Surgery in the Elderly:
Is Age a Risk Factor?

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ABSTRACT

This prospective, observational one-year study analyzed 623 patients who were 60 years and older, out of a cohort of 2375 patients who were admitted consecutively to the general surgery wards of the University Hospital of the West Indies (UHWI). Even though only 9.7% of the Jamaican population are 60 years and older, this age group accounted for 26.2% of total admissions. Comparison of elderly and non-elderly patients showed no differences in gender, but less elderly patients were emergency admissions (52% vs 64%, $p < 0.001$), more underwent surgery (68% vs 60%, $p < 0.001$), their mean hospital stay was longer (11.5 vs 8.0 days, $p < 0.001$) and their mortality rate was higher (8.8% vs 1.9%, $p < 0.001$). Emergency admissions (52%) exceeded elective admissions in the elderly. Forty-four (80%) of the 55 deaths in the elderly group were admitted as emergencies compared to elective admissions ($p < 0.001$). There were 11 deaths among the 296 elective admissions (3.7%) but 44 deaths among the 327 emergency admissions (13.5%), a significant difference in mortality rates ($p < 0.001$). Overall, the death rate for males was higher. Cancer was the commonest admission diagnosis (21%) and that amongst mortalities. Steps to improve the opportunities for earlier admission and optimization of care of elderly surgical patients would not only benefit them but would be an important step towards a more efficient use of already scarce resources.

La Cirugía en los Pacientes Mayores de Edad
¿Es la Edad un Factor de Riesgo?

IW Crandon[1], H Harding[1], R Carpenter[1], J Branday[1], DT Simeon[2]

RESUMEN

Este estudio observacional prospectivo de un año analizó 623 pacientes de 60 años de edad o más, de una cohorte de 2375 pacientes que fueron admitidos consecutivamente a las salas de cirugía general del Hospital Universitario de West Indies. Aunque sólo 9.7% de la población jamaicana tiene 60 años de edad o más, este grupo etario representó el 26.2% del total de ingresos. La comparación de pacientes mayores con no mayores no mostró ninguna diferencia en cuanto a género, pero los pacientes menos mayores fueron ingresos de emergencia (52% vs 64%, $p < 0.001$), más necesitaron cirugía (68% vs 60%, $p < 0.001$), su período medio de estancia en el hospital fue más largo (11.5 vs 8.0 días, $p < 0.001$) y su tasa de mortalidad fue más alta (8.8% vs 1.9%, $p < 0.001$). Los ingresos de emergencia (52%) excedieron a los ingresos electivos dentro del grupo de los pacientes mayores de edad. Cuarenta y cuatro (80%) de las 55 muertes en el grupo de mayores de edad fueron pacientes ingresados como emergencias en comparación con los ingresos electivos ($p < 0.001$). Se produjeron 11 fallecimientos entre las 296 admisiones electivas (3.7%) pero 44 muertes entre las 327 admisiones de emergencia (13.5%), una diferencia significativa en la tasa de mortalidad ($p < 0.001$). Por regla general, la tasa de mortalidad entre los hombres fue más alta. El cáncer fue el diagnóstico más común (21%) entre los ingre-

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sos y la causa más frecuente de las mortalidades. Los pasos para mejorar las oportunidades de ingreso temprano y optimizar la atención a pacientes quirúrgicos ancianos, no sólo redundaría en beneficio de estos últimos, sino que representaría también un paso importante hacia un uso más eficaz de recursos que están escasos.

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INTRODUCTION

The elderly have been defined as those persons 60 years and over (1) and constitute 6–13% of the population in developed (2, 3) and developing countries respectively (4). Their number in the Caribbean is expected to double the current level by the year 2025 (5). In 2001, 9.7% of the population in Jamaica were 60 years and older (6) and with a calculated life expectancy of 75.5 years (4), the burden on the healthcare system can be expected to increase.

It was estimated that half of the population over the age of 60 years will need surgery at some time during the remainder of their lives, mostly for hernia, cataract, prostate, gallbladder or hip diseases (7). The University Hospital of the West Indies (UHWI) is a 500 bed tertiary referral centre which admits patients directly or on referral from other institutions all across the island of 2.6 million people. This study was undertaken to document the numbers of elderly patients who require admission to the general surgical wards at the UHWI, to examine the outcome of their treatment and the effect on the use of hospital resources.

DESIGN AND METHODS

This was a prospective descriptive analytical study. Data were collected prospectively on all patients admitted consecutively to the general surgery wards of the UHWI during a 12-month period, using audit forms designed by the Section of Surgery. Biographical and clinical data were collected during each admission and an assessment of clinical status and progress following treatment was made at discharge. During the study period, the general surgery wards numbered 66 beds out of a total hospital complement of 500 and patients were admitted to them by general surgical, urological, neurosurgical and cardio-thoracic services. Orthopaedic, Otorhinolaryngology, and Ophthalmology patients are not admitted to the general surgery wards but to an independent specialist block and were not studied. Elderly patients were defined as those aged 60 years and over (1).

Data are expressed as frequencies, percentages or means ± standard deviation (SD). Differences between the elderly and non-elderly groups in gender, mortality rate, emergency admission rate and whether operated on or not, were examined using chi-square tests. Differences in mean hospital stay were analyzed using the Mann-Whitney U test. Data were recorded and analyzed using the Statistical Package for the Social Sciences (SPSS Version 11 Chicago, Illinois).

RESULTS

During the period of study, 2552 patients were admitted to the UHWI general surgery wards. Of these, data were available for 2375 (93%). Data were incomplete on 177 patients due to omissions in data recording and hence these are not included in the analysis. Of the 2375 eligible patients, 623 (26%) were aged 60 years and over and their characteristics are shown in Table 1. There were no differences in gender between the elderly and non-elderly patients. Of the 623 elderly patients admitted, 363 (58%) were males, but over the age of 80 years, females exceeded males. Significant differences between the elderly and non-elderly patients were that less of the elderly were emergency admissions (52% *vs* 64%, p # 0.001), more had surgery (68% *vs* 60%, p # 0.001), and their mortality rate was higher (8.8% *vs* 1.9%, (p # 0.01) than the non-elderly.

Table 1: Characteristics of patients admitted to the general surgery wards

Parameter	Elderly n = 623	Non-elderly n = 1752	Total n = 2375
% Males	58	58	58
% Emergency admissions	52*	64	61
% Surgery	68*	60	62
% Deaths	8.8*	1.9	3.7
Mean hospital stay (days) for survivors	11.5 ± 14.1*	8.0 ± 14.9	8.8 ± 14.8
Mean hospital stay (days) for mortalities	22.2 ± 24.0	25.2 ± 48.5	23.3 ± 34.5

* p # 0.001

Mean hospital stay was 11.5 ± 14.1 days for elderly patients who were discharged, but 8.0 ± 14.9 days, for patients below the age of 60 years admitted over the same period (p # 0.001). Among mortalities, mean hospital stay was 22.2 ± 24.0 days for elderly patients, not significantly different from younger patients in whom it was 25.2 ± 48.5 days.

Emergency admissions (52%) exceeded elective admissions in the elderly. Most patients (68.4%) had surgery before discharge or death and the majority of the study population were less than 75 years old. The age by gender distribution is shown in the Figure.

Admission and final diagnoses for the elderly patients are given in Table 2. Cancer formed the largest single diagnostic group on admission, constituting 135 patients (21%).

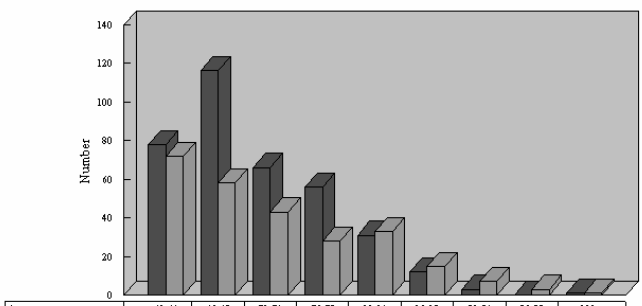

Figure: Frequency distribution of elderly patients by age and gender.

Table 2: Diagnosis of elderly patients

	Admission diagnosis	Final diagnosis (%)	Deaths
Total cancer	135	130 (21)	18
Genitourinary			
Non-malignant	106	107 (18)	2
Prostate enlargement	[50]	[53]	
Other	[56]	[54]	
Gastrointestinal			
Non-malignant	100	101 (17)	9
Intestinal obstruction	[35]	[28]	
Other	[65]	[73]	
Vascular	69	68 (11)	
Peripheral vascular disease	[48]	[48]	2
Abdominal aortic aneurysm	[21]	[20]	7
Hernia	47	48 (8)	0
Neurosurgical	41	39 (6)	3
Other	125	125 (20)	14
Total	**623**	**618***	**55**

*5 had no final diagnosis

This was evident in both surgically and non-surgically treated patients. Non-malignant conditions of the genitourinary (106) and gastrointestinal (100) systems were the next most common admission diagnoses, followed by peripheral vascular disease (48) and abdominal aortic aneurysms (21). Forty-seven patients were admitted with groin hernias and 41 with a variety of neurosurgical conditions. A total of 97 complications occurred in 35 patients, most often affecting the cardio-respiratory, gastrointestinal and genitourinary systems and the operation wounds (Table 3).

Fifty-five (8.8%) of 623 elderly patients died during their hospital stay compared with 34 deaths (1.9%) of 1752 patients below the age of 60 years ($p < 0.001$). Forty-four (80%) of the 55 deaths in the elderly occurred in those admitted as emergencies (Table 4). There were 11 deaths among the 296 elective admissions (3.7%) but 44 deaths among the 327 emergency admissions (13.5%), a significant difference in mortality rates ($p < 0.001$). Overall, the death rate for males was higher. Among mortalities, cancer was the most common diagnosis in both elective and emergency admissions (Table 4).

Table 3: Complications of elderly patients

Complication	Number
Cardiorespiratory (Pneumonia 9)	18
Gastrointestinal (Obstruction 9)	15
Genitourinary	13
Wound (Infection 11)	13
Others	38
Total (for 35 patients)	**97**

Table 4: Diagnosis of elderly patients who died

Group	Diagnosis	No died
Elective admission		
Operated	Cancer	5
	Miscellaneous	4
Non-operated	Cancer	1
	Miscellaneous	1
Emergency admission		
Operated	Cancer	7
	Aortic aneurysm	3
	Complicated peptic ulcer	2
	Acute cholecystitis	2
	Miscellaneous	6
Non-operated	Cancer	5
	Intestinal obstruction	4
	Miscellaneous	15
Total		**55**

DISCUSSION

Even though only 9.7% of the Jamaican population are 60 years and older (6), this age group accounted for 26.2% of total admissions to the general surgery wards, perhaps because of an increasing incidence of disease with advancing age. This disproportionate utilization of healthcare resources amongst the elderly is in keeping with other studies (3, 7, 8). The tendency seen here for males to exceed females is not as evident in some reports (9) but has been noted in others (10). In the present study, this preponderance was seen below the age of 80 years and seems to represent a smaller need for in-hospital surgical care among females, commensurate with their relatively greater longevity.

The high proportion of unscheduled admissions (52%) is not unusual (9) but in this study the situation may have been exaggerated by other factors. Elective operating time and bed complement have both been reduced in recent years as a result of staff shortages and financial constraints, thereby turning many potential elective admissions into emergen-

cies. The situation has been further aggravated by a nationwide inadequacy of facilities for satisfactory outpatient investigation. As a result, some persons including the poor and those who live away from urban centres must be admitted for assessment before treatment decisions can be made, prolonging hospital stay.

Mean hospital stay for elderly patients in this study was 11.5 days, significantly longer than younger patients over the same period. This contradicted a report by Dunlop *et al* (11) but was consistent with the findings of others (9, 12–14), suggesting that the elderly significantly over-utilized resources when compared to the younger population, at least with regard to the period of hospitalization. Also, co-morbidity amongst the elderly requires healthcare management over longer periods and are the major contributors to healthcare costs (15).

This did not hold true for those elderly patients who eventually died in hospital. Higher treatment costs for elderly patients seen in the Casualty department of this hospital have been documented by Weaver (16). It has been shown that the severity of illness is more clearly associated with length of stay in hospital than is age (11). While it was not possible to make this comparison in this study, the data suggest an apparent relationship between age and length of hospitalization for those who were discharged but not for those who died in hospital.

Cancer, the second most common cause of death recorded in Jamaica (17) was the most common diagnosis among admissions, whether or not they were operated on. Next in frequency were genitourinary and gastrointestinal conditions, with vascular disease, peripheral and aortic, accounting for a significant proportion of those admitted. The latter was also noted elsewhere (18). Cancer was also the most common diagnosis among those who died in hospital.

Two-thirds of those admitted underwent surgery, a proportion similar to that reported elsewhere (9). This rate compares favourably with the operation rate for younger patients in the UHWI who are operated on in 60% of their admissions. This may reflect a more practical policy when addressing the surgical needs of the elderly patient.

In the 5.6% of patients with complications in this study, it was the cardiorespiratory and gastrointestinal systems which were mainly involved. The respiratory and cardiovascular systems are usually the most commonly affected (19, 20). Complications are more common with advancing age in surgical patients (21) but this is related more to co-existing disease, emergency surgery, and severity of illness than to age alone (8, 10, 20, 22). Pre-operative assessment of patients (21, 23) and the avoidance of emergency surgery (14, 20, 24) can result in a reduction of the complication rate as well as greater efficiency in the utilization of resources (13). This is a direction which, in our circumstances, deserves further exploration.

The elderly accounted for more than half the total deaths among inpatients on the general surgery wards during the study period. While the mortality rate for the elderly patients was significantly higher than for younger patients, 80% of the deaths among the elderly occurred in those admitted as emergencies. Males were disproportionately represented among the mortalities, suggesting that they were more severely affected, suffered from more lethal conditions or were in poorer general health.

There are several possible reasons for the higher mortality among the elderly. A closer examination of the deaths shows that cancer was the most common diagnosis in all groups, elective and emergency admissions, operated and non-operated patients. It may be that some of those admitted had terminal malignant disease, their deaths being no direct reflection on surgical management. Aortic aneurysm and intestinal obstruction are conditions known to have a relatively high mortality, particularly with a leak in the former (25) and peritonitis in the latter (26). These findings may also reflect greater severity of illness in elderly patients compounded by restrictions on their access to elective surgical care. Emergency admission and surgery are known to be associated with increased mortality (9, 14, 20, 24). The 3.7% mortality for elective admissions is in keeping with other published reports about elective surgery in this age group (9, 20).

Unfortunately, data related to diagnosis, cause and age at mortality in the non-elderly were not collected and hence are not available for comparison. This is a limitation of this study. The authors conclude that the elderly constitute an important proportion of the patients presenting for surgical treatment, the outcome of which may have been adversely affected by the high proportion of emergency admissions. Unfortunately, the elderly are sometimes seen as being at the end of their lives and therefore not a priority when competing for healthcare. They may be in danger of further discrimination or neglect if it is not realized that their surgical problems are usually treatable (24) and that age alone is not an indication that their illness should be left untreated or that treatment is a waste of resources (11, 27). Admission policies regarding the elderly are the same as those employed for younger patients at the UHWI. Despite this, steps to improve the identification of the elderly at risk, and their opportunities for earlier admission, assessment and optimization would not only benefit them but would be an important step towards a more efficient use of already scarce resources.

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