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·*Complementary Medicine*·

Study of the efficacy of Korean Red Ginseng in the treatment of erectile dysfunction

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Abstract

Aim: To examine the treatment efficacy of Korean Red Ginseng (KRG) in impotent men with erectile dysfunction (ED). **Methods:** A total of 60 patients presenting mild or mild to moderate ED were enrolled in a double-blind, placebo-controlled study in which the efficacies of KRG and a placebo were compared. The patients received either 1 000 mg (3 times daily) of KRG or a placebo. **Results:** The five-item version of the International Index of Erectile Function (IIEF-5) score after the treatment was significantly higher in the KRG group compared with that before the treatment (from 16.4 ± 2.9 to 21.0 ± 6.3, $P < 0.0001$). In contrast, there was no difference before and after the treatment in the placebo group (from 17.0 ± 3.1 to 17.7 ± 5.6, $P > 0.05$). In the KRG group, 20 patients (66.6%), reported improved erection, significant in the global efficacy question ($P < 0.01$); in the placebo group there was no significance. Scores on questions 2 (rigidity), 3 (penetration), 4 and 5 (maintenance), were significantly higher for KRG than those for the placebo when those questions were answered after 12 weeks of each treatment ($P < 0.01$). When the score in the KRG group was compared to the placebo group after the treatment, there was a significant improvement in total score (IIEF-5 score) in questions 3 and 5 for the KRG-treated group ($P < 0.001$ and $P < 0.0001$, respectively). The levels of serum testosterone, prolactine and cholesterol after the treatment were not statistically significant different between the KRG and the placebo group ($P > 0.05$). **Conclusion:** Our data show that KRG can be an effective alternative to the invasive approaches for treating male ED. *(Asian J Androl 2007 Mar; 9: 241–244)*

Keywords: penis; impotence; ginseng; penile erection

1 Introduction

Among the three main lines of therapy for erectile dysfunction (ED), that is, oral therapy, self-injection therapy and penile prosthesis implantation, the first line therapy is always the first option. Despite the successful advent of sildenafil, the first effective oral agent for ED, further development of new drugs and phytochemical studies of widely known herbal plants are desirable. Furthermore, there seems to be a large population that prefers to use phytotherapies rather than pharmaceutical drugs for their health. Phytotherapy plants used frequently for ED include *Fadogia agrestis*, Ginseng and *Withania somnifera* [1, 2].

Ginseng is one of the most popular herbs in both

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Eastern and Western countries. It is known as a traditional Asian medicine for stimulation of sexual function [3] and studies have shown the effects of ginseng on relaxation of penile corpus cavernous smooth muscle in rabbits [4, 5]. We determined the real role of Korean Red Ginseng (KRG) in the treatment of ED. Our secondary goals were to determine if there are any changes in both hormonal levels and lipid profiles of the treated patients. In the present study, we analyzed patients' response to KRG treatment, through the five-item version of the International Index of Erectile Function (IIEF-5).

2 Materials and methods

A total of 192 patients were selected by one urologist in the Urology Clinic of São Paulo University, from July 2004 to September 2004. The patients responded to the IIEF-5 questionnaire. Of these patients, 60 with IIEF-5 scores between 13 and 21 (mild or mild to moderate ED) were included in the study. The exclusion criteria included history of radical prostatectomy, spinal cord injury, neurological impairments, Peyronie's disease, drug abuse and specific previous treatment.

The patients were divided into two groups with 30 patients in each group andrandomized into a 12-week double-blind protocol, and received either 1 000 mg KRG or a placebo (capsule containing starch with KRG flavor) t.i.d.

Every patient returned for reevaluation through IIEF-5 every month over a 3-month period. All patients were asked about any improvement in erection and sexual life, as well as any side effects related to the treatment. At the end of the 3 months all parameters were compared between the KRG group and the placebo group. Outcome measures were assessed using IIEF-5 and a Global Assessment Questionnaire (GAQ) (Did this treatment improve your erections?). Average values of the variables were compared with the paired *t*-test with significance considered at $P < 0.05$. The Mann-Whitney *U*-test was used to compare GAQ.

The level serum testosterone, prolactine and cholesterol were measured in pre and post-treatment in the two groups.

3 Results

The average patient's age was 52.6 year(ranging from 26 to 70 years) in the KRG group and 54.3 years (ranging from 34 to 67 years) in the placebo group. Organic comorbidities included hypertension in 9 patients (30.0%) in the KRG group and 13 patients (43.3%) in the placebo group; diabetes in 4 patients (13.3%) in the KRG group and 6 patients (20%) in the placebo group (18%). Two patients (6.6%) had combined cardiovascular disease in the KRG group and 3 patients (10%) had combined cardiovascular disease in the placebo group (Table 1).

According to the IIEF-5 score there were 18 patients (60%) presenting mild ED and 12 patients (40%) with mild to moderate dysfunction in the KRG group. In the placebo group, there were 15 patients with mild (50%) and another 15 patients (50%) with mild to moderate ED scores. The average baseline IIEF-5 in the KRG group was 16.4 ± 2.9. This score increased to 21.0 ± 6.3 after treatment ($P < 0.01$). In the placebo group, the average baseline score was 17.0 ± 3.1 and changed to 17.7 ± 5.6 after treatment ($P > 0.05$) (Table 2).

In the KRG group, 20 patients (66.6%) reported improved erection in response to the global efficacy question ($P < 0.01$); in the placebo group there was no reported improvement. Rigidity and maintenance of erection besides penetration were significantly better in the KRG group compared to the those in placebo group ($P < 0.01$) (Table 2).

When the score after treatment in the KRG group was compared to that in the placebo group, a significant improvement in total score (IIEF-5) was evident for questions 3 and 5 ($P < 0.001$ and $P < 0.0001$, respectively) (Table 2). However, there was no difference between the two groups according to average serum testosterone, prolactine and cholesterol after treatment (Table 3).

No patients in the present study presented with hypogonadism (Table 3).

There were only minor side effects, represented by headache and insomnia in 3 patients in the KRG group.

4 Discussion

Phytotherapy plays a major role in the treatment of

Table 1. Comorbidites in patients treated with placebo and KRG (Korean Red Ginseng).

Comorbidities	KRG	Placebo
Hypertension, *n* (%)	9 (30.0)	13 (43.0)
Diabetes, *n* (%)	4 (13.3)	6 (20.0)
Cardiovascular disease, *n* (%)	2 (6.6)	3 (10.0)

Table 2. Pre- and post-treatment score of the patients. IIEF-5, The five-item version of the International Index of Erectile Function; KRG, Korean Red Ginsen; GAQ, Global Assessment Questionnaire; NS, not significant. Qn, IIEF questions.

	Pre-treatment	Post-treatment	*P*-value
IIEF-5			
KRG	16.4 ± 2.9	21.0 ± 6.3	*P* = 0.00003
Placebo	17.0 ± 3.1	17.7 ± 5.6	NS
P-value		*P* = 0.0002	
Q1			
KRG	3.4 ± 1.2	3.8 ± 1.4	NS
Placebo	3.1 ± 1.3	3.2 ± 1.1	NS
P-value		NS	
Q2			
KRG	2.4 ± 1.1	3.1 ± 1.4	*P* = 0.0013
Placebo	2.5 ± 0.9	2.7 ± 1.2	NS
P-value		NS	
Q3			
KRG	3.0 ± 1.0	3.8 ± 1.2	*P* = 0.002
Placebo	2.9 ± 1.1	3.0 ± 1.2	NS
P-value		*P* = 0.002	
Q4			
KRG	2.4 ± 0.9	3.5 ± 1.4	*P* = 0.0001
Placebo	2.6 ± 1.1	2.9 ± 1.3	NS
P-value		NS	
Q5			
KRG	2.7 ± 0.9	3.6 ± 1.1	*P* = 0.00003
Placebo	3.0 ± 1.0	3.0 ± 1.2	NS
P-value		*P* = 0.014	
Q15 (GAQ)			
KRG	2.5 ± 0.7	3.2 ± 1.0	*P* = 0.0003
Placebo	2.8 ± 0.7	2.9 ± 0.8	NS
P-value		NS	

Table 3. Laboratory value. KRG, Korean Red Ginseng; HDL, high-density lipoprotein; LDL, low density lipoprotein, NS, not significant.

Treatment	Pre-treatment	Post-treatment	*P-value*
Testosterone			
KRG	552.0 ± 120.7	560.0 ± 112.5	NS
Placebo	540.3 ± 109.8	508.8 ± 103.0	NS
Prolactine			
KRG	8.2 ± 2.8	8.0 ± 2.0	NS
Placebo	10.0 ± 3.6	9.9 ± 3.1	NS
Cholesterol			
KRG	192.1 ± 47.7	179.0 ± 36.8	NS
Placebo	205.0 ± 46.0	189.0 ± 52.9	NS
HDL			
KRG	44.4 ± 9.7	47.2 ± 10.4	NS
Placebo	56.7 ± 10.7	42.2 ± 7.4	NS
LDL			
KRG	192.1 ± 47.7	179.0 ± 36.8	NS
Placebo	205.0 ± 46.0	189.0 ± 52.9	NS

most diseases and is extremely important in many countries around the world. Oral therapy for ED presents obvious advantages over more invasive approaches (i.e. self injection therapy and penile implants), which has lead researchers to seek alternative herbal treatment for ED.

In the study by Ryu *et al.* [6], the antioxidant activity of KRG and its effect on erectile function in non-insulin-dependent diabetes mellitus rats is observed. Oxidative stress is an important factor in vascular complications of diabetes. McKay [7] and Adimoelja [8] demonstrated that some medicaments and plants can act through different mechanisms to improve sexual dysfunction. Bakircioglu *et al.* [9] concluded that serum cholesterol levels were similar in the cholesterol only rats and in those treated with a Chinese herbal medicine mixture, erectile response was significantly high. High levels of β-FGF and caveolin1 expression might protect the cavernous smooth muscle and endothelial cells from the harmful effect of high serum cholesterol.

Ginseng is very popular worldwide, and has traditionally been used for stimulating sexual function in men of all ages. Even in the USA approximately 6 million people use this plant for improving sexual dysfunction [10]. Ginseng has several potential healing properties and many pharmacological actions [3]. Ginseng enhances the nitric oxide (NO) synthesis in the endothelium, and works as an antioxidant and has a protective role [11, 12]. Therefore, the enhanced NO synthesis in the corpus cavernous could improve erection and have therapeutic action on ED.

In a previous study of the clinical efficacy of KRG for treatment of ED, significant improvement in the penile rigidity, libido and patient satisfaction was demonstrated in relation to trazodone and placebo groups [13].

In the present study, mean scores on erectile function and satisfaction domains were significantly higher for KRG than those for placebo after 12 weeks of the treatment. These significant improvements in IIEF-5 scores and favorable responses to the global efficacy question, besides the 66% success rate, have been suggested to represent clinically relevant success. The sig-

nificant increase in the score of the erectile function domain was confirmed by the positive results on questions 2, 3, 4 and 5. These results indicate a specific positive action of KRG on penile erection. Because there were no differences in serum testosterone, prolactin and cholesterol levels, it can be concluded that the beneficial effect of KRG on erectile function was not related to serum hormonal or cholesterol levels.

Ginseng has stimulatory and inhibitory effects on the central nervous system [14]. An animal study revealed the psychomotor effects of ginseng [15]. Furthermore, a favorable effect on psychomotor performance, including attention, processing and auditory reaction time, has been observed in healthy individuals receiving a ginseng extract [15].

Another explanation could be the uptake of γ-aminobutyric acid (GABA), glutamate, dopamine, noradrenalin and serotonin in rat brain synaptosomes in a concentration-dependent fashion [16]. Ginsenosides compete with the agonist for binding to GABA-A and GABA-B receptors [17]. These experimental results suggest that KRG could act centrally in the process of erection through multiple mechanisms that have not yet been completely elucidated.

KRG plays a beneficial role in ED treatment, without any severe side effects. Considering that many patients are reluctant to use potentially invasive pharmaceutical drugs to achieve erection, KRG could be a useful and popular alternative therapy.

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