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## Abstract

Factors initiating senile delirium were examined in 129 elderly inpatients (65 years or older). Sixty-eight patients were males and 61 females, with a mean age of 76.3 years. Delirium developed in most cases on the first two days of admission in the hospital, and the admission appeared to be a key factor precipitating delirium in about 30% of the patients. Delirium resolved or improved in 80% of the patients, but usually persisted in patients with dementia. Senile delirium tended to reappear repeatedly in patients whose episode of delirium lasted for more than 2 weeks, was associated with dementia, or had a prior history of delirium.

**KEYWORDS:** delirium, the elderly, hospitalization, recurrent delirium

## Senile Delirium with Special Reference to Situational Factors and Recurrent Delirium

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Factors initiating senile delirium were examined in 129 elderly inpatients (65 years or older). Sixty-eight patients were males and 61 females, with a mean age of 76.3 years. Delirium developed in most cases on the first two days of admission in the hospital, and the admission appeared to be a key factor precipitating delirium in about 30% of the patients. Delirium resolved or improved in 80% of the patients, but usually persisted in patients with dementia. Senile delirium tended to reappear repeatedly in patients whose episode of delirium lasted for more than 2 weeks, was associated with dementia, or had a prior history of delirium.

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Delirium is an acute organic mental syndrome. Since the manifestations of the disturbance of consciousness may be mild to moderate in this disorder, physicians who are not in the field of psychiatry frequently overlook it and are attracted to the more pronounced symptoms such as illusions, hallucinations, and diminished mentation in their patients. Suspecting mental illness and facing the difficulties of caring for such patients, they frequently consult psychiatrists. As the elderly population is currently increasing rapidly, senile delirium, as well as dementia, is becoming more important in the field of geriatric psychiatry (1-5). Many elderly patients not only suffer from complications of central nervous system aging,

but also from chronic diseases of the visceral organs. Delirium may easily develop when these pre-existing functional impairments of the brain and visceral organs are compounded by deterioration in the patient's general physical condition, with the use of drugs, or with environmental changes. We analyzed various causative factors, in particular situational factors, for senile delirium, including recurrent delirium, in patients admitted to our general hospitals.

### Subjects and Methods

A total of 129 inpatients referred to our department were studied during a four-year period from 1985 to 1989. The patients were all over 65 years of age. The

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following data were obtained from the patients: underlying chronic diseases, complications, duration and outcome of the episode of delirium, hospitalization and operation dates, medications used, and psychological factors. Patients were divided into two groups: the patients with single episode of delirium and those with recurrent delirium. The single episode group referred to patients who developed one episode of delirium, irrespective of its duration. The recurrent group referred to patients who developed delirium at least twice, with a period of at least two days between episodes. Premorbid personality, job and family stresses, and anxiety and fear of diseases were evaluated as psychologic factors. Sudden environmental change was estimated as circumstantial factor. The presence or absence of dementia was evaluated. Dementia and delirium were both diagnosed according to DSM-III-R criteria (6). Chi-square analysis was used to study the recurrence of delirium. Patients with alcoholic delirium were excluded from this study.

## Results

### Patient Group Composition

Fifty-four patients (26 males and 28 females) were between 65 and 74 years old, 61 (36 males and 25 females) were between 75 and 84 years old, and 14 were 85 years of age or older. The mean age was  $76.3 \pm 6.5$  years. The sex ratio was nearly equal with 68 males and 61 females.

### Underlying Diseases

Underlying diseases were classified according to the affected organs. These included neurological in 39 cases (including 7 cases of Parkinson's disease), cardiovascular in 19 cases, digestive system in 15 cases, orthopedic in 12 cases, psychoses in 11 cases, respiratory in 11 cases, urinary in 7 cases, and ophthalmologic in 5 cases. The remaining 10 cases had the underlying diseases in other organs (Fig. 1). Twenty-three of the 39 neurological patients (59%) and 38 of the total 129 patients (30%) had dementia.

### Psychological and Situational Factors Associated with Delirium

**Hospitalization and delirium.** Forty cases (31%) developed delirium by the fifth hospital day. Of these, 17 cases (including 7 who were

already suffering from delirium when admitted) had onset on the first hospital day, 15 on the second day, 4 on the third day, none on the fourth day, and 4 on the fifth hospital day (Fig. 2). The major underlying diseases associated in these patients were neurological (13 cases), cardiovascular (9 cases), and orthopedic (7 cases). Of the 17 cases exhibiting delirium on the first hospital day, 14 had dementia. Ten of the 13 cases with neurological disorders and delirium were also suffering from dementia. Six of the 9 cases with cardiovascular diseases developed delirium by the second hospital day. Of the 7 cases with orthopedic diseases, 5 were 80 years of age or older

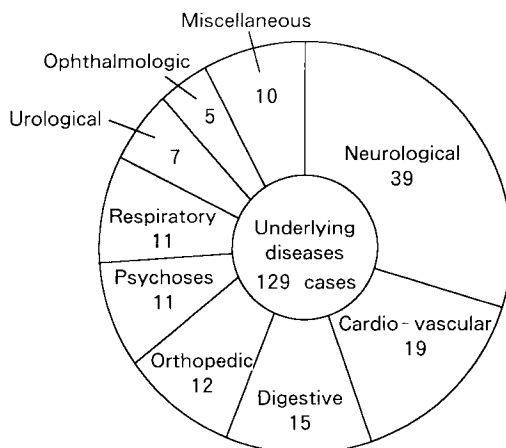


Fig. 1 Underlying diseases in the 129 cases examined.

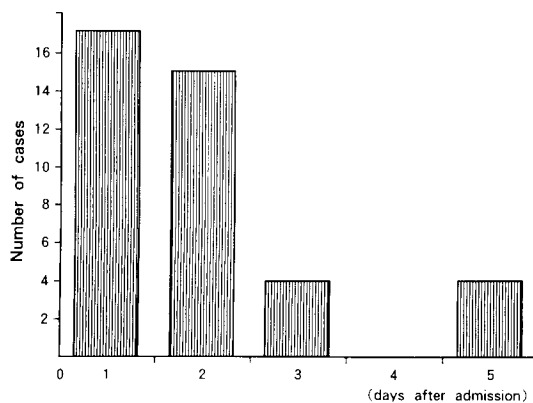


Fig. 2 Effect of admission on facilitating delirium.

and 4 had dementia. Three patients had respiratory disorders, and all of them developed delirium by the second hospital day. The duration of delirium ranged from 1 day to about 60 days. Symptoms lasted more than 15 days in 9 cases, which included 7 cases with dementia. Symptoms eventually disappeared in 19 cases and improved in 13 cases. Therefore, 80% of the patients recovered favorably, either spontaneously or with the help of medical therapy.

*Psychological factors and delirium.* Psychological factors were believed to be responsible for delirium in 10 cases (5 males and 5 females). Five cases had work and family problems, 2 cases of which were timid and nervous and 5 were anxious about their diseases. Delirium occurred immediately or shortly after hospitalization in 4 cases. However, in 6 cases delirium developed after a prolonged period of hospitalization. The causes of delirium in these cases were family problems and difficulties of interpersonal relationship. A reduced level of consciousness was a more prominent feature of the delirium in 6 of these cases, while hallucinations and delusions were more pronounced in 4 cases. In 2 of those 4 cases, the hallucinations and delusions were closely associated with underlying psychological

factors.

#### *Drugs and Delirium*

Medications were believed to be responsible for the development of delirium in 17 cases. The major underlying diseases were neurological (7 cases) and psychoses (4 cases). Drugs frequently involved were anticholinergics, such as antiparkinsonian drugs and antidepressants. Of the 17 cases, 11 had a single episode of delirium and 6 had recurrent delirium, including 5 with Parkinson's diseases. Among the benzodiazepines, diazepam was associated with delirium in one patient.

#### *Surgery and Delirium*

Surgery was associated with the occurrence of delirium in 19 cases. The delirium occurred on the day of surgery in 1 patient, on the second day in 3, on the third day in 7, on the fourth day in 3, on the fifth day in 2, on the sixth day in 2, and on the seventh day in 1 patient (Table 1). Thus, the highest incidence was observed 3 days after the operation. The common underlying associated diseases were digestive (6 cases) and orthopedic (5 cases). Reduced level of consciousness was a prominent feature of the delirium in 18 cases. Delirium lasted less than 7 days in 16 cases, and symptoms resolved completely in 17 cases (89%).

#### *Recurrent Delirium*

Forty-one cases (32%) with recurrent delirium were roughly divided equally in term of sex, with 22 males and 19 females. Their mean age, 76.4 years, was comparable to that of the patient population as a whole. Dementia was present in nearly one-half of the cases (20 cases) with recurrent delirium (Table 2). Two of the 88 cases (2%) in the single episode group, and 6 of the 41 cases (15%) in the recurrent group had a history of delirium prior to the present study (Table 3). The relationship between the duration and frequency of the delirium was analyzed. The delirium lasted less than 14 days in 89% of the patients with a single episode (78/88 cases) and more than 15 days in 11% of those patients (10/88 cases). In the recurrent group, the delirium

**Table 1** Onset of delirium and surgical episodes (19 cases)

Days after operation	1	2	3	4	5	6	7 (Days)
Onset of delirium	1	3	7	3	2	2	1 (Cases)

**Table 2** The relationship between dementia and recurrence of delirium

Dementia	Number of patients with delirium	
	Single-episode group	Recurrent-episode group
-	70	21
+	18	20
Total	88	41

P < 0.05 (Chi-square test)

lasted less than 14 days in 46 % of the patients (19/41 cases) and more than 15 days in 54 % (22/41 cases). This data was graphically illustrated in Fig. 3. The duration of delirium in the single episode group was generally shorter than those of the recurrent group. The number of patients decreased as the duration increased; as delirium lasted 15 to 30 days in 7 patients and more than one month in only 3 patients. In contrast, the number of patients in the recurrent group with delirium lasting less than 14 days were

small, only 1 to 4 patients, but those with a longer duration of 15 to 30 days and more than a month were large, with 11 patients for each period.

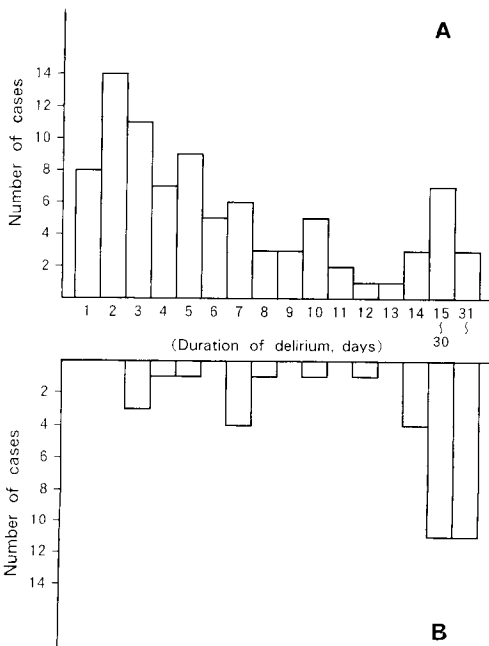
## Discussion

Senile delirium is frequently encountered in general hospitals. It is often said that senile delirium is induced by situational and psychological factors (7, 8). Situational factors include hospitalization, moving to a new place or room, and forced bedrest. Psychological factors include work and family problems and a fear of illness. We focused on hospitalization as a precipitating factor of senile delirium. It is natural that being removed from a familiar environment to that of a hospital (10) causes a tremendous psychological stress on the elderly. Our data indicates that moving to an unfamiliar environment, as a result of hospitalization, was responsible for the development of delirium in about one-third of all patients. The fact that 13 of the 17 patients who developed delirium on the first hospital day had dementia, shows the difficulty that demented patients have in adapting to a new environment. Our data includes a large number of patients with orthopedic diseases due to the fact that one of the hospitals participating in our study had patients of considerably advanced age with orthopedic problems. Orthopedic surgeons in that hospital experienced a high incidence of delirium among their elderly patients. Once this complication was noted in the patients, a psychiatrist was promptly consulted. Four of the 7 patients with orthopedic diseases and delirium had dementia, and 80 % of them recovered favorably. A similar study has been done by Takahashi (11). He reported that 10 of 73 cases (13.7 %) of delirium treated at a university hospital were believed to be associated with environmental changes immediately after hospitalization. Similar observations have been made by Cooper (12) and Patrick (13). Miyamoto *et al.* (14) reported that delirium developed in 20 patients with urological diseases,

**Table 3** The relationship between previous history and frequency of delirium

Dementia	Number of patients with delirium	
	Single-episode group	Recurrent-episode group
-	86	35
+	2	6
Total	88	41

$P < 0.05$  (Chi-square test)



**Fig. 3** Duration of delirium of patients with a single (A) and recurrent (B) episodes of delirium.

out of which, in 8 patients, it developed on the day of hospitalization, in 5, during hospital stay, and in 7, after surgery. Eighteen of the 20 patients suffered from dementia. Tanaka *et al.* (15) reported patients with stroke sequelae who developed delirium; 24 (75%) of these 32 patients developed delirium shortly after hospitalization because of environmental changes.

Delirium is a transient organic mental syndrome as symptoms subside and eventually disappear. However, it recurs most often when associated with cerebral impairments or persistent underlying diseases which may lead to organic mental syndromes such as dementia, personality changes, or even death in some extreme cases (16). Our patients who developed recurrent delirium did not differ in age from the patient population as a whole and were almost equally divided by sex. Approximately one-half of the recurrent cases had dementia. This indicates that even in cases with dementia, nearly one half of the patients recover after a single episode of delirium. As expected, delirium recurred in patients with a history of delirium. Six patients with recurrent delirium were on medication. Of these, 5 had Parkinson's disease and their delirium was attributed to the use of antiparkinsonian medication. Naturally, the episodes of recurrent delirium lasted longer than single episodes. As shown in Fig. 3, the number of patients in the single episode group decreased as the period of delirium lengthened to 14 days from onset. In contrast, in the recurrent group there was no notable change in the number of patients with up to 14 days of delirium, and the number with delirium more than 15 days clearly increased. Many patients who developed prolonged delirium of more than 15 days, or who suffered recurrent delirium, had dementia and chronic underlying diseases, as the patients who had a single delirious episode. Therefore, these were not factors which differentiated the recurrent group from the single episode group. It is well known that multiple factors are involved in the development of senile delirium. Our results suggest that if we are

successful in improving the underlying diseases and general physical condition, as well as maintaining the duration of delirium to less than 14 days, senile delirium may be limited to a single episode. There have been very few reports on recurrent delirium. Delberghe and de Beyl (17) reported a patient who developed recurrent delirium associated with homatropine eye drops. They suspected that pre-existing mild cognitive impairment was exacerbated by the drug's anticholinergic effect. Miyamoto *et al.* (14) reported 20 patients with urologic diseases who developed delirium. Of these, 2 developed recurrent delirium and had prolonged delirium. Kobayashi (18) reported the incidence of delirium in a nursing home. The symptoms of delirium disappeared within two weeks without recurrence in all patients without dementia. Of the 15 patients with mild dementia, 6 occasionally had a recurrence of delirium after a brief resolution, and 4 suffered prolonged delirium. Of the 26 patients with moderate to severe dementia, only 3 recovered completely from the episode of delirium, 20 suffered recurrent delirium, and 3 suffered from prolonged delirium. Omata (19) proposed that delirium be classified into simple, transitional, and demented subtypes. He emphasized that delirium tended to recur in demented type. As the elderly population increases, the prevalence of senile dementia and delirium is anticipated to increase. The key to solving this problem is in adjusting the patient to the sudden environmental changes resulting from hospitalization (20-22). The caregiver can also play an important role. The early identification of the initiating causes and early treatment are essential for preventing recurrent delirium.

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