Long-term prognosis of psychogenic visual disturbances (PVD) in children following SAT therapy

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Abstract

OBJECTIVE: This paper aims to (i) evaluate long-term prognosis of PVD after Structured Association Technique therapy based on recurrence rate and changes in behavioral characteristics, and (ii) elucidate the factors that play a role in the recurrence of PVD.

METHOD: The targets of this study were 17 cases diagnosed with PVD. Ten children who recovered under SAT therapy (SAT) and 7 children who recovered under conventional therapy (C.T.) Their parents agreed to participate in the study and completed the self–administered questionnaire. The follow up survey for the medium-term prognosis study was conducted in July 2002, while the long-term prognosis study was implemented in July 2004.

RESULTS: The following findings were obtained. 1) Recurrent numbers for each method of therapy was 2 out of 7 patients (28.6%) in the conventional-type therapy group at the medium-term prognosis observation time point, whereas it was one case out of the 10 subjects (10.0%) in the SAT therapy group. There was no statistically significant difference noted. At the long-term prognosis observation time point, visual

disturbance recurrence was seen in 1 out of 5 patients in the conventional-type therapy group, whereas recurrence was not seen in the SAT therapy group. Therefore, in both groups a significant difference in visual disturbance recurrence was not seen even at the long-term prognosis observation time point. In the SAT therapy intervention group, scores of self-repression, emotional dependency, and trait anxiety that improved soon after intervention remained low even though there was a slight increase at the long-term prognosis observation time-point. Similarly, scores of self value and degree of awareness of mother's emotional support similarly remained high, though there was a slight drop. On the other hand, scores of self-repression, self-esteem, trait anxiety, and perceived emotional support hardly changed in the conventional-therapy group. In the PVD recurrent cases, it was confirmed that anxiety, self-repression, and emotional dependency were high though an improvement was temporarily seen, and self-value and degree of awareness of mother's emotional support were low, thus accompanying a change in psychological characteristics.

These results suggest that since psychological conflicts were behind the outset of PVD, therapy should not focus on resolving superficial issues such as visual disturbance, but should involve psychological interventions to find solutions to observed psychological conflicts.

1. Introduction

1.1 Aim

Psychogenic visual disturbances (PVDs) cause abnormal visual performance. For many years its cause was unknown, as was the explanation for the resulting poor vision. The incidence in pediatric ophthalmology patients is reported to be approximately 1% (Yokoyama, 1999)[1]. Recent development of imaging diagnostic technology has enabled the identification of reduced blood flow to the visual association area as a cause of PVD (Okuyama, Kawakatsu, Wada & Komatani, 2002)[2]

Somatization disorders such as those seen in children with PVD, arise as a result of stress revealing itself as a functional disorder of the body or a transformation of the conscious mind, without the patient being aware of it. Such disorders are often seen in children whose body and mind have not properly differentiated[3]. These children are said to have the tendency to relieve stress by converting it to a physical symptom rather than finding a solution psychologically, perceiving stress as stress[4].

The present authors have so far reported that children with PVD have stressful psychological characteristics such as a low self-esteem, high anxiety, and show self-repressive and emotional dependency characteristics[5]. It is widely known that such psychological characteristics accumulate stress, easily cause worry and anxiety, and trigger psychobiological reactions (interactive reactions involving the autonomous nervous system, endocrine system and the immune system)[6] due to suppression of feelings and desires without expressing them. Therefore it was thought that the physiological characteristic of building up stress influences the onset of PVD through such mechanisms.

Research reports relating to long-term prognosis of PVD are scarce, with only a few that center on eyesight observations[7-9] and extremely few case reports[10]. There are

hardly any reports on detailed long-term observation through active psychological intervention. The various therapeutic approaches to PVD are mostly psychological education and advice[11)-12)]. Conventionally, psychotherapies for PVD used approaches that tried to reach memories and experiences of psychological trauma in early childhood. However, many evidences which memories of latent psychological trauma experienced in the fetal stage are recently being revealed. Then,in the present study, a prognosis evaluation will be conducted using a new psychological intervention that tries to approach memories of latent psychological trauma experienced in the fetal stage. This paper aims to (i) evaluate long-term prognosis of PVD following Structured Association Technique therapy (SAT) [13)] based on recurrence rate and changes in behavioral characteristics, and (ii) elucidate the factors that play a role in the recurrence of PVD.

2. Method

2.1 Subjects

The targets of this study were 23 cases diagnosed with PVD at A University Hospital from April 1999 to March 2003; subjects with organic symptoms were excluded. The chosen subjects did not show improvement of eyesight during the observation period of at least two months or more prior to intervention and included cases with psychogenic abnormal visual fields and abnormal color vision. The subjects who finished their treatments at least one year before were recruited for this study. Informed consent was obtained from patients and parents prior to participation in the study.

2.2 The method of intervention and treatment termination criterion

2.2.1 Intervention by SAT therapy

Conventional psychotherapy focuses on unresolved issues from early childhood and

tries to raise awareness of the issues that reconstitute the mental attitude[14]. Recently Van den Bergh et al.[15], in their fetal programming hypothesis, reported that the degree of anxiety of the mother in the early gestation period is likely to hinder brain development of the baby and that this degree of anxiety correlates with childhood ADHD and height of anxiety[16]. They described that when the mother's degree of anxiety is high during this period, the mother's cortisol has an effect on the baby through the placenta and may affect development of the HPA system, limbic system, and prefrontal cortex[17]. In SAT theory, it thought that the presence of such pre-birth trauma makes it easy to draw out image memories accompanying aversion system affects, and that these mutual influences cause misinterpretations in reality perception. Thus SAT tries to work on memories of fetal life and infancy using emotions and body sensations as clues. Image memories of the fetal period that are unperceivable during normal consciousness are aroused using hypnosis-mediated fetal stage image induction from fetal sensations while expressing the emotions.

The main technique used in SAT therapy is to modify the self-image script. Hypothesizing first that through flashback on past problems the client is currently aware of, SAT tries to identify those negative experiences of the past. Then, in order to find positive meaning within the associated negative images, image script formation is done through re-learning, re-talking, re-imaging, re-acting and physical contact. As a result of these, SAT aims to secure a new self-image. These are several reports that a brain activation which is related to imagery similar to actual experiences was evident. Therefore, a similar consequence is obtained when imaging and when actually experiencing the same experience[18]. Thus SAT therapy considers the formation of a detailed and vivid image to be highly important.

In order to achieve this, SAT therapy centers on approaching latent,

unconscious traumatic memories in the child, changing the images associated with the negative feelings, and forming a reassuring image. Specifically, SAT (i) grasps strong traumatic feelings (terror of being abandoned, self-denial, sadness and sorrow) that the child is currently aware of, elucidates the voice within that expresses those feelings, clarifies the key circumstances that are common to these situations, and promotes the child to image such that the emotions of traumatic scenes of the past are temporarily awakened; (ii) during the emotion awakening, the child is made to recall images of the fetal period and infancy, including physical sensations; (iii) from the drawn out sensations, the child is helped to realize latent emotions and wants, and a desired scenario such as "what he/she really wanted" is created. Based on this scenario, a role-play is performed to change the images to parental images that the child considers to be soothing, and images of parents welcoming the pregnancy and delivery. At this time the therapist creates an image that satisfies the desire and craving for affection and employs the somatic communication method (physical contact method) with the child.

The method implemented in this study sets specific action goals for finding solutions to actual problems the child faces at the moment, conducts a rehearsal taking practical use of social skills, and assists the mental and physical growth of the child himself by actively supporting the solution of the real issues behind. This is done by enhancing the feelings of efficacy attained through solving problems by oneself. The duration of intervention per session was 30-40 minutes. At commencement, art therapy was done, making efforts to enhance the expression of inner feelings and rapport building. SAT therapy was then performed in 2-3 sessions. These interventions were performed by the authors who are qualified Orthoptists with adequate knowledge and experience in testing and treating patients in the fields of Ophthalmology and Orthoptic Correction, and who are also qualified image therapists approved by the Heath Counseling Society.

2.2.2 Conventional-type therapy

This is a treatment practiced by University A which mainly involves hypnotic eyeglass prescription, placebo eye-drop prescription, advice giving to parents to improve the environment, and so on, conducted by the 0phthalmologist in charge of the patient. This is a general method widely used in Clinical Ophthalmology. Environment improvement involves advising the young patients to stop attending several after-school cram schools (a habit which has become a burden), requesting the mother to stop over-possessiveness or excessive meddling, and such. The patient is not informed that the visual dysfunction is the result of stress.

2.2.3 The intervention and completion of treatment

Completion of SAT therapy intervention was done after conducting one to several interventions and confirming improvements in each of disappearance of verbal complaints, evaluation of psychological characteristics, and visual function assessment. Finally ,healing judgment was done by doctors for both groups, and treatment was completed when the subject was judged to be healed based on improvement of visual functions including corrected vision.

2.3 Method of investigation

A survey was conducted to the patients and their guardians using a self-report questionnaire. In follow-up studies, subjects who were periodically visiting hospitals for near-sightedness and similar problems even after treatment were given questionnaires directly at the hospitals. To the other subjects, the questionnaires were posted by mail. The follow up survey for the medium-term prognosis study was conducted in July 2002,

and that for the long-term prognosis study was implemented in July 2004. In the current study, “medium-term prognosis” was defined as prognosis at a time point of one year or more after treatment, whereas “long-term prognosis” was defined as prognosis at a time point of three years or more following treatment. The questionnaire items for patients and their guardians are as follows:

＜For the patients＞

(1) Subjective symptoms: Higuchi (2000) and Higuchi & Munakata (2002) created this scale. Questionnaire items were collected from the data provided by the patients after which an item pool was created. After consulting with two ophthalmologists and three Orthoptists, 14 items were set after correcting inappropriate expressions. The 14 items included “Characters on the blackboard are difficult to see” and “Textbook characters are difficult to read.” The scores ranged from: 3 (*Strongly Agree*), 2 (*Agree*); 1 (*Slightly Agree*) and 0 (*Disagree*) with the total scale score ranging from 0 to 42 points. Cronbach's α coefficient was 0.95.

(2) State-trait anxiety inventory for children (STAIC; Soga, 1983): Assuming that a state anxiety indicated a “temporary emotional state that may change depending on the conditions being experienced by the subject” and a trait anxiety a “temporary emotional state that reflected a reaction inclination of the subject relative to the anxious state experience,” Spielberger (1966) created STAI and then a “State-transition anxiety inventory for children” (STAIC). This scale is a Japanese version standardized by Soga (1983). It consists of 20 items such as state and trait anxiety. Each item is scored between one and three with three being the highest level of anxiety. Anxiety points are distributed between 20 and 60. Only the trait anxiety scale was used this time to check the tendency of anxiety. Cronbach’s α coefficient was 0.90.

(3) Self-esteem for children (same as above): This scale is used to measure the degree of self-satisfaction or how highly the subject regards him- or herself. It was created by Yoshiba & Munakata (1997) and consists of ten items with values of 0 to 10 assigned to each item. A higher score indicated higher self-esteem. Cronbach's α coefficient was 0.83.

(4) Self-repression for children (Yoshiba & Munakata, 1997) (same as above): The self-repression scale is used to measure the behavioral trait indicating the patient's tendency to suppress his or her feelings or thoughts to avoid being disliked by others, or to avoid making things worse. This scale for children was revised by Yoshiba from that developed originally by Munakata. This scale consists of 10 items with point values assigned to each item of two points for "Always yes," one point for "Often yes," and no points for "No" with the total score ranging from 0 to 20 points. Cronbach's α coefficient was 0.83. This time, a value of 0.79 was obtained.

(5)Emotional dependency for children (Yoshiba & Munakata, 1997) (same as above): This scale is used to measure how much the relevant child expects others to take care of him or her and level of emotional dependency. This scale measures the trait whereby those behaviors that allow the subject to cope with the expectations of others are adopted according to other's evaluations, as well as that trait whereby unrealistic expectations continue to be held, even for an unreliable person. This scale consists of ten items with the total score between 0 and 10 points. Cronbach's α coefficient, from which internal consistency was confirmed by Yoshiba, was 0.74. This time, a value of 0.71 was obtained.

(6) Perceived Emotional Support (Yoshiba & Munakata, 1997) (same as above): This scale focuses on the perceived emotional support provided by the various social support networks. It measures how much a child is aware that there are "people around

you who support you emotionally and mentally." This scale, originally developed by Munakata, has been revised for children and its validity and reliability have been confirmed. This scale consists of ten items with a total score of ten points. Four categories include "Father", "Mother", "Brother" and "Friend" and the children identify which of these they have as supporters. Each individual counts for one point. The Cronbach's α coefficient for children, as confirmed by Yoshiba & Munakata (1997), is between 0.83 and 0.89. The α coefficients obtained for this sample were 0.91 for Father, 0.88 for Mother, 0.84 for Brother, and 0.81 for Friend.

＜For the guardians＞

(i) Results of eye tests done in school physical examinations

(ii) Complaints of vision difficulties

(iii) Causes behind the visual impairment of the child, the child's personality, behavior, child-parent relationship, family relationships.

（4 items, open-ended）

For subjects who recurrence was suspected, a visual function test were executed. Additionally, an interview survey of the guardians as to the causes of recurrence was executed after verifying the guardians' wish to consult the therapists.

2.4 Method of Analysis

The Friedmann test was used for data of three or more time points. When a within-group comparison showed a difference, a multiple comparison test (Wilcoxon

signed-rank test with Bonferroni correction) was used, and the evaluation was done by modifying the assessment criteria of the P value following Bonferroni correction. Differences between groups were tested with the Mann-Whitney U test. Furthermore, qualitative data such as verbatim records of the counseling process and verbatim records of the interview data were analyzed together with quantitative data.

3. Results

3.1 Demographic Characteristics of Intervention Participants (Table 1)

In the medium-term prognosis study, 23 subjects who had been healed for one year or more were asked to participate in the study out of which 17 subjects responded, making the valid response rate as 73.9%. In the long-term prognosis study, 14 out of 20 subjects responded, making the response rate as 70.0% -- Table 1.

The follow-up period for the medium-term prognosis study was 21.82 ± 7.6 months after healing, whereas that for the long-term prognosis study was 48.14 ± 7.72 months.

Table1. Demographic Characteristics of Study Participants

Case No.	gender	Age at 2 years follow-up	Age at 4 years follow-up	Age at first visiting	No. of Brothers	intervention	visual Acuity at first exmination (R) (L)	other visual symptoms	visual Acuity at final exmination (R) (L)	complications at 2 years follow-up	period to healing (ms)	medium-term follow-up period (ms)	long-term follow-up period (ms)
1	M	12	14	10	2	SAT	(0.7) (0.6)	spasm	(1.2)(1.2)		1	14	39
2	F	9		8	1	SAT	(0.5) (0.5)		(1.2)(1.2)	stomachache	4	12	37
3	F	11	14	9	1	SAT	(0.2) (0.1)	field	(1.2)(1.2)	stomachache	4	20	45
5	F	10	13	8	1	SAT	(0.2) (0.15)	field	(1.2)(1.2)		3	19	44
5	F	13	15	10	1	SAT	(0.4) (0.2)		(1.2)(1.2)		2	25	50
6	F	9	11	6	1	SAT	(0.1) (0.2)		(1.2)(1.2)		2	35	60
7	F	9	11	7	2	SAT	(0.3) (0.3)		(1.2)(1.2)		2	22	47
8	F	9	12	8	1	SAT	(0.3) (0.4)		(1.2)(1.2)		3	27	52
9	F	17	19	15	1	SAT	(0.8) (0.8)		(1.2)(1.2)		5	20	45
10	F	10		8	2	SAT	(0.1)(0.1)		(1.2)(1.2)	headache	5	20	
11	F	10	12	8	1	Conv.	(0.7) (0.8)		(1.2)(1.2)		1	27	52
12	F	16	18	12	0	Conv.	(0.5) (0.4)		(1.2)(1.2)	neadache stomachache dizziness	3	30	55
13	F	12	15	9	2	Conv.	(0.3) (0.3)		(1.2)(1.2)		14	14	39
14	F	12	14	7	1	Conv.	(0.1) (0.2)		(1.2)(1.2)	headache stomachache	2	36	61
15	F	12		10	1	Conv.	(0.4) (0.5)		(1.2)(1.2)		5	25	
16	F	16		14	3	Conv.	(0.4)(0.5)		(1.2)(1.2)	insomnia	5	13	
17	M	14		12	2	Conv.	(0.6) (0.5)	abnormal visual field	(1.2)(1.2)	headache stomachache	6	12	36

3.2 Recurrence frequency of psychogenic visual disturbance depending on the method of treatment

A comparison of psychogenic visual disturbance recurrence depending on the method of treatment was conducted. At the medium-term prognosis observation time point, results revealed recurrence in 2 out of 7 patients (28.6%) in the group that underwent conventional-type treatment. On the other hand, in the group that received SAT therapy, recurrence was contained to just one case out of the 10 subjects treated (10%). However, no statistically significant difference (Pearson's $\chi^2 = 0.977.00$, df=1, p=0.323) was noted as the studied cases were few in number.

At the long-term prognosis observation time point, results revealed recurrence in 1 out of 5 patients of the conventional-type treatment group, and in one case, the psychological symptoms had deteriorated and were diagnosed as symptoms of depression. On the other hand, in the group that received SAT therapy, there were no cases that showed recurrence of visual disturbance, but there was one patient who was refusing to attend school. Again, no significant statistical difference was found as to the number of visual disturbance recurrence cases between the two groups (Pearson's $\chi^2 = 0.733$, df=1, p=0.188).

3.3 Changes in psychological characteristics and psychotic symptoms before and after therapeutic intervention depending on the method of treatment

1) Baseline Value

First, baseline values of various scale scores in the SAT intervention group and conventional-type treatment group before and after treatment were compared. There was no significant difference in the two groups (Table 2).

Table 2.

Comparison of baseline data (before intervention) between SAT and conventional therapy groups

	Mean Score ±SD			
Scale(Min-Max)	SAT group (n=10)	Conventional Therapy group (n=7)	Z	Statistically difference
SATIC (20-60)	41.0±5.9	38.0±4.4	-0.64	n.s.
Self-repression (0-20)	8.7±4.7	8.0±4.1	-0.16	n.s.
Emotional dependency (0-10)	6.7±1.8	6.9±1.6	-0.11	n.s.
Self-esteem (0-10)	4.4±2.1	4.0±1.6	-0.70	n.s.
Percived emotional support from Father (0-10)	4.3±1.7	4.1±1.3	-0.16	n.s.
Percived emotional support from Mother (0-10)	5.8±2.6	6.9±2.0	-0.20	n.s.

Mann-Whitney U test

2) Changes in psychological characteristics and psychotic symptoms before and after therapeutic intervention depending on the method of treatment.

(i) Trait anxiety (STAIC)

Before commencing SAT treatment the score was on average 41.0±5.9 points, soon after SAT therapy it was on average 31.9±4.1 points, at the medium-term prognosis study time point, it was on average 32.1±9.0 points, and at the long-term prognosis study time point, it was on average 28.3±6.3 points, showing a significant difference at the 4 observation time points (Friedman, p=0.022). Compared to before intervention, a significant drop was seen soon after intervention ($p<0.05$) and at the long-term prognosis study time point ($p<0.05$), and the drop of scores at the medium-term prognosis study time point had a significant tendency ($p<0.10$) (Table 3-1).

Meanwhile in the conventional-type therapy cases, the score prior to treatment was on average 38.0±4.4 points, after therapy it was on average 36.7±3.1 points, at the medium-term prognosis study time point, it was on average 39.7±3.9 points, and at the long-term prognosis study time point, it was on average 37.2±7.1 points, showing no significant statistical difference at the 4 observation time points (Friedman, p=0.267 n.s) (Table 3-2).

(ii) Self repression

Before commencing SAT treatment the score was on average 8.7±4.7 points, soon after SAT therapy it was on average 4.2±2.1 points, at the medium-term prognosis study time point, it was on average 4.6±4.9 points, and at the long-term prognosis time point, it was on average 3.0±2.3 points, showing a significant difference at the 4 observation time points (Friedman, p=0.015). Compared to before intervention, a significant drop was seen soon after intervention (p<0.05) and at the long-term prognosis study time point

(p<0.05)(Table 3-1).

In the conventional-type therapy, the score prior to treatment was on average 8.0±4.1 points, after therapy it was on average 7.6±3.9 points, at the medium-term prognosis study time point, it was on average 9.3±3.9 points, and at the long-term prognosis study time point, it was on average 5.6±2.0 points, showing no significant statistical difference at the 4 time points (Friedman, p=0.3916, n.s.) (Table 3-2).

(iii) Emotional dependency

Before commencing SAT treatment the score was on average 6.7±1.8 points, soon after SAT therapy it was on average 4.2±1.2 points, at the medium-term prognosis study time point, it was on average 5.2±1.9 points, and at the long-term prognosis study time point, it was on average 4.4±2.3 points, showing a significant difference at the 4 observation time points (Friedman, p=0.0415). Compared to before intervention, a significant drop was seen soon after intervention (p<0.05). In medium-term prognosis and long-term prognosis, even though there was a drop of the average scores compared to that before intervention, there was no significant statistical difference (Table 3-1).

In the conventional-type therapy, the score prior to treatment was on average 6.9±1.6 points, after therapy it was on average 6.3±1.7 points, at the medium-term prognosis study time point, it was on average 7.4±1.4 points, and at the long-term prognosis study time point, it was on average 7.4±2.7 points, showing no significant statistical difference (Friedman, p=0.3033 n.s) (Table 3-2).

Table 3-1 Longitudinal observation on psychological characteristics in SAT therapy group

	before intervention	after intervention	2 years follow-up	4 years follow-up	Friedman χ^2= (df)	Statistically difference
SATIC	41.0(5.9)a	31.9(4.1)b	32.1(9.0)c	28.3(6.3)d	14.6 (3)	a>b, a>d* a>b†
Self repression	8.7(4.7)a	4.2(2.1)b	4.6(4.9)c	3.0(2.3)d	10.5 (3)	a>b,d*
interpersonal dependency	6.7(1.8)a	4.2(1.2)b	5.2(1.9)c	4.4(2.3)d	8.2 (3)	a>b*
Self esteem	4.4(2.1)a	8.9(1.2)b	6.4(2.7)c	6.9(1.1)d	14.2 (3)	a>b* a>d†
perceived emotional support from Father	4.3(1.7)a	8.3(1.1)b	5.2(4.1)c	6.0(2.8)d	7.3 (3)	a>b*
perceived emotional support from Mother	5.8(2.6)a	9.6(0.5)b	9.0(2.1)c	9.1(1.5)d	9.6 (3)	a>b* ,a>c†

Friedman rank sum test

† Significant at P<.08 Wilcoxon paired signed rank testwith Bonferroni adjustment (Post hoc test)

* Significant at P<.05 Wilcoxon paired signed rank test with Bonferroni adjustment (Post hoc test)

** Significant at P<.01 Wilcoxon paired signed rank test with Bonferroni adjustment (Post hoc test)

Table 3-2 Longitudinal observation on psychological characteristics in conventional therapy group

	before intervin tion	After interve ntion	2 years follo w-up	4 years follo w-up	Friedman χ^2 = (df)	Statistically differe nce
SATIC	38.0(4.4)	36.7(3.1)	39.7(3.9)	37.2(7.1)	4.8 (3)	n.s.
Self repression	8.0(4.1)	7.6(3.9)	9.3(3.9)	5.6(2.0)	4.0 (3)	n.s.
Emotional dependency	6.9(1.6)	6.3(1.7)	7.4(1.4)	7.4(2.7)	3.6 (3)	n.s.
Self esteem	4.0(1.6)	4.4(2.0)	3.7(3.4)	4.8(3.4)	0.6 (3)	n.s.
Perceived emotional support from Father	4.1(1.3)	4.9(1.8)	6.3(3.8)	3.8(3.2)	1.6 (3)	n.s.
Perceived emotional support from Mother	6.9(2.0)	6.5(2.1)	6.5(4.0)	7.8(3.9)	1.3 (3)	n.s.

Friedman rank sum test

(iv) Self-esteem

Before commencing SAT treatment the score was on average 4. 4±2.1 points, soon after SAT therapy it was on average 8. 9±1.2 points, at the medium-term prognosis study time point, it was on average 6. 4±2.7 points, and at the long-term prognosis study time point, it was on average 6.9±1.1 points, showing a significant difference at the 4 observation time points (Friedman, p=0.027). Compared to before intervention, a significant rise was seen soon after intervention (p<0.05). In long-term prognosis

(p<0.07), a rise with a significant statistical tendency was seen (Table 3-1).

In the conventional-type therapy, the score prior to treatment was on average 4.0±1.6 points, after therapy it was on average 4.4±2.0 points, at the medium-term prognosis study time point, it was on average 3.7±3.4 points, and at the long-term prognosis study time point, it was on average 4.8±3.4 points, showing no significant statistical difference (Friedman, p=0.8866, n.s) (Table 3-2).

(v) Perceived Emotional Support from father

Perceived Emotional Support was on average 4.3±1.7 points before commencing SAT treatment, soon after SAT therapy it was on average 8.3±1.1 points, at the medium-term prognosis study time point, it was on average 5.2±4.1 points, and at the long-term prognosis study time point, it was on average 6.0±2.8 points, with a significant tendency at the 4 observation time points (Friedman, p=0.0638). Compared to before intervention, the score following intervention was significantly high (p<0.05) (Table 3-1).

In the conventional-type therapy, the score prior to treatment was on average 4.1±1.3 points, after therapy it was on average 4.9±1.8 points, at the medium-term prognosis study time point, it was on average 6.3±3.8 points, and at the long-term prognosis study time point, it was on average 3.8±3.2 points, showing no significant statistical difference (Friedman, p=0.6525) (Table 3-2).

(vi) Perceived Emotional Support from mother

Perceived Emotional Support from mother was on average 5.8±2.6 points before commencing SAT treatment, soon after SAT therapy it was on average 9.6±0.5 points, at the medium-term prognosis study time point, it was on average 9.0±2.1 points, and at the long-term prognosis study time point, it was on average 9.1±1.5 points, showing a

significant change at the 4 observation time points (Friedman, p=0.0222). Compared to before intervention, the score following intervention was significantly high ($p<0.05$). Even at medium-term prognosis, a rise was seen although with a significant tendency ($p<0.10$)（Table 3-1）.

In the conventional-type therapy, the score prior to treatment was on average 6.9±2.0 points, after therapy it was on average 6.5±2.1 points, at the medium-term prognosis study time point, it was on average 6.5±4.0points, and at the long-term prognosis study time point, it was on average 7.8±3.9points, showing no significant statistical difference at the 4 observation time points (Friedman, p=0.7379) (Table 3-2).

4.3.5 Analysis of causes behind recurrence in recurrent cases (Table 4)

Features of changes in psychological characteristics in the 3 recurrent cases seen at the medium-term prognosis study time point were analyzed. Case A and B had received conventional therapy, and Case C had received SAT therapy. Recurrence was confirmed in Case A even at the time long-term prognosis study time point.

(i) Recurrent cases in the SAT-therapy group (C) – Table 4-1

After intervention, the scores of SATIC, self-suppressive behavioral characteristics and interpersonal-dependent behavioral characteristics showed a drop, but there was a significant rise in the scores at the time of recurrence (medium-term prognosis study time point). After that, vision improved by SAT intervention and at the long-term prognosis study time point all the scores had remarkably improved.

The degree of awareness of emotional support from father and mother showed an improvement following intervention, but at the time of recurrence (medium-term prognosis study time point), a significant drop in scores was observed. The scores then improved at the long-term prognosis study time point.

Table 4-1. Features of psychological characteristics in the recurrent cases in the SAT-therapy group

Scale(Min-Max)	Case	before intervention	After intervention	2 years follow-up	4 years follow-up
SATIC(20-60)	C	36	32	49↑	34
Self repression (0-20)	C	6	4	16↑	6
Interpersonal dependency (0-10)	C	8	5	8↑	4
Self esteem (0-10)	C	2	8	2↓	8
Perceived emotional support from Father (0-10)	C	3	10	4↓	7
Perceived emotional support from Mother (0-10)	C	4	9	4↓	9

Table 4-2. Features of psychological characteristics in the recurrent cases in Conventional therapy group

Scale(Min-Max)	Case	before intervention	After intervention	2 years follow-up	4 years follow-up
SATIC(20-60)	A	42	40→	41→	34↓
	B	32	31→	42↑	48↑
Self repression (0-20)	A	3	3→	11↑	9↑
	B	7	7→	5↓	6
Interpersonal dependency (0-10)	A	6	5→	9↑	7
	B	6	5→	7↑	10
Self esteem (0-10)	A	4	4→	7↑	5
	B	3	3→	0↓	0↓
Perceived emotional support from Father (0-10)	A	3	3→	0↓	0
	B	5	5→	10↓	1
Perceived emotional support from Mother (0-10)	A	6	8↑	3↓	2↓
	B	5	6→	0↓	10↑

(ii) Recurrent cases in the conventional-therapy group – Table 4-2

In the 2 recurrent cases of the conventional-therapy group, there was no change in scores, and a high degree of anxiety continued until the time of recurrence (medium-term prognosis study time point). In Case A where recurrence was confirmed at the time long-term prognosis study time point, the anxiety had become even stronger. Degree of

self-repression showed no change in Case B from before treatment to long-term prognosis study time point, whereas a rise in the score was seen for Case A at time of recurrence.

Scores of interpersonal dependence-type behavioral characteristics hardly changed in both cases even after therapy, a rise was seen at the time of recurrence (medium-term prognosis study time point), which continued to be high even at the long-term prognosis study time point.

Self-esteem scores showed no change before and after therapy, and continued to be low, showing a further decline at the follow-up study time point.

Perceived Emotional Support from father showed no change following therapy, and although a drop was seen in one case at the follow-up study time point, in the other case, there was a rise in the score. As for the Perceived Emotional Support from mother, a slight rise in scores was observed in both cases, but at the time of recurrence (medium-term prognosis study time point), the scores had sharply declined. In Case A where a further decline in vision was seen at long-term prognosis, this score showed an increase, but in Case B, there was a further decline.

3) Narrative evaluation of recurrence causes recognized by the patient himself and parents in recurrent cases

Inquiries were made as to causes that influenced recurrence in the 3 recurrent cases. There were important causes such as the way love was expressed, lack of communication within the family, etc.

4. Discussion

In the present study, recurrence was seen in 2 out of 7 patients (28.6%) in the group that underwent conventional therapy, and in 1 out of 10 patients (10.0%) in the

group that underwent SAT therapy, at the medium-term prognosis observation time point. At the long-term prognosis observation time point, recurrence was seen in 1 out of 5 patients (20%) in the conventional-type treatment group, whereas in the SAT therapy group, no visual disturbance recurrence was found in any of the patients (0 out of 9, 0%). Up to now, reports on PVD prognosis following therapy have described non-healing or recurrence in 7 out of 15 patients (46.7%) as reported by Rada et al. [22] from the field of clinical psychiatry; in 8 out of 19 patients (43.1%) as reported by Abe et al. from the field of ophthalmology; in 4 out of 14 patients (28.6%)) as reported by Sletterberg et al.[7]; and in 1 out of 23 patients (4.3%) as reported by Catalano et al. [23]. Even when these past reports and the present study's results for conventional therapy are compared, the long-term prognosis following SAT therapy was the best after the Catalano report. Catalano et al. [23] report that 35% of the cases showed an improvement within 24 hours and 61% showed an improvement within a month by merely a guarantee that the patient will be "definitely cured". In contrast, the subjects of present study's SAT therapy included many cases that had showed no response even to treatment spanning a few months to one year or more after being diagnosed with PVD. Even though a simple comparison is not possible, SAT therapy effects are thought to be good considering these differences in severity of the cases studied.

Mochizuki et al.[24] divided into two groups 42 patients who has been diagnosed as having conversion disorders by DSM-III-R based on decreased vision as the main complaint. The two groups were improved group and protracted group. Mochizuki et al.[24] reported that children who refused to attend school were significantly higher in the improved group. In the present study, although there was one child who refused going to school after SAT therapy, going to school became possible shortly after the child himself chose to undergo SAT therapy and when the problems were solved after the

intervention. This showed that symptom shifts to other somatizations and behavioral symptoms is hardly seen in SAT therapy intervention, and that resolution of underlying issues is urged.

There are extremely few reports relating to long-term prognosis of PVD. Yokoyama[10] observed long-term prognosis for 2 PVD cases and reported a psychological mechanism that mental swings of adolescence, namely sibling conflicts was the cause. The present study elucidated a long-term prognosis of PVD (4 years in average after healing) for the first time in a positive study with a control group and based on detailed data on visual functions and psychological characteristics following active intervention.

This study revealed that (i) trait anxiety, self-suppression, and interpersonal-dependence that decreased following SAT therapy remained low even at the long-term prognosis observation time-point, and (ii) self value and degree of awareness of mother's emotional support that improved following SAT therapy remained high even at the long-term prognosis observation time-point, although there was a slight drop. Detailed evaluation of each psychological characteristic showed that, first, PVD has a characteristic low self-value, which is improved after SAT intervention. Self-assessment and feelings of self-respect which are similar to self-value are said to arise from the age of eight[25]. This is the stage around which self-consciousness develops, enhancing an interest in internal matters. Incidentally, this period around 8 years of age overlaps with time when symptoms of psychogenic visual disturbances peak. Self-assessment at this stage depends on the assessment of others by significant others (generally, the mother). C. Rogers describes that children perceive themselves through clarification of self-concepts within interactions with significant others, and require positive assessment from significant others[26]. It is thought that self-images and self-concepts get determined by assessments of those around from early childhood, and self-confidence is

created and acted out via having a positive image of oneself. Having a low self-value at a time when the foundation of self- assessment is being completed, is thought to create defects in self-confidence and increase uneasiness when taking various actions, because the child always worries about other people's opinions. Therefore, psychological interventions at this stage that focus on self-image enhancement are extremely important.

In SAT therapy, latent traumatic memories such as sensation images in the fetal stage or early childhood were approached from problems recognized at the present time, and image conversion was conducted to satisfy unfulfilled internal demands of the mind and unresolved emotions associated with the trauma. To mention, re-learning of perception and behavior based on positive images was encouraged. Munakata has described that "dangers to survival experienced in infancy and birth are unconsciously played back[27)]". There are also reports that causes of certain mental and physical problems may lie in the fetal period, and experiences made during this fetal period and at birth have a huge influence on the life thereafter[28)]. By trying to approach traumatic memories that the patient is not aware of, SAT intervention is thought to have made it possible to transform various images of oneself and one's surroundings.

The following may explain the low self-suppression and interpersonal-dependence. What is behind strong interpersonal dependence are non-fulfillment of needs and desires to feel affection such as "not being understood", "not being able to emotionally depend on someone". High -suppression has the tendency to suppress ones thoughts and feelings to suit the expectations of those around. Negative latescent image memories such as fear of being abandoned, self denial, and loneliness are behind the patient being forced to become independent, giving up the need to emotionally depend on others. In SAT therapy intervention, real desires within the heart may be fulfilled due to the formation of the self-image that the patient is treasured by his/her parents, thus decreasing the

dependence and self-suppression.

Although a rise in the degree of awareness of the mother's emotional support was seen the SAT therapy group, this degree was low in all recurrent cases at the recurrence point. Deterioration of relationships with family and parents is thought to deteriorate the self-image along with the decrease of the feeling of having emotional support. This is thought to lead to stronger stress responses, and cause, as a physical response, the onset of visual disturbance recurrence. Wynick et al.[29] showed by analyzing PVD children's assessments of their mothers, that these children thought that while the mother was very loving and receptive towards him or herself, she was also dominating and meddlesome. The improvement of the degree of awareness of the mother's emotional support through SAT therapy can be presumed to have been the result of an improvement in the awareness of support from a significant other due to the decrease of the child's degree of dependence. However, in future, it would be necessary to conduct SAT therapy taking the influence of the family environment surrounding the PVD child into consideration.

Causes of PVD recurrence had, as intrapersonal factors, the features of (i) high anxiety, (ii) high self suppression and interpersonal dependency, and (iii) low self-value and low degree of awareness of the parents' emotional support. In cases in whom an improvement was seen after SAT intervention, the state of psychological characteristics were more or less maintained from the time soon after intervention, whereas recurrent cases showed a deterioration of psychological characteristics that once improved at the time of intervention. Taking into view situations where the gap between image scenarios created for SAT therapy and the actual images are too big, in order for the patient to convert the parental image and for that image to become established, SAT therapy currently considers it vital that (i) the parents themselves grow and accept psychological

interventions to change the personality so that they would become able to unconditionally accept the child, and (ii) the child lives separated from the parents for a while [30]. Even in the present recurrence, the improved parental image may have become bad again because the improved image was considerably different to the actual.

Turgay[31] gives the following as factors that correlate with good therapeutic achievements for conversion disorders in childhood and adolescence: (i) being a juvenile, (ii) having a healthy personality, (iii) having healthy family functions, and (iv) the family understanding the psychological features of the disorder. The present result also suggests that even in the PVD healing process, healthy psychological characteristics equivalent to Turgey's "healthy personality", in other words personality development, and the surrounding environment that "the family understanding the psychological features of the disorder" are highly important.

The present study reveals that to treat PVD, counseling of the patient and providing guidance for the mother are effective in most of the cases. However, analysis of recurrent cases teaches the necessity for the following improvements. Likelihood of recurrence is highly increased when the mother's level of anxiety is high, and the affection of "unconditionally accepting the child" is low. In such cases, it is vital that first the mother herself becomes emotionally stable to accept the child under any circumstance. Therefore, the authors believe that simultaneous SAT therapy intervention for the mother would lead to the prevention of recurrence and even solution of family issues that are appearing as a physical reaction in the child.

The sorting into each of the intervention groups done in the current study is not homogeneous. For example, the SAT group included cases in whom healing could not be seen even after several months, and too few cases were studied. Therefore, there still issues remaining for strict evaluation of SAT intervention group and conventional

therapy intervention group.

4.2 Conclusion

Effects of psychological intervention by SAT therapy were observed for a long duration assessing recurrence rate, behavioral characteristics and changes in psychological symptoms. As a result, the following findings were obtained:

(i) Recurrent numbers for each method of therapy was 2 out of 7 patients (28.6%) in the conventional-type therapy group at the medium-term prognosis observation time point, whereas it was one case out of the 10 subjects (10.0%) in the SAT therapy group, although there was no statistically significant difference. At the long-term prognosis observation time point, visual disturbance recurrence was seen in 1 out of 5 patients in the conventional-type therapy group, whereas recurrence was not seen in the SAT therapy group. Therefore, in both groups a significant difference in visual disturbance recurrence was not seen even at the long-term prognosis observation time point.

(ii) In the SAT therapy intervention group, scores of self-repression, emotional dependency and trait anxiety that improved soon after intervention remained low even though there was a slight increase at the long-term prognosis observation time-point. Similarly, scores of self value and degree of awareness of mother's emotional support similarly remained high, even though there was a slight drop. On the other hand, scores of self-repression, self-esteem, trait anxiety, and perceived emotional support were hardly changed in the conventional-therapy group.

(iii) In PVD recurrent cases, it was confirmed that anxiety, self- Self-repression, and

emotional dependency are high even though an improvement is temporarily seen, and self-value and degree of awareness of mother's emotional support are low, thus accompanying a change in psychological characteristics.

The above results suggest that since psychological conflicts are behind the onset of PVD, therapy should not focus on resolving superficial issues such as visual disturbance, but should involve psychological interventions that encourage finding solutions to those psychological conflicts.

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