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Original research

Postoperative delirium in elderly after elective and acute colorectal surgery: A prospective cohort study

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HIGHLIGHTS

- Factors on frailty and the incidence of delirium in elderly undergoing elective and acute colorectal surgery were studied.
- A high incidence of delirium was found in both acute and elective colorectal surgery.
- Half of the octogenarians receiving acute colorectal surgery developed a postoperative delirium in this study.
- Delirium was associated with adverse outcomes.

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ABSTRACT

Objective: To assess the frailty and the incidence of delirium in elderly patients undergoing elective and acute colorectal surgery in correlation with morbidity and mortality.
Methods: Patients aged 65 years and older having elective and acute colorectal surgery, between April 2013 and December 2013 were included in a prospective database. Patients diagnosed with a colorectal carcinoma or diverticulitis who were operated on were included. Factors that characterize frailty of patients were noted. The incidence rates of delirium after elective and acute surgery were recorded. Delirium was diagnosed using the Delirium Observation Screening Scale (DOSS). Preoperative evaluation, surgical outcome including morbidity, hospital stay and mortality were analyzed.
Results: Patients ≥65 years were included, 83 (75%) received elective and 28 (25%) acute surgery. The overall incidence of delirium was 21%, 18% for elective and 29% for patients having urgent surgery ($p = 0.24$). Patients with delirium were older than the non-delirious patients (median 82 years vs. 74 years; $p < 0.001$). Delirious patients showed higher incidence of adverse events. Hospital stay, mortality and discharge to a nursing home were significant higher in the delirious compared to the non-delirious group ($p = 0.01$; 0.01; 0.02 respectively).
Conclusion: High incidence of delirium was found in both acute and elective colorectal surgery. Delirium was associated with adverse outcomes.

1. Introduction

Colorectal surgery in elderly is being performed in increasing numbers [1]. Improvements in surgical techniques and post-operative care allows surgery in patients who previously would have been considered unsuitable. As high age is a leading risk factor for postoperative delirium, the incidence of delirium is expected to increase.

Postoperative delirium is associated with worse postoperative outcome and prolonged hospital stay [2,3]. Furthermore, delirium is associated with a higher number of complications, poor recovery and higher costs [3,4]. Rates of postoperative delirium in patients who have abdominal surgery range from 17% to 51% [5–7]. This wide variation relates to the issues of definition, differences in diagnostic tools and variation in the populations that have been studied. Available literature that report incidence rates are limited, and based on patient undergoing a variety of surgical procedures including hernia repair, cholecystectomy and appendectomy. Patients with dementia or cognitive impairment are often excluded, though these patients are at increased risk for postoperative delirium.

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The exact cause of delirium is unknown, but seems multifactorial and can be caused by many interacting factors, depending on the vulnerability of the patient [8]. A frail, elderly patient is more likely to develop postoperative delirium with lesser surgery when compared to younger patients who enjoy better overall health.

Data concerning factors on frailty, social status and living arrangement for patients receiving colorectal surgery are not well described. In our opinion this is of great importance, because the reported studied populations are varying and heterogeneous.

Compared with elective surgery, emergency abdominal surgery is associated with increased morbidity and mortality, especially in elderly patients [9–11]. Older patients undergoing acute abdominal surgery are also at risk for postoperative delirium [12]. However, to our knowledge the incidence of postoperative delirium and the associated morbidity and mortality after emergency colon surgery in the elderly has not been reported yet. In this study we focus on outcomes after elective and urgent colorectal surgery in elderly.

The aims of this study are to review elderly patients having elective or acute colorectal surgery and to assess the pre-operative parameters that characterize frailty. We also report the incidence of post-operative delirium and the associated outcomes.

2. Material and methods

2.1. Patient selection

All elderly patients having colorectal surgery admitted to the gastrointestinal surgical department of the Amphia Hospital in the Netherlands between April 2013 and December 2013 were included in a prospective database. Patients diagnosed with a colon or rectal cancer or diverticulitis who were operated on were included. The surgical procedures consisted of elective and acute (urgent) operations. Patients younger than 65 years old were excluded as well as all patients who could be discharged within 2 days. This research was based on regular patient care, therefore the need for individual informed consent was waived.

In all patients undergoing elective colon surgery fast-track protocols were followed [13]. Patients with colon or rectal cancer were staged following the 5th edition of the TNM staging system [14]. Patients with diverticulitis received elective surgery with partial colon resection in case of frequent episodes of diverticulitis or presence of fistulae. In case of diverticulitis with perforation and sepsis or signs of peritonitis, acute surgery was performed. We were able to prospectively collect available parameters during the study period using a full electronic patient file: Hyperspace© Version IU4 (Epic Inc., Verona, Wisconsin, USA) [15].

Patient characteristics included patient demographic data, comorbidities (cardiac, pulmonary, neurological, diabetes) and ASA-score following The American Society of Anaesthesiologists (ASA) classification [16].

2.2. Factors on frailty

Factors that characterize the frailty of patients were noted. Physical impairment was objectified by use of the Katz-ADL Score. The Katz-ADL score ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding. We used a cutoff point of 2 or less indicating severe functional impairment [17].

The nutritional status was determined by the SNAQ-RC score [18]. This is a validated screening instrument developed for early detection of undernourished elderly patients. The SNAQ-RC combines BMI with four questions related to involuntary weight loss, loss of appetite, and eating with help. The sensitivity and specificity to detect severely under-nutrition is over 80% [19]. We used a cutoff point of 3 or more indicating severe undernourishment.

Information on the social status (living alone or with a partner) and living arrangement (home or nursing home) prior to admission to hospital was collected.

2.3. Operative data

Surgical and anesthetic data were retrieved from the electronic patient file system.

Intraoperative data consisted of the applied surgical technique (laparoscopic or open), and duration of anesthesia. The surgical procedure was also recorded.

2.4. Postoperative data and delirium

Prospectively, delirium was scored using the Delirium Observation Screening Scale (DOSS) [20,21]. The scale used was a shortened version with 13 items and was performed three times a day by a nurse while providing regular care. Delirium was defined as a DOSS score of 3 and above. Duration of delirium was defined as the total number of days with at least one DOSS score of three or more per 24 h. The severity of postoperative delirium and the occurrence since surgical intervention were assessed using the DOSS score rates. Postoperatively data were collected including length of delirium, all adverse events and hospital stay length. The 30-day and 6-month mortality rates were calculated regardless of mortality in hospital or after discharge. Adverse events were scored following the definition of the Association of Surgeons of the Netherlands (ASN). Adverse events consisted of surgically related (wound infections, hemorrhage, anastomotic leakage) and non-surgically related (urinary, pulmonary, cardiac, renal, and neurological) complications. Our report follows STROBE guidelines.

2.5. Statistics

Statistical analysis was performed with SPSS Version 20.0 (SPSS Inc., Chicago, Illonis, USA) software. Differences of collected factors for elective and acute surgery were analyzed by Student *t*-test and Mann–Whitney U test for continues data and chi-square or Fisher exact test or dichotomous data. Continuous variables with Gaussian distribution are presented as mean and standard deviation; otherwise as median and range. Results were compared with a P value < 0.05 to show significant differences.

3. Results

A total of 111 patients was included in this study from April 2013 till December 2013. Patients had surgery for colon carcinoma (n = 62), rectum carcinoma ($n = 35$) and diverticulitis (n = 14). Of all included patients, 83 (75%) received elective surgery and 28 (25%) urgent surgery. Table 1 represents the characteristics and pre-operative data of patients receiving elective and acute colorectal surgery. Of the patients diagnosed with colon or rectal cancer they were classified as stage I (8%), stage II (43%) stage III (28%) and stage IV (18%) following the TNM V classification. Patients having emergency colorectal surgery had more frequently an ASA-score of 3–4 and were more physically impaired (KATZ ADL $\geq$2) compared to patients having elective surgery. Data on frailty of patients is shown in Table 1.

Open or laparoscopic techniques were used for urgent and elective surgery, with Table 2 summarising the surgical data.

The overall incidence of delirium was 21% (23/111), 18% for elective and 29% for patients receiving urgent surgery ($p = 0.24$). Patients with a period of delirium were significantly older than the non-delirious patients (median 82 years vs. 74 years; $p < 0.01$).