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A study of patients with spinal disease using Maudsley Personality Inventory

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Abstract We administered the Maudsley Personality Inventory (MPI) preoperatively to 303 patients with spinal diseases about to undergo surgery. Patients younger than 20 years, patients previously treated in the Department of Psychiatry, and patients with poor postoperative results were excluded. Patients with N-scores (neuroticism scale) of 39 points or greater or L-scores (lie scale) of 26 points or greater were regarded as “abnormal”. Based on clinical definitions we identified 24 “problem patients” during the course and categorized them as “Unsatisfied”, “Indecisive”, “Doctor shoppers”, or “Distrustful”. Preoperative MPI categorized 26 patients as abnormal; 22 patients categorized as abnormal became problem patients ($p < 0.001$). MPI sensitivity and specificity was 84.6% and 99.3%, respectively. Preoperative MPI to patients with spinal disease was found to be useful in detecting problem patients.

Résumé Nous avons utilisé l’Inventaire de Personnalité de Maudsley (MPI) chez 303 malades avant qu’ils subissent une chirurgie vertébrale. Ont été exclus les patients de moins de 20 ans, les malades traités précédemment dans le Département de Psychiatrie, et les malades avec un mauvais résultat postopératoire. Les malades avec un “N Score” (échelle pour la névrose) de 39 points ou plus et/ou un “L-score” (échelle de situation) de 26 points ou plus ont été considérés comme “anormaux”. Basé sur les définitions cliniques nous avons identifié 24 patients “à problème” pendant l’étude et les avons catégorisés comme “Insatisfait”, “Indécis”, “acheteur du Docteur” ou “Méfiant”. Le MPI pré-opératoire a catégorisé 26 malades comme “anormaux”. Vingt deux d’entre eux sont devenus des malades à problèmes ($p < 0.001$). La sensibilité et la spécificité du MPI étaient de 84.6% et 99.3%, respectivement. Le MPI pré-opératoire, appliqué à des ma-

lades avec une pathologie vertébrale a été utile pour détecter des malades “à problème”.

Introduction

Patients with deeply involved psychogenic elements occasionally resist conservative and surgical treatments for spinal disease. Some attempts have therefore been made to predict postoperative results by preoperative administration of personality inventories [3, 8, 12]. In the course of surgical treatment for spinal disease, a small number of patients may be behaving incorrectly toward doctors, and they may be “problem patients”; however, no studies have reported screening tests for detecting problem patients. In the present article, we investigated the utility of the Maudsley Personality Inventory (MPI) [1, 11] for predicting problem patients among patients who underwent spine surgery.

The MPI is a simple test including items related to extroversion and neuroticism, and a “lie scale” to evaluate the extent to which an individual may be trying to create false impressions. This allows simple investigation of neurotic tendencies and deceptive behaviors, which are important items when screening for problem patients. The test takes about 10–15 min to complete, a far shorter period than the Minnesota Multiphasic Personality Inventory (MMPI). In addition, physicians can determine results in a very short time. We utilized a Japanese version of the 80-item questionnaire personality test published by Jensen [7] in 1958, which has been extensively used as the Eysenck Personality Questionnaire [2] in Europe. The MPI was translated into Japanese by Oyama et al. [10], and the validity has been assessed in a number of studies [6, 9, 13]. There are no reports of predictive values of the Japanese MPI regarding clinical outcome for surgeries; however, it has been reported that the Japanese MPI N-score correlated with hypochondriasis, depression, or hysteria scales of the MMPI, and the Japanese MPI L-score correlated with depression or schizophrenia MMPI scales [13]. The Japanese MPI comprises

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80 questions, including 24 for extroversion (E-score, maximum 48 points), 24 for neuroticism (N-score, maximum 48 points), 20 for the lie scale (L-score, maximum 40 points) and 12 neutral questions. In this study, MPI was administered preoperatively to all patients, and the test process was evaluated for its ability to effectively identify problem patients.

Subjects and methods

From January 1997 to February 2000, 345 patients with lumbar spinal canal stenosis, lumbar herniation, cervical spondylotic myelopathy, cervical ossification of the posterior longitudinal ligament, or tumors of the spinal cord or cauda equina underwent surgery in our department. Patients under 20 years old, patients treated previously in the Department of Psychiatry, and patients with poor postoperative results (recovery rate less than 50% according to the Japanese Orthopaedic Association (JOA) scoring system for spinal disease) were excluded. This latter group was excluded because patients with poor surgical results are already less likely to be satisfied with postoperative results. All remaining patients were enrolled in the study.

The subject group comprised 303 patients, with 162 men and 141 women and an age range at time of surgery of 20–91 (mean±SD, 59.9±15.6) years. Diagnosis at time of admission included lumbar spinal canal stenosis in 108 patients, lumbar disc herniation in 100, cervical spondylotic myelopathy in 52, tumor of the spinal cord or cauda equina in 23, and cervical ossification of posterior longitudinal ligament in 20. Procedures performed were decompression and posterolateral fusion for lumbar spinal canal stenosis, Love modification discectomy for lumbar disc herniation, cervical laminoplasty for cervical spondylotic myelopathy or cervical ossification of the posterior longitudinal ligament, and tumor resection for tumors of the spinal cord or cauda equina.

All patients in the subject group were preoperatively administered the Japanese version of the MPI. No other psychological measures were administered. In accordance with the criteria of the Japanese MPI, subjects demonstrating N-scores of 39 points or greater and L-scores of 26 points or greater were therefore categorized as abnormal. Surgeons were not informed of MPI results to minimize bias toward the patient.

Postoperative recovery rate was used to reflect clinical results. Clinical results of lumbar spinal canal stenosis and lumbar disc herniation were evaluated using the JOA scoring system for lumbar disease (maximum 29 points) to assess pain, gait disturbance, sensory disturbance, muscular power, activities of daily living, and bladder function. Clinical results of cervical spondylotic myelopathy and cervical ossification of the posterior longitudinal ligament were evaluated using the JOA scoring system for cervical disease (maximum 17 points) to assess upper-limb function, lower-limb function, sensory disturbance, and bladder function. Clinical results of spinal cord or cauda equina tumors were evaluated using the JOA scoring system for cervical disease (maximum 11 points), excluding evaluation of upper-limb function. Postoperative recovery rate was determined 1 year after surgery according to the formula described by Hirabayashi, as follows: Recovery rate (postoperative JOA score–preoperative JOA score)×100/(full score–preoperative JOA score). The full score differs with disease,

such as 17 points for cervical spine disease and 29 points for lumbar spine disease. Two observers (coauthors) other than the surgeon evaluated preoperative and postoperative JOA scores, and the mean value was then calculated to determine the improvement rate. The rate of consistency of improvement achieved by two observers was 97.1%, and interjudge reliability was very good.

Although categorization of problem patients is very difficult, we attempted this study according to criteria based on our clinical experience. Problem patients were classified into four grades: “Unsatisfied”, “Indecisive”, “Doctor shopper”, or “Distrustful”. Unsatisfied patients reported “I should not have undergone surgery” in a self-evaluation utilizing four grades: “Markedly satisfactory”, “Satisfactory”, “Unknown”, and “I should not have undergone surgery” for satisfaction at 1 year postoperatively. Indecisive patients were defined as those who needed more than 5 h to provide preoperative informed consent. Usually, informed consent is provided in about 1 h. If the patient takes more than 5 h to provide informed consent, characteristics of focusing on trifles or being less decisive may be present. Doctor shoppers were defined as cases in which the patient reported dissatisfaction with postoperative results to three or more doctors in our clinic and other clinics for a long time, or visited our clinic repeatedly with indefinite complaints. In Japan, many related hospitals are affiliated to the university hospital, so if the patient visits another clinic, information can easily be obtained. Lastly, Distrustful patients were defined as those requesting a change of physician in charge due to distrust of the physician. If subjects were in two or three of the above categories, they were defined as more problem patients.

Subjects were evaluated according to these criteria to determine whether they became problem patients during the study period. Numbers of normal and abnormal patients according to MPI and numbers of problem patients were analyzed. MPI sensitivity and specificity were then calculated. Comparison of patient backgrounds, including age at operation, gender, symptom duration, and JOA score recovery rate between patients with normal and abnormal MPI, was performed. Data were statistically analyzed using Student’s *t*-test and χ^2 test, and values of *p*<0.05 were accepted as statistically significant.

Results

Preoperative MPI categorized 277 patients (91.4%) as normal and 26 (8.6%) as abnormal. Of the 26 patients categorized as abnormal, 16 displayed high N-scores,

Table 2 Number of “Problem patients” among patients categorized as abnormal in the preoperative Maudsley Personality Inventory (MPI)

	High N-score (n=16)	High L-score (n=7)	High N-score and L-score (n=3)
Unsatisfied	7	2	0
Indecisive	5	1	1
Doctor shopper	0	3	1
Distrustful	0	1	1

Table 1 Mean recovery rate of the Japanese Orthopaedic Association (JOA) score and the number of patients with abnormal Maudsley Personality Inventory (MPI) by diagnosis

	Mean JOA score recovery rate (%)	Patients with abnormal MPI
Lumbar stenosis (n=108)	68.5±12.3	6
Lumbar disc herniation (n=100)	71.6±16.3	7
Cervical spondylotic myelopathy (n=52)	63.2±8.9	3
Spinal cord or cauda equina tumor (n=23)	72.5±12.3	8
Ossification of cervical posterior longitudinal ligament (n=20)	59.2±6.2	2

Table 3 Comparison of age at operation, gender ratio, symptom duration, and JOA score recovery rate between patients with normal and abnormal Maudsley Personality Inventory (MPI)

	Age at operation (years)	Male/female	Symptom duration (months)	JOA score recovery rate (%)
Normal MPI	60.1±15.7	147/130	8.3±7.7	66.1±11.7
Abnormal MPI	57.8±11.2	15/11	9.8±8.2	64.7±9.2

seven had high L-scores, and three demonstrated both high N-scores and L-scores. The number of abnormal patients by diagnosis is shown in Table 1. Of particular note is the presence of eight abnormal patients (34.8%) among the 23 patients with tumors of the spinal cord or cauda equina.

Of the 303 study subjects, 24 problem patients were identified, comprising 11 Unsatisfied cases, seven Indecisive, four Doctor shoppers, and two Distrustful. No subject displayed more problem patients status. Twenty-two of the 26 patients evaluated as abnormal under MPI criteria became problem patients. Only 2 of the 271 patients categorized as normal under MPI became problem patients. Test sensitivity and specificity were thus 84.6% and 99.3%, respectively. Differences in problem-patient ratio between patients with normal and abnormal MPI were statistically significant ($p<0.001$). As shown in Table 2, of the 16 patients with high N-scores, seven were Unsatisfied, five Indecisive, and four nonproblem patients. The seven with high L-scores comprised two Unsatisfied, one Indecisive, three Doctor shoppers, and one Distrustful.

Comparison of patient backgrounds, including age at operation, gender, symptom duration, and JOA score recovery rate between patients with normal and abnormal MPI (Table 3) revealed no significant differences.

Discussion

Our results indicate that the MPI is a test that can be completed by patients in a short time and that a significantly high ratio of patients demonstrating abnormal MPI become postoperative problem patients. Problem patients comprised 26 (7.9%) of 303 subjects, and a large number of these were Unsatisfied or Indecisive. As definitions of and criteria for problem patients have not been standardized in past reports, we classified cases based on our clinical experience. The result was useful in that we were able to estimate types and ratios of problem patients.

A number of papers describe the use of the MMPI as a tool for selecting surgical candidates [5, 14, 16]. However, the MMPI has a variety of drawbacks: up to 75 min can be required to answer the more than 550 questions, patients often find questions difficult to answer, the method of judging scores is quite complicated [4], and correlation between MMPI finding and surgical outcome is poor [15]. The reasons we employed the MPI are that it allows simple determination of both neurotic and lying

tendencies. Based on the results of the present study, the MPI appears useful for predicting whether patients are likely to become problem patients. According to a report by Herron et al. [5], age may influence scores in the MMPI, with scores proving useful for predicting poor postoperative results in lumbar disc herniation patients who were predominantly young, but less useful for lumbar spinal stenosis patients who were predominantly elderly. In this regard, the questions used in the MPI are simple, and scores are not influenced by age or gender, as confirmed by the results of the present study. However, the MPI is not well known all over the world, and thus somewhat disadvantageous for the comparison of data between institutions.

Patients with high N-scores in the MPI reportedly tend to display hypochondriac dispositions and uneasiness or depression in addition to adherence [6, 9, 13]. In our investigation, many patients with high N-scores complained of dissatisfaction with surgical results despite favorable postoperative clinical courses, or required more than 5 h to supply preoperative informed consent. Compared to patients with other diseases, the ratio of patients with spinal or cauda equina tumor assessed as abnormal under MPI was significantly increased. N-scores were high in seven of the eight tumor patients assessed as abnormal, suggesting that patients with tumors experience higher levels of preoperative anxiety than patients with other diseases. Conversely, high L-scores are reportedly associated with intense desires that "things should be absolutely like this" [6, 9, 13]. According to the results of the present study, patients with high L-scores may tend to become Doctor shoppers postoperatively.

A sensitivity of 84.6% in the MPI as a screening test for detecting problem patients is certainly not a spectacularly high figure. We therefore do not recommend that surgery be excluded simply on the grounds of abnormal status in MPI results. We consider that surgery should not be performed on patients with abnormal status in MPI if the following two points are not met: (1) The probability of clear patient benefit from surgery is high; (2) A sound relationship has been established between doctor and patient. Of particular note is the fact that all patients with abnormal preoperative L-scores became problem patients, so attention should be paid to patients with abnormal L-scores.

Although no cases with abnormal MPI scores received psychiatric treatment in the present study, we consider the cooperation of a psychiatrist to be an important adjunct to treatment of such patients in future. The

present study did not utilize any personality inventories other than the MPI. We therefore aim to utilize other personality inventories and pursue methods of accurately identifying patients likely to become problem patients. We would also like to consider measures to reduce the number of problem patients.

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