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Predictors of relaparotomy after nontrauma emergency general surgery with initial fascial closure

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Abstract

BACKGROUND: Relaparotomy after emergency surgery for nontrauma intraabdominal catastrophes (NTIAC) is morbid. Our objective was to identify patients who likely will need on-demand relaparotomy after surgery for NTIAC.

METHODS: A retrospective chart review of patients from 1998 to 2008 identified cases of NTIAC surgery with fascial closure. Demographics, comorbidities, intraoperative findings, morbidity, and mortality were analyzed. Relaparotomy was defined as any return to the operating room with surgical re-entry of the abdominal cavity.

RESULTS: A total of 129 patients underwent NTIAC surgery with fascial closure. Twenty-nine patients (22%) required relaparotomy and 100 patients (78%) did not. Multivariate analysis identified the following predictors of relaparotomy: peripheral vascular disease ($P = .04$), alcohol abuse ($P = .02$), body mass index of 29 kg/m^2 or greater ($P = .04$), the finding of any ischemic bowel ($P = .02$), and operating room latency of 60 hours or longer ($P = .01$). Patients with 2 or more of these predictors had a 55% risk of relaparotomy whereas patients with fewer than 2 of these predictors had a 9% risk ($P < .001$).

CONCLUSIONS: Patients whose fascia is closed during NTIAC surgery do worse when they require relaparotomy. We have identified preoperative and intraoperative predictors that may help identify patients at high risk of on-demand relaparotomy.

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Patients with nontrauma intraabdominal catastrophe (NTIAC) undergoing emergent laparotomy encounter a grim prognosis. Recently published data in patients undergoing emergency general surgery have shown mortality rates approaching 9% in this population.[1] Further, a significant proportion of these patients require on-demand relaparotomy because of an unforeseen complication or deterioration in clinical status. When relaparotomy is necessary, mortality rates increase to as high as 22% to 51%.[2–5]

Recognition of patients at high risk of relaparotomy after emergency surgery would have significant clinical value. However, there is currently a dearth of evidence regarding factors prognostic of impending relaparotomy after NTIAC surgery.[6] The objective of this retrospective cohort study was to identify predictors of on-demand relaparotomy after emergency surgery for NTIAC in patients receiving initial closure of the fascia. To identify clinically relevant predictors, emphasis was placed on preoperative and intraoperative variables that would be available to the surgeon before abdominal closure of the initial emergency surgery.

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Table 1 Preoperative and intraoperative characteristics

Patient characteristics	Overall (n = 129)	SIFC (n = 100)	RL (n = 29)	*P* value
Mean age, y	63.3 (±1.2)	63.6 (±1.3)	61.6 (±2.0)	.2
Male sex	125 (97)	97 (97)	28 (97)	.9
BMI ≥ 29 kg/m^2	51 (40)	34 (34)	17 (59)	**.02**
Mean ASA class	3.3 (±.06)	3.3 (±.06)	3.5 (±.1)	.07
Mean comorbidities, n	3.2 (±.2)	3.04 (±.2)	3.66 (±.4)	**.01**
Comorbidities				
Hypertension	89 (69)	68 (68)	21 (72)	.7
Tobacco use	58 (45)	42 (42)	16 (55)	.2
Malignancy	39 (30)	32 (32)	7 (24)	.4
Diabetes	27 (21)	19 (19)	8 (28)	.3
Coronary artery disease	27 (21)	21 (21)	6 (21)	.97
COPD	21 (16)	12 (12)	9 (31)	**.01**
Alcohol abuse	15 (12)	7 (7)	8 (28)	**.002**
Peripheral vascular disease	9 (7)	4 (4)	5 (17)	**.01**
Times				
Mean surgery time, h	2.5 (±.1)	2.41 (±.1)	2.86 (±.5)	.1
Mean OR latency, h	64.9 (±6.9)	54.3 (±6.5)	101.2 (±19.4)	**.002**
OR latency ≥ 60 h	43 (33)	25 (25)	18 (62)	**<.001**
Intraoperative findings				
GI tract perforation	36 (28)	29 (29)	7 (24)	.1
Abscess	31 (24)	27 (27)	4 (14)	.2
Bowel obstruction	24 (19)	20 (20)	4 (14)	.5
Wound dehiscence	21 (16)	16 (16)	5 (17)	.9
Bowel incarceration	18 (14)	12 (12)	6 (21)	.3
Ischemic bowel	13 (10)	6 (6)	7 (24)	**.004**
Anastomotic leak	4 (3)	4 (4)	0 (0)	.3
Contamination				
Clean contaminated	25 (19)	19 (19)	6 (21)	.8
Contaminated	51 (40)	39 (39)	12 (41)	.8
Dirty or infected	53 (41)	42 (42)	11 (38)	.7
Fluids				
Intraoperative pressor requirement	7 (5)	4 (4)	3 (10)	.2
Mean intraoperative IV fluids, mL	3142 (±174.9)	3235 (±208.4)	3039 (±260.6)	.3
Mean blood loss, mL	249.3 (±26.8)	237.9 (±31.3)	289.3 (±48.1)	.2

Values are mean (± standard error of the mean) or number of patients (%). Bolded values are $P < .05$.

ASA = American Society of Anesthesiologists; COPD = chronic obstructive pulmonary disease; GI = gastrointestinal; SIFC = successful initial fascial closure.

Methods

A retrospective chart review was performed to identify patients receiving emergency surgery for NTIAC between 1998 and 2008 at the Houston Veterans Administration Medical Center after approval from the institutional review board. Surgeries without entry into the peritoneum and surgeries without fascial closure at the conclusion of the case were excluded.

All data was collected from the electronic medical records. Patient-specific data from the emergency room, admission history and physical, preoperative and postoperative progress notes, surgical reports, and intraoperative anesthesia records were reviewed. Patient vitals and laboratory values also were recorded for calculation of postoperative Acute Physiology and Chronic Health Evaluation III scores. Relaparotomy was defined as any urgent or emergent return to the operating room with surgical re-entry of the abdominal fascia after the initial emergency surgery.

Patients requiring on-demand relaparotomy before hospital discharge or death were compared with patients not requiring relaparotomy after their initial emergency surgery. Univariate analysis was performed with the chi-squared test or the Student *t* test as appropriate. Variables with a *P* value of less than .1 in univariate analysis were included in binary logistic regression multivariate analysis (IBM SPSS version 19, Armonk, NY). *P* values less than .05 were considered significant.

Results

There were 129 patients treated with emergency surgery for NTIAC with initial closure of the fascia between 1998 and 2008. Overall, the median patient age was 62 years; 97% were male (Table 1). Intraoperatively, perforation and intra-abdominal abscess were the most common pathologies