Multidisciplinary management in emergency surgery

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Abstract

This study examines the feasibility of a standardized protocol for managing frail patients over 65 who require urgent surgical treatment for acute abdominal conditions, with an emphasis on a multidisciplinary team (MDT) approach. The research aims to evaluate how effectively a virtual MDT can convene to assess patient suitability for surgery and establish tailored care plans that optimize perioperative management. Utilizing the Physiologic and Operative Severity Score for the Study of Mortality and Morbidity (POSSUM) and the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) scoring system for surgical risk assessment, the study gathers data on preoperative and postoperative outcomes, including rates of postoperative complications, hospital mortality within 30 days, and length of hospital stays. The methodology will employ a prospective observational design carried out at the General and Emergency Surgery Unit of M. Bufalini Hospital in Cesena, Italy, with a focus on systematically recording patient demographic data and outcomes. The analysis will use both univariate and multivariate statistical methods to evaluate the effectiveness of the virtual MDT model in enhancing surgical outcomes for frail patients. This research seeks to contribute to the body of knowledge on optimizing surgical care pathways and the role of multidisciplinary collaboration in improving patient outcomes in urgent surgical contexts.

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Introduction

Each year, thousands of medical conditions require surgical treatment as the primary form of therapy. It's essential to view the surgical procedure as part of a larger care pathway, encompassing preparation and postoperative recovery. Research emphasizes the importance of optimizing the entire care pathway to achieve the best outcomes for surgical patients.[1]

However, most research findings are based on orthogeriatric studies, which highlight the impact of the comprehensive geriatric assessment (CGA) on the recovery of elderly patients with hip fractures.[2,3]

The complexities inherent in managing frail patients with acute abdominal surgical conditions necessitate a collaborative, multidisciplinary approach to optimize treatment strategies, particularly when considering therapeutic abstention and end-of-life care.[4,1]

The feasibility of convening a multidisciplinary team (MDT) virtually to navigate these challenging cases warrants careful evaluation, focusing on logistical considerations and patient outcomes.[5,6]

Frailty, a state of increased vulnerability to stressors, significantly impacts surgical outcomes, demanding a tailored approach that integrates geriatric principles into surgical decision-making.[7,8] In acute abdominal conditions, where timely intervention is paramount, the ability to rapidly gather a diverse team of specialists – including surgeons, geriatricians, anesthesiologists, palliative care physicians, and nurses – can be invaluable in formulating a comprehensive treatment plan that aligns with the patient's physiological reserve and overall goals of care.[9,10]

Traditionally, MDT meetings occurred on geriatric wards, with physicians, nurses, physiotherapists, and occupational therapists present. The virtual modality introduces a novel approach to overcoming geographical barriers and time constraints, potentially enhancing the efficiency and accessibility of expert consultations. Previous research has shown the benefits of interdisciplinary teams.[5,6]

Dealing with a frail patient suffering from acute abdominal sur-

gical issues, an MDT can meet virtually to determine the treatment plan, particularly regarding decisions about therapeutic abstention and end-of-life care.[1,4]

Objectives of the study

The study aims to assess the feasibility of developing a standardized protocol for managing patients who require urgent surgical treatment. This protocol is designed to determine the suitability of the patient for surgery and to tailor their care plan accordingly. The appropriateness of the treatment pathway is determined through a comprehensive evaluation by a multidisciplinary team, which aims to recommend the most effective perioperative management methods to reduce hospital mortality in urgent surgical patients.[1,2]

The identification of MDT members, who collaborate with the surgeon and anesthesiologist-intensivist, is based on the parameters of the POSSUM score,[11] assessment of surgical risk using the ACS NSQIP score, and the patient's medical history. Additional tools such as the Portsmouth POSSUM (P-POSSUM) and the Acute Physiologic Assessment and Chronic Health Evaluation II (APACHE II) are also considered for mortality prediction.[12] The outcome of the perioperative MDT is not solely focused on the decision to operate or not, but on identifying the necessary support for the patient and planning an appropriate care pathway for each individual.[4]

The MDT meeting will be held with a remote video call.[5]

Outcomes

Outcomes will include the proportion of frail patients with acute abdominal surgical conditions for whom the MDT was able to convene remotely compared to the total number of such patients. Furthermore, outcomes for these patients will be assessed, encompassing both those who will undergo surgery and those deemed unsuitable for surgical intervention by the team. Additional results will cover the rates of postoperative sickness and death within 30 days, categorized by specific procedure or treatment, length of hospital stay, admission, duration of stay in the intensive care unit, and the location to which the patient is discharged (home, rehabilitation facility, or care facility).[1,4]

Postoperative complications will be documented and organized according to the Clavien-Dindo classification system.[10]

Materials and Methods

The study design is a prospective observational monocentric study with no commercial intent.

At the participating hospital, a local researcher, typically a surgical resident, will be responsible for gathering and inputting data into a password-protected electronic spreadsheet (Excel 2010; Microsoft, Redmond, Washington, USA) specifically created with predefined data fields. The categories used are: patient demographic data, comorbidities, multidisciplinary assessment, surgical intervention, course, and follow-up. Patient data will be collected, when feasible, on a daily basis. Preoperative and intraoperative data will be processed after the surgical intervention, while postoperative outcomes will be recorded at discharge and at the end of the follow-up period.

The study is expected to last for 6 months (potentially renewable).

Recruitment procedure and study population

Patient recruitment will take place at the General and Emergency Surgery Unit of M. Bufalini Hospital in Cesena. The process involves identifying patients eligible for the study at the time of diagnosis of a potentially surgically treatable condition. Recruitment will be carried out with respect to the patient's clinical condition and their ability to provide informed consent.

The inclusion criteria comprise: i) patients >65 years old; ii) diagnosis of a condition requiring urgent surgical treatment; and iii) patient consent, if capable of providing informed and conscious consent, or of the subjects referred to in Article 82, paragraph 2 of Legislative Decree 196/2003, as per the provisions related to the processing of specific data categories, in accordance with Article 21, paragraph 1 of Legislative Decree No. 101 of August 10, 2018, issued by the Guarantor Authority on June 5, 2019.

Patients ≤65 and those with trauma-related outcomes are excluded.

Data management

Data will be handled in accordance with current privacy regulations and Good Clinical Practice. No personal or identifying information, such as birth dates, tax codes, identification numbers, biometric data, photographs, phone numbers, or email addresses, will be processed. Those involved in data collection will be obligated to confidentiality and must process data in line with existing regulations. Data will not be made publicly accessible. The storage and anonymization of data is the responsibility of the study promoter.

Statistical plan

The analysis of short-term postoperative outcomes will involve the use of both univariate and multivariate models. When conducting univariate analysis, the Student's *t*-test and the Mann-Whitney test will be employed. To assess discrete outcomes, the Fisher exact test (2x2 tables) and the Pearson chi-square test will be utilized. For multivariate analysis, logistic regression will be applied to dichotomous variables, generalized mixed models to ordinal or nominal variables, and linear regression (ANOVA) or multivariate analysis of variance (MANOVA) to continuous variables. The multivariate data will be presented as odds ratios for dichotomous variables or effects for continuous variables. Survival data will be depicted using Kaplan-Meier curves and expressed as mean and/or median with the standard error. Statistical significance will be ascribed to p-values <0.05.

Results of the study show that all variables in the database can be utilized to predict outcomes of interest for emergency surgery patients discussed by the multidisciplinary team.

Security management

Given the observational nature of the study, we will report any adverse events or incidents that occur during or at the conclusion of the data collection process, in accordance with the standard company procedures already established for clinical practice.

Role of the promoter and experimenters

The study has been designed by the promoter. The experimenters will be accountable for the study's design, as well as the analysis and interpretation of the collected data. The promoter and the researchers will have the responsibility for all decisions related to authorship of any publications.

The ownership of the data belongs to the promoter in collaboration with the experimenters.

Table 1. Data to be collected.

Preliminary data	
Age	years
Height	cm
Weight	kg
BMI	num
ASA score	num
qSOFA	num
Peritonism	no/localized/diffuse
POSSUM score	
Cardiac signs	num
Radiology	num
Respiratory signs	num
Systemic blood pressure (mmHg)	num
Heart rate (bpm)	num
Hemoglobin (g/dL)	num
White blood cells (x10^9/L)	num
Plasma urea (mmol/L)	num
Plasma sodium (mmol/L)	num
Plasma potassium (mmol/L)	num
ECG signs	num
Comorbidity	
Diabetes	y/n
Cholelithiasis	y/n
History of alcohol abuse	y/n
Alcohol abuse	y/n
Former smoker	y/n
Active smoker	y/n
Cardiovascular disease	y/n, if yes…
Respiratory disease	y/n, if yes…
Thyroid disease	y/n
Renal disease	y/n
Oncological disease	y/n, if yes…
Hematological disease	y/n, if yes…
Liver disease	y/n, if yes…
Neurological disease	y/n, if yes…
Dementia	y/n
Other disease	y/n, if yes…
Trauma	y/n, if yes…
Former surgeries	y/n, if yes…
Steroid therapy	y/n, if yes…
Others	y/n, if yes…

Imaging	
Ultrasounds	y/n
TC	y/n
RMN	y/n
EUS	y/n
CEUS	y/n
ERCP	y/n
altro	y/n, if yes…
Multidisciplinary team	
Members number	num
Specialists involved	specify
Team activation date	time
Surgical indication	y/n
NOM indication	y/n, if yes…
Preoperative management	y/n, if yes…
Postoperative management	y/n, if yes…
Surgical procedure	
Surgery date	date
Surgery	specify
Multi-organ resection	y/n
Laparoscopy	y/n
Laparotomy	y/n
Laparotomic conversion (if laparoscopic)	y/n
Surgery length	min
Others	specify
Course	
Antibiotic therapy	y/n, if yes…
IC	days
Length of stay	days
Discharge date	date
Clavien-Dindo	num
Postoperative complications	specify

ASA score, American Society of Anesthesiologists score; BMI, body mass index; qSOFA, quick Sequential Organ Failure Assessment; y/n, yes/no; CT, computed tomography; MRI, magnetic resonance imaging; EUS, endoscopic ultrasound; CEUS, contrast-enhanced ultrasound; ERCP, endoscopic retrograde cholangiopancreatography; NOM, non-operative management; IC, intensive care.

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