

SHORT REPORT

Delirium episode as a sign of undetected dementia among community dwelling elderly subjects: a 2 year follow up study

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Abstract

Cognitive decline is commonly stated as one of the main risk factors for delirium. The aim was to assess the importance of a delirium episode as a symptom of an underlying dementia among community dwelling healthy elderly people in a prospective 2 year follow up study. The study patients consisted of 51 people living at home and older than 65 years of age, without severe underlying disorders including diagnosed dementia, admitted consecutively as emergency cases to hospital because of an acute delirious state and followed up for 2 years. The diagnosis of delirium and dementia were based on the DSM-III-R criteria. The community dwelling patients were evaluated and tested annually by a clinical investigator, a geriatric study nurse, and a neuropsychologist. The medical records of the institutionalised patients were also evaluated. Dementia was diagnosed immediately after the assurance that delirium symptoms had subsided in 14 out of 51 subjects (27%) and the additional 14 subjects were diagnosed as being demented during the 2 year follow up, 28 out of 51 patients (55%) altogether. Alzheimer's disease or mixed dementia was diagnosed in 14 out of 51 patients (27%), vascular dementia in 10 (20%), and dementia with Lewy bodies in two (4%). One case of alcoholic dementia and one case of a non-alcoholic hepatic encephalopathy were also found. A delirium episode is often the first sign of dementia requiring attention from medical and social professionals.

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Cognitive decline or dementia is commonly stated as one of the main risk factors for delirium.¹ The importance of a delirium episode as the sign of dementia is not known. The aim of this study was to assess the importance of a delirium episode as a symptom

of an underlying dementia among community dwelling elderly people.

Patients and methods

The study was carried out in the Harjula City Hospital and in the Brain Research and Rehabilitation Center Neuron, Kuopio, Finland. The Harjula Hospital, which has 124 acute beds, services Kuopio, a city with a population of about 85 000. Neuron is a private hospital with 50 beds for rehabilitation.

The study patients were senior citizens, older than 65 living at home in Kuopio. They were consecutive admissions to Harjula Hospital between 1 May 1994 and 31 October 1996 with an acute delirious state as one of the symptoms leading to admission, or their delirium was seen immediately after admission.

The clinical investigator (TR or SP) visited all of the relevant wards twice a week. If a delirium was suspected between these visits the study group was also consulted. In addition, before the start of the study the ward personnel had received special training to be able to detect and identify the symptoms of delirium. The clinical investigator contacted and examined the patients and reviewed their medical records.

The study patients were restricted to healthy elderly people living at home and without any serious underlying disorders predisposing to delirium. Subjects with diagnosed dementia or symptoms of moderate or severe dementia determined by information from medical records, from relatives, or from care givers were excluded. However, it was decided to include those with mild cognitive impairment because of the difficulties in differentiating delirium and the early stages of dementia in a short period. Patients were also excluded if they had severe communication disorder (n=2). Patients with severe stroke or an illness requiring treatment in the intensive care ward or cardiac unit and all surgical patients going on to University Hospital of Kuopio were excluded, as were patients with alcoholism, major psychiatric disorders, or those with malignant disorder and patients who were discharged within 24 hours of admission.

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When the acute phase and treatment were over, the study patients were referred for an investigational and rehabilitation period to the Brain Research and Rehabilitation Center Neuron. The costs of the periods were covered by the study funding. A thorough medical examination including laboratory tests, ECG, chest radiography, and CT of the head was carried out to confirm the cause of the delirium, to ensure that the delirium symptoms had subsided, and also to detect any possible dementia disorder and its potentially treatable cause. A structured interview, including the mini mental state examination (MMSE), Barthel index, and instrumental activities of daily living (IADL) index²⁻⁴ was undertaken by the research nurse.

The neuropsychological testing was performed by an experienced clinical neuropsychologist (RL-M) annually. The main aim was to differentiate cognitive impairment such as different types of dementia from normal variation. The core areas covered were orientation, automatisms, immediate memory, and learning versus delayed reproduction, the clock drawing test, visuoconstructive drawings, and basic abilities of reading, writing, and calculation.

After the rehabilitation period, the patients were followed up further by the research nurse for 2 years. The interviews and examinations were repeated annually during a short visit to Neuron by the community dwelling patients. The medical records and nurses' charts of the institutionalised patients were reviewed later on and additional information asked from house personnel of the institution when appropriate.

Delirium and dementia were diagnosed according to the criteria of the third edition of the diagnostic and statistical manual of the American Psychiatric Association revised (DSM-III-R).⁵ The likely cause of delirium was ascertained using the criteria established by Francis *et al.*⁶ Alzheimer's disease was diagnosed in conformity with the criteria for probable Alzheimer's disease outlined by the NINCDS-ADRDA Work Group.⁷ Vascular dementia was diagnosed according to the criteria of NINCDS-AIREN.⁸ Mixed dementia was

diagnosed when the patient had signs and symptoms from both degenerative and vascular dementia. The diagnosis of dementia with Lewy bodies was based on the clinical guidelines reported by McKeith *et al.*⁹

ETHICAL ISSUES

Informed consent for the study was obtained from patients or their relatives. The study was approved by the ethics committee of the Kuopio University Hospital and the Health Centre of Kuopio.

STATISTICAL ANALYSES

Statistical analyses were made with SPSS for Windows 7.5. Student's *t* tests for continuous variables and χ^2 tests for nominal variables were used when comparing groups. Fisher's exact test was applied when needed because of the small expected frequencies.

Results

Fifty six patients with delirium fulfilling the study criteria were found during the study period of 2.5 years. Five patients or their relatives refused. Fifty one patients were transferred to the rehabilitation centre for further assessment and rehabilitation (table). The causes of the delirium were infection in 22 patients (43%), a cerebrovascular disorder in 13 (25%), and a cardiovascular disorder in nine (18%). A drug related disorder was detected in six patients (12%) and acute glaucoma was found in one (2%).

A diagnosis of dementia was made in 14 patients (27%) at the first period in the rehabilitation centre at the beginning of the study. After the first year we found eight new patients (16%) and by the end of the second year six more patients (12%) with dementia were detected. Thus, altogether 28 cases (55% of the study subjects) were diagnosed as being demented. The dementia types diagnosed are shown in the table. There were no differences in baseline characteristics between the patients in whom dementia was diagnosed at the beginning of the study (*n*=14) and those diagnosed during the follow up (*n*=14) (data not shown).

At the end of the follow up, 15 patients out of the 28 diagnosed as being demented were institutionalised (54%), only three patients without dementia (13%) were institutionalised (*p*=0.003). During the follow up five (18%) of the patients diagnosed as being demented died and six (26%) of the non-demented.

Discussion

The patients consisted of all community dwelling patients over 65 years of age in the city of Kuopio without any serious underlying disorder who experienced delirium and were admitted to hospital during the study period. The number of patients (51) who fulfilled the study criteria was smaller than we expected when we were planning the study. The prevalence rates of delirium, about 20% in several studies among medical elderly patients in hospital, had led us to predict that there would be a greater number of patients.^{6 10 11} However, most of the

Baseline characteristics of patients with delirium with and without dementia diagnosed during the 2 year follow up

	All	Non-demented	Demented	<i>p</i> Value
No (%)	51 (100)	23 (45.1)	28 (54.9)	
Age (mean (SD))	82.1 (5.4)	82.3 (4.7)	81.8 (6.0)	0.725
Range	71-93	72-90	71-93	
Female (No (%))	46 (90)	22 (96)	24 (86)	0.362
Living alone (No (%))	42 (82)	20 (87)	22 (79)	0.434
With spouse	6	3	3	
With own child	2	0	3	
MMSE Score (mean (SD))	20.8 (3.9)	22.5 (3.4)	19.3 (3.7)	0.003
Range	11-29	17-29	11-27	
Bartel index score (mean (SD))	85 (12)	83 (13)	87 (11)	0.273
Range	55-100	55-100	65-100	
IADL score (mean (SD))	22 (6)	20 (6)	22 (7)	0.276
Range	8-32	8-29	11-32	
Dementia	28 (55)			
Alzheimer's disease	11 (24)		11 (39)	
Vascular dementia,	10 (20)		10 (36)	
Dementia with Lewy Bodies	2 (4)		2 (7)	
Mixed dementia	3 (6)		3 (11)	
Other types of dementia*	2 (4)		2 (7)	

*An alcoholic dementia in one case and a non-alcoholic hepatic encephalopathy in one case.

patients in previous studies had been diagnosed as having some disease predisposing them to delirium.

In this study 14 patients (27%) were diagnosed as demented after the delirium episode had subsided and another 14 patients (27%) were diagnosed as being demented by the end of the 2 year follow up. The proportion of patients getting dementia (almost 40% out of those 37 not having dementia after delirium had subsided) during the 2 year follow up was much greater than the age specific incidence of dementia (6.9–53.4/1000 person-years in men aged over 70 and 4.2–100.9 in women) found in the EURODEM studies.¹²

Rockwood *et al* recently reported 18.1%/year as an incidence of dementia over 3 years for elderly patients with delirium and 5.6%/year for those without.¹³ Additionally, some earlier studies have indicated that a delirium episode could be a sign of an underlying dementia.^{14 15}

This study confirms earlier results that the prognosis after a delirium episode is poor.^{6 11 13} Over one third of the study patients (35%) and 54% of the demented patients were admitted to an institution by the end of the 2 year period. There were high mortality rates 2 years after discharge, 26% of the non-demented and 18% of the demented patients, emphasising the severity of a delirium episode as a forerunner of poor prognosis even in healthy non-demented elderly people living at home.

Although, the number of the patients was small the results emphasise the importance of a delirium episode as a sign of a dementia disorder. Those elderly patients having an episode of delirium should be evaluated and followed up for cognitive decline.

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