

Emergency surgery in older patients

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Videosurgery Miniinv 2019; 14 (2): 182–186
DOI: <https://doi.org/10.5114/witm.2018.77628>

Abstract

Introduction: At present, emergency guidelines do not differentiate between younger adults and older persons. The changing socioeconomic situation associated with the aging population will be challenging for the healthcare system and requires new medical guidelines to best accommodate it.

Aim: To analyze whether the age and comorbidities of a patient affect acute care surgical outcomes.

Material and methods: We performed a retrospective study of 161 patients who were admitted in emergency to the Department of General, Minimally Invasive and Elderly Surgery in Olsztyn between May and October 2017. Patients were divided into three age groups. Outcomes in patients older than 80 years were compared with corresponding statistical predictions of morbidity and mortality, as calculated using the Physiologic and Operative Severity Score for the enUmeration of Mortality and Morbidity (POSSUM).

Results: Patients in the 80+ age group had a higher mortality rate in comparison with those in the other age groups, and a higher number of comorbidities ($p = 0.002$ and $p = 0.001$, respectively). The POSSUM morbidity and mortality rates were significantly higher for the older patients who died than for the older patients who were discharged ($p = 0.013$ and $p = 0.003$, respectively).

Conclusions: Decisions about suitable therapy in the acute care setting should be made after consideration of the overall health of a patient. This study shows that age itself has a huge impact on postoperative results. The older the patient is, the higher the risk of perioperative death. We recommend patient evaluation using the POSSUM scale to better predict this risk.

Key words: emergency, elderly, Physiologic and Operative Severity Score for the enUmeration of Mortality and Morbidity (POSSUM), older patients.

Introduction

Technology and improved healthcare in developed countries have extended lifespans to previously unattainable ages. In the European Union the average lifespan is 80.6 years, with 77.9 years for males and 83.3 years for females [1]. These statistics are supported by alarming birth to death ratios of 10.1 and 10.2 per 1000 citizens for males and females, respectively [1]. These two factors prove that the European population is aging rapidly. According to research conducted by Eurostat, this trend will

continue in the upcoming decades. It is anticipated that the median age will rise, while the base of the population pyramid will contract. By 2050, it is estimated that around 30% of the Polish population will be 65 or older. Data obtained from the Polish National Health Foundation (NFZ) indicate that more than 30% of hospital admissions in 2016 were for people aged 65 or older [2]. The changing socioeconomic situation associated with the aging population will be challenging for the healthcare system, public finances and medical staff and requires new

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medical guidelines to best accommodate it. At present emergency guidelines do not differentiate between younger adults, for whom these guidelines were originally developed, and older persons (aged 65 years or above) [3]. However, failure to make this very critical distinction may have serious operative and post-operative consequences that contribute to increased hospitalization times, mortality and morbidity [4–7].

Aim

The aim of this study was to analyze whether the age and comorbidities of a patient affect acute care surgical outcomes. We evaluated whether it is possible to objectively predict outcomes in older persons according to these parameters. We also examined whether these predictions can be used to determine patient management options, including which patients should undergo surgery with the intention of cure, and which would instead benefit more from minimally invasive treatments or palliative care.

Material and methods

We performed a retrospective study of 161 patients who were admitted in emergency to the Department of General, Minimally Invasive and Elderly Surgery in Olsztyn between May and October 2017. Patients were divided into three groups: 18–60 years, 61–80 years, and older than 80 years. For each patient, data were gathered during hospitalization, upon relocation to the intensive care unit (ICU) and 3 months after dis-

charge. Gender, age, primary diagnosis, comorbidities, length of hospital stay (LOS) and type of discharge were analyzed. Comorbidities were: diabetes mellitus, hypertension, atrial fibrillation, asthma, chronic obstructive pulmonary disease, heart failure, renal failure, hyperthyroidism and hypothyroidism. Emergency surgery outcomes in patients older than 80 years were compared with corresponding statistical predictions of morbidity and mortality, as calculated using the Physiologic and Operative Severity Score for the enUmeration of Mortality and Morbidity (POSSUM) [8].

Statistical analysis

Statistical analyses were performed using Microsoft Excel 2007 for Windows. Dependence between variables was determined using Qlik Sense software. All data values are presented as the mean and standard deviation. For continuous variables the independent-samples *t*-test was used and a *p*-value below 0.05 was considered as statistically significant.

Results

The majority of patients were women. Each age group had distinctive characteristics in terms of primary diagnosis and overall response to treatment (Table I).

Age group 18–60

The most common primary diagnosis in this age group was appendicitis. Of the cases admitted for emergency surgery 1.1% resulted in death (Table I).

Table I. Characteristic of 161 patients

Parameter	Age group 18–60 (n = 95)	Age group 61–80 (n = 53)	Age group 80+ (n = 13)
Male	43 (45.3%)	22 (41.5%)	5 (38.5%)
Female	52 (54.7%)	31 (58.5%)	8 (61.5%)
Predominant primary diagnosis	Appendicitis (56.8%)	Cholecystitis (26.4%)	Ileus (38.5%)
Mean number of comorbidities per person	0.38 ±0.64	1.19 ±1.08	2.31 ±1.77
Predominant comorbidity	Hypertension (17.9%)	Hypertension (62.3%)	Hypertension (46.2%)
LOS [days]	3.7 ±5.7	5.23 ±4.68	7.0 ±6.66
Discharge (%)	96.8	86.7	38.5
ICU (%)	2.1	5.7	7.7
Death (%)	1.1	7.6	53.9

Age group 61–80

The most common primary diagnosis in this group was cholecystitis. The emergency surgery mortality rate was 9.4% (Table I).

Age group 80+

The majority of patients older than 80 years were admitted to the hospital because of ileus. The average rate of comorbidities was 2.3 per patient. This group had high morbidity and high mortality scores, as predicted by POSSUM, and these scores were supported by a 31% mortality rate on the surgical ward (Table I). Taking into account patients followed up after relocation to the ICU, the overall mortality

rate in this age group was 53.9%. One of the 13 patients was lost to follow-up (Table II).

Comparison between groups

Patients in the 80+ age group had a higher mortality rate in comparison with those in the other age groups, and a higher number of comorbidities ($p = 0.002$ and $p = 0.001$, respectively). There were no statistically significant differences in the LOS between the groups (Table III). The POSSUM predictions of the morbidity and mortality rates were significant higher for the older patients who died than for the older patients who were discharged ($p = 0.013$ and $p = 0.003$, respectively). There was no significant difference in the number of comorbidities in this comparison (Table IV).

Table II. Characteristic of patients older than 80 years

Age	Disease	Procedure	Type of discharge	Number of comorbidities	Morbidity POSSUM [%]	Mortality POSSUM [%]
99	Perforation of gastric ulcer	Laparoscopy	Death	3	96.1	61.8
88	Ileus – colorectal cancer	Laparotomy, left hemicolectomy, ileostomy	Death	5	95.7	60.1
86	Ileus – unknown reason	Laparoscopy	Discharge	2	37.3	6.8
86	Strangulated femoral hernia	Hernioplasty	Discharge	4	59.9	13.7
86	Ileus – pancreatic cancer	Laparotomy, tumor resection, anastomosis	ICU, death	1	96.3	63.6
85	Ileus – strangulated internal hernia	Laparotomy, ileal resection, anastomosis	Discharge	5	97.8	72.5
85	Ileus – colorectal cancer	Laparotomy	ICU, death	4	98.5	78.1
84	Cholecystitis	Laparoscopic cholecystectomy	Discharge	0	16.2	2.9
84	Ileus – ileostomy failure	Ileostomy repair	Discharge	0	33.6	6.1
82	Ileus – colorectal cancer	Laparotomy, bypass	Discharge	0	68.9	17.2
81	Ileus – unknown reason	Conventional treatment	ICU, death	3	98.1	75.0
81	Gastrointestinal hemorrhage	Conventional treatment	Death	1	99.7	93.7
81	Gastrointestinal hemorrhage	Conventional treatment	ICU, death	2	98.2	79.3

Discussion

The main reasons why older patients cannot be treated the same as average-aged adults are that they have higher rates of preexisting comorbidities and age-associated mental disorders. Moreover, they often have a reduced will or an overall weakened autonomic response as a result of frailty syndrome [9–12]. Frailty is a common geriatric syndrome that is characterized by age-associated declines in function across multiorgan systems and leads to increased vulnerability to disease [9–12]. There are numerous studies reporting the influence of frailty syndrome on surgical complications, post-operative outcomes and LOS [4, 12]. Our study found that older patients had longer mean LOS, but the difference was not statistically significant.

Our retrospective study shows that older patients who undergo emergency surgery have significantly higher risk of death in comparison with younger patients. We used the POSSUM scale to predict the risk-adjusted mortality and morbidity rates of the patients included in our study. This scale is used in a wide range of surgical settings and consists of 12 criteria describing the physical state of the patient and 6 criteria concerning the surgery. The physiological parameters include age, cardiac, respiratory and neurological signs and laboratory test results. The surgical parameters include the type of operation, its urgency, and the predicted operative blood loss or peritoneal contamination. The presence of cancer is also taken into account in the calculations [6–8]. All of the patients who died a short time after surgery had mortality rates greater than 95% and morbidity rates greater than 60% according to POSSUM. In contrast, the older patients who were discharged from hospital and lived for at least 3 months after the surgery had clearly reduced mortality and morbidity rates. Therefore, POSSUM appears to be a useful tool for predicting severe complications of surgery in older persons. This conclusion is supported by the findings of other studies in the published literature [6–8].

Using a scale that incorporates the patient's physical state within the calculated risk may help the surgeon to most appropriately manage a patient. Operative decisions should be made taking into account the overall state of the patient, including their general condition, age and consent [10, 12–15]. It is important that the potential benefits of the surgery outweigh the risks of complications.

Table III. Comparison between age groups regarding mortality rate, comorbidities and LOS

Parameter	Age groups		P-value
	18–80	80+	
Mortality rate (%)	0.03 ±0.18	0.54 ±0.5	0.002
Comorbidities [n]	0.28 ±0.56	2.31 ±1.77	0.001
LOS [days]	3.97 ±5.5	7.0 ±6.66	NS

Table IV. Comparison between died and discharged patients older than 80 years

Parameter	Death	Discharge	P-value
Morbidity POSSUM (%)	97.51 ±1.38	52.28 ±26.71	0.013
Mortality POSSUM (%)	73.09 ±11.2	19.87 ±24.06	0.003
Comorbidities [days]	2.71 ±1.39	1.83 ±2.03	NS

In cases involving high-risk patients, treatments that are minimally invasive should be selected to avoid overzealous treatment. Overzealous therapy is the use of medical procedures that prolong dying and cause excessive suffering [16, 17]. Older patients who are in a poor initial condition should receive care that maintains their dignity, such as good nursing, control of pain and other symptoms and feeding and fluid administration. These types of care should be provided as long as they are beneficial to the dying person. Surgical management of cases such as these may be futile and burdensome therapy.

Depending on the case, minimally invasive procedures such as laparoscopy should be considered instead of open procedures such as laparotomy, and withholding surgery completely should also be considered [10, 15]. Less traumatic procedures that have lower risks of complications than normal surgery should also be favored. For example, endoscopic or invasive ultrasound therapy should be performed as required to address bleeding or a pseudocyst, or to allow stent placement to relieve an obstruction of the gastrointestinal tract [18, 19].

Limitations of our analysis include the small sample size of patients and the heterogeneity of the age groups. Nevertheless, our results are similar to those reported in other studies. Further investigation in-

volving larger sample sizes should be performed in future.

Conclusions

At present, there are no surgical guidelines that are specific for older persons. Decisions about suitable therapy in the acute care setting should be made after consideration of the overall health of a patient. This study shows that age itself has a huge impact on postoperative results. The older the patient is, the higher the risk of perioperative death. We recommend patient evaluation using the POSSUM scale to better predict this risk. Patients with higher mortality and morbidity scores should be very carefully selected for surgery. For cases in which the risk of postoperative complications are greater than the potential benefits of the treatment, minimally invasive or even palliative treatment should be considered instead.

Acknowledgments

We thank Shelley Robison, PhD, from Edanz Group (www.edanzediting.com/ac) for editing a draft of this manuscript.

Conflict of interest

The authors declare no conflict of interest.

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Received: 15.05.2018, accepted: 13.07.2018.