

# Delirium as the most common antemortem psychiatric disorder: a 7-year experience at an inpatient psychiatric institution

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Symptoms of delirium are usually reversible; however, they often occur in severely ill patients several hours or days preceding death and are considered a predictor of death.

**Objective.** To examine the demographic data, somatic and psychiatric disorders, the frequency of delirium and its subtypes, to compare the parameters of delirium in the age and dementia groups in the somatopsychiatric department patients deceased in 1997–2003.

**Materials and methods.** 138 medical records of deceased patients were analyzed retrospectively. The diagnoses were recorded according to the ICD-10 criteria. The data were collected in forms designed specifically for this trial. The deceased patients were divided into groups according to age (below/above 70 years) and the level of cognitive functions (dementia present/absent).

**Results.** The number of deceased males (68.8%,  $n = 95$ ) was larger than that of deceased females (31.2%,  $n = 43$ ) during the period 1997–2003. Dementia was found in 69.6% ( $n = 96$ ) of the patients. 71.1% ( $n = 99$ ) of the patients were hospitalized only once, 13.0% ( $n = 18$ ) two times, 8.0% ( $n = 11$ ) three times, and the remaining 5% ( $n = 10$ ) more (4–16) times. The symptoms of delirium were manifested in 85.5% ( $n = 118$ ), its hyperactive form was present in 58.5% ( $n = 69$ ) and the hypoactive form in 35.6% ( $n = 42$ ) of the hospitalized patients. Hypoactive delirium was predominant in all groups immediately preceding death (80.5%,  $n = 95$ ,  $p = 0.001$ ). Delirium occurred more frequently in older than in younger patients (90.9%,  $n = 90$  vs. 71.8%,  $n = 28$ ;  $p = 0.005$ ) and in patients with dementia compared to patients without it (94.8%,  $n = 91$  vs. 64.3%,  $n = 27$ ;  $p = 0.000$ ). The mean duration of delirium was 66.67 days.

**Conclusions.** Delirium was the most common psychiatric disorder preceding death. Hypoactive delirium carries the most adverse prognosis. The frequency of delirium was higher in older and demented than in younger and non-demented patients, but the duration of delirium was shorter and the course was more severe in younger and non-demented patients as compared to older demented patients.

**Key words:** delirium, dementia, dying patient, mortality

## INTRODUCTION

Delirium is an acute, distinct disturbance of consciousness with impairment of the cognitive functions, thinking, attention and perception, and variation of the intensity of symptoms in the course of the day (1). It is one of the most severe psychiatric disorders and is associated with longer hospitalization and increased mortality (2). Despite the reversibility of the symptoms of delirium, it often occurs in severely ill patients a few hours or days preceding death, and it is considered a

sign of an incipient “hard way to death” (3). The most common causes of antemortem delirium are vital organ changes, electrolyte imbalance, dehydration, hypoxia, sepsis, and drug toxicity (4). Delirium is classified into subtypes (or forms) depending on the predominant motor activity: hyperactive delirium, hypoactive delirium, and delirium with mixed (or normal) activity (5–8). Many authors consider hypoactive delirium to carry the most unfavorable prognosis (9).

The frequency of delirium, its risk factors, severity and the effect on survival were assessed in vario-

us populations in numerous recent epidemiologic studies, and survival was found to be shorter in patients with delirium compared to those without it (10–12). There is a lack of studies, however, in which delirium parameters of possible significance with respect to prognosis are assessed in dying patients (1, 4, 13). These studies are complex due to the limited data on delirium, absence of morphologic basis, its intermittent course, polymorphic symptoms, and diagnostic difficulties; it is thus described as “elusive” or “unclear” by many researchers (2, 3, 14).

The most extensive studies of antemortem delirium in the world practice were carried out in oncology clinics and departments of palliative care (15 – 21). In the last decade are coming studies about the psychopathology of dying patients with AIDS (22) and patients in intensive care units (ICU) (23). According to these studies, the frequency of delirium in dying patients fluctuates from 20% to 88%.

There have been no delirium studies in Lithuania so far. There were no researches of the parameters of delirium even in psychiatric clinics. Most of data are reviews of studies and they concern only the problems of psychopathology diagnostics and the treatment of delirium (24, 25). According to our material, the parameters of delirium in dying patients, such as dependence of the frequency and duration of delirium on the age of dying patients and the condition of cognitive functions, were not studied at all or studied but little (26). There were no materials about the psychopathologic parameters of dying patients in psychiatric hospitals.

In an attempt to show the peculiarities of delirium, to compare them with the results reported from other countries, we began the research of delirium in our psychiatric hospital. Patients with incident dementias of various origin and organic psychotic disorders, and patients with prevalent endogenous psychiatric diseases and incident somatic disorders who cannot be admitted to a general hospital due to their condition are treated in the department of somatopsychiatry and Alzheimer disease. Terminally ill patients with psychiatric disorders are also treated by the doctors of the department.

### **Objective**

The objective of this study of all the patients that died at the department from 1997 to 2003 was to assess the demographic data, the frequency and duration of delirium as the most common antemortem psychopathological syndrome – predominant motor activity, the motor activity preceding death, to compare the parameters of delirium in younger/older patients and patients with/without dementia.

### **MATERIALS AND METHODS**

Medical records of 138 patients who died from 1997 to 2003 were analyzed retrospectively. Data were col-

lected in forms designed specifically for this study. The dates of birth, death and last hospitalization, and the number of hospitalizations were recorded. The dates of the last episode of delirium (if any) and the impairment of cognitive function (or dementia, if any) were determined based on the objective data and history records. Upon determination of the presence of delirium symptoms, the predominant and antemortem motor activity was assessed. Psychiatric and somatic diagnoses were made according to the ICD-10. The main psychiatric disorders such as delirium of various origin, delusional and depressive disorders (F05.0, F 05.1, F06.2, F06.3, F10.4, F20, F25, F33), which warranted patient's hospitalization, were diagnosed along with psychiatric comorbidities: dementias of various origin, non-psychotic organic psychiatric disorders, non-psychotic endogenous psychiatric disorders, which may have contributed to the development of antemortem psychiatric disorders (F 00-03, F07.0, F 20-29, F31-33), and somatic diseases such as cardiovascular, cerebrovascular, respiratory, gastrointestinal, urogenital, endocrine disorders, or cancer in any organ system. The determination of predominant motor activity and motor activity preceding death was made based on physicians' and nurses' records, and was only assessed in patients with delirium.

Patients were divided into two groups of those below and above 70 years of age to determine the origin of the delirium and the parameters of its forms and duration in younger and older patients. The deceased were further subdivided into two groups of those with dementia and without it to assess the differences in the parameters of antemortem delirium in demented and non-demented patients.

The collected data were analyzed by means of the SPSS-11 statistical package. The arithmetic means and standard deviations were calculated, and the Student (*t*) test was used to determine the reliability of the difference of two means. The chi-square ( $\chi^2$ ) test and contingency tables were used to compare delirium differences in the age and dementia groups. Delirium duration differed from the normal distribution (there were some extremely long-lasting cases), therefore, the differences of delirium duration were compared in the groups tested by means of the non-parametrical Mann-Whitney test.

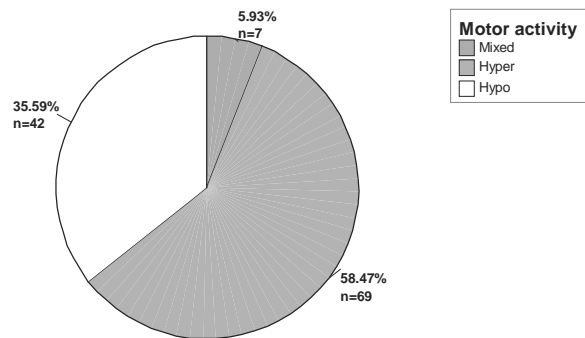
### **RESULTS**

#### **General characterization of the deceased**

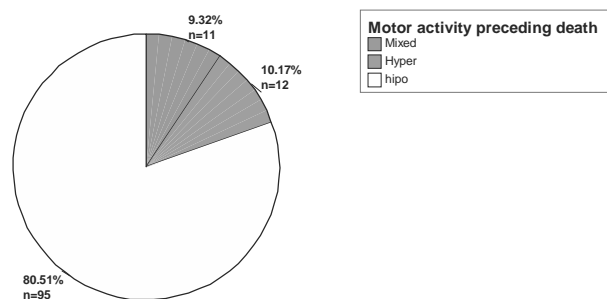
From 1997 to 2003, 139 deaths were recorded at the department of somatopsychiatry and Alzheimer disease there was one case of suicide, and the disease(s) was (were) the cause of death in the remaining 138 patients. The ratio of deceased males to females was 2.2 during that period, however, the age distribution of females was wider than that of males: females –

**Table 1. Characteristics of the patients (n = 138)**

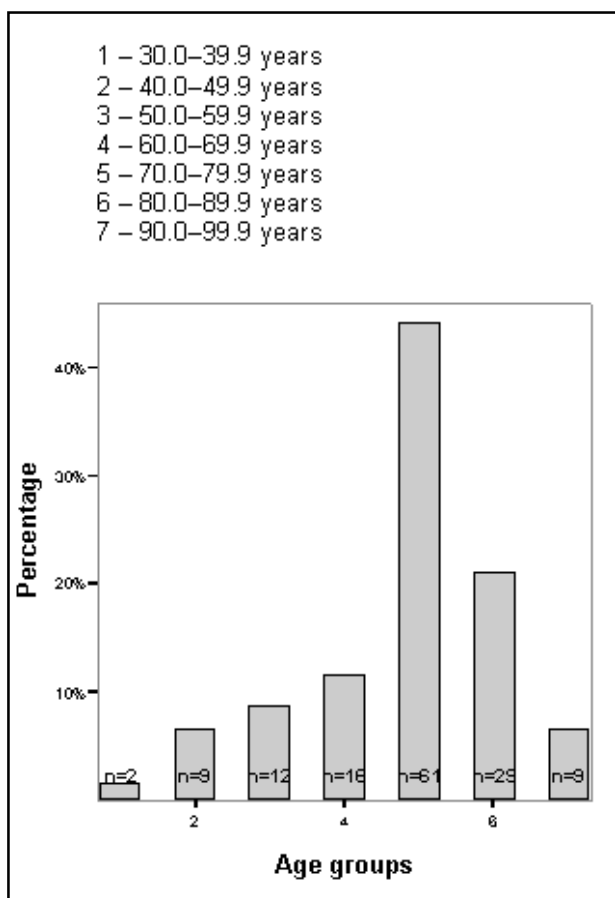
<b>Age</b>		
under 70 years	39	(28.3%)
above 70 years	99	(71.7%)
<b>Gender</b>		
male	95	(68.8%)
female	43	(31.2%)
<b>Delirium</b>		
F05	103	(74.6%)
F10.4	15	(10.9%)
<b>Predominant motor activity</b>		
hyperactive	69	(58.5%)
hypoactive	42	(35.6%)
mixed	7	(5.9%)
<b>Motor activity preceding death</b>		
hyperactive	12	(10.2%)
hypoactive	95	(80.5%)
mixed	11	(9.3%)
<b>Dementia</b>		
vascular	50	(36.2%)
alzheimer's disease	35	(25.4%)
another	10	(7.2%)
<b>Predominant somatic diseases</b>		
cardiovascular	102	(73.9%)
cerebrovascular	31	(22.5%)
cancer	18	(13.0%)



**Fig. 2. Frequency of predominant motor activity**



**Fig. 3. Frequency of motor activity preceding death**



**Fig. 1. Distribution according to age groups**

31.1 to 97.4 years (mean 73.5) and males 41.4 to 92.8 years (mean 72.8). Ninety-six patients (69.6%) were diagnosed with dementia, 99 patients (71.1%) were hospitalized only once, 18 patients (13.0%) two times, 11 patients (8.0%) three times, and the remaining 10 patients (5%) more (4-16) times. All the deceased patients had various severe somatic diseases, cardiovascular and cerebrovascular disorders being most common (Table 1). Patients in the seventies were predominant among the deceased (Fig. 1).

Autopsy was performed on 3 patients only, but the pathologic and clinical diagnoses matched in all these cases. No symptoms of delirium were observed in the first case: the patient died suddenly, due to pulmonary thrombembolism. One patient had dementia, and the symptoms of delirium developed preceding death; no acute somatic disorders were found at autopsy. The established cause of death was unspecified dementia in this case. The symptoms of delirium were found to have started 5 days prior to the development of myocardial infarction in another case, and there were no other disorders which might have been the cause of death.

**The frequency of delirium**

The symptoms of delirium were found in 118 hospitalized patients (85.5%), its hyperactive form in 69 (58.5%), and hypoactive form in 42 (35.6%) patients (Fig. 2) Hypoactivity was observed in 95 (80.5%) pa-

Table 2. Differences in the frequency of delirium and its subtypes between age groups

	Under 70 years (n = 39)	Over 70 years (n = 99)	p
Frequency of delirium	28 (71.8%)	90 (90.9%)	0.005
Predominant motor activity	Hyper - 16 (57.1%) Hypo - 10 (35.7%)	Hyper - 53 (58.9%) Hypo - 32 (35.6%)	> 0.05
Motor activity preceding death	Hyper - 3 (10.7%) Hypo - 24 (85.7%)	Hyper - 9 (10.0%) Hypo - 71 (78.9%)	> 0.05

Table 3. Differences in the frequency of delirium and its subtypes between patients with and without dementia

	No dementia (n = 42)	Dementia (n = 96)	p
Frequency of delirium	27 (64.3%)	91 (94.8%)	0.000
Predominant motor activity	Hyper - 15 (55.5%) Hypo - 10 (37.0%)	Hyper - 54 (59.3%) Hypo - 32 (35.2%)	> 0.05
Motor activity preceding death	Hyper - 4 (14.8%) Hypo - 22 (81.5%)	Hyper - 8 (8.8%) Hypo - 74 (81.3%)	> 0.05

Table 4. Duration of delirium among patients over and under 70 years of age

Duration of delirium, days	Under 70 years	Over 70 years	p = 0.001
Mean	16.46	82.29	
Median	15.00	33.00	
Standard deviation	13.585	174.059	
Min	0	2	
Max	52	1335	

Table 5. Duration of delirium in demented and non-demented patients

Duration of delirium, days	No dementia	Dementia	p = 0.000
Mean	12.37	82.78	
Median	10.00	34.00	
Standard deviation	9.580	172.829	
Min	0	2	
Max	39	1335	

tients immediately preceding death (Fig. 3). A comparison of predominant motor activity and motor activity preceding death in patients with delirium yielded a statistically significant difference:  $p = 0.000$ .

Delirium was noted in 29 (67.4%) females and 89 (93.7%) males ( $p = 0.000$ ).

The difference in the frequency of delirium was statistically significant between the age groups. The frequency of hyperactive delirium was higher in both older and younger patients, and the symptoms of hypoactive delirium were predominant before death, however, no difference in statistical significance was found (Table 2).

The frequency of delirium was significantly higher in patients with dementia compared to those without it. The frequency of hyperactive delirium was higher in demented patients and that of hypoactive delirium was somewhat higher in non-demented patients. The frequency of hypoactive delirium was higher in both demented and non-demented patients immediately preceding death, however, there was no statistically significant difference in the forms of delirium in dementia groups (Table 3).

#### The duration of delirium

The mean duration of delirium was 66.67 days (median 25.20, standard deviation 154.530, min 0, max 1335). The limits of delirium duration are very wide, therefore, its duration was determined separately in demented and non-demented patients, males and females, and those above and below 70 years of age.

The mean duration of delirium in males was shorter than in females: 57.0 and 96.38 days, respectively, however, no difference of statistical significance was found ( $p > 0.05$ ).

The duration of delirium was shorter in younger than in older patients and reached: 16.46 and 82.29 days, respectively. The duration of delirium in patients with dementia was longer than in patients without dementia: 82.78 and 12.37 days, respectively. These differences are statistically significant (Tables 4, 5; Figs. 4, 5).

## DISCUSSION

The adaptive capacities of the cardiovascular system, liver, kidneys and the central nervous system are decreased in patients before death. Therefore, the frequency of delirium symptoms is significantly higher in these patients, and these symptoms are considered to be the predictor of impending death.

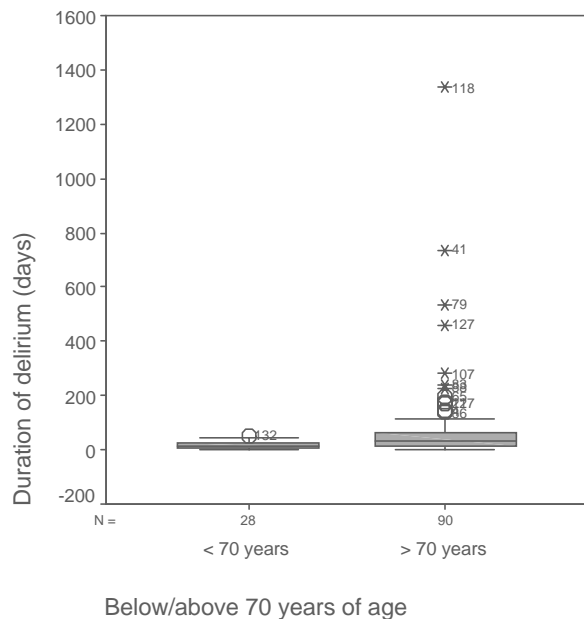


Fig. 4. Duration of delirium and age

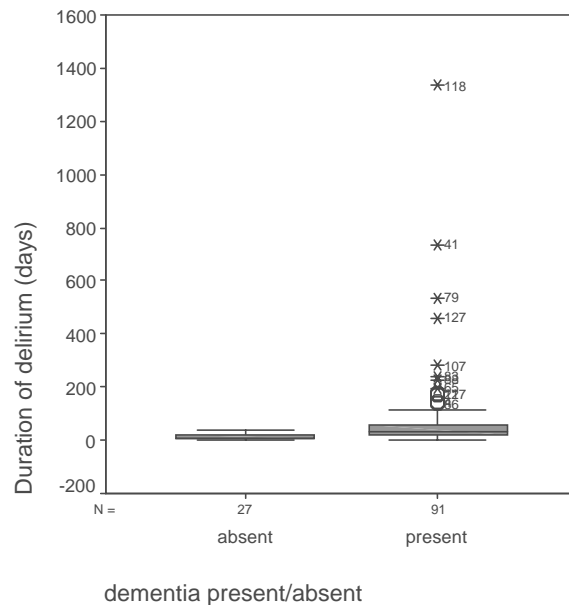


Fig. 5. Duration of delirium and status of cognitive impairment

- 1 – 30.0–39.9 years
- 2 – 40.0–49.9 years
- 3 – 50.0–59.9 years
- 4 – 60.0–69.9 years
- 5 – 70.0–79.9 years
- 6 – 80.0–89.9 years
- 7 – 90.0–99.9 years

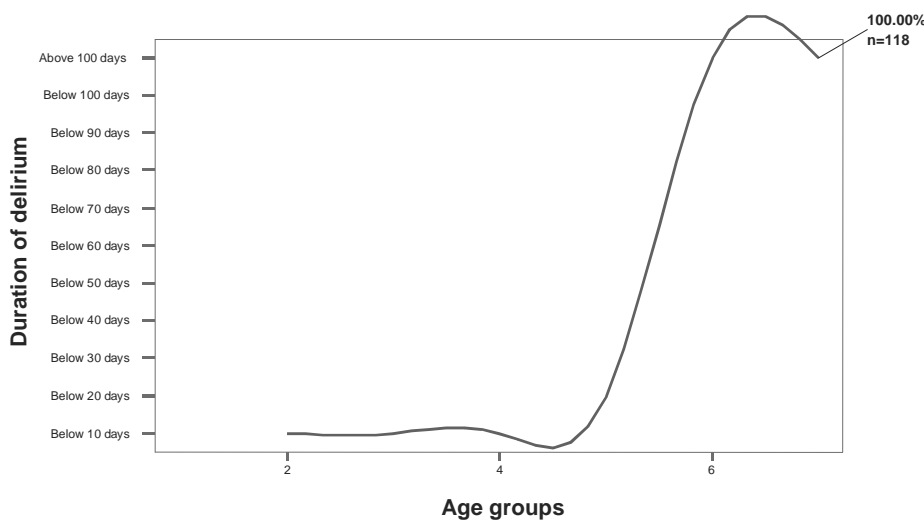


Fig. 6. Differences in the duration of delirium of patients according to age

Deceased patients of various age who had diverse psychiatric and somatic disorders were included in this study. Therefore, a wide range of psychopathological parameters was noted. However, delirium was found to be the most common psychiatric disorder preceding death. The overall frequency of delirium (85.5%) in our study corresponds to the data of multiple studies in which de-

lirium was noted in up to 88% of terminally ill cancer patients. This study again demonstrates that the manifestation of delirium preceding death is independent of the origin of the somatic disease.

A difference of statistical significance was found between the motor activity forms of delirium. Overall, the hyperactive form of delirium was predominant, however, hypoactive delirium was most common preceding death in both older and demented and younger and non-demented patients. It can therefore be concluded that hypo-

active delirium is particularly dangerous and is a predictor of adverse prognosis.

Overall, there was a wide variation in the duration of delirium, which can be accounted for by the wide age differences and various disease acuity of the deceased. Antemortem delirium was found to be more common in older and demented patients, but its duration was longer. Delirium

was less common in younger and non-demented patients, but its duration was shorter, and the patients died sooner due to the greater severity and acuity of their diseases and the resulting sooner development of disturbances incompatible with life. The graph (Fig. 6) indicates no particular differences in the duration of delirium of patients in their forties to sixties: its duration was up to 10 days; the duration of delirium increased in direct proportion to the age of patients in their seventies and above.

The deficiency of this study is the impossibility to assess the severity of somatic disorders and the level of organ system impairment by means of retrospective analysis of medical records. In addition, the width of the spectrum of somatic diseases precludes the comparison of antemortem psychopathological parameters in different disease groups. However, the overall trend of shortest antemortem delirium duration in patients with myocardial infarction (2 patients, 3–16 days, mean 9.50), alcohol dependency (20 patients, 0–57 days, mean 16.05), and stroke (11 patients, 2–71 days, mean 23.82) and longest duration in patients with chronic cerebrovascular disease (30 patients, 2–1335 days, mean 143.97) were noted.

The results of this study are of importance to medical personnel dealing with the treatment and care of patients with various somatic diseases, particularly of elderly patients. Firstly, delirium should be considered a life-threatening condition and such patients should be supervised with particular care. Secondly, attention should be paid to the diagnosis of the hypoactive form of delirium. This form is characterized by the lack of symptoms and is often not diagnosed or mistaken for another psychiatric disorder. However, it is this specific form that carries particular danger, and failure to diagnose it in a timely fashion and to administer appropriate treatment results in patient's death. It should be noted that occasionally delirium is the only disorder diagnosed before death. This was the case with a patient without dementia or any particular diseases, who developed delirium and died in 5 days. A 12-hour old myocardial infarction was found at autopsy. Thirdly, the important finding of this study is the transformation of hyperactive delirium to hypoactive delirium before death. This transformation of motor activity is caused by the use of CNS-depressant medications in a subgroup of patients. Therefore, these medications should be used with great care for the treatment of these patients.

## CONCLUSIONS

1. Delirium was the most common antemortem psychiatric disorder.

2. Overall, the predominance of hyperactive delirium was noted; hypoactive delirium was more common preceding death.

3. Hypoactive delirium carried the most adverse prognosis.

4. Antemortem delirium occurred more commonly in older and demented patients, compared to younger and non-demented patients.

5. The duration of antemortem delirium was shorter and its course was more severe in younger and non-demented patients, compared to older and demented patients.

**Future plans.** The knowledge of the danger and frequency of delirium in severely ill patients warrants its further investigation. The effects of delirium and its forms on the survival of psychiatric inpatients after the first manifestation and the survival of patients with delirium and without it must be investigated. Prospective studies must also be carried out to determine the effect of delirium severity on survival.

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### DELYRAS – DAŖNIAUSIAS PRIEDMIRTINIS PSICHIKOS SUTRIKIMAS: 7-IØ METØ PSICHIATRIJOS STACIONARO PATIRTIS

#### Santrauka

Dažniausiai delyro simptomai yra grąptami, taėiau nere-tai delyras iđtinka sunkiai serganėius įmones kelias va-landas ar dienas prieš mirtį ir yra laikomas mirties pre-dikatoriumi.

**Tikslas.** Ąvertinti somatopsichiatrijos skyriuje 1997–2003 m. mirusio pacientø demografinius duomenis, so-matinius, psichikos sutrikimus, nustatyti delyro ir jo sub-tipø dažnā trukmā, palyginti delyro parametrus lyties, amžiaus ir demencijos grupėse.

**Medžiaga ir metodai.** Retrospektyviai išanalizuotos 138 mirusio pacientø ligos istorijos. Diagnozės uđfiksuotos re-miantis TLK-10 kriterijais. Duomenys rinkti ā specialiai điam tyrimui sukurtā anketā. Mirusieji suskirstyti ā grupes pagal ampio (iki 70 metø ir per 70 metø) ir kognityvinio funkcijø lygā (su demencija ir be).

**Rezultatai.** Tiriamuoju laikotarpiu mirė daugiau vyrø (68,8%, n = 95) nei moterø (31,2%, n = 43). Demen-cija nustatyta 69,6% (n = 96) asmenø. 71,1% (n = 99) pacientø buvo hospitalizuoti tik vienā kartā, 13,0% (n=18) – du kartus, 8,0% (n = 11) – tris kartus, li-kusieji 5,0% (n = 10) – daugiau (4–16) kartø. Delyro simptomatika iđryđkėjo 85,5% (n = 118) hospitalizuotø asmenø, hiperaktyvi forma – 58,5% (n = 69), hipoaktyvi – 35,6% (n = 42). Visose grupėse prieš mirtā vy-ravo hipoaktyvus delyras – 80,5% (n = 95, p = 0,001). Delyras dažniau pasireiđkė vyresniems (90,9%, n = 90; vs 71,8%, n = 28; p = 0,005) ir dementiškiems asme-nims (94,8%, n = 91; vs 64,3%, n = 27; p = 0,000). Vidutiniđkai delyras tęsėsi 66,67 dienas.

**Išvados.** Dažniausias psichikos sutrikimas prieš mirtā buvo delyras. Prognostine prasme nepalankiausias yra hipo-aktyvus delyras. Dažniau delyras pasireiđkė vyresniems ir dementiđkiems pacientams, taėiau jo trumpesnė trukmė ir sunkesnė eiga buvo būdinga jaunesniems ir nedementiđ-kiems.

**Raktažodžiai:** delyras, demencija, mirtis, mirtingumas