

Emergency Colorectal Resections in Asian Octogenarians: Factors Impacting Surgical Outcome

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Abstract

Purpose. The population in developing countries is aging and the number of octogenarians is expected to increase in the future at an alarmingly fast rate. This paper evaluates the surgical outcomes of emergency colorectal resections among Asian octogenarians.

Methods. We conducted a retrospective review of all octogenarians and older, who had an emergency colorectal resection performed between February 1996 to December 2001.

Results. Fifty-eight emergency colorectal resections were performed in patients with a median age of 83 years. The indications for surgery were colorectal cancer (74%) and complicated diverticular disease (12%). The most common presentation was an intestinal obstruction (72%). Fifty-one (88%) of the patients had comorbidities. Forty-five percent of patients had an American Society of Anesthesiologists (ASA) score of I and II, while 55% had a score of III and IV. Consultants performed 53% of the procedures. The mean surgical time was 156 min. Hartmann's procedure was the most common procedure performed (43%). There were 16 (28%) mortalities. The postoperative morbidity was 81%. The only factor impacting outcome was a high ASA score of III and IV. The median length of stay was 17.5 (range 3–108) days.

Conclusions. The mortality and morbidity of emergency colorectal resections among Asian octogenarians are high and can be predicted by their ASA status.

Key words Emergency · Colorectal · Asians · Octogenarians

Introduction

The population in developing countries is aging, and surgeons practicing in these countries should be prepared to perform surgery on a greater number of elderly patients in the future.^{1,2} Octogenarians and older individuals have proportionately experienced the greatest increase in population.³ Therefore, surgeons must expect to face the challenges of treating octogenarian patients more frequently. Currently, elective surgery can be performed with a low mortality and morbidity rate for elderly patients who have few or negligible comorbid conditions. However, in gastrointestinal emergencies, especially colorectal cancer, studies have shown that the elderly present as an emergency more frequently than younger patients.^{4,5}

Emergency surgical treatment of octogenarians poses several problems. Firstly, octogenarians often have multiple concomitant illnesses. These concomitant illnesses will inevitably affect the outcome of surgery in terms of mortality and morbidity. Secondly, emergency surgery often represents an unfavorable condition and is associated with higher mortality rates.^{5,6} Lastly, elderly patients often tolerate postoperative complications poorly because of their lower physiological reserves.^{5–7}

This retrospective study reviewed the results of treating octogenarians who underwent an emergency colorectal resection. The mortality and morbidity rates were analyzed and a series of risks factors easily available during the preoperative and intraoperative periods were evaluated. The aims of this study were to determine the short-term outcomes of octogenarians following emergency colorectal resection, as well as to determine the predictive factors impacting the surgical outcome.

Patients and Methods

Using a computerized database containing a total of 375 emergency colorectal resections performed between February 1996 and December 2001, 58 (15.5%) patients aged 80 years or older were identified who underwent emergency colorectal resection for various benign and malignant causes in this 1200-bed institution. These patients were admitted to the general surgery department as an emergency, and subsequently underwent a colorectal resection. The extracted data included the patient demographics, surgeons' expertise, American Society of Anesthesiologists (ASA) grade, hemoglobin on admission, blood transfusion, duration of the operation, type of operation, length of stay, and postoperative outcomes. Postoperative mortality was defined as death occurring within 30 days of the operation.

A statistical analysis was performed using the Chi-squared test or Fisher's exact test for nominal variables. The two-sample *t*-test was used to compare the continuous data from independent samples. The Mann-Whitney *U*-test was used to determine the significance of the differences in mean values for continuous variables. A multiple logistic regression was used to ascertain how the identified factors were associated with mortality and morbidity. All statistical tests were analyzed with Stata 10.0 (Stata, College Station, TX, USA), and conducted at a 5% level of significance.

Results

The 58 patients in the study included 24 males and 34 females; there were 57 Chinese and 1 Malay patient. The median age was 83 (range 80–96) years. The most common diagnosis was colorectal cancer in 43 (74.1%) patients, and complicated diverticulitis in 7 (12.1%) patients. The Dukes' staging and other less common diagnoses are shown in Table 1. Forty-two (72.4%) patients presented with an intestinal obstruction, while

Table 1. Diagnosis

	Numbers (%)
Colorectal cancer	43 (74)
Dukes' B	15 (35)
Dukes' C	24 (56)
Dukes' D	4 (9)
Complicated diverticulitis	7 (12)
Adhesions	3 (5)
Volvulus	2 (3)
Appendiceal mass	1 (2)
Terminal ileum stricture	1 (2)
Ischaemic bowel	1 (2)
Total	58 (100)

13 (22.4%) and 3 (5.2%) presented with perforation and bleeding, respectively. Colorectal cancer (37 patients, 88.1%) was the most common cause of intestinal obstructions, followed by adhesions (3 patients, 7.1%) and volvulus (2 patients, 4.8%). Among the 13 patients who presented with perforations, 6 had colorectal cancer, 4 had diverticulitis, and 3 had other causes. All 3 patients who presented with bleeding had diverticular disease. The types of colorectal resections are shown on Table 2.

Fifty-one (88%) patients had comorbidities. These included cardiac disease (53%), respiratory disease (14%), diabetes mellitus (16%), hypertension (12%), thyroid disorders (5%), and other medical problems (35%). Ten patients had three or more comorbidities. The ASA scores are reflected in Table 3. The mean operating time was 156 min (range 60–300). Thirty-one patients (53%) had their procedures performed by consultant surgeons while residents performed the remaining 27 (47%). The surgeon's level of expertise (consultant vs registrar) did not have any statistical impact on the surgical time. The median length of stay was 17.5 days (range 3–108).

There were 16 (27.5%) surgical mortalities. The causes of death are shown in Table 4. When we analyzed our results for mortality, the univariate analysis revealed that only the development of postoperative

Table 2. Types of colorectal resection

Type of Colorectal resection	Numbers (%)
Hartmann's procedure	25 (43)
Sigmoid colectomy	4 (7)
Right hemicolectomy	17 (29)
Anterior resection	1 (2)
Subtotal colectomy	8 (14)
Total colectomy	3 (5)
Total	58 (100)

Table 3. Grading of patients

	Numbers (%)
Median age (years)	83
ASA grade	
I & II	26 (45)
III & IV	32 (55)
Type of operation	
Stoma	25 (43)
Anastomosis	33 (57)
Pathology	
Malignant	43 (74)
Benign	15 (26)
Surgeon expertise	
Consultant	31 (53)
Registrar	27 (47)

ASA, American Society of Anesthesiologists

Table 4. Mortality

Cause of mortality	Numbers (%)
Acute myocardial infarction	3 (19)
Pneumonia	6 (38)
Cerebrovascular accident	1 (6)
Sepsis	3 (19)
Small bowel infarct	1 (6)
Heart failure	1 (6)
Multiorgan failure	1 (6)
Total	16 (100)

Table 5. Morbidity

Cause of morbidity	Numbers (%)
Cerebrovascular accident	4 (7)
Acute myocardial infarction	4 (7)
Pneumonia	22 (38)
Deep vein thrombosis/pulmonary embolus	1 (2)
Wound infection	9 (16)
Renal impairment	8 (14)
Prolonged ileus	8 (14)
Urinary tract infection	7 (12)
Hypokalemia	6 (10)
Fluid overload	8 (14)
Others	3 (5)
Total	47 (81)

morbidity ($P = 0.017$), intraoperative blood transfusion ($P = 0.03$), and a high ASA (III and IV) score affected mortality ($P = 0.04$). However, a multivariate analysis revealed that only a high ASA score of III and IV (odds ratio [OR] = 10.41, 95% confidence interval [CI] = 1.48, 73.19) correlated with mortality.

The postoperative complication rate was 81% (47 patients). The predominant complications were pneumonia (38%) and wound infection (16%), although many patients developed multiple complications. The rest of the complications are shown in Table 5. When we analyzed our results for morbidity, the univariate analysis revealed that only a higher hemoglobin count ($P = 0.03$) and a high ASA (III and IV) score affected morbidity ($P = 0.04$). However, the multivariate analysis showed that only a high ASA score of III and IV (OR = 37.29, 95% CI = 2.31, 602.60) correlated with the development of postoperative complications.

Discussion

The median age of the patients in the current study was 83 years and this is similar to another reported series in Singapore.⁸ The predominant indications for emergency colorectal resection were colorectal cancer (74.1%) and complicated diverticular disease (12.1%). This is not an

unusual finding, because colorectal cancer is predominantly a disease of the middle-aged and elderly. The higher proportion of cancer as a cause reflects the spectrum of colorectal diseases found in the population in which diverticular disease is less common and an increasing incidence of colorectal cancer is being reported.⁹⁻¹² 12.2% of new colorectal cancer cases in Singapore were diagnosed in octogenarians between 1988 and 1992.^{11,12} Thirty-seven (88%) patients with colorectal cancer presented with obstruction, which is the most common emergency presentation for colorectal cancer in other studies as well.^{13,14}

In the literature, the mortality rates have been reported to range from 5% to 54%.¹³⁻¹⁷ The mortality rate of 27.5% in this study falls within this range. In a previous study in Singapore, the mortality rate for emergency colorectal surgery in octogenarians was 6.7%.⁸ However, in that study the vast majority (69.5%) of patients had an ASA score of I, 25% had an ASA score of II, and only 4% had an ASA score of III and IV. The difference in mortality rates between this and the current study is reflected in the difference in ASA scores and this is an indication of a different patient profile. In another study in the United Kingdom, the mortality rate for emergency colorectal cancer over 75 years was 28.7%.¹⁵ In this study, 52.5% of the patients had an ASA score of III and IV, similar to the current patients where 55% had an ASA score of III and IV. Bearing in mind that the current patients' age was slightly older, starting from 80 in comparison to 75, the mortality is comparable to other studies in developed countries. When the factors impacting mortality were analyzed, only a high ASA score of III and IV affected mortality. This finding is consistent with recent studies suggesting that chronological age is less significant than physiological age.^{17,18} However, many octogenarians have multiple associated preoperative morbidities. The main causes of mortality were pneumonia, acute myocardial infarction (AMI), sepsis, and cerebrovascular accidents (CVA). These causes are similar to other studies.⁸

The postoperative complication rate of 81% is high. The most common postoperative complications were pneumonia and wound infection, similar to other studies.^{8,14,19} When the factors impacting morbidity were analyzed, only a high ASA score of III and IV affected morbidity. Relatively minor complications such as atelectasis, urinary tract infections, and wound infections are poorly tolerated in this specific group of patients who have little, if any, reserves. Pneumonia and septicemia evolves rapidly and decompensation occurs.

The median length of stay was 17.5 days and is comparable to another series that reported 16.5 days.¹⁶ This is despite the fact that all of the patients were slightly older (80 vs 75), and had more pre-existing

comorbidities and postoperative complications. The long postoperative hospital stay is a reflection of the slower recuperative capabilities of the older patients.

The mortality and morbidity rates were not influenced by the pathology, surgeon's expertise, or operative time. A possible reason for this would be that consultant surgeons were involved in the more difficult and complex cases with higher risks involved, while residents performed the more straightforward cases. Another possible reason would be that the residents may have attempted to perform the surgery; however after experiencing technical difficulty, they may have asked for help and advice from the respective consultants. In such cases, the failed attempt may have prolonged the operative time, and because the consultants were involved later, the surgery was classified as a consultant-led operation. The majority of the patients had colorectal cancer (74.1%). A subset analysis of these patients showed that Dukes' staging had no impact on the mortality ($P = 0.48$), morbidity ($P = 0.51$), or length of stay ($P = 0.28$). A possible explanation for this could be the small sample size of this study, thus resulting in a type 2 error.

Twenty-five (43%) patients underwent a Hartmann's procedure (HP) for left-sided colonic pathology. This is higher than most series.^{9,15,17,18} The main indication for performing Hartmann's procedure was colorectal carcinoma (72%). Hartmann's procedure has been considered a useful option in the management of an obstruction or perforation at the tumor site when malignant disease is present.¹⁹⁻²³ The presence of fecal or gross purulent peritonitis is often deemed a contraindication toward performing a colonic anastomosis for fear of an increased likelihood of anastomotic leaks.²² Nine (36%) of the patients, who presented with perforations, had either fecal or purulent peritonitis. The presence of systemic illnesses, such as diabetes, renal failure, cardiovascular disease, persistent hypotension, compromised immunity, and malnutrition can jeopardize anastomotic healing.²² In the current series, 22 (88%) patients had at least one of these comorbidities. Thirteen (52%) patients had an ASA score of III and IV. Hence the Hartmann procedure may be the safest surgical procedure under these circumstances.²³

Conclusion

In the Asian population, while there is a high incidence of colorectal cancer among the elderly, octogenarians may still safely undergo emergency colorectal resections. The mortality rate is not higher than in other parts of the world, although it carries a significant morbidity. Both mortality and morbidity can be predicted based on the ASA status. Although chronological age in itself

is not predictive, it remains a fact that more than half of octogenarians have comorbidities which thus put them at an increased risk. Hartmann's procedure is often performed for safety reasons. Further studies are required to evaluate other more refined predictive factors regarding such patients.

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