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Abstract

We studied the causes and treatments of delirium in 43 patients admitted to the geriatric-psychiatric ward of a hospital in Japan. Patients studied were divided into three groups according to the type of factor responsible for their delirium. We termed these causal factors precipitating, facilitating and predisposing factors. Twenty-one patients exhibited precipitating factors, the most common of which were overmedication and poisoning. Almost all these cases were treated with psychotropic drugs. Facilitating factors were judged responsible in nine cases. In six of these, admission to a hospital was thought to be the facilitating factor. Thirteen patients who had only predisposing factors were treated with psychotropic drugs while 27% of patients without precipitating factors were successfully treated for delirium without the use of such drugs.

KEYWORDS: delirium, causal factors, treatment

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We studied the causes and treatments of delirium in 43 patients admitted to the geriatric-psychiatric ward of a hospital in Japan. Patients studied were divided into three groups according to the type of factor responsible for their delirium. We termed these causal factors precipitating, facilitating and predisposing factors. Twenty-one patients exhibited precipitating factors, the most common of which were overmedication and poisoning. Almost all these cases were treated with psychotropic drugs. Facilitating factors were judged responsible in nine cases. In six of these, admission to a hospital was thought to be the facilitating factor. Thirteen patients who had only predisposing factors were treated with psychotropic drugs while 27% of patients without precipitating factors were successfully treated for delirium without the use of such drugs.

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Delirium is an organic mental disorder characterized by acute onset and impairment of perception, cognition, attention and psychomotor activity (1-5). It is one of most common and important psychopathologies in later life. Behavioral problems occur frequently in patients with delirium and burden caregivers (6, 7). An agitated delirious patient may be difficult to care for and many patients are admitted to psychiatric hospitals or nursing homes. Thus there is a demand for effective methods to diagnose and treat delirium.

Despite its clinical importance, delirium is often misdiagnosed and sometimes overlooked. It is often superimposed on dementia and it may be difficult to determine which of these conditions is responsible for which symptoms in a patient. Delirium sometimes has a

multi-factorial etiology and the underlying causes include both physical and environmental factors. From the viewpoint of therapeutic strategies, some investigators (3, 8) have divided causal factors into three groups: precipitating, facilitating and predisposing factors. Precipitating factors include organic disorders that directly impair brain function and impede patients abilities. These include systemic infections, metabolic disorders, psychoactive substances and so on. Some investigators have asserted that, in cases where precipitating causal factors are present, treatment should be directed primarily at ameliorating these factors (8). Facilitating factors include events which facilitate the onset of delirium: psychosocial stressor such as bereavement, transfer to an unfamiliar environment, excessive or deficient sensory input, and sleep-wake cycle disturbances. Preexisting chronic vulnerability of the central nervous system increases predisposition to delirium. Elderly patients can also suffer delirium with any apparent precipitating or facilitating factors. Isse *et al.* recommended that physicians first try to identify the main precipitating factor of delirium. If there is no precipitating factor, therapists should consider the presence of a facilitating factor. When neither precipitating factors nor facilitating factors are identified, predisposing factor should be considered to the primary cause of delirium.

The aim of this paper are to a) precisely examine the causal factors of delirium in elderly patients and b) to judge the effectiveness of therapies employed to treat patients with different etiologies.

Subjects and Methods

A total of 43 patients admitted to Kawada Hospital,

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Table 1 Clinical characteristics of delirium and patients in each subgroup

	Number of patients	Mean age of patients	Preexistence of dementia (Number of patients)		Psychotropic administration (Number of patients)		Duration of delirious state (Number of patients)	
Precipitating factor group ^a	21	79.9	Present	(15)	Used	(20)	< 5 days	(7)
			Absent	(6)	Not used	(1)	> 30 days	(5)
Facilitating factor group ^b	9	84.3	Present	(6)	Used	(6)	< 5 days	(2)
			Absent	(3)	Not used	(3)	> 30 days	(4)
Predisposing factor group ^c	13	82.8	Present	(12)	Used	(10)	< 5 days	(6)
			Absent	(1)	Not used	(3)	> 30 days	(1)
Total	43	81.7	Present	(33)	Used	(36)	< 5 days	(15)
			Absent	(10)	Not used	(7)	> 30 days	(10)

a : Patients who had etiologic organic factors were assigned to the precipitating factor group.

b : Patients who had no precipitating factor and developed delirium with environmental events were assigned to the facilitating factor group.

c : Patients who had neither precipitating factor nor facilitating factor were assigned to the predisposing factor group.

< 5 days: Delirious state lasted less than 5 days.

< 30 days: Delirious state lasted more than 30 days.

Okayama, Japan, suffering from delirium were studied during a three-year period from 1995 to 1997. Ages ranged from 65 to 96 years old. Diagnosis of delirium was based on criteria from the Diagnostic and Statistical Manual of Mental Disorders, third edition, which was published by The American Psychiatric Association (9).

Patients suffering from delirium were investigated as to their causative factors, underlying and accompanying diseases, symptom profiles, duration of the episode and drugs used. They were subdivided into three groups as to their main causal factor; precipitating, facilitating or predisposing, and compared as to the outcome of their treatment (Table 1).

Results

The mean age was 81.7 years old (80.3 years in males and 83.6 years in females), with 25 male and 18 female patients.

In 21 cases, precipitating factors were judged to be responsible for delirium (Table 2). The most common precipitating factors were overmedication and poison. Four cases had multiple precipitating factors and it was difficult to make an accurate determination of their primary etiology. Four patients suffered from pneumonia. The mean age of patients was 79.9 years in this subgroup which was younger than that of other subgroups. Fifteen of 21 patients had dementia. Although patients were

already taking medications to treat their existing organic conditions, all but one patients required additional psychotropic agents to treat their delirium. In 7 cases delirium disappeared within 5 days. Five patients had a long duration of more than one month.

In 9 cases there were no precipitating factors and delirium was associated with facilitating factors. Delirium occurred shortly after admission in 6 cases. In 2 cases, delirium developed while the patient was living alone and it disappeared when they moved in with their families. In 1 case, the patient showed delirium when she moved in with her daughter's family and recovered when she lived alone as before. The patients' mean age in this subgroup was 84.3 years. In 6 cases dementia preexisted. Two of 9 cases had a short duration of less than 5 days. In 4

Table 2 Sorts of precipitating factors and number of cases

Causes	Number of cases
Drug and poison	10
Multiple ^a	4
Pneumonia	4
Fever	1
Myocardial infarction	1
Central venous attack	1
Total	21

a : More than one organic causes present.

cases, the state of delirium continued for 1 month or more.

In 13 cases, there were no precipitating or facilitating factors. Thus predisposing factors were judged to be responsible for the development of delirium. The major underlying disease was dementia but one subject was very old without dementia. The mean age of this subgroup was 82.8 years. In 6 cases, symptoms disappeared within 5 days. Only 1 case had a prolonged duration of more than 1 month.

In the cases we studied, psychotropic drugs were administered to 36 patients. Tiapride and hydroxyzine were most common. Haloperidol was given to 7 cases at a dosage of 0.75-3mg/day.

Delirium disappeared in 7 cases without psychotropic medication. Three cases were delirium resulting from facilitating factors and three from only predisposing factors. Only one patient with a predisposing factor was successfully treated for delirium without the use of a psychotropic medication.

Discussion

The patient population we studied was very advanced in age. This fact reflects the fact that the hospital in question, Kawada Hospital, specializes in geriatric psychiatry. While delirium can occur at any age, the process of aging greatly increases the tendency to develop delirium. Vascular and degenerative brain disease increase the tendency toward delirium further. Therefore, elderly patients suffering from dementia are particularly susceptible to delirium (10). It is important to distinguish delirium from dementia but delirium in the elderly is often superimposed on dementia. Wells reported that about one-third of hospitalized patients with dementia also suffer from delirium at some time (11). In this study, we found that 77 percent (33/43 patients) of patients with delirium were also suffering from dementia.

Nearly half of our patients (21/43) had precipitating causative factors. Drugs and poison-induced delirium was found in 10 cases and these were mostly caused by anti-Parkinson drugs and hypnotics. Elderly patients had age-related changes in the pharmacokinetics and pharmacodynamics of drugs and reduced capacity for homeostatic regulation. Aging and degenerative cerebral diseases also affected their central cholinergic systems. We must pay close attention to the anticholinergic effect, overdosages and polypharmacy of these drugs. Pneumo-

nia and myocardial infarction leading to hypoxia and reduced cerebral oxidative metabolism was commonly found in elderly patients. Hypoxia produces delirium easily in elderly patients. The preexistence of dementia was common but not universal in this subgroup. Ninety-five percent of patients required psychotropic administration. We also found that patients suffering from organic factors tended to show hyperactivity that necessitated treatment with sedatives.

The remaining half of the patients manifested delirium without any etiologic organic factors. We never neglected patients' environments and daily lives. Facilitating factors include psychosocial stress, sleep deprivation and sensory underload or overload (3, 12, 13). It is well known that admission to hospitals and immobilization contribute to delirium in the elderly. In our patients, admission was responsible for delirium in 6 cases. In 2 cases, they developed delirium living alone and it disappeared when they were moved in to live with their families. In 1 case, a female patient became delirious soon after she left her home and moved in with her daughter's family. Her symptoms disappeared when she returned to her own home. These episodes indicate how important it is to keep patients in contact with their former familiar environments (14). The mean age of this group was the highest and only two out of 9 patients had a short duration (less than 5 days). Three out of 9 patients improved without psychotropic drugs. Delirium resulting from facilitating factors tended to have milder and longer durations.

Thirteen cases had neither precipitating nor facilitating causative factors. Preexistence of dementia was almost universal in this subgroup. In about 12 cases, dementia played a major role in producing delirium as a predisposing factor. Nine of them suffered from vascular dementia. Typical cases in this subgroup were elderly patients showing mild symptoms of short duration.

The adequate treatment of delirium presupposes that the syndrome has been diagnosed correctly and that its underlying causes have been identified. Delirium can have a multi-factorial etiology and treatment for such cases includes treatment of underlying diseases and providing the patient with a stable, non-threatening environment. However, pharmacological agents were occasionally necessary to keep patients calm and to correct their sleep-wake cycles (Table 3). We must pay close attention to the fact that psychotropic drugs may worsen patients' cognitive and motor functions (15, 16). It is essential to minimize the dosage and number of drugs given to

Table 3 Kinds of psychotropic drugs which were given to patients

Drugs	Number of patients
Tiapride and hydroxyzine	18
Haloperidol	7
Hydroxyzine	6
Tiapride	2
Other drugs	3
Total	36

patients. However, delirium resulting from precipitating factors tended to require psychotropic medication. In contrast, 27% (6/22 patients) who did not have any precipitating factors were successfully treated for delirium without resorting to psychotropic administration. Three patients had only predisposing factors. In the rest of the cases, facilitating factors were considered to be the main causative factors. Takahashi reported that 16 of 141 patients recovered from delirium without medication. Fourteen of these 16 patients also suffered from dementia (17). He reported that delirium in patients suffering from dementia was often caused by psychological factors and that effective treatment of these factors often led to improvement of delirium.

In conclusion, we divided patients suffering from delirium according to the main causes of their delirium. This classification system should be useful for the treatment of large numbers of elderly patients with behavioral problems who are admitted to psychiatric hospital.

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