The Relationship between Mental Disorders and Physical Severities in Patients with Acute Myocardial Infarction

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We studied the relationship between the mental disorders and the mental severities of 163 patients with acute myocardial infarction (AMI), who were admitted to the CCU (Coronary Care Unit) of Nippon Medical School Hospital during the past 2 years. Their mental disorders were diagnosed by psychiatrists, and the relationship between their physical severities according to Killip's classification and their mental severities was investigated. Based on these studies, the authors described the way to manage AMI patients in a CCU, especially from a psychiatric point of view. 1) About 64% of all the patients showed some mental disorders, and many of them were in a state of anxiety or depression. In most of the cases their mental severities were considered to be mild or moderate. 2) We found some correlation between physical severities according to Killip's classification and mental severities ($r = 0.3061, p < 0.005$). Many patients with grade I of Killip's classification showed a normal or mild severity, and many with grade II had a mild or moderate severity. About one half of the patients with grades III and IV showed moderate and severe severities, respectively. 3) About 26% of the subjects were in need of psychotropic medication. 4) About 10% of the subjects showed disorientation or cloudy consciousness. The mental severity of patients with an acute lidocaine intoxication was severe.

These results showed that there was a significant correlation between physical severity according to Killip's classification and mental severity of AMI patients in the CCU. Patients whose physical severity was not so great showed comparatively mild mental disorders. As Killip's grade of physical severity progressed, mental disorder became more severe.

In Japan the incidence of acute myocardial infarction (AMI) has tended to increase recently, and the coronary care unit (CCU) has been instituted successively in various places. The therapeutic means for AMI has progressed remarkably with the development of various monitoring apparatuses and with the introduction of various medicines. Thus, the mortality rate of AMI has decreased.

In a CCU, the medical team is usually monitoring only the physical symptoms of the patients, including complications such as arrhythmia, heart failure and so on. Organic heart disease is the main object of the physicians' interests, and they seldom pay attention to the mental state of the patients.

As a part of our activities in consultation-liaison psychiatry, we have been taking a psychiatric approach to AMI patients in the CCU. We examined the relationship between the mental disorders and the mental severities of

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Key Words:
- Mental disorders
- Acute myocardial infarction
- Killip's classification
- CCU

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TABLE I VARIETIES OF MENTAL DISORDERS OF PATIENTS IN THE CORONARY CARE UNIT

1) The acute stage (the first and second day in the CCU, i.e., immediately after admission)
   1) Anxious state
   2) The so-called troublesome patient (problematic behavior)

2) The convalescent stage (usually from the third day in the CCU to the time just before transfer from the CCU)
   a) Anxious state
   b) Problematic behavior
   c) Depressive state
   d) Manic state
   e) Hypochondriacal state
   f) Regressive state
   g) Hallucinatory-paranoid state
   h) Demented state
   i) Delirious state
   j) Withdrawal state
   k) Acute lidocaine intoxication

AMI patients in the CCU\textsuperscript{3–10} and the relationship between the physical severities according to Killip's classification\textsuperscript{11} and the mental disorders. We also describe the way to manage the mental disorders of these patients.

TABLE II MENTAL DISORDERS AND THEIR SEVERITIES IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION IN THE CORONARY CARE UNIT

<table>
<thead>
<tr>
<th>Mental disorder</th>
<th>Normal group</th>
<th>Mild group</th>
<th>Moderate group</th>
<th>Severe group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
<td>59</td>
</tr>
<tr>
<td>Anxious state</td>
<td></td>
<td>32</td>
<td>9*</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>Depressive state</td>
<td></td>
<td>11</td>
<td>19</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Manic state</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Hypochondriacal state</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Regressive state</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Problematic behavior</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Demented state</td>
<td>8</td>
<td>3</td>
<td>0</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Delirious state</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Withdrawal state</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Acute lidocaine intoxication</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59 (36.2%)</td>
<td>61 (37.2%)</td>
<td>37 (22.7%)</td>
<td>6 (3.7%)</td>
<td>163</td>
</tr>
</tbody>
</table>

\* A significant difference was observed using a \( \chi^2 \) test between the numbers enclosed by a dotted square (\( p < 0.001 \)).

SUBJECTS AND METHODS

Subjects

One hundred and sixty-three patients, ranging in age from 29 to 84 with an average age of 62.7, were randomly selected from patients with AMI, who were admitted to the CCU of Nippon Medical School Hospital during the 2-year period from September 1, 1979 to August 31, 1981. These patients included 121 males (age: 29–84, average age: 61.6) and 42 females (age: 45–81, average age: 66.0), and all of them had received interviews by psychiatrists.

Evaluation Methods of Mental States

The psychiatric consultation was performed on the third to the tenth day after admission. The most suitable period for the investigation was considered to be the time when patients had passed safely the acute physical crisis in the CCU and when they had recovered enough to receive a psychiatric interview.

Three psychiatrists repeatedly interviewed patients and evaluated their mental disorders. In order to diagnose correctly, some psychometries, such as Y-G test, Hasegawa's D-R scale, Rorschach test and Egogram, were used.

In patients, in whom mental disorders had changed gradually during their hospitalization in the CCU, for example, from an anxious state to a
TABLE III RELATIONSHIP BETWEEN PHYSICAL SEVERITIES (KILLIP) AND MENTAL DISORDERS OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION IN THE CORONARY CARE UNIT

<table>
<thead>
<tr>
<th>Mental severity</th>
<th>Killip’s grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Normal group</td>
<td>49</td>
</tr>
<tr>
<td>Mild group</td>
<td>38</td>
</tr>
<tr>
<td>Moderate group</td>
<td>16</td>
</tr>
<tr>
<td>Severe group</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
</tr>
</tbody>
</table>

\[ r = 0.3061, \; p < 0.005 \]

depressive state and then to a hypomanic state, we considered the mental state which was most severe and which lasted for a long period to be the mental disorder of that patient. We classified the severities of the mental disorders into the following 4 groups:
1) normal group: mental state for which there was no need of medical treatment by psychiatrists,
2) mild group: mental disorder which needed brief psychotherapy, 3) moderate group: mental disorder which needed psychotropic medication and 4) severe group: the most serious mental disorders.

Based on our experience\(^4,7\) we know that it is better to study the mental disorders of patients with AMI in a CCU by dividing their illness into 2 stages, i.e., an acute stage and a convalescent stage (Table I).

The acute stage consisted of the first and the second day in the CCU immediately after admission. In these 2 days, most of the AMI patients passed their acute physical crisis and their physical conditions become steady to some extent. Patients in this stage showed mainly an anxious state. At the same time, they became some what troublesome showing problematic behavior: Patients try to unduly exercise their authority, look down on the medical team and do not follow its instructions. Most of these patients are people of high standing with little knowledge of medical science.

The convalescent stage consisted of the period from the third to the tenth day. The main mental disorders in this stage was an anxious state with problematic behavior, a depressive state, a manic state, a hypochondriacal state, a regressive state and a hallucinaory paranoid state. These states are considered to be psychogenic disorders. In addition, some patients showed a demented state, a delirious state, a withdrawal state and an acute lidocaine intoxication which are exogenous mental disorders (toxic or organic psychoses). Patients with cloudy consciousness were included in the group which psychiatrists could not interview.

RESULTS

Mental Disorders and Mental Severities

Table II shows the mental disorders and the mental severities of AMI patients in the CCU. The mental states of 59 patients (36.2% of all patients) were classified as the normal group, and the remaining 104 patients (63.8%) showed some mental disorders.

Out of 104 patients, who showed some mental disorders, 87 (53.4% of all patients and 83.7% of the patients who showed some mental disorders) had mainly psychogenic mental disorders, and 17 (10.4% and 16.3%, respectively) had mainly exogenous mental disorders (toxic or organic psychoses).

Out of 87 patients who showed mainly psychogenic mental disorders, 42 (25.9%) were in an anxious state, 30 (18.4%) in a depressive state, 7 (4.3%) in a manic state, one (0.6%) in a hypochondriacal state and one (0.6%) in regressive state, and 6 (3.7%) showed problematic behavior.

Out of 17 patients who had mainly exogenous mental disorders, 11 (6.7%) were in a demented state, 2 (1.2%) in a delirious state, one (0.6%) in a withdrawal state and 3 (1.8%) in an acute lidocaine intoxication.

In summary, the mental severities of the patients were assessed as follows: 59 patients (36.2%) were in the normal group, 61 (37.2%) in the mild group and needed brief psychotherapy, 37 (22.7%) in the moderate group and needed psychotropic medication, and 6 (3.7%) in the...
severe group which showed the most serious mental disorders.

The mental severities of 87 patients who showed mainly psychogenic mental disorders were assessed as follows: 52 patients (59.8%) were in the mild group, 32 (36.8%) in the moderate group and 3 (3.4%) in the severe group. As for the mental severities of 17 patients who showed mainly exogenous mental disorders, 9 (52.9%) were in the mild group, 5 (29.4%) in the moderate group and 3 (17.7%) in the severe group.

Severities of each mental disorder were as follows: out of 42 patients with an anxious state, 32 (76.2%) showed a mental severity of the mild group, 9 (21.4%) of the moderate group and one (2.4%) of the severe group. On the other hand, out of 30 patients with a depressive state, 11 (36.7%) were in the mild group and 19 (63.3%) in the moderate group, showing a significant difference as compared with the relation in the anxious state, as shown in Table II. In other words, patients whose mental severity was mild often showed an anxious state and those whose mental severity were moderate often showed a depressive state. Out of 7 patients with a manic state, 5 (71.4%) were in the mild group and 2 (28.6%) in the moderate group. One patient with a hypochondriacal state was in the severe group, and one patient with a regressive state was in the mild group. Out of 6 patients with problematic behavior, 3 (50.0%) were in the mild group, 2 (33.3%) in the moderate group and one (16.7%) in the severe group. Out of 11 patients with a demented state, 8 (72.8%) were in the mild group and 3 (27.2%) in the moderate group. Two patients with a delirious state were in the moderate group, and one patient with a withdrawal state was in the mild group. Three patients with an acute lidocaine intoxication were all in the severe group.

Relationship between Physical Severities and Mental Severities

Table III shows the relationship, between the physical severities according to Killip’s classification and the mental severities of AMI patients in the CCU.

Among 105 patients with grade I of Killip’s classification, the mental severities of 49 patients (46.7%) were classified as the normal group and those of 38 (36.2%) as the mild group. Among 39 patients with grade II, 18 patients (46.2%) were classified as the mild group and 14 (35.9%) as the moderate group. Thus, the number of patients with serious mental disorders increased as the physical severity progressed from grade I to II. Among 11 patients with grade III, 3 (27.3%) were in the mild group and 3 (27.3%) in the moderate group. Four out of 8 patients (50.0%) with grade IV were classified as the moderate group.

DISCUSSION

The therapeutic means for acute myocardial infarction in its acute stage in a CCU has made a remarkable progress in Japan as well as in Western country. However, we are still behind in the field of the mental disorders of these patients.

Patients with AMI admitted to a CCU suffer more or less from mental imbalance due to various factors. However, medical teams usually pay attention only to the physical symptoms of the patients, for example, whether or not the patients develop complications such as arrhythmia, heart failure and so on. They hardly notice the mental conditions of the patients, although the control of their mental disorders is very important as a treatment in the acute stage. In Europe and the U.S.A., medical teams have already been making a psychiatric approach to AMI patients, as reported by Cassem et al.12 who have described many patients in an anxious or a depressive state in a CCU.

In the present study, 104 out of 163 patients (63.8%) showed some mental disorders. Eighty-seven patients (53.4%) showed mainly psychogenic mental disorders, out of whom 42 (25.9% of all subjects) were in an anxious state and 30 (18.4%) in a depressive state, and the remaining showed a manic state, a hypochondriacal state, a regressive state or problematic behavior. Among 17 patients, who showed mainly exogenous mental disorders (toxic or organic psychoses), 11 (6.7%) showed a demented state, and the remaining showed a delirious state, a withdrawal state or an acute lidocaine intoxication.

Mental severities of the present patients were as follows: 59 patients belonged to the normal group, 61 to the mild group, 37 to the moderate group and 6 to the severe group. Patients in the normal group accounted for 36.2% of all the subjects. Patients in the mild group (37.4%) needed brief psychotherapy and those in the moderate group and in the severe group (26.4% of all the subjects) needed psychotropic drugs.

An anxious state or a depressive state was
observed in 72 patients (69.2% of the patients) with mental disorders. This is the same finding as that by Cassem et al.12 Most patients whose mental severities were not so serious showed an anxious state, and the patients whose mental severities were more severe tend to show a depressive state. Therefore, it is important to notice an anxious state or a depressive state in AMI patients from the psychiatric point of view.

Among the patients who showed exogenous mental disorder, 3 patients with an acute lidocaine intoxication were all classified as the severe group of mental severities. These 3 patients accounted for 50% of the severe group. As an acute lidocaine intoxication occurs iatrogenically, we must always pay attention to the serum lidocaine level.

What factors affect the mental states of AMI patients? Usually patients in a CCU are mentally disturbed more or less by various factors caused by a sudden attack of myocardial infarction. This heart disease accompanied by acute chest pain affects the mental state of the patient due to its life-threatening characteristic and also due to the fact that the patient needs special care in a CCU. However, most of these factors are only speculative, and have not been established as facts. It is difficult for the medical team to assess accurately the mental state of AMI patients in a CCU due to the fact that there is no expert in psychiatry on the medical team.

In order to make it easy for the medical team to evaluate the mental state of the patients, we have tried to discover a way to estimate the patients' mental state based on their physical state. For this purpose, we investigated the relationship between the physical severities and the mental severities.

We used Killip's criteria for judging the physical severities of the patients. Finally, it was confirmed that there was a significant correlation between the physical severities according to Killip's classification and the mental severities ($r = 0.3061, p < 0.005$). Among 105 patients with grade I of Killip's classification, 87 (82.9%) belonged to either the normal group or the mild group with mental severities. Among 39 patients with grade II, 32 (82.1%) belonged to the mild group or the moderate group.

As the grade of Killip's classification progressed from I to II, the number of patients with serious mental disorders increased. Among 144 patients with Killip's grade I and grade II, 110 patients (76.4%) were classified as the normal group or the mild group with mental severities and they needed no psychotropic medication. Among 19 patients with Killip's grade III (11 patients) and grade IV (8 patients), 5 patients were in the normal group, 5 in the mild group, 7 in the moderate group and 2 in the severe group, i.e., about one half of the patients with grade III and grade IV needed psychotropic medication.

The patients who showed mainly exogenous mental disorders (toxic or organic psychoses) accounted for about 10% of all the subjects. A few AMI patients showed a mild cloudy consciousness, including an inability to recognize others, disorientation and so on. Therefore, the medical team should take into account the patients' mental state when examining them. In practice, the patients should be asked about the time and date, and about the contents of their meals in order to judge their ability for orientation and recognition.3

This is for patients who show cloudy consciousness but also for most of the patients in special circumstances, such as in a CCU. They tend to lose their orientation of time and date, which often causes new mental disorders. Therefore, the medical team should ask patients about the time and date and let them know the correct time and date.

Patients who belonged to the mild group could be cured of their mental disorder with only brief psychotherapy, but it is needless to say that the medical team should take a psychotherapeutic approach to all patients, including those in the normal group. At the same time, it is effective to support and reassure the patients. The medical team should carefully listen to the complaints of the patients and explain their condition thoroughly to them. It is most important for the team to increase the chance for conversation with the patients. Patients who have some knowledge of myocardial infarction tend to show comparatively mild mental disorders after their admittance to a CCU. Therefore, it is important to tell these patients about their present condition and their future prospects intelligibly and concretely.

It was necessary to give psychotropic drugs to 23.6% of the AMI patients who were classified as grade I or grade II of Killip's classification and to 47.4% of those classified as grade III or grade IV, immediately after being admitted to the CCU.

It was also necessary to give a sleep inducing drug to patients suffering from insomnia. Sleep inducing drug are sometimes very effective for
patients who are taking minor tranquilizers after each meal. Minor tranquilizers with anti-depressive effects should be given to patients with some mental disorder, and anti-depressant and anti-psychotic drugs should be given to patients with more severe mental disorders.

Therefore, it is most important to pay attention to the mental disorders of the patients, especially to their orientation. The CCU staff should increase the time of conversation with the patients and give them psychotropic drugs soon after noticing symptoms of some mental disorder.

REFERENCES