Personality Stability in Chronic Pain Patients without Psychological Disturbance : Confirmation with the MMPI

Mamoru Hasegawa¹, Suguru Hattori², Keiji Ishizaki¹,
Yukiteru Machiyama² and Fumio Goto¹

¹*Department of Anesthesiology and Resuscitology and* ²*Department of Psychiatry,*
Gunma University School of Medicine, Maebashi, Japan

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Abstract

The Minnesota Multiphasic Personality Inventory (MMPI) is used widely in chronic pain patients to assess psychological aspects of pain. Controversy exists as to the ability of the MMPI to predict response to treatment of pain. We believe that personality profiles measured by the MMPI have little influence on treatment-associated changes of pain intensity. We tested our hypothesis by giving the MMPI, the State Trait Anxiety Inventory (STAI), the Beck Depression Inventory (BDI), and pain intensity scales to chronic pain patients without overt psychological disturbance at initial consultation and after 2 months of treatment. Personality profiles measured by the MMPI were almost unchanged despite changes of pain intensity, and the profiles could not predict changes in pain intensity or outcomes of treatment.

Key words : MMPI, personality stability, psychologically undisturbed patients, chronic pain

INTRODUCTION

The Minnesota Multiphasic Personality Inventory (MMPI)⁵⁾ is widely used in chronic pain patients to assess psychological aspects of pain. Originally devised by Hathaway and McKinley in 1940, the MMPI provides standard-

ized assessment of abnormal behavior and psychological disturbance from 550 statements which subjects assess as "true," "false," or "cannot say". A person's responses to these statements are scored on 10 clinical scales that measure major categories of abnormal behavior. In addition, 4 validity scales assess the subject's

test-taking attitudes. The MMPI was designed to assess psychopathological personality traits in psychologically disturbed patients. Accordingly, controversy exists about the ability of the MMPI to predict the changes of pain intensity in chronic pain. Soto Werder et al.¹¹⁾ reported that in headache patients high scores on the depression and social introversion scales correlated positively with the outcome of biofeedback treatment. More recently, Ellertsen et al.⁴⁾ compared MMPI profiles before and after biofeedback treatment in a group of women with migraine and failed to find significant differences in outcome. However, they found significant changes in the MMPI after improvement of headache, and concluded that "personality traits as measured by the MMPI seem to reflect migraine headache problems and not to be the predisposing cause of such problems." Moreover, a multiple-regression analytic study by Main et al. (1991) criticized the utility of administering the MMPI at the time of initial assessment as an outcome predictor in chronic pain patients⁸⁾. More generally, Leon et al. (1979) periodically evaluated personality profiles with the MMPI in a group of physically healthy and emotionally stable men over 30 years from middle to old age and observed personality stability⁷⁾. Therefore, the questions of whether personality disorders predispose to chronic pain syndromes and whether personality profiles can predict treatment outcome remain unsettled.

We hypothesized that personality profiles measured by the MMPI would vary little with change of pain intensity, reflecting the long-term stability generally observed by Leon⁷⁾. We administered the MMPI to chronic pain patients at initial consultation and after 2 months of treatment.

Our aims were to determine whether long-term findings of personality stability also hold in a patient population with various forms of chronic pain, and specifically whether or not personality characteristics change after successful treatment. We also considered whether treatment outcome was influenced by personality characteristics before treatment.

SUBJECTS AND METHODS

Subjects

Selection criteria included a history of chronic illness with pain lasting a minimum of 6 months, fluency in Japanese, freedom from psychological disturbance according to diagnostic criteria from DSM-IV¹⁾, and an age between 21 and 75 years. Prior to participation in the study, all subjects gave informed written consent.

One hundred eighty-six consecutive outpatients at the pain clinic at Gunma University Hospital who satisfied the above criteria (88 men and 98 women) were admitted to a multidisciplinary pain program over 1 year (1996~1997). The mean age of the group was 55.0 years (SD, 14.2). Seventy-nine percent of the subjects were married. The mean educational level was 12.5 years. Only 2% had upcoming litigation. The commonest site of pain was back/leg (n=81), with other areas including neck/arm (n=54), head/face (n=20), shoulder (n=16), and various others (n=15). The average duration of pain was 1.3 years (SD, 0.69).

Measures and procedure

Before starting the program, the subjects were given an intake questionnaire addressing demographic and medical information and were seen by a physician for a comprehensive medical interview. Next, a credentialed clinical psychologist and a psychiatrist assessed patients according to diagnostic criteria from DSM-IV¹⁾ in order to exclude psychologically disturbed patients. Subjects included took the MMPI, the Beck Depression Inventory (BDI), the State-Trait Anxiety Inventory (STAI), and a Japanese version of the McGill Pain Questionnaire (MPQ)^{6,9)}. They also were asked to rate subjective pain intensity in a private interview with one of the authors on a visual analogue scale (VAS). About 2 months after the start of treatment, the MMPI, the STAI, the BDI, and pain intensity scales were administered again to the patients who had partially recovered from their pain but still needed treatment ("relief group") and not to the patients whose pain had recovered to a degree that they did not have to be treated any more ("recovery group"). Measurement selec-

tion was based on the recommendation of Williams¹⁴. Where possible, psychometrically based clinical measures with demonstrated validity and reliability which were specifically designed for chronic pain patients were selected.

The MMPI is the most widely used and thoroughly researched personality assessment instrument. From self-reporting of many specific questions, it gives scores on 10 standard empirically-derived clinical scales. The MMPI was designed to measure a variety of psychopathological changes. In this study the 3 major validity scales and the 10 major clinical scales of the MMPI were scored. Standard K-scale corrected *t* scores were used throughout⁵.

The BDI in a 21-item multiple-choice self-reporting instrument that measures cognitive, behavioral and somatic aspects of depression². Each item reflects a specific sign of depression and is weighted 0 to 3. The BDI has been used widely in clinical settings and has demonstrated applicability to chronic pain patients¹³.

The STAI contains 2 separate 20-item self-report scales for measuring state and trait anxiety¹². The STAI A-state scale (STAI-1) measures how individuals feel at a particular moment in time, while the A-trait scale (STAI-2) measures how an individual feels in general.

The MPQ consists of 20 groups of adjectives commonly used to describe chronic pain. Previous studies employing factor analysis have revealed that these adjectives can be classified as relating to one of three subscales (sensory, affective and evaluative pain descriptors) or a fourth miscellaneous subscale^{3,10}. The Pain Rating Index (PRI) is the the sum of the rank values selected by the patient in each subclass. These subscales can be summed to yield a total pain rating score (PRI-T), which represents an accepted measure of pain severity. The MPQ contains a 6-level scale or Present Pain Intensity (PPI), a 100 mm VAS, a 5-point Verbal Rating Scale (VRS) (100 mm) and a 0-100 Numerical Rating Scale (NRS) (100 mm). The MPQ also contains a human figure drawing for localization of pain⁹.

ANALYSES

Potential bias related to demographic data was assessed using *t*-tests for continuous variables and chi-square tests for categorical variables, respectively.

Paired *t*-tests were employed to evaluate differences in MMPI (T score), BDI, STAI-1, STAI-2, and pain intensity (PRI-T and VAS) scores at initial consultation between recovery and relief groups. This also was done before and after 2 months of treatment for the relief group. The Pearson correlation coefficient was used to examine correlations between the MMPI, BDI, and STAI scores and pain intensity scores before treatment.

To examine if improvement of pain correlated with changes in MMPI, BDI, and STAI, multiple regression analysis was employed. Differences in pain intensity scores before and after treatment were taken as the independent variable, and differences in MMPI, BDI, and STAI scores as the dependent variable.

Data obtained in this study were analyzed using the program package Statistica (StatSoft Inc., Tulsa, OK, USA). A value of $p < 0.05$ was considered statistically significant.

RESULTS

Considering all patients, the mean pain intensity measured by the PRI-T fell from 32.9 before treatment to 8.7 after treatment. By the VAS pain declined from 72.6 to 23.0 ($p < 0.001$, paired *t*-test). No substantial difference was found between men and women in pain intensity improvement.

Table 1 compares the features of subjects in the recovery and relief groups. Significant differences were evident between recovery and relief groups in pain intensity and duration of pain before treatment **Table 2** shows mean MMPI, STAI, BDI and pain intensity scores for recovery and relief groups at initial consultation shortly before treatment. Significant differences were found in scale 2 of the MMPI, state anxiety (STAI-1), and pain intensity (PRI-T, PPI, and VAS) scores between recovery and relief groups before treatment. **Fig. 1** graphically displays the

Table 1 Features of subjects in recovery and relief groups

	recovery group	relief group
subjects (male:female)	n=152 (69:83)	n=34 (19:15)
age	55.1 ± 14.2	54.4 ± 14.3
duration of pain	10.6 ± 4.5	14.6 ± 6.2
pain intensity		before/after
PRI-T	19.8 ± 12.0	25.5 ± 11.9 / 16.6 ± 10.9
VAS	46.8 ± 23.2	61.0 ± 21.1 / 39.9 ± 24.4
pain location		
head/face	15	5
neck	42	12
shoulder	14	2
low back	66	15
others	15	0

PRI-T, Total score of the Pain Rating Index; VAS, Visual Analogue Scale.

Table 2 Mean MMPI, STAI, BDI, and pain intensity scores for recovery and relief groups at initial consultation before treatment

scale	recovery group (n=152)	relief group (n=34)	p
L	56.02 ± 10.05	55.71 ± 10.36	0.875
F	52.77 ± 9.41	52.85 ± 10.10	0.963
K	52.49 ± 9.60	51.68 ± 8.65	0.651
1(Hs)	64.18 ± 13.16	68.50 ± 11.61	0.079
2(D)	59.79 ± 12.42	54.50 ± 12.01	0.046 *
3(Hy)	60.39 ± 12.42	64.03 ± 11.16	0.118
4(Pd)	52.52 ± 11.69	54.26 ± 9.89	0.420
5(Mf)	50.88 ± 10.26	50.18 ± 7.96	0.710
6(Pa)	51.11 ± 11.13	53.21 ± 9.69	0.310
7(Pt)	54.66 ± 11.43	57.62 ± 11.69	0.177
8(Sc)	55.16 ± 10.73	55.74 ± 11.06	0.781
9(Ma)	47.55 ± 9.82	48.47 ± 11.09	0.631
0(Si)	51.14 ± 9.14	52.76 ± 8.27	0.343
STAI-1	42.26 ± 8.50	45.74 ± 6.44	0.026 *
STAI-2	40.60 ± 6.92	41.03 ± 5.51	0.734
BDI	4.48 ± 2.98	4.76 ± 2.54	0.639
PRI-T	19.76 ± 11.97	25.53 ± 11.94	0.012 *
PPI	2.34 ± 1.21	3.00 ± 1.10	0.004 *
VAS	46.78 ± 23.19	60.97 ± 21.06	0.001 *

*p<0.05

L, Lie scale; F, Infrequency scale; K, Suppressor scale; 1, Hypochondriasis; 2, Depression; 3, Hysteria; 4, Psychopathic Deviance; 5, Masculinity-Femininity; 6, Paranoia; 7, Psychastenia; 8, Schizophrenia; 9, Hypomania; 0, Social Introversion; STAI-1, State Anxiety of the State-Trait Anxiety Inventory; STAI-2, Trait Anxiety of the State-Trait Anxiety Inventory; BDI, Beck Depression Inventory; PRI-T, Total score of the Pain Rating Index; PPI, Present Pain Intensity; VAS, Visual Analogue Scale.

Table 3 Mean MMPI, STAI, BDI, and pain intensity scores for relief group before and after treatment

scale	Before	After	p
L	55.71 ± 10.36	54.79 ± 9.82	0.566
F	52.85 ± 10.10	51.23 ± 8.50	0.285
K	51.68 ± 8.65	54.03 ± 10.74	0.072
1(Hs)	68.50 ± 11.61	66.74 ± 13.60	0.244
2(D)	64.50 ± 12.01	59.94 ± 9.23	0.005 *
3(Hy)	64.03 ± 11.16	62.62 ± 14.41	0.404
4(Pd)	54.26 ± 9.89	53.03 ± 11.10	0.440
5(Mf)	50.18 ± 7.96	49.85 ± 8.44	0.819
6(Pa)	53.21 ± 9.69	50.82 ± 9.01	0.197
7(Pt)	57.62 ± 11.69	54.62 ± 9.06	0.140
8(Sc)	55.74 ± 11.06	54.68 ± 8.14	0.568
9(Ma)	48.47 ± 11.09	47.44 ± 10.05	0.801
0(Si)	52.76 ± 8.27	51.59 ± 7.77	0.119
STAI-1	45.74 ± 6.44	46.15 ± 5.06	0.697
STAI-2	41.03 ± 5.51	40.71 ± 6.21	0.693
BDI	4.76 ± 2.54	3.44 ± 2.36	0.004 *
PRI-T	25.53 ± 11.94	16.65 ± 10.87	0.00005 *
PPI	3.00 ± 1.10	1.74 ± 1.02	0.00001 *
VAS	60.97 ± 21.06	39.88 ± 24.41	0.00005 *

*p<0.05

For abbreviations, see footnote of Table 2.

MMPI profiles for recovery and relief groups at initial consultation.

Table 3 shows mean MMPI, STAI, BDI, and pain intensity scores for the relief group before and after treatment. After treatment there was a significant decrease of scale 2 of the MMPI, the BDI, and pain intensity scores. **Fig. 2** shows the MMPI profiles for the relief group before and after treatment. Contrary to expectations, scores on most of the MMPI scales and the distress scales (the STAI and the BDI) in this study subjects were almost in normal range before treatment.

Personality profiles before and after treatment were basically the same with higher scores for scales 1, 2, and 3, than for others.

Multiple regression analysis failed to show any correlation between pain intensity changes and MMPI, STAI, and BDI changes before and after treatment.

DISCUSSION

This study confirmed the hypothesis that personality profiles measured by the MMPI are almost stable despite changes of pain intensity in a great variety of chronic pain patients, consistent with the more general observations of Leon et al.^{7) in physically healthy, emotionally stable men over 30 years. In that report, all standard scales except L showed some changes over the study, but most were quite small, usually less than half a standard deviation. Larger changes were found in scale 2 (Depression), probably because many items in this scale refer to somatic problems that increase with age^{15), what changed was more likely health than personality. The authors state "the general profile configuration for the group remained remarkably stable and within normal limits over the 30-year period of time from middle age to old age"^{7). Our results also found considerable stability in group profile configurations (change less than one-half of a standard deviation in essentially every major scale of the MMPI and individual scale correlations between the two evaluations). Significant change at variance with Leon et al. was recognized only as improvement with pain treatment in scale 2 (Depression). This general similarity}}}

Fig. 1 MMPI profiles for recovery and relief groups at initial consultation.
For abbreviations, see footnote of Table 2.

Fig. 2 MMPI profiles for relief group before and after treatment.
For abbreviations, see footnote of Table 2.

in results indicates that the personality profile measured by the MMPI is stable in psychologically undisturbed chronic pain patients.

A predictive value of personality profiles for treatment outcome was not supported by our results, in agreement with Main et al.⁸⁾. The poor performance of the MMPI in this context may reflect personality stability in chronic pain patients and also characteristics of the MMPI which compromise it in a use differing from its original purpose. Simple, practical psychometric tests which take only a short time

to complete are finding favor in clinical use, compared with the MMPI where satisfactory completion sometimes posed a considerable problem of the MMPI. The length of the test and the nature of its items suggest that the MMPI might best be used for its original purpose of assessing abnormal personality traits.

In summary, we found that among chronic pain patients without a severe psychological disturbance, personality profiles as measured by the MMPI were fairly stable in the face of changes of pain intensity, and did not predict

changes in pain intensity or treatment outcome.

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Address for correspondence: Mamoru Hasegawa, M.D., Department of Anesthesiology and Resuscitology, Gunma University School of Medicine, 3-39-22 Showa-machi, Maebashi 371, Japan.
Tel : +81-27-220-7111 (ext. 8454)
Fax : +81-27-220-8473