

Clinical Science

Incidence and risk factors of delirium in the elderly general surgical patient



Steve M.M. de Castro, Ph.D., M.D.^{a,*}, Çağdaş Ünlü, M.D.^a,
Jurriaan B. Tuynman, Ph.D., M.D.^a, Adriaan Honig, Ph.D., M.D.^{b,c},
Bart A. van Wagenveld, Ph.D., M.D.^a, E. Philip Steller, Ph.D., M.D.^a,
Bart C. Vrouenraets, Ph.D., M.D.^a

^aDepartment of Surgery and ^bDepartment of Psychiatry, Sint Lucas Andreas Hospital, Jan Tooropstraat 164, 1061 AE, Amsterdam, The Netherlands; ^cDepartment of Psychiatry, Free University Hospital, De Boelelaan 1117, 1081 HZ, Amsterdam, The Netherlands

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General surgery;
Hip fracture

Abstract

BACKGROUND: This study evaluates the incidence of delirium and risk factors associated with delirium in elderly patients admitted to a general surgical ward.

METHODS: Patients aged over 60 years who were admitted with an acute or elective general surgical diagnosis were eligible for this prospective cohort study. Risk factors associated with delirium were analyzed using univariate and multivariate analysis to identify those independently associated with delirium.

RESULTS: A total of 209 patients were included in the study. The incidence of delirium was 16.9% (23.2% for acute admission, $P < .001$). Variables associated with delirium were dementia, presence of an urinary catheter, cognitive decline at admission measured with the mini-mental state examination, white blood cell count $>10.0 \times 10^9/L$, and urea >7.5 mmol/L. Median length of hospital stay was 13 days (range 3–85) for patients with delirium versus 7 (range 1–54) for patients without ($P = .002$).

CONCLUSIONS: The incidence of delirium is high in elderly patients, especially after an acute admission, leading to an increase in length of hospital stay. To minimize delirium, associated risk factors must be identified and, if possible, treated.

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Delirium, or acute confusional state, is a syndrome that presents as severe confusion and disorientation, developing with relatively rapid onset and fluctuating in intensity. Other characteristics include reduced ability to focus, sustain, or shift attention; a decline in cognitive function;

perceptual abnormalities; circadian disruption; and psychomotor disturbances. Delirium may be hyperactive, hypoactive, or mixed, based on psychomotor features.¹ Delirium occurs often after hospital admittance or after surgery. The incidence of delirium ranges from 11% to 42% among medical inpatients depending on the population studied.² Postoperative delirium occurs mostly in the elderly patients with the highest rates after acute surgery for hip fracture,³ major cardiac surgery,⁴ and major vascular surgery.⁵ Furthermore, delirium is associated with poor outcomes, such as prolonged hospital stay and increase in hospital

* Corresponding author. Tel.: +31-20-510-87-40; fax: +31-20-685-40-14.

E-mail address: stevedecastro@me.com

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costs and functional and cognitive decline. Patients who have developed a delirium during admission have a higher rate of institutionalization and a greater need for rehabilitation and home healthcare services after discharge.^{6,7} In a review article of 80 older studies of patients with postoperative delirium, it was concluded that age was a major risk factor along with dementia and depression.⁸

Few studies have been performed in general surgical patients including trauma care and many general surgeons are still responsible for the management and care of trauma in their hospital. This study focused on a general surgical population of consecutive elderly patients (aged 60 years or more) admitted to a teaching hospital for acute conditions (including fractures) or general elective surgical procedures. The aims of this observational cohort study were to assess the incidence of delirium in this patient population and to identify perioperative risk factors associated with the development of delirium. Finally, a systematic review of the literature was performed to identify similar studies.

Methods

Patient recruitment commenced in February 2009 and was completed in August 2009. The inclusion criteria were as follows: patients of either sex above the age of 60 years, admitted with an expected duration of hospital stay of at least 2 days, or operated on in the surgical unit. Exclusion criteria were as follows: patient unable to perform cognitive and psychometric tests for any reason, day-care surgery patients, and patients admitted for observation for 1 day. The study was undertaken in accordance with the Declaration of Helsinki and the guidelines on Good Clinical Practice.

A range of preoperative and postoperative risk factors was documented to which the included patients were exposed. A standardized history was taken to document patient demographics. Patterns of smoking, alcohol consumption, and drug use (in particular benzodiazepines, hypnotics, narcotic drugs, antiarrhythmic) were recorded. The medical history included the following: presence of congestive heart failure, cerebral infarction in the past, documented transient ischemic attack, any classified psychiatric condition diagnosed according to diagnostic and

statistical manual of mental disorders-IV (DSM-IV) criteria, peripheral artery occlusive disease, the presence of angina pectoris in the last year, and myocardial infarction in the past. The following laboratory parameters were measured: hemoglobin, white blood cell count, sodium, potassium, creatinine, urea, C-reactive protein, and serum albumin. Cognitive status was measured at admission using the mini-mental state examination (MMSE) and developed by Folstein et al⁹ to assess mental status in the elderly. On the MMSE, correct answers are given a score of 1 and refusals 0, yielding a score ranging from 0 to 30. Making 6 or more errors is considered a sign of clinically significant cognitive decline.¹⁰ We also used the short orientation memory concentration test (SOMCT) developed by Katzman et al.¹¹

Subtracting points from the maximum score for each error yield the overall score. This gives a 0 to 28 score with a higher being better; scores over 20 are considered “normal.” The cognitive scoring systems were assessed at admittance and used in the analysis as predictive factor for delirium.

Trained nurses performed all assessments. During each shift a delirium observational screening (DOS) scale was obtained.^{12,13} The DOS scale was developed to facilitate early recognition of delirium based on nurses’ observations during regular care. The DOS scale is derived from these criteria and is based on 13 items that can be rated as present or absent in less than 5 minutes. The highest total score is 13 and the cutoff point is 3. Three or more points are associated with a high risk of delirium. An experienced psychiatrist subsequently evaluated patients with a positive DOS scale and delirium was diagnosed according to DSM-IV criteria. The DSM-IV criteria include the presence of disturbance of consciousness (ie, reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention. Occurrence of a change in cognition or the development of a perceptual disturbance that is not better accounted for by a pre-existing, established, or evolving dementia. The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of the day. There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by the direct physiologic consequences of a general medical condition.

The medical databases MEDLINE and EMBASE and the Cochrane library were used to search for relevant studies on the incidence and risk factors of delirium in general surgical patients. Search algorithms combined the medical subject heading terms and keywords. The “related articles” feature of PubMed was also used. A manual search of the bibliographies of relevant papers was carried out to identify publications for possible inclusion. No unpublished data or abstracts were included. Studies involving only single surgical types were excluded. Examples of the latter include studies exclusively examining patients with hip fracture or limb peripheral vascular disease. In contrast, mixed studies including different types of gastrointestinal surgery and vascular surgery (eg, encompassing aortic, peripheral vascular, and carotid surgery) were included.

Table 1 Patient characteristics

	(n = 213)
Male/Female	77 (36.2%)/136 (63.8%)
Median age	76 years (60–100)
No. of patients who underwent acute surgery	142 (66.7%)
Median hospital stay (range)	7 days (1–85)
No. of patients with delirium	36 (16.9%)
Trauma and acute surgery	33/142 (23.2%)
Elective surgery	3/71 (4%)
Median duration with delirium (range)	3 days (1–10)

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