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ORIGINAL ARTICLE

Large-scale implementation of enhanced recovery programs after surgery. A francophone experience



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KEYWORDS

Enhanced recovery after surgery;
Colorectal surgery;
Bariatric surgery;
Orthopedic surgery

Summary

Introduction: Enhanced recovery after surgery program (ERP) has now surpassed the stage of clinical research in certain specialties and currently poses the problematic of large-scale implementation. The goal of this study was to report the experience during the first year of implementation in three French-speaking countries.

Material and methods: This is a prospective study in which 67 healthcare centers, all registered in the Grace-Audit databank, participated. Included were patients undergoing colorectal (CRS), bariatric (BS) and orthopedic hip and knee surgery (OS), performed within an ERP. The main endpoints were duration of hospital stay, postoperative morbidity, the degree of compliance with the elements of the ERP, the relation between the extent of application of the elements and postoperative hospital stay, and finally the completeness of data inclusions in the databank.

Results: A total of 1904 patients were included in the Grace-Audit databank between January 1, 2015 and January 31, 2016, undergoing CRS ($n=490$), BS ($n=431$), and OS ($n=983$). The mean implementation rate was $83.7 \pm 10.0\%$ for CRS, $75.0 \pm 23.7\%$ for BS, and $83.5 \pm 14.9\%$ for OS. The duration of hospital stay was 6.5 days for CRS, 2.6 days for BS and 3.4 days for OS. Overall postoperative morbidity (onset of postoperative undesirable event), surgical morbidity (superficial or deep organ space surgical site complications such as bleeding, infection or defective healing) and readmission rates were 20.6%, 7.5%, and 5.7% for CRS; 2.5%, 1.4%, and 1.6% for BS and 2.9%, 0.2%, and 2% for OS, respectively. A statistically significant relationship was found between the degree of compliance of the elements of ERP and the duration of hospital stay for CRS and BS; hospital stay was reduced when at least 15 of the 22 elements of the program were applied ($P < 0.001$). The patients included in the Grace-Audit databank represented less than 20% of the patients undergoing operation in the same establishments during the study period for all three specialties.

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Conclusions: This study shows that large-scale ERPs are feasible and safe in French-speaking countries. Nonetheless, although encouraging, these preliminary results highlight that implementation must be improved in specialties such as bariatric surgery and that more complete data collection is needed.

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Introduction

Enhanced recovery in surgery is a multimodal approach that aims to optimize perioperative management. Enhanced recovery programs (ERP) group together a cluster of perioperative management elements to reduce the degree of surgical aggression [1]. The result is an improved postoperative course with, in the majority of cases, a reduction in the risk of postoperative complications and hospital stay, as well as enhanced physiologic recovery [2,3]. ERP have been adapted to all types of surgery [4]. Having shown that ERP is harmless and effective, the current ongoing challenge is to enhance ERP implementation in everyday practice. The Francophone Group for Enhanced Recovery after Surgery (*Groupe francophone de réhabilitation améliorée après chirurgie* [GRACE]) is a multidisciplinary group created in early 2014 with the goal of enhancing the development and diffusion of ERP on a large-scale basis. The goal of this study was to report our experience during the first year of development for three widespread specialties: colorectal (CRS), bariatric (BS) and orthopedic surgery of the hip and knee (OS).

Material and methods

Type of study

Sixty-seven centers registered in the Grace-Audit database agreed to participate in this multicenter prospective study. Patients who underwent CRS, BS, or OS with an ERP between January 1, 2015 and January 31, 2016 were included. Specific ERPs were established for each specialty by the GRACE group (www.grace-asso.fr/espace-membre) according to the numerous existing international recommendations.

Data collection

The Grace-Audit software has the dual function of being a database and audit tool at the same time and is accessible online (www.grace-audit.fr); it was provided to all participating GRACE centers. This study included three modules: colorectal surgery (CRS), bariatric surgery (BS) and hip and knee orthopedic surgery (OS), with all three specialties incorporated into the original software program. Collected information concerned patient demographics, comorbidities, the type of surgical procedure, the postoperative course (postoperative mobility and pain, overall hospital stay, complications and 30-day mortality), mean postoperative hospital stay (MPHS), theoretical (discharge criteria met) and actual duration of hospital stay, morbidity, application (or not) of the different elements of the ERP as well as the relationship between the MPHS and the number

of elements applied. Exclusion criteria included emergency surgery, pregnancy, patient refusal to participate in the program, and impossibility to contact the patient after discharge. For safety reasons, data were entered anonymously. Data were stored in a web-based host approved for health-care data handling (according to the French ministerial decree of Jan 4, 2006). Data collection was declared to the National Commission of Informatics and Liberties (CNIL) according the terms of the modified law of Jan 6, 1978, and CNIL authorization was obtained on December 8, 2014 (n° 1817711).

Analysis of the completeness of data inclusion

In order to analyze the completeness of the Grace-Audit tool, collected data were compared to the overall activity of participating centers. Non French-speaking GRACE centers (difficulty in accessing data) and centers exploring the outcome of only one patient ("just to see") were not included in this analysis. The *Agence technique sur l'information hospitalière* (ATIH) database (http://www.scansante.fr/applications/casemix_ghm_cmd) was consulted, choosing the Diagnostic Related Groups (DRG) roots (irrespective of levels 1,2,3,4) corresponding to the French Codification system for medical acts (*Classification commune des actes médicaux*) and listed in the Grace-Audit. After this analysis, an inquiry was sent to all participants to ask why patients were not included in the Grace-Audit. The inquiry questionnaire was sent via surveymonkey (<https://fr.surveymonkey.com>).

Statistical analysis

All analyses were two-sided with an alpha error set at 5% using the Stata® software (version 13, StataCorp, College Station US). Populations were described as number and percentage for categorical variables and as means ± standard deviation or median and interquartile intervals for quantitative variables, in view of the statistical distribution (statistical normality analyzed by the Shapiro-Wilk test). Sensitivity analysis was proposed to study the threshold below which the number of applied elements was associated with a statistically significant decrease in MPHS. Comparisons between independent groups were performed using the *t* test of Student or the Mann-Whitney test as appropriate [(1) normality and (2) homogeneity of variance, according to the Fisher-Snedecor test].

Results

In all, 1904 patients were included in the Grace-Audit between January 1, 2015 and January 31, 2016 in 67

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