

P-F study can predict the psychiatric symptoms of patients confined to the germ-free unit

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Psychological symptoms are often seen in pediatric patients who are confined to a germ-free unit while undergoing bone marrow transplants. The Picture-Frustration Study (P-F study) was performed at the outpatient clinic before admission to the germ-free unit. After admission to the germ-free unit, the patients were interviewed once a week in the germ-free unit, and their mental symptoms were recorded in their clinical records. Condition of anxiety, unresponsiveness, resistance to treatment, and aggression have been noted in pediatric patients below the age of 18 in the Tokai University Hospital. Insomnia, appetite loss, anxiety, unresponsiveness showed a significant correlation with the patient's age. Forty-seven children were given the P-F study before entering the germ free unit. Anxiety, depression, and unresponsiveness correlated significantly with several items in the P-F study. The results of P-F study are useful in predicting the appearance of psychological or physical symptoms of patients confined to the germ-free unit.

Key words: Bone marrow transplantation, consultation-liaison, germ-free unit, pediatric patients, psychological support

INTRODUCTION

Bone marrow transplantation requires rigorous pre-transplantation immunosuppressive therapy, and temporary admission of the patient to the germ-free unit is inevitable for the prevention of infections during the period of immunodeficiency. During this period, the patient is exposed to various stressors in the special environment isolated from the external world. This often induces the patient's emotional instability, difficulty in adapting to the therapeutic environment, and resistance or rejection of necessary treatments or procedures (Kellerman *et al.*, 1977; Molassiotis *et al.*, 1995). Particularly, if the patient is a child, limitation of understanding of the disease and treatment is likely to cause intense tension, anxiety, and fear. This may induce regression, withdrawal, depression, and physical discomfort) such as abdominal pain and vomiting as well as the expression of violent anger and extreme dependence, leading to resistance or rejection of treatments such as oral medication and necessary procedures, and the medical staff may have difficulty in coping with these reactions (Kellerman *et al.*, 1979; Günter *et al.*, 1999). Moreover, sufficient mental care of not only the patient but also the family is indispensable for successful transplantation (Futterman *et al.*, 1996), and active involvement of a psychiatrist is important (Kiss *et al.*, 1994).

Various psychiatric problems are known to occur during treatment in the germ-free unit, and the importance of their evaluation and management has been emphasized (Fine *et al.*, 1969; Gordon, 1975; Gordon,

1975(2)). Therefore, assessment of the psychological state before admission to the germ-free unit is important. However, there have been only a few reports on specific methods for this assessment, including those of Jenkins *et al.* (1991), Futterman *et al.* (1991), and Bryant *et al.* (1997).

At our department, we interview patients before admission to the germ-free unit and perform the P-F study as a method for understanding them. In this study, we evaluated the usefulness of the P-F study by examining the correlation between the results of the P-F study before admission to the germ-free unit and the psychiatric symptoms that appeared after admission.

MATERIALS AND METHODS

The subjects were 47 (67.6%) who underwent the P-F study among the 71 patients (48 males and 23 females), aged 7-18 years, who were treated at the germ-free unit of Tokai University Hospital between January, 1995 and March, 2001. Of the patients who did not undergo the P-F study, 12 were judged not to be able to tolerate the test physically, 10 were not tested because of intelligence problems, and 5 were not tested because the time until admission was short. However, no statistical difference was noted in age, gender, duration of stay in the germ-free unit, outcome, or disease type between those who underwent the P-F study and those who did not (Table 1).

The P-F study was performed at the outpatient clinic before admission to the germ-free unit. The results of the P-F study were examined by converting

Table 1 Characteristics of patients.

	P-F(+)	P-F(-)	
Number of patients	47	24	n.s.
Age (range of years)	7-18 (mean 12.0)	7-18 (mean 13.1)	n.s.
Sex Male (patients)	33	15	n.s.
Female (patients)	14	9	n.s.
Hospital admission (days)	25-87 (median 43)	11-179 (median 32)	n.s.
Outcome alive	27	12	n.s.
dead	20	12	n.s.
Diagnosis Leukemia	40	40	n.s.
Solid tumor	2	1	n.s.
Others	5	7	n.s.

p < 0.005

Table 2 Symptoms.

	Number of Patients (%)
Physical discomfort	45 (96%)
Mood	32 (68%)
Activity patterns	20 (43%)
Sleep	16 (34%)
Management problems	15 (32%)
Perceptual disturbances	1 (2%)
Removal of patients	0 (0%)
Social-communication behavior	0 (0%)
Sedation	0 (0%)
Others	1 (2%)

the group conformity rating (GCR), profiles (15 items), and superego factors (6 items) into deviation values. After admission to the germ-free unit, the patients were interviewed once a week in the germ-free unit, and their mental symptoms were recorded in their clinical records. The mental symptoms, extracted retrospectively from the clinical records 1, 2, and 3 weeks after admission, were evaluated after being classified according to the major scale for symptom assessment used by Kellerman *et al.* (1979) primarily for the assessment of mental symptoms in patients admitted to the germ-free unit.

Statistical analysis was performed by converting the values of each item obtained by the P-F study into deviation values and examining the correlations between these values and the clinical symptoms by the t-test using the Japanese version of SPSS 11.0J for Windows.

RESULTS

1) Types and frequencies of symptoms observed in the germ-free unit

Symptoms were observed in 44 (94%) of the 47 patients within 3 weeks after admission. Physical discomforts such as appetite loss, nausea, and headache were the most frequent symptoms and were observed in 45 patients (96%). As for mental symptoms, mood symptoms such as anxiety and depression were noted in 32 (68%), changes in the activity pattern in 20 (43%), sleep disturbance such as insomnia in 16 (34%), and management problems such as refusal of drugs or food in 15 (32%). None of the patients required unscheduled discharge or sedation or exhibited changes

in social-communicative behavior (Table 2).

2) Correlation with the P-F study

The results of the P-F study were converted to deviation values, and their statistical correlations with the symptoms observed in the germ-free unit were examined. Correlations were observed between some of the profile items and clinical symptoms.

- A significant correlation ($t = 2.406$, $p = 0.020$) was observed between the ego-defense (E-D) value, which is considered to be related to the strength of ego, and mood symptoms such as anxiety and depression, and such mood symptoms were rare in patients with high E-D values (Table 3-1).
- A significant correlation ($t = 2.303$, $p = 0.026$) was observed between the M value, representing impulsive responses, and mood symptoms such as anxiety and depression, and such mood symptoms were rare in patients with high M values (Table 3-2).
- A significant correlation ($t = 2.203$, $p = 0.033$) was observed between the i value, representing introjective responses, and management problems such as delays of drug administration or treatment, and such problems were rare in patients with high i values (Table 3-3).
- A significant correlation ($t = 2.032$, $p = 0.048$) was observed between the M' value, representing impulsive responses, and management problems such as delays of drug administration or treatment, and such problems were frequent in patients with low M' values (Table 3-4).
- A significant correlation ($t = 2.641$, $p = 0.011$) was

Table 3-1 E-D/Mood.

Mood	N	medianE-D (S.D.)
no	15	56.767 (2.7049)
yes	32	49.331 (1.6954)

$t = 2.406 \quad p = 0.020$

Table 3-2 M/Mood.

Mood	N	medianM (S.D.)
no	15	56.767 (4.9505)
yes	32	49.331 (1.8787)

$t = 2.406 \quad p = 0.020$

Table 3-3 i/Management Problem.

Management Problem	N	Median i (S.D.)
no	32	58.128 (3.4668)
yes	15	46.547 (1.9264)

$t = 2.203 \quad p = 0.033$

Table 3-4 M'/Management Problem.

Management Problem	N	Median M' (S.D.)
no	32	51.075 (1.8811)
yes	15	44.940 (1.7993)

$t = 2.032 \quad p = 0.048$

Table 3-5 I%/Management Problem.

Management Problem	N	Median I% (S.D.)
no	15	50.530 (2.369)
yes	32	40.830 (1.733)

$t = 2.641 \quad p = 0.011$

observed between the I% value, representing intro-punitive responses, and management problems such as delays of drug administration or treatment, and such problems were frequent in patients with low I% values (Table 3-5).

- f) No clinical symptom was significantly correlated with the GCR or superego factors.

DISCUSSION

The P-F study is a personality test based on projection devised by the American psychologist Saul Rosenzweig (1978). In this test, frustrating situations often encountered by anyone in his/her daily living are shown as illustrations, and the personality characteristics of the subjects are evaluated on the basis of their verbal responses to the illustrations. There have been reports of evaluation of the relationships of hypoglycemia (Benton D, *et al.*, 1982), hypertension (Perini C., *et al.*, 1986; Perini C., *et al.*, 1988), atherosclerosis (Matsumoto Y., *et al.*, 1993), epilepsy (Beghi E., *et al.*,

2002), and menstrual cycle with stress (Krug R., *et al.*, 1996), and of the effects of abuse (Kinard E.M., 1982) and divorce of parents (Spigelman G., *et al.*, 1991) in children, using the P-F study. However, our review of the literature showed no report on the P-F study performed in patients admitted to the germ-free unit.

In this study, we evaluated the usefulness of the P-F study by examining the correlation of its results with mental symptoms that appear after admission to the germ-free unit. As a result, the values of E-D (ego-defense) and M (impunitive) were significantly correlated with the appearance of mood symptoms such as anxiety and depression. Also, the values of i (intropersis-tive), M' (impeditive), and I% (intropunitive), which is considered to represent excuse responses among items of superego factors, significantly correlated with the appearance of management problems such as delays of administration or treatments.

We interpreted the results of the P-F study that we obtained as follows according to the instruction manual by Rosenzweig (1987).

- 1) Symptoms such as anxiety and depression were significantly infrequent when the E-D value was high. E-D is related to strength of the ego, and is an honest and radical response to overcome stress in frustrating situations. A person with a high E-D value is considered to be a type who attempts to defend himself/herself by excessively emphasizing the ego to ease stress in frustrating situations. According to our results, symptoms such as anxiety and depression were unlikely to appear when the E-D value was high, i.e., the patient was eager to be involved in the disease treatment.
- 2) Symptoms such as anxiety and depression were shown to be significantly infrequent when the M value was high. M is considered to reflect impunitive responses, represents an attitude of not directing reproach to either the self or others and of regarding the situation as "unavoidable", and is a factor related to tolerance and social maturity. It was shown that symptoms such as anxiety and depression are unlikely to appear when the M value is high, i.e., the patient is ready to forgive the person who may be responsible for the frustrating situation.
- 3) Management problems related to the drug administration or treatment were significantly infrequent when the i value was high. i is considered to reflect intropersis-tive responses, or an attitude of trying to overcome the frustration by self-reflection. A high i value indicates a positive attitude to solve the problem by oneself and strong willingness to be involved in the treatment. Problems with administration and treatment were unlikely to appear in patients with a high i value.
- 4) Problems with drug administration and treatment were significantly frequent when the M' value was low. M' is considered to reflect impeditive responses and represents disappointment with being frustrated and an attitude of not directing the frustration externally. A high M' value indicates a strong will not to point out the problem that has caused the frustration, if there are complaints or frustration, and problems with drug administration and treatment were likely to occur in such patients.

5) Problems of drug administration and treatment were significantly frequent when the I% value of superego factors was low. I% is a factor that indicates a tendency to make excuses even when the person feels guilty and, essentially, to avoid admitting one's fault. Problems with drug administration and treatment were likely to occur when this factor was low, i.e., the patient cannot even make excuses.

We examined whether mental symptoms after admission of children to the germ-free unit can be predicted by the results of the P-F study before admission. The values of E-D, an ego-defense factor, and M, an impulsive factor, were significantly correlated with the appearance of mood symptoms such as anxiety and depression. In addition, the values of i, an introjective factor, M', an impulsive factor, and I%, an excuse factor among superego factors significantly correlated with the appearance of management problems such as delays of drug administration and treatments.

Generally physical condition such as pain, fever, etc. and recognition about their disease are predictable for developing anxiety and depression. However, these results suggest that the P-F study is useful for predicting the appearance of mental or physical symptoms during the stay in the germ-free unit and for improving the understanding of children to be admitted.

It is difficult to take measures to protect the patients' mental health during treatment for severe diseases including bone marrow transplantation. Stressful treatment may not necessarily result in a satisfactory therapeutic outcome, and patients often develop marked stress responses. However, the patients' mental burden may be reduced by the therapists' eagerness to understand and accept the patients. However, if there are differences in the understanding of a patient among members of the care team, they may take contradictory approaches to the patient and increase his/her mental burden. If a psychiatrist is involved in a patient's care from before admission to the germ-free unit, his/her stress responses may be predicted, and, if they appear, may be detected early and managed more satisfactorily. In addition, if the psychiatrist shares his/her understanding of the patient with the care staff and proposes better approaches to the patient, the care team may be able to provide consistent and more appropriate care.

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