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# Postoperative morbidity and mortality for malignant colon obstruction: the American College of Surgeon calculator reliability

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ABSTRACT

*Background:* The American College of surgical risk calculator (SRC) score has never been validated specifically for surgery in emergency. The objective was to evaluate the reliability of this calculator in patients with malignant colon obstruction.

*Materials and methods:* We retrospectively have analyzed the morbidity and mortality observed in operated patients. Risk factors for postoperative morbidity and mortality were analyzed by logistic regression model. We have compared the morbidity and mortality estimated by the SRC score with that observed using the Brier Score (BS). A BS of 0 indicated perfect prediction, whereas a BS of 1 indicated the poorest prediction.

*Results:* Sixty-nine patients aged 75 y (41-93) have been operated on emergency from November 2001 to August 2015. The tumor was localized in the sigmoid in 33 cases (48%), in the splenic flexure in nine cases (13%), and in the right colon in 17 cases (25%). The surgical procedures were as follows: right colectomy with anastomosis (29%), diverting proximal iliac colostomy (23%), and subtotal colectomy with anastomosis (19%). The SRC score indicated a good predictivity for mortality (9.8% predicted versus 8.7% observed, BS = 0.058), for morbidity (33.4% *versus* 40.6%, BS = 0.209), and for serious morbidity (25.5% *versus* 17.4%, BS = 0.131). In multivariate analysis, SRC was an independent risk factor for mortality ($P = 0.030$ odds ratio [OR] = 1.07 [1.01-1.15]) and morbidity ($P = 0.001$ OR = 1.16 [1.08-1.27]).

*Conclusions:* SRC score is a reliable tool for assessing the morbidity and mortality of obstructive colon cancer and could help with adapting the surgical gesture to the risks predicted.



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## Introduction

The obstruction in colon cancer is a serious presentation to diagnosis with a poorer prognosis for long term.[1] Surgery for an obstructive colon cancer is known to increase the postoperative morbidity and mortality in comparison with elective colon surgery.[2-4] Hence, the importance of a precise evaluation of the postoperative risk is great. Such an evaluation enables a choice of which surgery is most adapted to the patient, and whether it is reasonable to achieve an anastomosis in emergency. Moreover, it helps to identify high-risk patients who require more attention during the postoperative period and to provide objective and fair information to the patients.

The National Surgical Quality Improvement Program (NSQIP) was developed in the 1990s at the Veterans Health Administration. Its mission was to improve surgical care and to reduce morbidity and mortality.[5-7] The American College of Surgeons (ACS) NSQIP wanted to create a score for assessing postoperative risks and thus developed a universal surgical risk calculator (SRC).[8] Preoperative and postoperative data were collected from more than 2500 Current Procedural Terminology codes and from more than 1.4 million patients in 586 hospitals. These data from all surgical specialties, except for trauma and transplant, were used to create an online user-friendly tool to estimate individualized risk of 15 different outcomes within 30 d from surgery. This score was applied to various surgical procedures including planned digestive surgery[9-11] but was never evaluated for emergency surgery specifically.

Our aim was to validate the efficiency of the SCR-score to predict postoperative morbidity and mortality of patients with obstructive colon cancer in a French hospital.

**Table 1 – Demographic characteristics of 69 patients who underwent emergency surgery for a malignant colonic obstruction.**

| Patients characteristics | $n = 69$ (%) |
|---|---|
| Gender | |
| Male | 33 (48)* |
| Female | 36 (52) |
| Age (y) | 75 ± 13 (41-93)† |
| BMI (kg/m$^2$) | 23 ± 4 (15-34) |
| ASA score | |
| 1/2 | 47 (69) |
| 3/4 | 21 (31) |
| Comorbidity: yes/no | 43 (62)/26 (38) |
| Vascular | 34 |
| Respiratory | 8 |
| Neurological | 5 |
| Kidney failure | 3 |
| Metastasis | 25 (36) |
| Peritoneal | 6 |
| Liver | 18 |
| Lung | 2 |
| Initial hemodynamic instability | 4 (6) |
| Localization of the tumor | |
| Right colon | 23 (33) |
| Splenic flexure | 9 (13) |
| Left colon | 37 (54) |

* Number of cases (percentage of cases).
† Mean ± standard deviation (range).

## Materials and methods

### Population

All patients who underwent emergency surgery for an obstructive colon tumor at Ambroise Paré Hospital (Boulogne-Billancourt, France) between November 2001 and August 2015

**Table 2 – Surgical procedures, complications, and pathology results.**

| | $n = 69$ (%) |
|---|---|
| Chronology | |
| Surgery first | 67 (97)* |
| Stent then surgery | 2 (3) |
| Perforated/ischemic cecum in preoperative view | 10 (14) |
| Surgery | |
| Right colectomy without anastomosis | 2 (3) |
| Right colectomy with anastomosis | 20 (29) |
| Splenic flexure resection without anastomosis | 7 (10) |
| Hartmann's procedure | 5 (7) |
| Left colectomy with anastomosis with ileostomy | 3 (4) |
| Left colectomy with stoma without anastomosis | 3 (4) |
| Diverting colostomy without resection | 16 (23) |
| Total/subtotal colectomy with anastomosis | 13 (19) |
| Laparoscopy/laparotomy | 8 (12)/61 (88) |
| LOS (d) | 18.7 ± 14.3 (1-72)† |
| Morbidity (Clavien-Dindo classification) | 28 (40) |
| Grade I | 3 (4) |
| Grade II | 12 (17) |
| Grade IIIa | 1 (1) |
| Grade IIIb | 3 (4) |
| Grade IV | 3 (4) |
| Grade V: death | 6 (9) |
| Anastomotic leakage | 7/36 (19) |
| Stage (T) | $n = 67$ |
| 1 | 0 (0) |
| 2 | 1 (1) |
| 3 | 28 (42) |
| 4 | 38 (57) |
| Examined lymph nodes | 25 ± 13 (1-60) |
| N + ($n = 67$) | 49 (73) |

* Number of cases (percentage of cases).
† Mean ± standard deviation (range).