

Effect of Qigong on Biological Indicators and Psychiatric Symptoms of Schizophrenics

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Abstract

Objective: Both biological measurement and psychiatric testing were performed to evaluate the effects of qigong on schizophrenics. **Methods:** Sixteen hospitalized patients diagnosed as schizophrenics were divided into two groups (qigong group and controls). The qigong training was done with qigong group for twelve weeks. The measurements were performed twice, before and after the qigong intervention. **Result:** Regarding biological indicators, the qigong group showed significantly lowering in cortisol. On the other hand, epinephrine was significantly elevated only in the control group. Compared with the normal range, the qigong group showed normalization of norepinephrine. In the qigong group, psychiatric score showed significant lowering in some items. **Discussion:** Overall, both biological and psychiatric indicators showed some significant changes in both groups. In the qigong group, lowering of cortisol and normalization of norepinephrine was observed. These facts suggest that the stress reduction might be brought by qigong. In the control group, epinephrine was significantly elevated. This fact suggests that in the qigong group, elevation of epinephrine be inhibited by qigong. These facts suggest that qigong training be useful for the chronic schizophrenics to get stress reduction.

Key Words: schizophrenia, stress reduction, qigong, biological indicators, psychiatric symptoms

Recently, with the spread of the Complementary and Alternative medicine as qigong, herbal therapy, yoga etc., there are various complementary programs in many therapeutic situations mainly in U.S.A. and Europe. In the treatment of schizophrenics, the occupational therapy, the social skill training, art therapy etc. have been adopted in many hospitals. However in Japan, the Complementary and Alternative medicine has not been adopted in most of hospitals except Kampo. Regarding the psychiatric situation, various trainings, art therapies and play therapies are often adopted as a recreation, nevertheless, there are seldom systematic and therapeutic applications of the Complementary and Alternative medicine. The Complementary and Alternative medicine has been proved to promote the self-healing ability and the stress reduction. And so to apply these methods to therapeutic situations must be very significant especially in Japan. Because each patient has a right to accept the most effective therapy battery.

Studies on stress and stress reduction

With the development of Psychoneuroimmunology^{[1] [2]}, studies on the influences of stress on human bodies have used various measurements. For example, in short-term studies, immunological suppression under stressful situations has frequently been reported^{[3] [4]}, in longitudinal studies, there was a study on health and immunological function in the caregivers of dementia patients^[5]. There have also been studies of intervention to reduce stressful situations. As an intervention strategy, hypnotism, relaxation, meditation, image therapy, conditioning, autonomous training, self-disclosure and other methods have been adopted in normal volunteer, cancer patients and HIV patients to date. Immunological improvement or improvements of symptoms were reported for each intervention method^{[6] [7] [8]}. Initially, stress reduction studies were applied to patients with

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chronic somatic diseases, but recently, these studies have widened to include schizophrenics. Lukoff et al.^[9] Compared stress reduction methods (education on stress management, meditation and other methods.) with social skill training, and concluded that there was no difference in relapse rates two years later. Starkey et al.^[10] investigated stress management education for hospitalized schizophrenics, and reported positive results. Reker^[11] performed music therapy with thirty schizophrenics who were hospitalized on an open ward. They reported that relaxation, activation, decreased anxiety, improvement in contact and expression of emotion etc. were observed.

In therapy for schizophrenia, not only medication and psychological therapies but also stress reduction therapy is now used in the context of Psychoneuroimmunology and holistic medicine.

Qigong as an intervention strategy

It is not merely a recent tendency to provide therapies and preventive medicine that focus on stress reduction. Hippocrates proposed that fresh air, good digestion, resting, and proper exercise should prevent disease. And the Chinese doctors have considered it important to consider food, sexuality and breathing as a part of hygiene. Recent emphasis on holistic medicine shows that these medical bases which were forgotten with development of medication-centered therapies have been revived along with scientific evidence of their usefulness^[12].

National-wide Chinese committees combined ancient Chinese therapies such as Lead and other methods under the name “qigong” in the middle of the twentieth century. Qigong includes various methodologies, so it can be classified in many ways. From the quantity of movement, it is divided into “active qigong”, and “static qigong”, the former involves large movements as in Taijiquan, while the latter involves less movement and is often performed while seated or standing still. Qigong is also classified as internal qigong and external qigong. In the former, the person moves and trains the *qi* in his body, while the latter means that a certain person (the qigong master) sends his *qi* to a sick portion of the other person’s body. Studies on qigong therapy are mainly performed in China. These include studies on physiological functions in qigong masters and effects on chronic psychosomatic disease such as hypertension, asthma etc. For example, Liu et al.^[13] introduced qigong intervention for circulatory disease, digestive disease, articular disease, respiratory disease and other diseases, and measured the change in peripheral amine (5-HT, norepinephrine and dopamine). The overall results showed significant lowering of 5-HT and elevation of norepinephrine, dopamine. In each disease except respiratory disease, there were significant lowering of 5-HT and elevation of dopamine. Regarding the short-term effects of qigong on hormones, Liu et al.^[14] measured the concentration of peripheral hormones three times, before and after a 70-minute qigong training session and 40 minutes after the beginning of training. They reported that beta-endorphin increased during training while ACTH decreased during and after qigong intervention, but cortisol and DHEA-S were not changed. In a study of qigong intervention for aplastic anemia^[15], patients initially showed an increase in suppressor T cells and decrease in helper T cells, but after qigong intervention, a significant increase in helper T cells was observed. Concerning transitory psychotic states due to qigong, Shan et al.^[16] measured MMPI and examined differences between a schizoid-symptom group and a neurotic-symptom group. In the schizoid group, there were disorders in perception, thought and behavior. Kuang et al.^[17] studied the effects of qigong training on various diseases with pre and post menopausal females, they reported that although essential hypertension patients showed low concentration of E2 (estradiol), E2/TS (testosterone) before qigong training, after intervention, these patients showed an increase in E2 and decrease in blood pressure. In sensitivity test of the cellular immune system, the qigong group required a shorter time to reach to maximal response and showed a stronger response than the normal control group. Liu et al.^[18] reported that the

peripheral CD4/8 ratio of the qigong group that had trained for more than six months was increased compared to that in the normal control group. Liu et al. reported that CD4 was increased in the qigong group. Takeshige et al. [19] studied the effect of artificial and human external qigong on electroencephalograms in rabbit and on spontaneous electrical activity in the rat pineal gland, and reported that the change observed after qigong training was similar to the changes after intravenous injection of 5-HT. Furthermore, after removing the pineal gland or administering anti-5-HT drugs, there were no changes. Takeshige et al. inferred that in a magnetic field, concentration of 5-HT increases and then suppresses N-acetyl transferase, and the change on EEG was induced by the increased 5-HT concentration in the pineal gland, and this increase in 5-HT was due to suppression of N-acetyl transferase due to qigong training.

There are some studies of qigong training as therapy for somatic disease as cancer, respiratory disease, hypertension, etc. [20] [21], nevertheless, there are no studies of qigong training as therapy for schizophrenics, even in China. However, there are some studies that report the occurrence of transitory psychotic states in subjects undergoing qigong therapy, but the prognosis in such cases is benign [22] [23].

At present, it is confirmed that qigong causes decrease and increase in peripheral 5-HT, increase in dopamine and norepinephrine, decrease in adrenocorticotrophic hormone (ACTH), increase in CD4, CD4/8. These contradictory findings on 5-HT suggest that qigong has different effects depending on the physical condition of the subject because it influences the maintenance of homeostasis like other traditional therapies. For example, it was confirmed in animal studies, that when you administer chemical agents of decrease blood pressure, blood pressure continuously decreases as long as the agent is taken. But when herbal medicine is administered to lower blood pressure, the decrease of blood pressure stops at a certain point (in the normal range) even if the herbs are taken continuously.

In this paper, biological indicators, psychiatric symptoms, and the mood such as aggression, confusion and depression in schizophrenia were examined in relation to stress reduction. We hypothesized that stress reduction would occur and decrease the psychiatric symptoms, and that it would also cause some change in the biological indicators.

METHODS

Subjects: Sixteen schizophrenic inpatients in a general hospital. The subjects had been diagnosed with schizophrenia by the Diagnostic Statistic Manual version IV (DSM-IV). The patients were divided into two groups with matched sex and age. The experimental group (the qigong group) consisted of four males and four females and the control group of four males and four females. During the intervention, there was no change in psychotropic drugs administered.

Intervention procedure: Chinese qigong “Xiang-gong beginners’ course” was adopted. This qigong is rather static and primarily focuses on movement of the upper body. A professionally trained qigong master instructed the subjects at each session. Sessions lasted for thirty minutes and were given once a week. The duration of therapy was twelve weeks.

Measurement: On two occasions in the early morning before breakfast (one day before the start date and one day after completing twelve session) twenty ml blood was drawn. Psychiatric and psychological measurements were taken within a few days of drawing blood. Measured indicators were as follows.

Immunological indicators: T cell subsets; CD4+, CD8+, CD4+/8+, CD56+16+.

Endocrinological indicators: plasma 5-HT, catecholamine 3 (epinephrine: norepinephrine, dopamine), hormones (cortisol, adrenocorticotrophic hormone: ACTH).

Symptom scale: Positive and Negative Symptoms Scale: PANSS, estimated by two psychiatrists in charge.

Becton-Dickinson FACScan was used for immunological measurement and immunological antibodies were products of Becton-Dickinson. PE mark was used for CD4/CD56, FITC mark was used for CD8/CD16. For endocrinological measurement, HPLC method was used with amine. RIA (tube fix phase method) was used with cortisol. IRMA (bease fix phase method) with ACTH. In measuring the dopamine score, less than 0.02 were treated as 0.02.

Normal ranges of indicators: CD4+; 24-61%, CD8+; 19-40%, CD4/8;0.8-2.7, CD56/16; 5-20%, epinephrine; less than 0.17 ng/ml, norepinephrine; 0.15-0.57 ng/ml, dopamine; less than 0.03 ng/ml, 5-HT; 53-200 ng/ml, ACTH; less than 60 pg/ml, cortisol ; 5.6-21.3 μ g/dl.

Statistics: Paired T test was used for biological tests and Wilcoxon Matched Pairs. Signed-Rank Test for psychiatric test. Analytical software was SPSS 9.0J.

RESULT

There was no significant difference in age between two groups. Mean age of the qigong group was 52.0 years old, while that of the control group was 45.5 years old.

Changes in measured values before and after intervention were compared between two groups.

1. Biological indicators

The result on the biological indicators was presented in Table1. Among peripheral concentrations of amine, epinephrine increased only in the control group. There were no significant changes in norepinephrine, dopamine or 5-HT in either group. Regarding hormones, cortisol decreased in qigong group. In the immune system, there were no significant changes in both groups.

2. Psychiatric scores

The results in psychiatric symptoms were shown in Table 2. The qigong group demonstrated a significant decrease in PANSS-N4 (passive apathetic social withdrawal), G5 (mannerisms and posturing). In addition, the decreasing tendency was shown in G13 (disturbance of volition), G14 (poor impulse control). While the control group showed significant decrease in PANSS-G4 (tension), and decreasing tendency in N5 (difficulty in abstract thinking), G9 (unusual thought content). Both group showed a tendency of decreasing the scores in N1 (blunted affect).

3. Comparison to normal values

From a clinical perspective, it is more significant to examine the direction of functional change, that is, toward normal or abnormal values than to simply compare values with those of controls. Therefore changes to normal or abnormal values were also examined. Table 3 presents the results. Normal percent indicates the rate of normal values before intervention, while changes after intervention were indicated by 3 symbols. ○ indicates change to a normal value, △ indicates change to an abnormally high value and ▽ indicates changes to an abnormally low value. The number of symbols corresponds with the number of subjects.

Regarding biological indicators, the Qigong group showed significantly lowered in cortisol. And epinephrine was significantly elevated only in the control group. Immunological indicators showed no significant change.

Table 1. Mean Changes in Biological Variables between pre- and post- Intervention

(T test for Paired Samples)

Variables	groups	pre-means&S.D.	post-means&S.D.	T-score	significance
Epinephrine	Qigong	.0362 ± .0250	.0350 ± .0106	.188	.857
	Control	.0538 ± .0282	.0925 ± .0710	-2.36	.050 *
Norepinephrine	Qigong	.4975 ± .3784	.4713 ± .1753	.262	.801
	Control	.6250 ± .1684	.6950 ± .2410	-1.52	.172
Dopamine	Qigong	.0237 ± .0074	.0250 ± .0070	.314	.763
	Control	.0262 ± .0176	.0212 ± .0035	1.00	.351
5-HT	Qigong	81.80 ± 42.39	81.87 ± 43.81	-.020	.984
	Control	79.05 ± 19.76	74.20 ± 25.16	.785	.458
ACTH	Qigong	43.12 ± 13.72	34.62 ± 15.10	2.02	.083
	Control	44.75 ± 20.54	49.50 ± 13.15	-.510	.626
Cortisol	Qigong	14.00 ± 4.211	10.40 ± 1.224	2.67	.032 *
	Control	12.71 ± 4.388	10.90 ± 1.040	1.33	.224
CD4	Qigong	44.81 ± 14.28	42.38 ± 8.227	.606	.564
	Control	48.83 ± 13.86	49.16 ± 10.06	-.073	.944
CD8	Qigong	23.61 ± 8.31	20.40 ± 4.60	1.25	.249
	Control	22.91 ± 12.04	17.01 ± 6.937	1.48	.180
CD4/8	Qigong	2.439 ± 1.981	2.216 ± .7672	.346	.740
	Control	3.316 ± 2.806	3.385 ± 1.674	-.080	.939
CD56/16	Qigong	18.91 ± 11.20	11.95 ± 5.355	1.51	.175
	Control	15.63 ± 11.96	11.62 ± 5.333	1.09	.312

* p<.05

Table 2. Changes in Psychological Variables between pre- and post- Intervention

(Wilcoxon Matched-Pairs Signed-Ranks test)

PANSS Items	group	decreased cases	increased cases	no-change cases	Z score	significance
N1 (Blunted affect)	Qigong	4	0	4	-1.890	.059+
	Control	3	0	5	-1.732	.083+
N4 (social withdrawal)	Qigong	4	0	4	-2.000	.046*
	Control	0	0	8	.000	1.00
N5 (Difficulty in Abstract Thinking)	Qigong	2	1	5	-.816	.414
	Control	5	1	2	-1.667	.096+
G4 (Tension)	Qigong	2	0	6	-1.414	.157
	Control	5	0	3	-2.236	.025*
G5 (Mannerisms and posturing)	Qigong	4	0	4	-2.000	.046*
	Control	2	1	5	-.577	.564
G9 (Unusual thought content)	Qigong	1	0	7	-1.000	.317
	Control	4	0	4	-1.857	.063+
G13 (disturbance of volition)	Qigong	4	0	4	-1.890	.059+
	Control	1	1	6	.000	1.00
G14 (poor impulse control)	Qigong	3	0	5	-1.732	.083+
	Control	1	1	6	.000	1.00

* p<.05

+ p<.10

Table 3. Normalization & Abnormal Change in Variables after Intervention

indicators	Qigong group (N=8)		Control group (N=8)	
	Normal %	change	Normal %	change
epinephrine	100	-	100	△△
norepinephrine	40	○○○△	42	○△
dopamine	88	○△	88	○
5-HT	75	-	88	▽
ACTH	80	-	58	○○○○△
cortisol	100	-	88	○
CD4	75	○○	75	○
CD8	75	▽▽	38	▽▽
CD4/8	63	○○△	50	○△▲
CD56/16	75	○○	75	○○▽

○: normalized case

▽: abnormally decreased case

△: abnormally increased case

▲▼: case observed remarkable change

Compared with the normal range, the qigong group showed normalization of norepinephrine, while the control group showed normalization of ACTH. In addition, CD8 value is suggested to be changeable in both groups.

DISCUSSION

In the qigong group, there was decrease in cortisol, while higher epinephrine values were observed in the control group. This may suggest that the stress reduction might be brought to the qigong group. From the perspective of normalization or abnormal change, remarkable abnormal changes in CD8, CD4/8 were observed only in the control group. Adding increase in epinephrine in control group, this may indicate that in the qigong group, changes to abnormal range were prevented by the qigong intervention.

In the psychiatric symptom scale, improvement in passive and apathetic social withdrawal and mannerisms and posturing were observed only in the qigong group. The corresponding change in biological indicators of these symptom changes was decrease of cortisol. This suggests that there is some stress induced or reinforced symptoms in schizophrenia. Possibly there is time lag between biological change and psychiatric change.

Regarding normalization and abnormal change, the qigong group also showed less change than that in the control group. This suggests that changes due to external stimulation such as stressful situation, change in temperature etc. may be prevented by training effects of qigong which influences the autonomous nervous system. However, the changes observed in this study, especially regarding immunological indicators, are not compatible with the findings of other studies^{[15] [18]}. As Teshima et al.^[24] reported, it may take time and continuous training for the effects of stress reducing therapy to clearly appear. Twelve weeks is not a short period but if there is more time, more preferable effects may be seen. Especially in schizophrenics, harmony and strength in action are often disordered. Therefore, much more training time is required for the full effects of qigong to appear. But the author can draw decisive conclusions that qigong is useful to reduce stress and to promote the social skill.

CONCLUSION

As a strategy for stress reduction, we attempted intervention therapy with qigong, and measured the effects using both biological and psychiatric indicators. Regarding biological indicators, the control group showed an increase in epinephrine. The qigong group showed no change in the same indicators.

Decrease in cortisol, which is called “stress hormone”, was observed in the qigong group. This may suggest that the stress reduction should be brought by the qigong intervention.

In psychiatric symptoms the patients in qigong group showed improvement in sociability and stiffness. In this sense, qigong is useful as stress reduction strategy and social skill training exercise.

This intervention has continued after this study period, and after four months of training, the patients reported subjective changes such as feelings of warmth and relaxation. The subjects in the qigong group reported that they enjoyed qigong very much, and the relationship among the patients has become more relaxed, in this sense, qigong intervention might be clinically very effective.

In addition, remarkable abnormal changes in CD8, CD4/8 and increase in epinephrine were observed only in the control group. This may indicate that the complementary and alternative therapies as qigong, kampo, natural therapy etc. should promote the balance of whole body, homeostasis. In this sense, this kind of therapies might be useful not only for the sick people but also for the aged with senile dementia and poor sociability, for the normal people who inevitably lead a stressful life. For the new intervention method, the complementary and alternative therapeutic strategy must be more extensively studied.

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統合失調症者の生物学的指標と精神症状に及ぼす気功の効果

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要約 :

目的 : 統合失調症者に及ぼす気功の効果を評価するため、生物学的測度と精神医学検査が施行された。
方法 : 統合失調症と診断された16名の入院患者を気功群と統制群に分け、気功群には12週間の気功トレーニングを実施し、介入前後で両群に諸検査を実施した。結果 : 気功群では有意なコルチゾールの低下がみられた。一方、エピネフリンは統制群でのみ有意な上昇を示した。測定値の正常値との比較では、気功群ではノルエピネフリンの正常化がみられ、精神症状でも幾つかの項目で有意な低下がみられた。考察 : 気功群では、コルチゾールの低下とノルエピネフリンの正常化がみられ、また統制群でのみエピネフリンの有意な上昇がみられたが、これは気功群においては、気功によってストレスの軽減がなされ、エピネフリンの上昇が抑制されたためと考えられる。以上より、気功トレーニングは、統合失調症者のストレス軽減に有用であることが示唆された。

キーワード : 統合失調症、ストレス軽減、気功、生物学指標、精神医学症状