THE EFFECT OF GINSENOSIDE-TRIOL ON THE POSTOPERATIVE RECOVERY IN GYNECOLOGICAL PATIENTS

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Abstract

Ginseng has been widely used in the Oriental world for more than 2,000 years. Its chemical and pharmacological studies have been published by many investigators of many countries. But its clinical studies have not been performed in satsifactory amount.

This study was carried out to evaluate the effect of ginsenoside-triol on the postoperative recovery in 120 cases of gynecological laparotomies. Daily dose of 0.23 gram of ginsenoside-triol was administered orally for three weeks after surgery to 60 cases, and placebo to 60 cases as control.

Hemoglobin, hematocrit, leukocyte count, serum total protein, albumin, cholesterol and glucose were studied at pre- and postadministration. At the same time, body weight, blood pressure and subjective symptoms such as appetite, bowel movement and digestion were checked.

The results obtained were summarized as follows:

1) The side effect was nil.
2) Hemoglobin and hematocrit were more increased in treated group than in control group, but the changes were not significant.
3) Serum total protein was more significantly increased in treated group than in control group.
4) Serum cholesterol was significantly less increased in treated group than in control group.
5) Serum glucose level was significantly decreased in both groups, more significantly in control group.
6) Body weight was significantly increased in treated group.

Introduction

Ginseng is one of the most important Oriental herb medicines which has widely been used in many countries including Korea. The history of ginseng in use of herb medicine could probably be traced back to more than two thousand years.

The tonic properties of ginseng have been known in herb treatment through its empirical application to patients. Saponins have been identified as the main components in pharmacological activity of ginseng[1,2,3,4]. The mode of pharmacological activity is believed to be stimulation of RNA and protein synthesis, and stimulation of sugar and lipid metabolism through numerous animal investigations[2,4,6]. Clinical research for the application of ginseng has been occasionally reported in journals and periodicals abroad[7,8,9]; however, this paper is the first report in the area of research on the clinical effects of ginseng in Korea.

We administered ginseng saponin for a certain period to gynecological patient in the post-

operative recovery phase, then evaluated its effects upon blood picture and improvements of subjective symptoms in order to confirm its tonic properties scientifically.

Materials and Methods

1. Materials

(A) Experimental population

One hundred and twenty patients who were admitted and received laparotomies at the Department of Obstetrics and Gynecology of Seoul National University Hospital from April 1, 1977 to October 30, 1977 were selected for the experiment. The patients were randomly selected and evenly divided into the control and the treated group. But the cases who were included in the final analysis were 49 cases in the treated group and 52 cases in the control group due to some failure of followup. Cervical and ovarian malignancy cases were excluded for the reason to give the same conditions to the both groups. So that only the benign cases who received laparotomies were included in this experiment.

Age distributions were the range of 20–65 years in treated group and that of 26–65 years in the control group, the most frequent age groups were 31–50 years in both the groups (Table 1).

Table 1. Age distribution

Age (yrs.)	Control		Treated	
	No. of cases	%	No. of cases	%
Less than 20	0	0.0	1	2.0
21–30	7	13.4	4	8.2
31–40	16	30.8	20	40.8
41–50	17	32.7	15	30.6
51–60	8	15.4	4	8.2
61 or more	4	7.7	5	10.2
Total	52	100.0	49	100.0

Among the postoperative diagnoses, myoma uteri (42.3% in control group and 36.7% in treated group) and uterine cervical diseases (28.8% in control group and 24.5% in treated group) were the most frequent. Other diagnoses included in this study were ectopic pregnancy, pelvic inflammatory disease, ovarian tumor, descensus uteri and adenomyosis (Table 2).

Table 2. Post-operative diagnosis

Diagnosis	Control		Treated	
	No. of cases	%	No. of cases	%
Myoma ut.	22	42.3	18	36.7
Ectopic preg.	5	9.6	6	12.3
CIS* & dysplasia	15	28.8	12	24.5
P.I.D.**	3	5.8	5	10.2
Ovarian tumor	3	5.8	5	10.2
Endometrial hyperplasia	1	1.9	1	2.0
Procidentia	3	5.8	2	4.1
Total	52	100.0	49	100.0

*CIS = Carcinoma in situ.
**PID = Pelvic inflammatory disease.

Table 3. Name of the operation

Operation	Control		Treated	
	No. of cases	%	No. of cases	%
TAH*	16	30.8	22	44.9
TAH+** unilat. adnexectomy	11	21.2	8	16.3
TAH+* bilat. adnexectomy	14	26.9	6	12.3
Unilat. adnexectomy	8	15.4	11	22.4
VTH**	3	5.7	2	4.1
Total	52	100.0	49	100.0

*TAH = Total abdominal hysterectomy
**VTH = Vaginal total hysterectomy

Types of laparotomies are shown in table 3. Total abdominal hysterectomy was the most frequent in both groups. Number of unilateral adenexectomy cases were 8 (15.4%) in control group and 11 (22.4%) in treated group.

(B) Medication

Ginsenoside-triol, one component of the ginseng saponins, was administered to the treated group and placebo, composed of lactose, was administered to the control group.

2. Methods

0.23 gm/day of ginsenoside-triol was admini-

stered orally to the treated group for the period of three weeks. This amount of ginsenoside-triol is regarded as the equivalent with 7.5 gm/day of crude ginseng, since average level of ginsenoside-triol contained in ginseng is about 3% of that. The equivalent amount of placebo was administered to the control group for the same period.

Blood samplings were carried out on the postoperative 5th day (preadministration) and on the postoperative 26th day after three weeks administration. They were analyzed to define hemoglobin, hematocrit, leukocyte count, serum total protein, albumin, cholesterol and glucose. The data which were obtained on pre- and postadministration were compared between the two groups.

Also body weight and blood pressures were measured to find the differences betweeen the two groups. Subjective symptoms such as appetite, digestion, bowel movements and general feeling were also recorded.

Results

The data on 49 cases in the treated group and 52 cases in the control group were finally acquired from 60 cases of initial target population, and then analyzed for study purposes.

The data were analyzed to find the statistical differences between the control and treated groups in the hematological and biochemical pictures, and the results are showed in table 4-11, figures 1 and 2.

Increments of hemoglobin levels in control and treated groups presented 0.94 gm/dl and 0.95 gm/dl respectively and the increments were statistically significant at the level of P value 0.05, but the differences in the increments between the two groups were not statistically significant (Table 4). And also hematocrit values showed the same trend as hemoglobin, that is, the increments of hematocrit in both groups revealed 2.3% respectively but the increments following treatment were statistically significant in both groups (Table 5).

Increments of total serum protein in control and treated groups showed 0.55 gm/dl and 1.0 gm/dl respectively and the increments were statistically significant and the difference between two groups were also statistically significant (Table 7, Fig 1).

Although the increments of serum albumin in both groups showed 0.6 gm/dl respectively, that was statistically significant. The results on the increments of total serum protein and serum albumin for the study groups refers that the significant increase of total serum protein in treated

Table 4. Hemoglobin

	(gm/100 ml)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	11.3 ± 1.5	12.3 ± 1.1	0.94 ± 1.5*
Treated (N = 49)	11.0 ± 1.4	12.0 ± 1.2	0.95 ± 1.2*
			P > 0.1

Table 5. Hematocrit

	(%)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	34.4 ± 4.3	36.7 ± 2.9	2.3 ± 4.5*
Treated (N = 49)	34.0 ± 4.1	36.3 ± 2.9	2.3 ± 3.6*
			P > 0.1

Table 6. Leukocyte

	(No./mm³)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	8328 ± 3070	6417 ± 1689	-1910 ± 2569*
Treated (N = 49)	6368 ± 1664	6416 ± 2150	96 ± 121
			P < 0.05

Table 7. Serum protein

	(gm/100ml)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	7.3 ± 0.7	7.8 ± 0.7	0.55 ± 1.0*
Treated (N = 49)	7.1 ± 0.5	8.1 ± 0.05	1.0 ± 0.6*
			P < 0.01

Table 8. Serum albumin

	(gm/100 ml)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	4.0 ± 0.6	4.9 ± 0.5	0.6 ± 0.8*
Treated (N = 49)	3.9 ± 0.3	4.5 ± 0.3	0.6 ± 0.4*
			P > 0.1

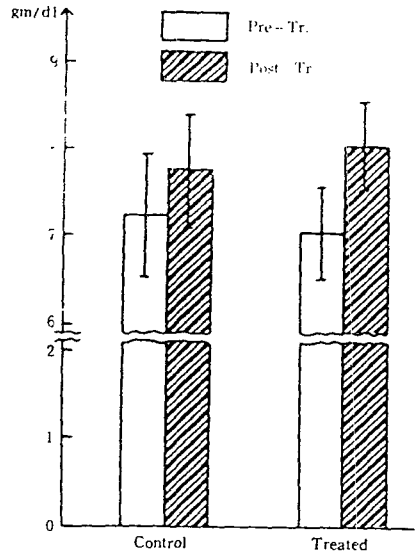

Fig. 1. Changes in serum protein content.

group comparing control group would mainly be caused by increase of serum globulin which is another major component of serum protein (Table 8).

Increments of serum cholesterol in control and treated groups presented 21.6 mg/dl and 11.5 mg/dl respectively and increments were significant and the difference in the increments between two groups were also statistically significant (Table 9, Fig. 2). These findings agree with previous studies performed in the animal experiments, which revealed that ginseng saponin lowered the blood cholesterol.

Table 9. Serum cholesterol

	(mg/100 ml)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	157.4±21.1	179.1 ± 27.3	21.6 ± 37.9*
Treated (N = 49)	163.9 ± 23.1	175.3 ± 32.1	11.5 ± 36.0*
			0.05 < P < 0.1

Decrements of serum glucose in control and treated groups revealed 32.5 mg/dl and 21.6 mg/dl respectively and the decrements were significant, and the difference in the decrements between two groups was also statistically significant (Table 10).

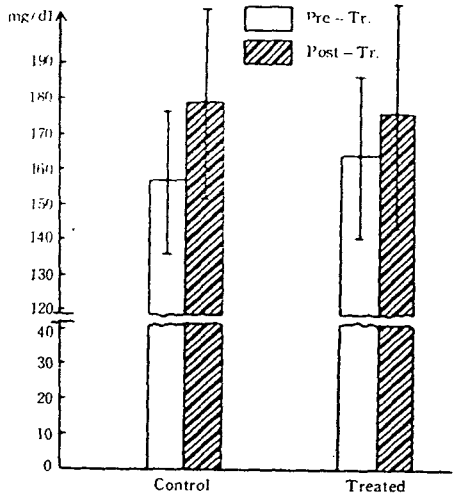

Fig. 2. Change in serum cholesterol.

Increment of body weight in the control group was 0.18 kg, and it was not statistically significant. But the increment in the treated group was 1.17 kg, and it was statistically significant (Table 11).

Table 10. Serum glucose

	(mg/100 ml)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	113.5 ± 35.6	81.0 ± 15.5	-32.5 ± 31.8*
Treated (N = 49)	115.2 ± 30.2	93.6 ± 12.0	-21.6 ± 29.6*
			P < 0.01

Table 11. Body weight

	(kg)		
	Pre-Tr.	Post-Tr.	Diff.
Control (N = 52)	51.2 ± 7.2	51.3 ± 7.5	0.18 ± 2.9
Treated (N = 49)	48.3 ± 7.3	49.4 ± 7.5	1.17 ± 1.9*
			P < 0.01

The differences of blood pressure, and subjective symptoms such as appetite, digestion, bowel movements were not significant between control and treated groups. But general feeling was improved in the treated group, but not significantly.

During this experiment we could not find any side effects which were believed to be a result of ginsenoside-triol.

Discussion

Although ginseng has been used in Chinese medicine since time immemorial under the vague impression that it has a tonic property, it is seldom used in modern medicine due to failure of scientific approach.

But recently the physiological and biochemical studies upon ginseng are actively carried out in many countries. The present trend of ginseng study is concerned mainly with the biochemical action of ginseng and its mechanism, and with determining which component of ginseng is biochemically active.

Now the active principle of ginseng is considered to be saponin when the activity is measured as protein biosynthesis, and the tonic effect is interpreted as a stimulatory effect on RNA and protein biosynthesis[1].

Oura[3] revealed that intraperitoneal administration of ginseng extract to rats was found to enhance the rate of synthesis of serum protein through the increment of the RNA polymerase activity in the liver, and reported that rats treated with extracts from roots of ginseng also produced an increase in serum protein.

In the experiment serum protein showed a significant increase in the treated group, so we could find the stimulating effect upon the protein biosynthesis of ginsenoside-triol.

The effect of ginseng on the metabolism of sugar and lipids is considered as follows. That is, liver glycogen content is reduced markedly and the reducing sugar level in liver, kidney and muscle is also decreased by the ginseng treatment. And the rate of lipid synthesis is increased transiently. Thus ginseng extract causes an increase in lipid synthesis and concomitantly reduced blood glucose and liver glycogen; ginseng saponin caused a transformation from carbohydrate to fat, and its transference from liver to the adipose tissue[4].

But in our clinical experiment blood sugar level showed a decreasing tendency in both control and treated groups. However the decreasing tendency was more remarkable in the control group than in the treated group.

This result means that our finding does not support previous results of animal studies in regard to the effect of ginseng on the metabolism of sugar.

Park[10] revealed that rats fed with ginseng extract for prolonged periods presented a significant decrease in the blood cholesterol levels, compared with the control group. He thought that this could be an answer to the question "how does ginseng play a therapeutic role in arteriosclerosis and hypertension?" Also in this experiment we could find less increase in blood cholesterol in the treated group than in the control group.

Ginseng saponin was considered also to have a hematopoietic action through the DNA, RNA, protein and lipid synthesis in bone marrow and the increment of mitotic indices in myeloid and erythroid[11]. But in this experiment we could not find the hematopoietic effect of ginsenoside-triol, and this result matches with the report of Arichi[8].

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