MAJOR SURGERY IN THE ELDERLY – A STUDY OF OUTCOME IN 295 CONSECUTIVE CASES

K S Ngian, R Nambiar

ABSTRACT

The results of major surgery in 295 consecutive patients over the age of sixty years were analysed. In this series, 70% were electives and 30% emergency cases with a male preponderance of 3:2. The overall mortality was 11.2%. Mortality following emergency operations was three times more than electives. Seventy percent (70%) of deaths after elective surgery followed palliative operations for advanced cancer. For elective surgery, complications of peptic ulcers were associated with a high mortality rate whereas deaths were fairly uniform in the emergency group. In general, concomitant medical diseases and postoperative complications were the major determinants of outcome of surgery in the elderly.

Key Words: Aged Surgery, operative mortality, post operative complications

SING MED J. 1989; NO 30: 339-342

INTRODUCTION

The proportion of elderly patients is increasing throughout the world. In Singapore, it has increased from 5.7% in 1970 to 8% in 1985. This figure is expected to rise to 10% in the year 2000 and 20% by 2030. This expected increase in geriatric patients in Singapore will see a greater demand for surgery in the elderly patient. Although older age per se does not increase the surgical risk, there are many associated medical problems in the elderly that could increase the risk of surgery.

We reviewed the outcome of surgery in elderly patients and identified the subgroups of patients and types of operations that were associated with higher mortality and complications.

MATERIALS AND METHODS

During the ten-month period from March to December 1986, 295 patients of sixty years of age or older had major surgery performed at the Department of Surgery, Singapore General Hospital. The data regarding the type of surgery, the indication and the timing of surgery, concomitant medical illnesses, postoperative complications, morbidity and mortality were analysed. Only major complications were recorded. These were wound infection, anastomotic leak and postoperative bleeding. Medical complications were cardiac, pulmonary or renal failures.

Mortality was defined as deaths occuring within thirty days of surgery or within the same hospital admission.

Department of Surgery
Singapore General Hospital
Outram Road
Singapore 0316

KS Ngian, MBBS, FRCS (Edin), Registrar

R Nambiar, MBBS, FECS (Edin & Eng), FRACS,
Senior Surgeon & Head of Department

Correspondence to: Professor Nambiar

RESULTS

There were 207 (70%) elective cases and 88 (30%) emergencies. The male to female ratio was 3:2. The age distribution is shown in Table 1. About 60% of patients were aged 70 years or over. Table 2 shows the distribution of patients according to the type of diseases and surgery. In the elective group, 29% of cases were surgery for cancer or cancer complications. Transurethral resection of prostate, biliary and hernia operations, together accounted for 49%. Elective surgery for peptic ulcer diseases formed 3% of cases. In contrast, the commonest indication for emergency surgery was for complications of peptic ulcers and this formed 28% of the total. Surgery for malignant large bowel obstructions accounted for 17% while appendicectomies formed 11%

Table 1
AGE DISTRIBUTION OF CASES

Age (yrs)	Percent distribution
60 – 69	41%
70 – 79	49%
80 and above	10%

Table 2
DISTRIBUTION BY TYPE OF CASES

Elective N = 207		Emergency N = 88	
Cancers	29%	Peptic ulcers	28%
Colorectal	14	Perforated	18
Stomach	8	Bleeding	10
Breast	4	Hernias	23%
Esophagus	3	Colorectal cancers	17%
TURP	20%	Appendicitis	11%
Hernias	15%	Others	21%
Gallstone	14%		
Thyroid	3%		
Peptic ulcer	3%		
Others	16%		
Total	100%	Total	100%

of the total. Tables 3 and 4 show the incidence of associated medical conditions. It was noted that out of 56% of patients who had associated medical conditions, 39% had one and 17% had two or more concomitant diseases. Pulmonary diseases were the commonest followed closely by hypertensive and cardiac diseases.

Table 5 shows the incidence of major postoperative complications. The commonest postoperative complications of medical nature were cardiac and pulmonary while postoperative anastomotic leak and bleeding were the main surgical complications.

Table 3
PREVALENCE OF CONCOMITANT MEDICAL DISEASE

Disease	% cases
Pulmonary diseases	24%
Hypertensive disease	22%
Cardiac diseases	19%
Diabetes Mellitus	12%
Total	77%

Therefore no medical illness 23%

Table 4
DISTRIBUTION OF CASES BY NUMBER OF CONCOMITANT DISEASES

Number	Percentage
0	44%
1	39%
2 or more	17%
Total	100%

Table 5
DISTRIBUTION OF MAJOR POSTOPERATIVE COMPLICATIONS

Medical	Number	Surgical	Number
Cardiopulmonary	42	Wound infection	36
Acute right ventricular failure	4	Anastomotic leak	9
Cardio Vascular Accident	1	Post-op bleeding	4

MORTALITY

There were 33 deaths giving a mortality rate of 11.2% of which the rate for electives was 6.3% and emergencies 22.7%. There was a significant increase in mortality noted in those over the age of 70 years (Table 6). The mortality rate in patients between 60 and 69 years was 9%, from 70 to 79 was 13% and those above 80 years was 17%. Seventy percent of deaths after elective surgery were in patients undergoing surgery for palliation of advanced cancer. The rest were mainly following transurethral surgery of whom two were due to postoperative bleeding. Emergency operations for complications of cancer and peptic ulcers accounted for about 35% of deaths for each (Table 7 & 8).

Table 6
DISTRIBUTION OF MORTALITY RATE BY AGE

Age	Rate
60 – 69	9%
70 – 79	13%
80 and above	17%

Table 7
DISTRIBUTION OF DEATHS FOLLOWING ELECTIVE OPERATIONS

Diagnosis	No	Cause of Death		Primary Disease
		Medical Complications	Surgical Complications	
Advanced Cancer	10	5	–	5
Gastroesophageal 6				
Colorectal 2				
Others 2				
Benign Prostratic Hypertrophy	3	1	2	–
Total	13	6	2	5

Table 8
DISTRIBUTION OF DEATHS FOLLOWING EMERGENCY OPERATIONS

Diagnosis	No	Cause of Death		
		Medical Complications	Surgical Complications	Primary Disease
Advanced Cancer	7	3	–	4
Colorectal 6				
Hepatoma 1				
Peptic Ulcer	7	6	1	–
Others	6	4	1	1
Total	20	13	2	5

In elective surgery, 8 out of 13 deaths were related to postoperative complications. Most were medical complications of which 5 were due to chest infection and respiratory failure and 1 acute myocardial infarction. Among those who died of their primary disease, all were advanced cancers. In the emergency group, 15 died of the advanced disease itself, 1 from severe head injury and the rest from advanced cancer. 13 out of 15 complications were medical problems.

There was an increased rate of deaths with the increase in the number of concomitant diseases (Table 9). In those with no disease, the risk was only 6%, with 1 it was 11% and with 2 or more it was 27%.

Table 9
DISTRIBUTION OF MORTALITY BY PREOPERATIVE CONCOMITANT DISEASES

Number of Concomitant Disease	Mortality risk
0	6%
1	11%
2 or more	27%

DISCUSSION

The reported rates of mortality and morbidity following surgery in the elderly varies with different centres because of variations in the patient population, indications for surgery and the definitions of mortality and morbidity. Where the lowest age of the study population was 60 years, the mortality rate ranged from 5.1% to 15% (2, 10). The results of the present series of 11.2% falls within this range.

In our study, there was an increase in the mortality rate with each decade of age increase. Bosch in a study of 500 cases found a sharp increase in the mortality from 5.41% for those below 70 years to 16.1% in the age group over seventy (6). In the individual case however, chronological age may not reflect the biological status (3), as the functions of various organs and the general adaptability of the body changes at different rates in different individuals. It is not surprising that some authors have found no particular correlation between age and outcome in their study (12).

Among the factors which affected the outcome of study population, emergency surgery was significant as it consistently carried a higher mortality than electives. In our present series, it was about 3.5 times more than electives. This compared well with various studies reported (11, 14, 6, 17).

In the present series which included 88 emergencies, the commonest indication for operation was either bleeding or perforated peptic ulcers. Together, they made up 28% of the total number. More importantly, they also accounted for a third of deaths following emergency surgery. The high mortality rates following emergency surgery for peptic ulcer complications is well known and rates of 23.1% for perforated duodenal ulcers and 46.2% for bleeding ulcers have been observed. In those over seventy years of age, even a higher mortality of 62% for primary closure of perforated ulcers and 45% for emergency gastrectomy were quoted (13).

Obstructed or strangulated hernias formed 23% of emergency cases in our series but did not have a significant mortality. Surgery for appendicitis formed only 11% of cases which is in contrast to the much higher incidence in younger population and is in keeping with reports of below 10% in other reports (16). No patient died following appendicectomy in our series although the reported mortality in elderly patient ranges from 11% to 14% (7 & 13).

For elective surgery, the commonest indication for operation was cancer which accounted for 29%. The majority of deaths, 10 out of 13 were also in this group of patients. There was no mortality following surgery for hernias, gallstone, peptic ulcer and thyroid diseases. This is in keeping with the general impression that elective surgery in elderly patients can be a relatively safe procedure. Two out of three deaths in the elective surgical group occurred following transurethral resection which resulted in postoperative bleeding which might have been avoided with better technique.

In view of the high mortality rate for emergency surgery, many authors have advocated a more aggressive approach to elective surgery in elderly patients (9, 12). Deaths following cancer surgery occurred in 10 patients and all of these were for palliation of advanced cancer. In this group, advanced disease and surgical complications had an equal share. The decision to perform surgery for palliation in advanced cancer is often difficult as the high mortality and morbidity should be weighed against the duration and benefit of palliation in decision making.

It is well known that medical conditions feature prominently in the elderly patients both as coexisting diseases and as the major cause of complications and deaths following surgery. 56% of patients in this series had one or more coexisting medical condition. It was noted that those with one coexisting medical condition had a two-fold increase in risk and those with two had a four-fold increase. The number of coexisting diseases was noted to be a gross measure of surgical risk and this is increased with each additional disorder by a factor of four (1). As expected, cardiopulmonary complications were by far the most frequent morbidity encountered with chest infection being the commonest. Of the 42 patients who developed cardiopulmanary complications, 15

deaths were directly from cardiopulmonary problems of which 11 were severe postoperative pneumonias.

CONCLUSION

There is a significant mortality in the surgical treatment of patients above the age of 60 years. In this series it was 11.2%. This risk is increased 3.5 times with emergency procedures. Seventy percent of deaths after elective surgery followed palliative operations for advanced cancer. Deaths were more uniform in the emergency group. In general, concomitant medical diseases and postoperative complications were the major determinants of outcome of surgery in the elderly.

Palliative surgery for advanced cancer is often a difficult decision. The risk and benefits of surgery must be carefully assessed in order to avoid futile surgery.

Surgery for non-malignant diseases can be safe even in the elderly provided care is taken in the selection and perioperative management of patients especially those with concomitant diseases. In the emergency situation, the surgeon is often forced into operating to save life. In such cases the prevention and treatment of post operative complications determine to a large part the outcome of surgery. In particular, steps must be taken to avoid the onset of bronchopneumonia.

The ultimate aim in surgery of the elderly should be to achieve a lower mortality and morbidity rate with proper care and selection of patients.

REFERENCES

1. Anderson B, Ostberg J: Long term prognosis in geriatric surgery: 2-17 years follow-up of 7922 patients. J Am Geriat Soc 1972; 20:255-8.
2. Albano WA, Zielinski CM, Organ CH: Is appendicitis in the aged really different? Geriat 1975; 30:81-8.
3. Bafitis H, Sargent F: Human physiological adaptability through the life sequence. J Gerontol 1977; 32:402-10.
4. Bonus RL, Dorsey JM: Major surgery in the aged patient. A continuation study. Arch Surg 1965; 90:95-6.
5. Linn BS: Surgery and the elderly patient in fundamentals of geriatric medicine edited by Ronald T. Cape Reven Press NY 1983.
6. Bosch DT, Tan CTC, Beling CA: The elderly surgical patient. An analysis of 500 consecutive cases of patients 60 years or older 1952; 64,3:269-77.
7. Browne HJ: Acute appendicitis in the aged. J Ir Med Assoc 1962; 51:121-3.
8. Burnett W, McCaffrey J: Surgical procedures in the elderly. Surg Obs Gyn 1972; 134:221-6.
9. Cogbill CL: Operations in the aged. Arch Surg 1976; 94:202-5.
10. Cole WH, Mason JH: Surgical aspects in the care of the geriatric patients in "The Care of the Geriatric Patient" edited by EV Cowdry, Mosby, St Louis 1968.
11. Estes WL: Reduction of mortality in surgery of the aged. Penn Med J 1949; 52:937-43.
12. Greenbury AG,Saik RP, Farris JM, Peskin CW: Operative mortality in general surgery. AM J Surg 1982; 144:22-8.
13. Herron PW, et al: Analysis of 600 major operations in patients over 70 years of age. Ann Surg 1960; 152:686-98.
14. Haug CA, Dale WA: Major surgery in old people. Arch Surg 1952; 64:421-7.
15. Marshal WH, Fahey PI: Operative complications and mortality in patients over 80 years of age. 1964; 88:896-904.
16. Ponka JL, Welborn JK, Brush BE: Acute abdominal pain in aged patients. An analysis of 200 cases. J Am Geriat Soc 1963; 11:993-1007.
17. Stahlgren LH: Analysis of factors which influence mortality following extensive abdominal operations upon geriatric patients. Surg Obs Gyn 1961; 113:283-92.
18. Tanner NC: Gastroduodenal surgery in the aged. Br Med J 1943; 1:563-5.
19. Wilder RJ, Fishbein RH: Operative experience with patients above 80 years of age. Surg Obs Gyn 1961; Aug 205-12.