Proceedings of the 5th International Ginseng Symposium, Seoul, 1988

A Study of the Therapeutic Effects of Ginseng on Chi-deficiency Syndrome with Sphygmography

Hen-Hong Chang, Yung-Yu Shen, Yat-Kwong Chan, Shu-Yu Wang, and Chien-Chung Ma

China Medical College Hospital, 75 Yu-Der Road, Taichung, Taiwan, R.O.C.

Abstract

Since ancient times, records pertaining to chi-reinforecenent of ginseng have been documented in books of Chinese nedicine. We, therefore, assessed the therapeutic effects of ginseng on patients with chi-deficiency syndrome. Eighteen cases of chi-deficiency, screened at the outpatient service in the internal department of Chinse medicine at the China Medical College Hospital, were prescribed two grams of Korean red ginseng powder three times daily for a two week period. For evaluation, a questionnaire and diagnosis by sphygmography were conducted prior to and after administration of the prescription. For control purposes, fourteen volunteers fasted for more than five days (seven had access only to ginseng, and the other seven were given only mineral water) and were subsequently evaluated by the same criteria. Three results were obtained for the ginseng treated group : (1) improvements in symptoms of chi-deficiency such as fatigue and dizziness;(2) changes in pulse waves with time domains showing alternate P-waves, strengthened dicrotic waves, and some minute waves in the end-diastolic period ; (3) frequency domains with enhanced amplitudes around 12Hz. These three findings, which are consistent with each other, suggest the reinforcement of the effect of ginseng on "heart-spleen chi" in Chinese medicine.

Introduction

From June to September of 1987, eighteen cases with chi-deficiency were screened via outpatient department by our research unit. Korean red ginseng powder were prescribed for the continuous intake for two weeks. Changes of sphygmography were found to be as the following :

1. Alterenate P wave : including systolic buldge, systolic plateau and disappeared P wave.
2. The tendency of forming the dicrotic type wave.
3. Minute waves found in the end-diastolic phase.
4. The disappearance or obscurity of the "pulsus alternans" phenomenon.
5. The concentration of high frequency wave toward the low frequency area in frequency domain.

The above investigation was carried out in the outpatient department. Changing factors, such as patient's life-style or diet, might have affected the results of investigation.

Concerning the above situation, we designed another control group in comparison. Because of the concept that "chi" is abstracted from food, we asked for volunteers to fast for five days or more in order to produce artificial chi-deficiency syndrome. During the fast, we could observe the changes in sphygmography after the volunteers' intake of ginseng. We could also record the difference between the results of the control group and the effects of treatment in the pathological chi-deficiency syndrome.

Material and Method

1. Screening of patients and volunteers :

a. From the local cultural groups, we asked for volunteers under the age of fourty to perform a fast only with intake of mineral water and no food. We then divided them into group A and group B. The group A would continue a fast for more than five days until their subjective feeling of debility became unbearable. In the meantime, the group B would be give ginseng powder during the fast and stopped the fast at the seventh day. Just before and right after the fast, sphygmography, blood pressure, ECG, blood chemistry test and urine routine, etc. were performed.

b. Patients with chi-deficiency were screened during the outpatient service in the internal department of Chinese medicine at the China Medical College Hospital as group C. Diagnosis and record were proceeded by senior physicians. The patients were given oral intake of ginseng powder for two weeks as the treatment. Before and after the treatment, sphygmography was recorded.

2. Drugs : Two grams of Korean red ginseng powder introduced from the Korean Monopoly Corporation were prescribed for each intake with three intakes per day after meals. The mineral water that the group A and took B was Chi-Kang mineral water. Its contents were as te following (unit : p.p.m.) :

Calcium 15± 3 Magnesium 4.3± 0.2 Sodium 39± 3
Chloride 20± 3 Fluoride <0.1 Potassium 1.3± 0.1
Total alkalinity 106± 12 pH value : 7.5± 0.2

3. The Examination of Sphygmography

A. Instruments for recording sphygmography

(1). Pressure sensor : Entrans S/N 22V2U-D3-3 U.S.A.
(2). Computer : Multitech IBM 16-bit personal computer, Taiwan
(3). Interface : Microcomputer program co-designed with Instrument Inspection Section of the Nuclear Power Research Institute, Atomic Energy Commission and revised by the Medical Engineering Research Institute of Chung Yuan College of Science and Technology.
(4). EKG : Cardisuny 501A, FME, Japan
(5). Recording paper : Reporting paper of printer No : SF 80010
Specification : 80 columns, 9 1/2 "X11", Taiwan

(6). Holder and adjuster : Produced by Harvard Apparatus Limited Fircraft Way. Edenbridge Kent U.S.A.

(7). Pull gauge : Produced by Chatillon-N.Y.-U.S.A. Gauge-R

The above accessories were designed and combined by Prof. Shu-Yu Wang. With scale on the pull gauge, the pressure borne by the pressure sensor can be shown.

B. Measurement of pulse wave :

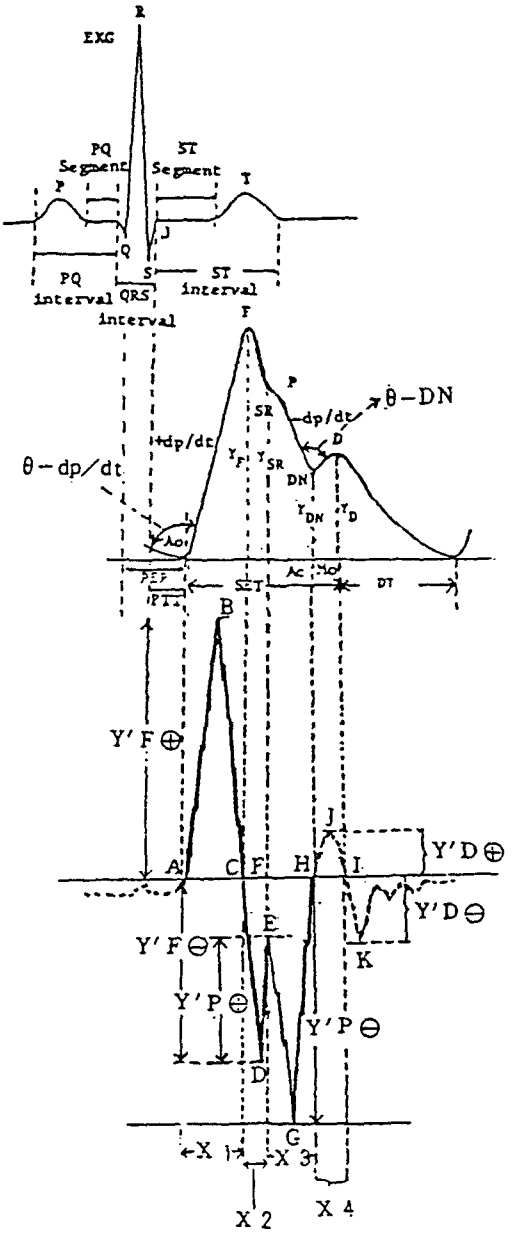
(1). The standarization of the sphygmography recorder : At a paper speed of 25 mm/sec on the X axis.

(2). The selection of measuring part for pulse wave : Take the pulsing sopt of radial artery on the palm side of wrist joint, which is equivalent to the horizontal of styloid process of radial bone, as the part of "Kwan" (關). Take the front end o "Kwan" close to the wrist joint as the part o "Tsun" (寸) and the back end of it as the part o "Chih" (尺).

(3). Patients examined were asked to sit on a chai at a height of 45 cm, lay their hand on a tabl at that of 80 cm, flatly stretch their arms an place their palms horizontally upward. Afterwards the pressure sensor was fastened tightly on thei skin under where radial artery pulses.

(4). The fixture may impose additional pressure or the sensor, which is equivalent to the method o "Fu, Chung, Chen" (浮,中,沈) in Chinese medicine The pressure added were respectively 50 gms, 150 gms and 200 gms.

C. Demonstration of Sphygmography and its first derivative data



X-axis : Time (25 mm/sec)
Y-axis : pulse pressure
Ao : Aortic valve opening
θ dp/dt : Angle of ascending limb
+ dp/dt : ascending limb
F : Apex of F wave (the first wave peak in systolic phase)
- dp/dt : Descending limb
P : Apex of P wave(the second wave peak in systolic phase)
DN : Dicrotic notch
θ DN : Angle of dicrotic notch
Ac : Aortic valve close
D : Dicrotic wave(the first wave peak in diastolic phase)
YF : The interval from the apex of F wave to the baseline
YP : The interval from the apex of P wave to the baseline
YDN : The interval from the dicrotic notch to the baseline
YD : The interval from the apex of D wave to the baseline
SET : Systolic ejection time
Y' F⊕ : The interval from point A to the baseline
Y' F⊖ : The interval from point D to the baseline
Y' P⊕ : The interval from point D to point E
Y' P⊖ : The interval from point G to the baseline
Y' D⊕ : The interval from point J to the baseline
Y' D⊖ : The interval from point K to the baseline
X1 : The interval from point A to point C
X2 : The interval from point C to point F
X3 : The interval from point F to point H
X4 : The interval from point H to point I

Fig. 1 Model of sphygmography and its first derivative measurement

Results

1. The distribution of cases : From November of 1987 to June of 1988, 34 cases were screened. 23 of the them were physiological and 11 of them were pathological Chi-deficiency syndrome. The distribution on sex and age were as shown in table 1.

2. The changes of body weight after fasting : In group A, members fasted from 5 to 11 days unequally. The average period of their fast was 7.3 days.

In group B, members all fasted for 7 days. They all took ginseng, but their descent of body weight was more prominent than that of group A.

The average descent of body weight was shown in table 2. Concerning the twelve persons in group A, the great differences among their original body weight should account for the main cause of insignificance in statistics.

3. Generally, the blood pressure decreased slightly after fasting. But, with the intake of ginseng in group B, the diastolic pressure showed a tendency of uprising in contrary. However, this increase had no statistical significance (As in table 3).

4. The changes of pulse rate after fasting : After fasting, the average pulse rates shown a prominent increase. Especially in group B, the increase was clearer as shown in table 4.

5. The changes in urinary examination : There was nothing particular in urinary examination after fasting exculsively on urinary pH value, which revealed significant decline (As in table 5). This might be related to the increased production of lipid metabolite such as ketone.

6. The changes of blood biochemistry after fasting : After the group A had fasted, their blood sugar decreased but cholesterol and triglyceride increased. All of these had shown significant changes. The picture clearly demonstrated that the energy supply inside the body became inadequate. Therefore, the metabolic pathways had changed and lipolysis occured. Lipids became the main source of energy supply.

Although there was a slight increase in GOT and GPT, it was within the normal range and showed no clear effect on the liver function. Sodium had also decreased slightly, but it was still within the normal range. The entire picture was shown in table 6, 7.

7. The changes on sphygmography : The sphygmogarphy was measured and analyzed with their first derivative data. The results were as the folling :

The patients with pathological Chi-deficiency syndrome had received treatment via outpatient service for 14 days. After measuring and analyzing their sphygmography before and after the treatment, no significant changes were shown as in table 8. In group A, only SET had shown a significant decrease after fasting and other factors had no statistically significant changes as in table 9.

In group B with simultaneous intake of ginseng during fasting, the amplitudes of F wave, D wave and DN point all appeared to have significant decreases, and the DN point became lower as in table 10. After we compared the data of both group A and B after fasting, these changes became even more prominent as shown in table 11.

Table 1. Case distribution on sex and age

	Group A	Group B	Group C
Male	10	8	3
Femal	2	3	8
Total	12	11	11
Averagely age (year)	32.8± 4.8	32.5± 5.3	38.5± 13.6

Table 2. Changes on body weight after fasting

	Before fasting	After fasting	Difference	T value	P value
Group A (N=12)	61.36± 10.34	57.21± 10.56	-4.15	T=0.97 (df=22)	N.S**
Group B (N=11)	61.04± 3.77	56.77± 3.53	-4.27	T=2.74 (df=20)	P<0.05

* Unit : Kilogram
** No significance

Table 3. Changes on arterial blood pressure after fasting (Systolic / Diastolic)

	Before fasting	After fasting	Difference	T value	P value
Group A (N=12)	109.4± 7.9 63.8± 7.1	106.2± 5.8 61.5± 6.6	-3.2/-2.3	1.13/0.82	N.S**
Group B (N=11)	110.5± 11.6 60.5± 9.6	107.8± 8.6 66.2± 8.8	-2.7/+5.7	0.62/1.45	N.S

* Unit : mmHg
** No significance

Table 4. Changes on pulse rate after fasting

	Before fasting	After fasting	Difference	T value	P value
Group A (N=12)	77.4± 11.2	82.2± 10.3	+ 4.8	1.08	N.S*
Group B (N=11)	71.2± 5.3	82.6± 10.5	+11.4	3.22	P<0.05

Unit : beats / minute
* No significance

Table 5. Changes on urine pH value after fasting

	Before fasting	After fasting	Difference	T valu	P value
Group A (N=12)	5.99± 0 53	6.02± 0.77	0.03	T=0.11 (df=22)	N.S *
Group B (N=11)	6.40± 0.99	5.77± 0.26	-0.63	T=2.04 (df=20)	P<0.05

* No significance

Table 6. Changes on blood biochemistry after fasting (Group A)

	Before fasting	After fasting	difference	T value*	P value
Cholesterol	180.7± 24.75	221.1± 36.19	40.4	T=3.06	P<0.05
Triglyceride	69.4± 21.69	93.4± 28.75	24.0	T=2.21	P<0.05
Albumin	4.18± 0.18	4.27± 0.19	0.09	T=1.14	N.S**
Globulin	3.1± 0.39	3.23± 0.33	0.13	T=0.84	N.S
Glucose A.C	79.74± 15.41	64.77± 9.23	14.97	T=2.76	P<0.05
A/G	1.33± 0.1	1.28± 0.08	0.05	T=1.29	N.S
GOT (AST)	15.2± 7.41	23.36± 8.59	8.16	T=2.39	P<0.05
GPT (ALT)	9.73± 3.75	20.7± 15.05	10.97	T=2.35	P<0.05
Na	141.00± 1.87	138.46± 1.86	2.54	T=3.19	P<0.05
K	4.47± 0.6	4.48± 0.3	0.01	T=0.05	N.S
Ca	9.94± 0.54	9.78± 0.04	0.16	T=0.98	N.S

* n=12, df=20
** No significance

Table 7. Changes on blood biochemistry after fasting (Group B)

	Before fasting	After fasting	difference	T value*	P value
Cholesterol	155.08± 51.29	234.16± 43.89	79.08	T=4.06	P<0.05
Triglyceride	100.33± 38.74	131.66± 49.52	31.33	T=1.73	P<0.05
Albumin	4.43± 0.2	4.80± 0.56	0.37	T=2.16	P<0.05
Glucose A.C	82.00± 9.59	65.33± 12.16	16.67	T=3.88	P<0.05
Na	141.53± 1.42	138.92± 3.47	2.61	T=2.41	P<0.05
K	4.03± 0.27	4.40± 0.32	0.37	T=3.05	P<0.05
Ca	9.61± 0.25	9.79± 0.26	0.18	T=1.75	P<0.05

* n=12, df=22

Table 8. Quantifying analysis on spygmography of Group C

	Before treatment	After treatment	T value*	P value
PR	74.45± 13.35	72.54± 10.88	T=0.38	N.S**
YF	29.04± 10.98	30.06± 4.94	T=0.25	N.S
YD	11.95± 4.28	12.65± 3.85	T=0.4	N.S
YDN	10.10± 3.57	11.18± 3.21	T=0.75	N.S
F/D	2.43± 0.45	2.50± 0.71	T=0.29	N.S
F/DN	2.91± 0.66	2.81± 0.82	T=0.31	N.S
D/DN	1.19± 0.2	1.12± 0.01	T=0.98	N.S
θ(dp/dt)	65.90± 12.87	69.36± 20.64	T=0.47	N.S
θ(DN)	59.00± 31.84	75.18± 32.65	T=1.18	N.S
SET(sec)	0.3135± 0.03	0.3293± 0.02	T=1.45	N.S
XI(sec)	0.1102± 0.01	0.1109± 0.01	T=0.16	N.S
dp/dt	7.83± 3.67	7.71± 2.08	T=0.09	N.S

* n=11, df=20
** No significance

Table 9. Quantifying analysis on sphygmography of Group A

	Before fasting	After fasting	T value*	P value
PR	77.41± 11.16	82.16± 10.32	T=1.08	N.S**
YF	21.73± 7.91	20.37± 6.9	T=0.45	N.S
YD	8.59± 3.18	7.51± 2.49	T=0.93	N.S
YDN	6.88± 2.96	5.6 ± 3.04	T=0.22	N.S
F/D	2.60± 0.45	2.724± 0.26	T=0.86	N.S
F/DN	3.76± 1.87	4.25± 1.69	T=0.67	N.S
D/DN	1.40± 0.50	1.58± 0.71	T=0.74	N.S
θ(dp/dt)	71.00± 17.52	72.75± 14.23	T=0.27	N.S
θ(DN)	77.00± 26.25	72.75± 26.19	T=0.48	N.S
SET(sec)	0.3043± 0.02	0.2730± 0.03	T=3.01	P<0.05
XI(sec)	0.11± 0.01	0.1033± 0.01	T=1.64	N.S
dp/dt	6.16± 3.23	6.11± 2.14	T=0.04	N.S

* n=12, df=22
** No significance

Table 10. Quantifying analysis on sphygmography of Group B

	Before fasting	After fasting +Ginseng	T value*	P value
PR	71.18± 5.34	82.63± 10.51	T=3.22	P<0.05
YF	24.9± 6.57	17.72± 4.94	T=2.90	P<0.05
YD	9.91± 3.41	6.23± 2.26	T=2.98	P<0.05
YDN	8.53± 2.25	3.94± 1.4	T=5.75	P<0.05
F/D	2.59± 0.38	3.05± 0.98	T=1.46	N.S**
F/DN	2.97± 0.49	5.17± 2.47	T=2.90	P<0.05
D/DN	1.15± 0.14	1.70± 0.59	T=3.01	P<0.05
θ(dp/dt)	71.72± 21.02	73.54± 16.75	T=0.24	N.S
θ(DN)	80.00± 31.53	67.63± 23.76	T=1.12	N.S
SET(sec)	0.3145± 0.03	0.2549± 0.03	T=4.66	P<0.05
XI(sec)	0.1091± 0.02	0.0873± 0.01	T=3.23	P<0.05
dp/dt	6.40± 3.06	5.98± 2.14	T=0.36	N.S

* n=11, df=20
** No significance

Table 11. A comparison of quantifying analysis on sphygmography between Group A and B after fasting

	Group A (N=12)	Group B (N=11)	T value (df=21)	P value
PR	82.16± 10.32	82.63± 10.51	T=0.11	N.S*
YF	20.37± 6.91	17.72± 4.94	T=3.22	P<0.05
YD	7.51± 2.49	6.23± 2.26	T=2.9	P<0.05
YDN	5.6± 3.04	3.94± 1.4	T=5.75	P<0.05
F/D	2.72± 0.26	3.05± 0.98	T=1.46	N.S
F/DN	4.25± 1.69	5.17± 2.47	T=2.9	P<0.05
D/DN	1.58± 0.71	1.70± 0.59	T=3.01	P<0.05
θ(dp/dt)	72.75± 14.23	73.54± 16.75	T=0.24	N.S
θ(DN)	72.75± 26.19	67.63± 23.76	T=1.12	N.S
SET(sec)	0.2730± 0.03	0.2549± 0.03	T=4.66	P<0.05
XI(sec)	0.1033± 0.01	0.0873± 0.01	T=3.23	P<0.05
dp/dt	6.11± 2.14	5.98± 2.41	T=0.36	N.S
XI/SET	0.3775± 0.06	0.3427± 0.05	T=1.5	N.S

* No significance

Although the SET and XI had decreased, the value of SET in each person was quite different. The factors affecting this value were abundand, we should not give assessment with a single factor. When the pulse rate increased, the ventricular ejection time decreased in contrast. When these two factors changed parallelly, we knew from the value of XI/SET that nothing of particular significance was found.

Group B and C represented physiological and pathological Chi-deficiency syndromes respectively. After giving the same dosage of ginseng treatment, we compared the results and discovered that the amplitude of sphymography, in group C was higher, but the lowering of DN point in group B was more prominent than that of group C as shown in table 12.

Table 12. A comparison of quantifying analysis of sphygmography between group B after fasting (except taking Ginseng) and Group C after treament

	Group A (N=11)	Group B (N=11)	T value (df=20)	P value
PR	72.54± 10.88	82.63± 10.51	T=2.21	P<0.05
YF	30.06± 7.64	17.72± 4.94	T=4.5	P<0.05
YD	12.65± 3.85	6.23± 2.26	T=4.77	P<0.05
YDN	11.18± 3.21	3.94± 1.4	T=6.86	P<0.05
F/D	2.50± 0.71	3.05± 0.98	T=1.51	N.S*
F/DN	2.81± 0.82	5.17± 2.47	T=3.0	P<0.05
D/DN	1.12± 0.01	1.70± 0.59	T=3.18	P<0.05
θ(dp/dt)	69.36± 20.64	73.54± 16.75	T=0.52	N.S
θ(DN)	75.18± 32.65	67.63± 23.76	T=0.62	N.S
SET(sec)	0.3293± 0.02	0.2549± 0.03	T=6.84	P<0.05
XI(sec)	0.1109± 0.01	0.0873± 0.01	T=5.53	P<0.05
dp/dt	7.71± 2.08	5.98± 2.41	T=1.81	P<0.05
XI/SET	0.3345± 0.04	0.3427± 0.05	T=0.42	N.S

* No significance

Discussion

Fasting can be viewed as a kind of elimination of physical energy. If the time of fasting prolongs, human body should have a tendency of turning cold and deficient. After analyzing the sphygmographic data of group A after fasting, four cases of Yang-deficiency and four cases of Yin-deficiency deteriorated, three cases of heat syndrome alleviated, but one case of heat syndrome intensified. Because of the constitutional difference between every person, the responsive mechanisms toward stress were different.

In group B, eleven cases took ginseng during fasting, the pulses in seven of them turned rapid (but one of them turned slow). Generally speaking, a state of excitement was expressed. Symptoms such as fatigue and headache alleviated, but four cases complanined of palpitation. If the oral intake of ginseng was not accompanied by fasting (such as group C), the prominent changes mentioned above would be absent. This was probably due to the increase of sympathetic tone in response to the stress of hunger, during which ginseng could easily cause the effect of excitement. This finding coincided well with the concept of "Yin-deficiency causing internal heat" in Nei-Ching.

Beside the analysis of sphygmography, table 2 to table 8 all had shown that the range of response in group B is greater then that of group A. When ginseng was added to the daily diet, half of the Chi-deficiency patient's pulse transformed into the normal heart-spleen pattern (e.g. figure 2A,B).

In 1988, Bai-Hsin Chang et al performed a research on the pulse waves at 38 pregnant women. Their results demonstrated that women who had Yang-deficiency syndrome in the early months of pregnancy gave no significance in the quantitized analysis of the sphygmograms. In our study, the quantitized analysis of sphygmograms of the patients with Chi-deficiency syndrome found nothing in particular. Whether it was because of the mild

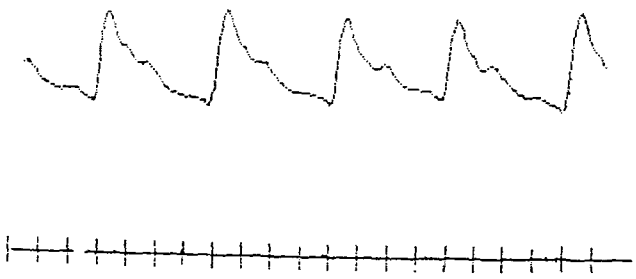


Fig. 2-A A sphygmography of group B (Before fasting)

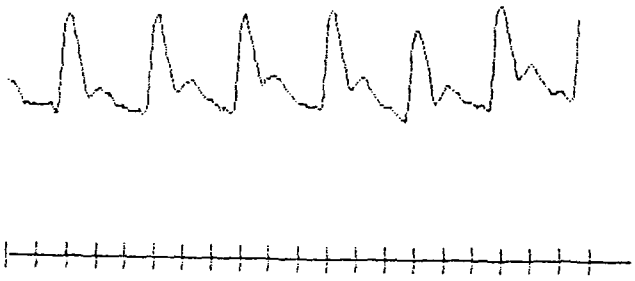


Fig. 2-B Sphygmography of the same case (Fasting & ginseng)

degree of Chi-deficiency or not, further research on the topic was required.

In the mid-semester of pregnancy, the pulse was transformed into the stomach-heat pattern. The lowering of the DN point and uprising of the D wave were found on the sphygmograms. In our study, giving ginseng during fasting could cause similar pulse waves of Yin-deficiency and Yang-excess. The lowering of DN point and the rise of D wave also discovered.

Conclusion

1. A fast caused Chi-Yin-deficiency syndrome, which included fatigue, weight loss, increase of pulse rate, increased catabolism and lowering of DN point, etc.
2. A fast accompanied by the intake of ginseng would intensify the above changes, especially on the rising of D wave.
3. Concerning the eleven patients with Chi-deficiency syndrome who took ginseng without fasting, their variable patterns of sphygmography tended to stabilize. This coincided well with the concept of "reinforcement of Heart-Spleen Chi" in Chinese medicine.

Summary

In this study, 23 volunteers underwent fasting for more then 5 days to become models of Chi-deficiency syndrome. Twelve of them were as group A. Eleven of them, as group B, took the same dosage of ginseng powder as another 11 Chi-deficiency patients screened via O.P.D. without fasting, who were termed as group C.

Examination of blood, urine and sphygmography were performed before and after the course for evaluation. The results of this study were achieved as following :

1. Fasting results Chi-Yin-deficiency syndrome included fatigue, body weight loss, accelerated pulse and increased catabolism. Also, the decline of DN point on sphygmography appeared.
2. Fasting with the oral intake of ginseng exaggerated the above effect and protruded D wave.
3. Half of the Chi-deficiency patients treated by ginseng without fasting achieved stability on their pulse wave pattern. This achievement coincided with the reinforcement of "Heat-Spleen Chi" in traditional Chinese medicine.

Acknowledgements

The authors wish to thank Professor Hongchien Ha, Chairman of Academic Program and Research Development Committee of China Medical College, for his great help during the course of this study. Also we owe thanks to Miss Wu Jun-Long for her laborious laboratory work with this project.

This study was carried out with grant of Ginseng powder supported by Japan Korea Red Ginseng Co., Ltd., Japan.

References

1. Caro, C.G., Pedley, T.J., Schroter, R.C., Seed, W.A. : The mechanics of the circulation. (ed.) Oxford. 1987.
2. Cunningham, L.N., Labrie, C., Soeldner, J.S., and Gleason, R.E. : Resting and exercise hyperemic pulsatile arterial blood flow in insulin-dependent diabetic subjects. Diabetes. Vol.32 : 664-669, July. 1983
3. Whitmore, R. L. : Rheology of the circulation, Pergamon Press. 1968.
4. Wang, S.Y., Huang, C.Y., Cheng, S.Y. : Identification of diagnostic pulse wave pattern in orthodox Chinese medicine and verification by modern science, National Science Council Monthly. Vol.8, No.5, 1980.
5. Wang, S.Y., Change, H.H. : Form the distortion of the Sphygmogram to observe the Chi are either asthenic or plecotic in Meridians. Proceedings of the Chinese Medicine published by Pacific division, Amer. Assoc. for the Advancement of Science. Sept, 1984
6. Wang, S.Y. : Diagnosis of intrinsic asthma with Chinese sphygmography ···Renal deficit. Proceeding of 4th International Congress of Oriental Medicine, 1986.
7. Chang, H.H. : To evaluate the therapeutic effects of Ginseng on chi-deficiency syndrome with sphygmography···preliminary report. Proceedings of the International Symposium on Ginseng Research, R.O.C. p.156-169.1987.
8. Chang, B.H. : A study on the Chinese sphygmograms during the first and second trimester of pregnancy. Graduate thesis of Institute of Chinese Medical Science, China Medical College. ICMS 083, 1988.

S. K. F. Chong : How do your define the Chi-dificiency syndrome? Did you exclude chronic anemia, chronic viral infection, and thyroid dysfunction in this syndrome?

H. H. Chang : "Chi-deficiency syndrome" is a term according to traditional Chinse medicine. The "Bien-zheng (辨症)" diagnostic criteria were : fatigue, asthenic breathing, feeble voice, pale face, spontaneous perspiration, and weak pulse. Whatever factors decreasing the vital force could cause this syndrome, meaning that it tells nothing about etiology. Chronic wasting disease especially tends to develop this condition, cachexia is an example of extreme chi-deficiency. It is not proper to make di-

fferential diagnosis between chi-deficiency syndrome and other "diseases" because of their different methodology. But we can analyze the patient by both of two system, thus enable us to know more about his life quality other than a biochemical aspect, or microbiological aspect. As a matter of fact, this syndrome is still the most important indication to which doctors prescribe ginseng for their patients. Thank you for your question.

H. Saito : There are many crude drugs which are effective in chi-deficiency. Did you use these crude drugs in your experiment? I would like to know the difference between ginseng effect and crude drugs's effect.

H. H. Chang : First of all, there are many subgroups in the chi-deficiency syndrome. Patients might be deficient in one or all of the different functional system of vital force. Different herbs help to reinforce chi on different system. Secondly, chi-defiency patients are often complicated with other problem, such as the imbalance of Yin and Yang, the factors of heat and cold, etc., depending on the constitutional variation individually. Herbs are different in their effects on various level. Therefore, doctors have to make a choice or combine some of them to be a suitable formula for each condition. For example, ginseng is effective in heart-spleen chi-deficiency ; *Schizandra chinensis*(五味子) is special in lung-kidney chi-deficiency ; *Cinnamomun loureirii* Nees (肉桂) reinforce chi and Yang. while *Schizandra chinensis* reinforce chi and Yin. Refined evaluation indicates proper administration. In the field of traditional Chinese medicine, doctors seldom prescribe single herb, but it is necessary in our study.

맥파계법을 이용한 인삼의 氣부족 증상 치료효과에 관한 연구

Hen-Hong Chang, Yung-Yu Shen,
Yat-Kwong Chan, Shu-Yu Wang,
and Chien-Chung Ma

China Medical College Hospital, 75 Yu-Der Road,
Taichung, Taiwan, R.O.C.

고래로 부터 인삼이 익기보강에 관련이 있다는 기록이 한의서에 기록되어 내려온다. 그래서 우리들은 기부족 증상에 대한 인삼의 치료효과를 평가하였다. 중국의과대학 한방내과에서 기부족치료 환자 18명에 대해 실험하였다. 그 환자들에게 고려홍삼분말 2g을 1일 3회씩 2주간 계속 투약하였다. 결과의 평가를 위해 질문서와 맥파계에 의한 진단이 투약 전후에 신중히 이루어졌다. 대조군으로 5일이상 절식한 14명의 자원자에 대해 같은 평가를 하였는데 그 중 7명은 고려인삼을 섭취하였고, 나머지 7명은 물만 섭취하였다. 인삼투여군에서 3가지 결과가 관찰되었다. 하나는 피곤, 무력감과 같은 기부족 증상이 개선되었으며, 두번째는 시간에 따른 맥파의 변화로 P-파의 변화, 중복맥박 및 확장기 말기의 몇몇 미세한 파들이 강화 되었다. 세째는 주파수에서의 효과로 대시벨 진폭이 12 Hz까지 증가되었다. 이와같은 세가지의 현상들은 서로 잘 일치되었다. 이 세가지 결과들은 한의학에서 말하는 "심장비장의 기"에 대한 효과 증강을 의미한다.