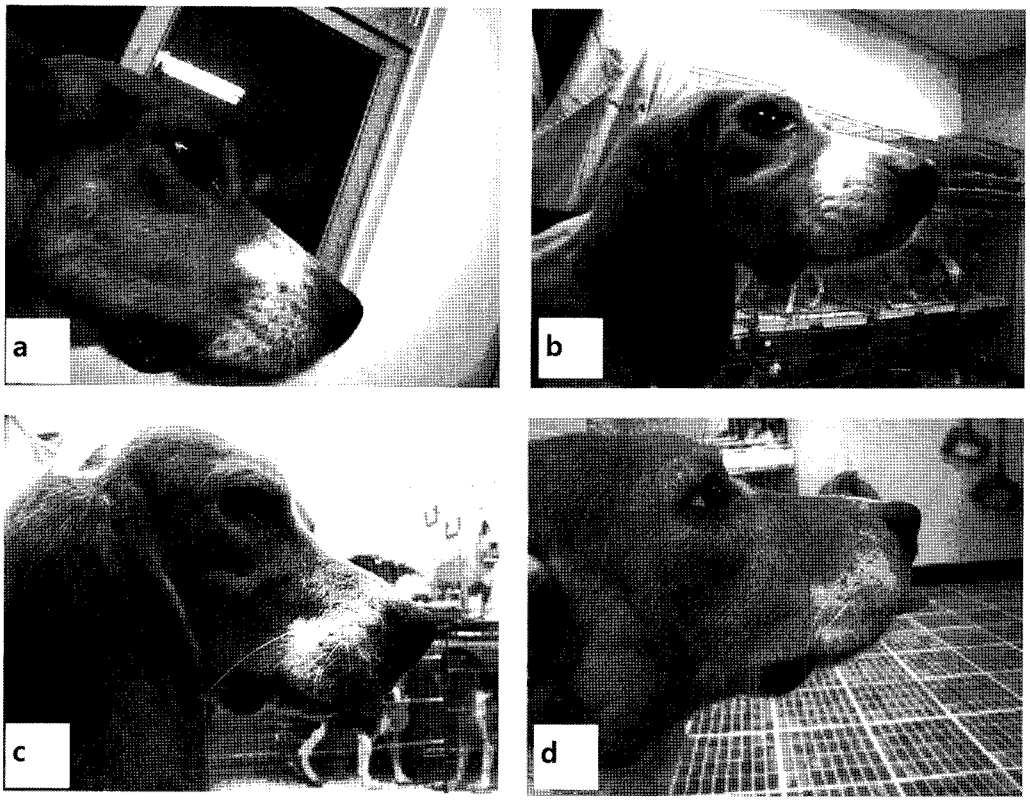

Fig 1. The changes in the FNP symptoms in the experimental groups (a: day 0 in control group, b: day 14 in control group, c: day 0 in Oyaksungisan-treated group, d: day 14 in Oyaksungisan-treated group).

Table 3. The changes in the serum CK activities in theexperimental groups

Groups	Days after induction of FNP			
	pre	0	7	14
Control	169.4 ± 50.2	108.2 ± 39.3	284.4 ± 145.4	135.6 ± 32.7
Oyaksungisan	166.8 ± 40.6	118.6 ± 44.0	205.2 ± 90.5	137.6 ± 53.6

detected in Oyaksungisan-treated group, but only salivation was a little improved in control group. At day 14,clinical symptoms such as slight asymmetry of mouth, no drooping and complete closure with maximum effort of eye were detected in Oyaksungisan-treated group, while no improvements of clinical symptomswere detected in control group. In addition, There was significant difference in the clinical scores between the Oyaksungisan-treated and control groups at day 14 ($p < 0.05$, Table 2 and Fig 1).

Changes of serum CK activities

The serum CK activities did not show a regular pattern of change with each treatment in the Oyaksungisan-treated and control groups. The Oyaksunkisan-treated group showed a tendency to decrease compared with the control group. However, there was no significant difference in change of serum CK activities between the Oyaksungisan-treated and control groups (Table 3).

Discussion

FNP is generally called Bell's palsy. Corticosteroids, needle-AP, electro-AP, silver spike point therapy combined by electro-AP and herbal medicines have been used to treat human FNP. However, the therapeutic effects of needle-AP and injection-AP with dexamethasone and bee-venom (apitoxin) have only been examined in canine FNP (6,7,20).

Oyaksungisan is a herbal medicine described in Dong Eu Bo Gam that consists of Ephedra herba, Auranti nobilis percarpium, Linderae radix, Cnidii rhizoma, Angelicae davuricae radix, Bombycis corpus, Aurantii fructus, Platicodi radix, Zingiberis rhizoma siccum, Glycyrrhizae radix, Zingiberis rhizoma and Ziziphi fructus. This prescription is commonly used to enhance the flow of "qi" for the treatment of paralysis (20).

The anti-inflammatory, anti-arthritis and analgesic effects of Oyaksungisan have been reported. Kim *et al.* (13) investigated anti-inflammatory effect of Oyaksungisan on inflammation caused by TNF-α, IL-1β, IL-6 and IL-10 and TNF-β1. Moon *et al.*(14) reported anti-inflammatory and analgesic activities of Oyaksungisan. In addition, Ha *et al.*(5) reported that injection-AP with Oyaksunkisan inhibited the inflammatory reaction and muscular tissue necrosis in rats with adjuvant-induced arthritis.

This study investigated the therapeutic effect of Oyaksungisan on canine FNP. The results showed improvement in clinical symptoms, and a significant difference was detected between the Oyaksungisan-treated and control groups. Regarding the changes of serum CK activities, the Oyaksunkisan-treated group showed a tendency to decrease, compared with those of the control group but no significant difference was detected.

On the other hand, Jun *et al.* (9) examined the therapeutic effect of an injection-AP with apitoxin and dexamethasone at LI04, LI20, ST02, ST07, TH17, SI18, GB03 and GB34, twice/week for 2 weeks, and reported that the apitoxin and dexamethasone groups showed significantly different clinical scores and serum CK activities than those of the control group. In this study therapeutic effect of Oyaksungisan for treatment of canine FNP was investigated, however, more precise researches about herbal medicines combined by AP therapy should be performed in the future.

In conclusion, Oyaksungisan was effective for treatment of the induced canine FNP.

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개 안면신경마비에 대한 오약순기산의 치료효과

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요 약 : 한약제는 사람의 많은 질병의 치료를 위하여 사용되어 왔으나, 개 안면신경마비에 대한 한약제의 치료 효과는 현재까지 검토된 바 없다. 개 안면신경마비에 대한 오약순기산의 치료 효과를 조사하였다. 인공적으로 안면신경마비를 유발한 총 10두의 개를 대조군(5두)과 한약제 치료군(5두, 오약순기산 치료군)으로 나누어 공시하였다. 대조군은 아무런 처치를 하지 않았으며, 오약순기산 치료군은 1일 2회, 총 2주간 오약순기산(50 mg/kg)을 경구 투여하였다. 오약순기산 치료군의 임상 지표는 대조군에 비하여 14일($p < 0.05$)에 유의성 있는 개선을 보였다. 오약순기산 치료군의 혈청 CK 활성 변화는 대조군에 비하여 낮은 경향을 나타냈지만 유의성은 인정되지 않았다. 결론적으로, 오약순기산은 개 안면신경마비 치료에 유효한 것으로 판단되었다.

주요어 : 오약순기산, 개, 안면신경마비