The impact of acute high-risk abdominal surgery on quality of life in elderly patients

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ABSTRACT

INTRODUCTION: Undergoing acute high-risk abdominal (AHA) surgery is associated with reduced survival and a great risk of an adverse outcome, especially in the elderly. The primary aim of this study was to investigate the residential status and quality of life in elderly patients undergoing AHA surgery.

METHODS: From 1 November 2014 to 30 April 2015, consecutive patients (≥ 75 years) undergoing AHA surgery were included for follow-up after six months. The patients included answered a health-related quality-of-life questionnaire and a supplemental questionnaire regarding residential status. The results were compared with an age-matched national control group.

RESULTS: A total of 52 patients matched the inclusion criteria. Mortality at six months after surgery was 46%. Out of the 28 survivors, 22 participated in the study. Quality of life was estimated as good in 77% of the survivors and they were willing to undergo surgery again, if necessary. All study participants were admitted from their own home, and 95% had no change in residential status after six months.

CONCLUSIONS: The self-reported quality of life in elderly survivors six months after AHA surgery was surprisingly good in a small study where all findings should be interpreted with precaution. The majority had no change in residential status. Our study may provide useful information for surgeons advising elderly patients and their families about realistic outcomes following AHA surgery.

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TRIAL REGISTRATION: The study was approved by the Danish Data Protection Agency and registered with clinicaltrials.gov.

When undergoing acute high-risk abdominal (AHA) surgery, elderly people have a massive risk of dying, experiencing complications or having a prolonged hospital stay [1-5]. This vulnerable population of elderly people is are also at risk of being permanently disabled and having increased dependency after surviving major surgery [6]. Survival alone is not necessarily a positive outcome if it leads to a high dependency and a very low quality of life. Unfortunately, the understanding and knowledge of the effect of AHA surgery on elderly patients' lives after discharge is poor [7].

Preoperative counselling of elderly patients and their relatives in the emergency setting is often difficult and requires careful consideration of their physical and mental status as well as a discussion of the potential for short- and long-term survival with or without surgery. This dialogue often occurs and information is given in a moment of crisis, and can potentially lead to prolonged and overly intensive care in patients with a limited chance of survival [8].

The decision to operate on an elderly person with an abdominal catastrophe can be a back-against-the-wall decision. The patients are often both physiologically deranged and mentally unfit and have little time to consider whether or not to accept treatment.

Ideally, obtaining detailed knowledge about long-term patient-reported outcomes may contribute to informing the long-term prognosis and status of the elderly patients after discharge and may be instrumental to forming realistic expectations as to the overall outcome after AHA surgery. A few studies have explored health-related quality of life (HRQOL) in elderly surgical patients [9, 10], but none have focused on elderly patients undergoing AHA surgery. In the literature, studies exploring surgery and frailty often include patients above 65 years of age. Nevertheless, few surgeons today consider 65 years as old. To investigate a population with clinical dilemmas regarding level of appropriate treatment initiatives, we decided to include the oldest of the elderly only, arbitrarily defined as patients aged 75 years or older.

The primary aim of this study was to assess the quality of life and residential status in elderly patients six months after AHA surgery. A secondary aim was to explore the patients' and closest relatives' estimations of the patients' health status, quality of life and the probability that they would consent to undergoing AHA surgery again, if indicated.

METHODS

Protocol and patients

This was a single-centre prospective study with an exploratory design of all consecutive AHA surgery patients ≥ 75 years of age undergoing an emergency gastrointes-

ORIGINAL ARTICLE

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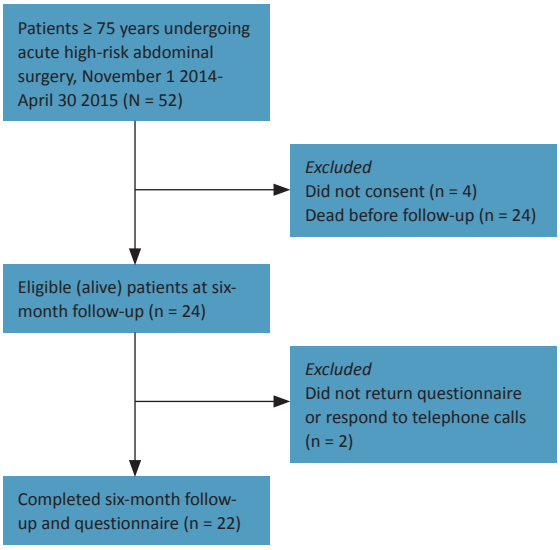
FIGURE 1

Study cohort.



tinal laparotomy or laparoscopy including reoperations after elective surgery between 1 November 2014 and 30 April 2015 at Hvidovre Hospital, Denmark. In Denmark, all abdominal emergency surgery patients are treated in public health-care centres, making the population non-selected.

Patients undergoing the following procedures were not included: simple appendectomies, negative laparoscopies/laparotomies, laparoscopic cholecystectomies, acute hernias without strangulation, sub-acute inflammatory bowel disease surgery and sub-acute colorectal cancer surgery. Sub-acute was defined as planned in less than 48 hours.

The patients were a subgroup of a cohort of patients undergoing AHA surgery, receiving protocol-bundled emergency care with expedited diagnosis and treatment, and perioperative cardiac output optimisation. The patients' physiological performance status (Zubrod score) at admission was registered in an attempt to quantify the activity of their daily life before admittance. Patients were approached within the first post-operative week and asked for written informed consent to participate in a follow-up study after six months. Patients who were unable to participate when first approached (due to delirium or intubation) were included when their clinical situation had stabilised. Patients with dementia were registered as non-compliant regarding questionnaires and consent for follow-up was permitted by next of kin.

Danish law exempts questionnaire surveys from ethical board approval. The study was approved by the Danish Data Protection Agency (Reg. No. 2012-58-0004) and registered with clinicaltrials.gov (NCT02377687). The Danish Civil Registration System is continuously updated with information on the vital status of everyone living in Denmark [11], which facilitates 100% follow-up on mortality in all individuals.

Six months after surgery (5-7 months), the patients were mailed a short-form health survey with 36 items (SF-36) and an additional questionnaire, together with a questionnaire for their closest relative, to be self-administered and returned by prepaid mail. Primary non-responders were contacted by telephone after two weeks and the questionnaires were answered by phone. The patients and their closest relatives were asked to score overall health status and overall quality of life and they were asked about the probability that they would consent to major emergency surgery again if indicated, using a one to seven scale, with one indicating "very low/bad" and seven indicating "very high/good". A score of five or higher was interpreted as a positive answer. Residential status and need for home care service were also recorded.

Short form 36

The SF-36 is a generic, standardised health status questionnaire widely used to measure HRQOL on the following eight separate scale scores: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health [12]. In this study, we used the original SF-36, version 1.0.

Statistics

Pre-study power calculations were not done since no previous data existed for this patient group. All data are presented as numbers or medians, unless otherwise stated. Summary scores were compared with age-matched controls from a national survey in Denmark [13]. A one-sample t-test was used to compare differences in SF-36 scores between the study population and the national age-matched control, and the significance was then adjusted by the Bonferroni correction.

Statistical analyses were performed with the SAS Enterprise Guide 7.1.

Trial registration: The study was approved by the Danish Data Protection Agency and registered with clinicaltrials.gov.

RESULTS

All patients

A total of 52 patients ≥ 75 years of age underwent AHA surgery in the study period (**Figure 1**). The characteristics of the population are presented in **Table 1**. The pathology in the study cohort was heterogeneous and cat-

TABLE 1

Population characteristics. The values are n (%).

	All patients ≥ 75 yrs in major emergency surgery, 11.1.14-4.30.15 (N = 52; 81 [78.5-86.5] yrs[a])	Follow-up study population (N = 22; 79 [78-84] yrs[a])
American Society of Anesthesiology physical status classification		
1	5 (10)	3 (14)
2	20 (38)	13 (59)
3	16 (31)	6 (27)
4	10 (19)	0
5	1 (2)	0
WHO/ECOG/Zubrod score[b]		
0	1 (2)	1 (5)
1	12 (23)	9 (41)
2	24 (46)	11 (50)
3	14 (27)	1 (5)
4	1 (2)	0
Comorbidity		
Cardiovascular disease	35 (67)	12 (55)
Pulmonary disease: asthma and/or COPD	11 (21)	4 (18)
Previous stroke	10 (19)	3 (14)
Diabetes		
NIDDM	9 (17)	1 (5)
IDDM	1 (2)	2 (9)
Preoperative residential status		
Own home	47 (90)	22 (100)
Semi-independent living: skilled nursing facility	0	0
Nursing home	5 (10)	0
No home care service	39 (75)	17 (77)
Pathology		
Perforated viscus	20 (38)	10 (45)
Obstruction	27 (52)	10 (45)
Other	5 (10)	2 (9)
Enterostomy	18 (35)	8 (36)
Intensive care stay	6 (12)	2 (9)
Preoperative sepsis	28 (54)	7 (32)

COPD = chronic obstructive pulmonary disease; ECOG = Eastern Cooperative Oncology Group; IDDM = insulin-dependent diabetes mellitus; IQR = interquartile range; NIDDM = non-insulin-dependent diabetes mellitus; WHO = World Health Organization.
a) Median age [IQR].
b) 0 = normal activity, no restrictions; 1 = symptomatic, restrictions in strenuous activity; 2 = spending up to 50% of waking hours in bed; 3 = spending > 50% of waking hours in bed but not bedbound; 4 = bedbound.

egorised as perforated viscus (mainly perforated ulcer and perforated diverticulitis, Hinchey grade 4), obstruction (both malignant and non-malignant colonic, volvulus and small-bowel obstruction) and other (bowel ischaemia and Hinchey grade 3 diverticulitis). Six of the patients were unable to complete the questionnaires due to dementia. The 30-day overall mortality was 33%, and the 180-day mortality was 46%. None of the patients suffering from dementia were alive at follow-up. Among the elderly, 23% (12/52) of the patients had a documented do-not-resuscitate (DNR) status, and 54% (28/52) had documented clinical signs of sepsis preoperatively [14]. The median length of post-operative stay (defined as the time from operation to discharge or in-hospital death) was 11.5 days in the entire population (interquartile range (IQR): 5-18).

The survivors participating in the follow-up

Of the 28 survivors, 22 (79%) returned the questionnaire. The results of the SF-36 are shown in **Table 2**. Only one survivor (1/28, 4%) had a documented DNR status. Among patients with a DNR status, the 180-day mortality was 92% (11/12). In the surviving follow-up population, only 32% had documented clinical signs of sepsis preoperatively. The median length of post-operative stay was 13 days (IQR: 5-18). All patients surviving for a minimum of six months post-operatively and participating in the follow-up study were admitted from

TABLE 2

Summary scores of the SF-36 of survivors ≥ 75 years six months after acute high-risk abdominal surgery and national age-matched controls. The values are median (IQR)[a]

Category	Study population (n = 22)	National controls (n = 229)	p-value[b]
Bodily pain	74 (62-100)	74 (51-100)	0.99
General health	69 (53-75)	62 (47-77)	1.00
Mental health	80 (68-92)	80 (64-96)	1.00
Physical function	58 (40-80)	65 (43-85)	1.00
Role emotional	67 (0-100)	67 (33-100)	0.87
Role physical	0 (0-50)	50 (0-100)	0.26
Social function	88 (75-100)	100 (63-100)	1.00
Vitality	50 (40-60)	60 (40-80)	0.27

IQR = interquartile range; SF-36 = 36-item short-form.
a) SF-36 questions are transferred into weighted scores of 0-100 points.
b) Bonferroni corrected.

TABLE 3

Additional questionnaire of patients/closest relatives giving positive answers[a]. The values are n (%).

Question	Patient (N = 22)	Closest relative (N = 17)
How would you estimate your/ your relative's overall health status?	16 (73)	11 (65)
How would you estimate your/ your relative's overall quality of life?	17 (77)	11 (65)
How would you estimate the probability of your/your relative consenting to major emergency surgery again, if indicated?	16 (73)	15 (88)

a) Answers were given with a score of 1-7: 1 = very low/bad, 7 = very high/good, and a score of ≥ 5 was considered positive.

their own home, and 95% (21/22) were living in their own home after six months. None of them had a preoperative American Society of Anesthesiology (ASA) physical status classification score above three.

Table 3 shows the results from the additional questionnaire.

DISCUSSION

We found the self-reported quality of life six months after AHA surgery to be comparable with that of the background population, apart from the categories of physical function and vitality. This indicates a somewhat unexpected, good recovery considering the patients' age and the severity of their surgery. Despite self-reported impaired physical function and vitality, the majority of the survivors had no loss of independence and they were willing to undergo AHA surgery again, if necessary.

The mortality after six months was high (46%), consistent with extant literature [2, 3]. The survivors were all admitted from their own home and none of them had an ASA score above three, indicating a trend towards survival of the fittest. Also, preoperative sepsis was less frequent in the group surviving AHA surgery. Several physiological factors are related to a low probability of survival in major emergency surgery, such as septic shock, an ASA score of five and dependent functional status [15], but not very many patients fall into these obvious categories, which complicates the prediction of a poor outcome. Chronological age or number of comorbidities alone have been shown not to be predictive of surgical outcome in elderly people undergoing major and minor emergency surgery procedures [16], but a higher ASA class has shown to be associated with mortality in several studies [16-18]. It is also known that elderly people undergoing emergency surgery with a DNR status have a higher risk of a poor outcome [19]. The same trend was seen in this study, where 92% of the patients with a DNR status did not survive. It is reasonable to consider if treatment is futile in this group of patients, where the DNR status could be a proxy for overall health status with extensive frailty and comorbidity. Conversely, there is also a potential risk that the status in itself could affect both health care providers and patients when deciding whether to initiate and maintain aggressive treatment [20].

Physical recovery may be poor. The survivors had self-reported impaired physical function and vitality (describing energy level and fatigue) scores, indicating a prolonged physical recovery period after major emergency surgery exceeding six months, as found by Lawrence et al when testing both performance-based and self-reported measures after major elective surgery in the elderly [6]. The high overall quality of life score suggests that physical performance is a less important factor in the overall quality of life for the elderly people in this study. We recognised that the closest relative had the impression that the patient had a lower overall quality of life and a lower overall health status, but a higher probability of consenting to AHA surgery again than the patient (Table 3), reminding us that the presumptions of the closest relatives are not necessarily the same as the patient's wishes.

The present study is the first to describe long-term patient-reported outcomes in a consecutive, unselected cohort of elderly people undergoing AHA surgery. The SF-36 questionnaire is a validated tool and the available age-matched control is a great advantage in this population where preoperative scoring is not an option. After Bonferroni correction of the p values, none were statistically significant, highlighting the risk that the findings might be incidental due to limited sample size.

There are several limitations to the present study.

It is a single-centre study with a limited number of patients surviving to the point of follow-up. Furthermore, the additional questions were not validated. However, we found a high degree of consistency between responses to self-reported quality of life in the additional questionnaires and responses to the SF-36. It is crucial that results from a small study like this one are interpreted with precaution and primarily used to generate hypotheses and to design future studies.

Our knowledge of the long-term outcomes of this subpopulation remains limited. In the present study we employed the SF-36 questionnaire for evaluation of our results at a tingle point in time, but the development over time remains unknow . Future studies should be designed with a larger sample size and several fixed follow-up periods in a total follow-up period that should exceed six months and repeated evaluations should be performed to identify the timing of any potential changes in the dimensions in the post-operative course. This would provide important information facilitating the development of realistic rehabilitation programmes for the survivors, as well as mapping of the recovery. This should, ideally, be combined with measurements of both cognitive and physical functions.

Standardised approaches and tools to enhance preoperative counselling are needed to form realistic expectations about the post-operative outcome and to allow us to communicate the high risk of death, adverse effects and prolonged hospital stay, but also the fact that the survivors have a quality of life comparable with that of the age-matched background population. In the future, we must analyse the expectations to and experience of the preoperative counselling between health providers, patient and closest relatives. Qualitative data collection including ward-based observation of these situations could potentially provide us with valuable information.

CONCLUSIONS

This study revealed a good quality of life in elderly survivors six months after AHA surgery in a small study in which all findings should be interpreted with caution. The majority of survivors had no change in residential status despite prolonged physical recovery. Also, they were motivated to undergo major emergency surgery again, if necessary. Most importantly, our study may provide useful information for surgeons advising elderly patients and their families about realistic patient-centred outcomes after AHA surgery.

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