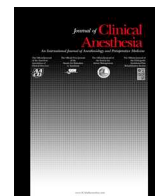




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Original Contribution

## Incidence of postoperative delirium in elderly ambulatory patients: A prospective evaluation using the FAM-CAM instrument

Antoine G.M. Aya<sup>a,b,\*</sup>, Pierre-Henri Pouchain<sup>a</sup>, Hubert Thomas<sup>a</sup>, Jacques Ripart<sup>b</sup>,  
Philippe Cuvillon<sup>b</sup>

<sup>a</sup> New Bonnefon Clinic, Alès, France<sup>b</sup> Nîmes University Hospital, Nîmes, France

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## ABSTRACT

**Background:** While the incidence of postoperative delirium is high in aged hospitalized patients undergoing major surgery, little is known concerning patients undergoing ambulatory surgery.

**Objective:** To determine the incidence of postoperative delirium in aged patients after hospital discharge from an ambulatory surgery unit.

**Design:** Prospective observational study.

**Patients:** Elderly patients ( $\geq 75$  years) scheduled for a surgical procedure on an ambulatory basis.

**Interventions:** Filling of the Family Confusion Assessment Method (FAM-CAM) questionnaire (11 items) during a phone interview of family caregivers on two separate occasions: five to three days before surgery, and three to five days after surgery.

**Main outcome measures:** The detection of acute onset and fluctuating course inattention, disorganized thinking, altered level of consciousness, disorientation, perceptual disturbances, and psychomotor agitation from the observations of family caregivers.

**Results:** Signs of delirium appeared de novo in 2 of 141 patients (incidence 1.4%) in the postoperative period: a 80-years old man who was disoriented and had incoherent and illogical speech on postoperative day 1 of resection of a cephalic cutaneous melanoma under local anesthesia and sedation (midazolam, sufentanil, and propofol), and a 83-years old woman with a pre-existing mental confusion, who experienced visual and hearing hallucinations and had inappropriate behaviour on postoperative day 2 of cataract surgery performed under episcleral block. Both patients returned to their preoperative states within a few days.

**Conclusions:** Using the FAM-CAM instrument for the detection of postoperative delirium in ambulatory patients, the study showed that the incidence of cognitive changes in the ambulatory setting is very low. Among several putative factors, the lightness of the surgical procedure, the wide use of regional anesthesia, and the short hospital stay may be contributing factors to this result. The findings of this study need to be confirmed in a larger sample of patients.

### 1. Introduction

The number of elderly patients requiring surgery is increasing with the increase of the 65 years and older population. Investigators showed that aging is an important risk factor for mortality and morbidity in the perioperative period. This is true for postoperative delirium as well. Postoperative delirium is an acute neuropsychiatric disorder occurring in the first days after surgery, and characterized by disturbance in awareness, attention and cognitive function. Its incidence varies greatly, depending on the study population. In elderly surgical patients,

it ranges from 0 to 60%, and can reach 73% in cardiac surgery. Although postoperative delirium is usually reversible, its occurrence appears to be predictive of future cognitive decline and dementia within months after the episode. Besides advanced age, several precipitating factors were identified, including prolonged hospital stay, general anesthesia, and postoperative pain [1,2]. On the other hand, a significant proportion of surgical procedures are increasingly performed on an ambulatory basis. While the incidence of postoperative delirium was studied and shown to be high in aged hospitalized patients undergoing major surgery, little is known concerning patients

\* Corresponding author at: Nouvelle Clinique Bonnefon, 45 Avenue Carnot, 30100 Alès, France.

E-mail address: [guy.aya.pro@hotmail.com](mailto:guy.aya.pro@hotmail.com) (A.G.M. Aya).

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undergoing ambulatory surgery. In a study of 400 patients admitted in the post-anesthesia care unit, Card et al. showed the presence of delirium signs in 31% of patients at admission, 15% at 30 min, 15% at 1 h, and 4% at PACU discharge [3]. The time course of these signs in these 4% patients is unknown. Furthermore, postoperative delirium is likely to occur 2–3 days after surgery in hospitalized patients. Whether a similar occurrence exists in ambulatory surgery patients is unknown. Therefore, we conducted a prospective observational study with the aim to determine the incidence of postoperative delirium after hospital discharge of aged patients undergoing an ambulatory surgery procedure. We chose the age limit of 75 years because of less heterogeneity in the health state compared with the population of 65 years and older, usually referred to as elderly patients.

## 2. Patients and methods

The study was conducted in the ambulatory unit of a private medico-surgical center, the New Bonnefont Clinic (Ales, France). This ambulatory unit receives 4700 surgical patients and 2800 patients for ambulatory medical procedures (including 2200 endoscopy) per year, in 38 ambulatory boxes. The study was approved by the ethics committee of the French Society of Anesthesiology and Critical Care (IRB 00010254-2016-106), and patients or their relatives gave written informed consent. Patients were included if they were 75 years or older, and scheduled for a surgical procedure on an ambulatory basis.

Delirium symptoms were identified on the basis of reports from family using the Family Confusion Assessment Method (FAM-CAM) [4]. FAM-CAM is an instrument derived from the well-known Confusion Assessment Method (CAM) [5], and was developed to screen for delirium by interviewing family caregivers. It is made of 11 items, allowing the detection of acute onset and fluctuating course inattention, disorganized thinking, altered level of consciousness, disorientation, perceptual disturbances, and psychomotor agitation from the observations of family caregivers. Sensitivity and specificity of 87.5% and 94.2%, respectively, were reported when FAM-CAM was used by spousal, daughter or son to report sudden changes in older adult's cognitive baseline [4]. Several studies showed a high and significant agreement (up to 94%) between family caregivers rating on the FAM-CAM and researcher ratings on CAM [4,6–8]. In the present study, the FAM-CAM questionnaire was filled during a phone interview on two separate occasions: five to three days before surgery, and three to five days after surgery. In addition to the FAM-CAM items, data concerning the patient clinical status, the surgical procedure, and the ambulatory process were recorded.

Descriptive statistics are presented for basic demographic variables, as mean  $\pm$  SD, median and range, or number and percentage, when appropriate. Fisher exact test was used to compare the occurrence of signs of delirium in the postoperative vs preoperative periods.

## 3. Results

A total of 141 consecutive patients were enrolled, 74 men and 67 women. Their mean age was  $81 \pm 5$  years (range: 75 to 102), their mean BMI was  $26.6 \pm 4.0$  (range: 17.3 to 41.6), and their median ASA score was 3 (range: 1 to 4). All but 8 patients (94.3%) had comorbidities (Table 1), some of them having several coexisting diseases (median number 3) and taking several medications (median number 4). Ten patients already had cognitive impairment (including 4 with Alzheimer's disease), and 9 others had psychiatric disorders. Only 2 of 141 patients were not living at home. All patients took their medications as usual, and no premedication was given. Surgical procedures are detailed in Table 2. Most were performed under regional anesthesia (80.1%): episcleral bloc for cataract surgery using 4 to 6 mL 2% mepivacaine, axillary bloc for surgical procedures on the upper limb using 25 to 35 mL of a mixture of 2% mepivacaine and 0.75% ropivacaine, and spinal bloc for surgical procedures on the lower limb using 8 to

**Table 1**

Patients' coexisting diseases (N = 141).

Hypertension	98 (69.5%)
Ischemic heart disease	23 (16.3%)
Heart failure	4 (2.8%)
Cardiac arrhythmias	46 (32.6%)
Vascular disease	13 (9.2%)
Diabetes	23 (16.3%)
Dyslipidemia	50 (35.4%)
Chronic obstructive pulmonary disease	14 (9.9%)
Renal failure	6 (4.2%)
Stroke/transient ischemic attack	25 (17.7%)
Thyroid dysfunction	19 (13.4%)
Cognitive impairment	10 (7.0%)
Alzheimer's disease	4 (2.8%)
Psychiatric disease	9 (6.4%)
Other pathologies	70 (49.6%)
Number of pathologies	3 (0–10)
Number de medications	4 (0–14)

Data are expressed as number (percentage), and median (range).

12 mg of plain or hyperbaric 0.5% bupivacaine at the discretion of the anesthesiologist. Twenty patients had local anesthesia combined with light sedation (midazolam 1–2 mg + sufentanil 5–10  $\mu$ g  $\pm$  propofol 20–80 mg), and only 8 had general anesthesia (ketamine, sufentanil, propofol and sevoflurane). No significant perioperative alteration in vital signs occurred. When taking all procedures together, the mean operative time was  $16 \pm 9$  min. Operative times are detailed in Table 2, along with the length of stay of ambulatory patients. The postoperative phone call revealed that mild to moderate pain was the only side effect, reported by 9 patients. FAM-CAM data are presented in Table 3. We compared data of patients who had signs of cognitive impairment, in the pre- vs postoperative periods. It appeared that all but two of these patients were in the same cognitive status preoperatively. Therefore, the cognitive status was not changed significantly by ambulatory anesthesia and surgery (Fisher exact test,  $p = 0.97$ ). As a consequence, the incidence of postoperative delirium in our series was 1.4%. Confusion appeared de novo in an 80-years old man who undergone resection of a cutaneous melanoma under local anesthesia and sedation (midazolam, sufentanil, and propofol). He was disoriented and had incoherent and illogical speech on postoperative day 1. The second patient was a 83-years old woman with a pre-existing mental confusion, who experienced visual and hearing hallucinations and had inappropriate behaviour on postoperative day 2 of cataract surgery performed under episcleral block. Both patients returned to their preoperative states within a few days.

## 4. Discussion

This is a single institution preliminary and exploratory study which aims was to determine the incidence of postoperative delirium after hospital discharge of elderly patients undergoing an ambulatory surgery procedure. Signs of postoperative delirium were observed in 2 of 141 patients (1.4%). Delirium is characterized by the acute onset of inattention, impaired consciousness, inappropriate behaviour, emotional lability and disturbances of cognition, sleep-wake cycle, perception, and psychomotor activity [2]. The diagnosis is difficult because these signs occur in variable combinations. Although its incidence varies upon the clinical setting, elderly hospitalized patients are at particularly high risk. Several other risk factors (predisposing or precipitating) are known, including intrinsic factors (pre-existing cognitive dysfunction, denutrition, anxiety, depression), extrinsic factors (hypertension, tachycardia, pain, hypotension, dehydration, hypothermia, poly-medication) and some pharmacologic agents such as benzodiazepines, cholinergic agents, or tramadol. Several of these precipitating factors are particularly frequent in the postoperative period [9]. Given the multiplicity of the causative factors, the pathophysiology of

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