

seen in Kampala, Uganda.

J Njoroge M Med (Surg)

I Kakande M Med (Surg)

S. Kaggwa M Med (Surg)

Department of Surgery, Makerere University,

P O Box 7072, Kampala, UGANDA.

A cross sectional descriptive prospective study was conducted at three of Kampala's main hospitals with the aim of determining the pattern of major surgery among the elderly and aged patients over a six months period from 1st July to 31st December 1999. In the study, patients aged between 65 and 74 years were regarded as elderly while those aged 75 years and above were considered aged.

A total of 196 patients were included in the study. There were 152 (75.5%) males and 46 (23.5%) females (M: F=3:1). More elderly patients than the aged were operated on. Only 25.3% of the emergencies. Operations on the gastrointestinal tract were the commonest and accounted for 36.9% of cases, followed by surgery of the genitourinary (30.8%) and cardiovascular (13.1%) systems. In 63% of cases, the operations were palliative.

Wound sepsis was the commonest post-operative complication and accounted for 17.8% of all complications. There were 19 deaths, an overall mortality rate of 9.6%. Thirteen (68.4%) of all deaths occurred after operations on the gastrointestinal tract. The mean hospital stay was 11.6 days for both the

elderly and aged. Both the short and long term outcome of both emergency and elective operations were good. The study confirmed that age should not be a contraindication to surgery.

Introduction

It has been estimated that 50% of men and women who reach the sixth and seventh decades of life require surgery before they die. In categorizing age groups in the old population, the UK population Census and Survey Centre defined persons aged 65-74 years as the elderly or the old and those older than 75 years as aged¹. The 1991 Uganda population census reflected a total population of 16,671,705 people. Persons aged 65 years and above constituted 3.5% of this population. The average annual growth rate of persons aged 65-74 (1969-1991 census) was 3.9% while for the population of persons aged 75 years and above was reflected as 1.34% of the total population². The projected mortality rates (1991-2016) for elderly persons was 380,193 whereas for the aged (75 years and above) it was 128,203, with due consideration of the HIV / AIDS scenario. Miettinen et al³, in assessing the outcomes of the elderly after operation for acute abdomen, concluded that their short term outcome of emergency and elective abdominal operations is good in benign diseases and

therefore active surgery is justified. Factors that affect the outcome of surgery among the elderly and aged include:

- a) Patient factors such as age, sex, obesity, nutritional status and anaemia,
- b) Pre-operative medical, anaesthetic and surgical assessments,
- c) The surgeon and surgical technique and pre-operative preparation.

The main aim of this study was to determine the pattern of surgery and factors that influence the outcome of surgical management among the elderly and the aged treated in Kampala, Uganda.

Material and methods

The study was conducted in Mulago Hospital, St. Francis Hospital Nsambya and Mengo Hospital all the three in Kampala between 1st July and 31st December 1999. The study was a cross sectional and descriptive prospective study. Included in the study were all male and female patients aged 65 years and above who underwent major general surgical, urologic, orthopaedic, otolaryngeal, and neurosurgical operations under general or spinal anaesthesia and gave an informed consent for inclusion in the study. The study group was divided into two groups, the elderly or old patients

who were aged 65 to 74 years and the aged 75 years and above. Data collected included personal information, reasons for admission, results of general and specific investigations, pre-operative assessment, mode of treatment, outcome of surgery, and duration of hospital stay. Patients were also divided into two categories based on whether the operations performed were emergency or elective. The collected data was recorded in a special questionnaire form. Laboratory and radiographic investigations carried out included the full haemogram, blood sugar, urea and electrolytes. Electrocardiograms were done in patients who had elective surgery. The sample size was calculated using a formula by Keish and Leslie¹². Data collected was analysed using Epi-info soft ware. Data was summarised in form of percentages and tabular charts. Probability values (p-values) were calculated where the strength of association was required.

Results

Of the 198 patients included in the study, 152 were males and 46 were females, a male to female ratio of 3:1. One hundred and twenty six (63.6%) of the patients were elderly while the remaining 72 (36.4%) were aged. The majority of the patients (74.7%) had elective surgery Table 1.

Table 1. Age and sex distribution of elderly and aged patients.

AGE IN YEARS	Emergency		Elective		Total	% of Total
	Male	Female	Male	Female		
65-74 (Elderly)	27	6	71	22	126	63.6
75+ (Aged)	13	4	41	14	72	36.4
Total	40	10	112	36	198	100

BODY SYSTEM OPERATED

Table 2 shows the body system for which surgery was performed. The gastrointestinal (GIT) and genitourinary (GU) systems accounted for 36.9% and 30.3% respectively. Table 3 shows the gastrointestinal operative diagnosis. Complicated hernias and sigmoid volvulus respectively accounted for 13.6% and 7.6% of the total

number of cases operated. Other conditions included oesophageal carcinoma (7.6%) and colonic tumours (4.6%). In both the elderly and aged, 26.2% of the GIT operations were due to obstructive lesions. Table 4 shows the type of GIT operation done. In both the elderly and aged, 26.2% of the GIT operations were due to obstructive lesions.

Table 2. Body system involved in the surgical pathology.

Body System	EMERGENCIES		ELECTIVES		Total No.	%
	Elderly	Aged	Elderly	Aged		
Gastrointestinal	25	14	33	16	88	44.4
Genitourinary	0	0	36	24	60	30.3
Orthopaedics / Fractures	3	0	8	5	16	8.1
Cardiothoacic / Vascular	4	0	4	3	11	5.6
Hepatobiliary	0	0	5	2	7	3.5
Neurological	0	2	0	0	2	1.0
Miscellaneous	0	0	6	5	11	5.6
Total	33	17	93	55	198	100

Table 4 shows the type of GIT operation done. Resection, anastomosis and herniorrhaphy for complicated hernias which resection and Hartmann's colostomy were performed.

Table 3 Gastrointestinal indications for surgery

Diagnosis	Emergency		Elective		Total	% of total
	Elderly	Aged	Elderly	Aged		
Complicated hernias	8	7	6	6	27	13.6
Simple hernias	0	0	3	1	4	2.0
Complicated sigmoid volvulus	9	6	0	0	15	7.6
Simple sigmoid volvulus	3	3	0	0	6	3.0
Redundant sigmoid colon	0	0	5	2	7	3.5
Colonic tumours	3	0	2	4	9	4.6
Gastric tumours	0	0	5	0	5	2.5
Total	23	16	21	13	73	36.8

Sixty (30.3%) of the patients had elective surgery for genitourinary disorders. There were 35 (17.7%) cases of benign prostatic hyperplasia (BPH) for which open prostatectomy was done (Tables 5 and 6). Of the 16 (8.1%) patients who had surgery for musculoskeletal system, 13 had fractures of the long bones and 2 had spinal injuries. Six (3.0%) and 5 (2.5%) of the patients respectively had surgery for diabetic foot and gangrene due to peripheral vascular disease. Thirty-seven patients (18.6%) had co-existing medical conditions before surgery. There were 22 (11.1%) cases of hypertension and 14 (7.0%) of anaemia. One patient had diabetes. Only two patients admitted being smokers. Seventy-two (36.4%) of the patient had post-operative complications of which wound sepsis was seen in 35 (17.8%) of them. Six patients (3.0%) developed confusion state. There was only one case of pulmonary embolism (Table 7).

Complications were more in the elective (33.8%) than in the emergency (10.1%) operations but the difference was not statistically significant (p value = 0.19). There were 19 deaths; an overall mortality rate of 9.6%. Among the 126 elderly patients, there were 15 deaths (11.9% Mortality) while among the aged, 4 died (5.6% mortality). The mortality rate for the emergencies was 18% and 6.8% for the electives. Four deaths (21.1%) occurred in the first 24 hours, 8 (42.1%) in 24-48 hours and 7 (36.8%) died more than 7 days after surgery. The GIT conditions accounted for 15 (68.4%) of the deaths; seven had GIT tumours while the other six were sigmoid volvulus cases. Three of the deaths occurred after elective operations for BPH. The average hospital stay for emergency operation cases was 9.1 days as compared with an average of 12.5 days for the elective operations.

Table 4. Operations performed for GIT conditions

Operative procedure	Emergencies		Electives		Total	%
	Elderly	Aged	Elderly	Aged		
Resection & anastomosis + herniorrhaphy	8	7	6	6	27	13.6
Herniorrhaphy alone	0	0	3	1	4	2.0
Hartmann's colostomy for complicated volvulus	9	6	0	0	15	7.6
Derotation - simple volvulus	3	3	0	0	6	3.0
Sigmoid colectomy for Redundant Sigmoid	0	0	5	2	7	3.5
Hemicolectomy for colonic tumour	3	0	2	4	9	4.6
Polya gastrectomy for gastric tumours	0	0	1	0	1	0.5
Gastrojejunostomy for gastric tumours	0	0	4	0	4	2.0

Table 5. Genitourinary Diagnosis.

Diagnosis	Emergencies		Electives		Total	%
	Elderly	Aged	Elderly	Aged		
BPH	0	0	19	16	35	17.7
Ca prostate	0	0	13	6	19	9.6
Urethral stricture	0	0	3	2	5	2.5
Ca Penis	0	0	1	0	1	0.5
Total	0	0	36	24	60	30.3

Table 6. Genitourinary operative procedures.

Diagnosis	Emergencies		Electives		Total	%
	Elderly	Aged	Elderly	Aged		
Open Prostatectomy for BPH	0	0	19	16	35	17.7
Orchidectomy for Ca Prostate	0	0	13	6	19	9.6
Urethroplasty for strictures	0	0	3	2	5	2.5
Penile amputation	0	0	1	0	1	0.5
Total	0	0	36	24	60	30.3

Table 7. Postoperative complications in the elderly and aged.

Complication	Emergencies		Electives		Total	%
	Elderly	Aged	Elderly	Aged		
Wound infection	4	4	20	7	35	17.7
Wound dehiscence	2	0	4	0	6	3.0
Fever	0	1	2	3	6	3.0
Confusion state	1	1	4	0	6	3.0
Shock	0	0	0	3	3	1.5
ARS	2	0	0	1	3	1.5
Pneumonia	0	0	3	0	3	1.5
Pulmonary embolism	0	0	0	1	1	0.5
Renal failure	0	0	2	0	2	1.0
Acute urinary retention	0	0	1	0	1	0.5
Urinary tract infection	0	0	1	0	1	0.5
GIT fistula	1	0	0	0	1	0.5
Peritonitis	3	1	0	0	4	2.0
Total	13	7	37	15	72	36.4

Discussion

This study showed that in the three Kampala hospitals of Mulago, Nsambya and Mengo, 75% of the operations among the elderly and aged were elective. Males outnumbered the females by a ratio of 4 to 1 but in this study, cases undergoing gynaecological operations were excluded. Barlow et al¹ looked at the outcome of major surgery among 2697 elderly and 402 aged patients during the years 1968/9, 1975/6 and 1985/6. Their male to female ratio was 2:1. Linn and Linn⁴, in their evaluation of results of surgical procedures in the elderly and aged, reviewed 108 articles starting from late 1930 and found that the overall deaths of general surgery especially in elective surgery, had increased over the years. That increase was probably a reflection of increase in elective surgery with the rate in emergency surgery tending to decrease.

In the present study, gastrointestinal operations were the commonest. Farugi et al⁵ had similar findings. Barlow et al¹, in their study on the changing patterns of general surgery in the elderly and aged, found that most gastrointestinal emergencies were due to obstructive malignant lesions rather than incarcerated hernias. However, their study did not indicate the specific sites of the malignancy. In contrast to the findings in our study, Barlow et al¹ and Seymour and Vaz⁶ found that genitourinary (GU) surgery were operations were more common than gastrointestinal operations. In this study all patient who underwent elective GU surgery were males, 36 (60%) of them elderly and 24 (40%) aged. Open prostatectomy for benign prostatic hyperplasia (BPH) was the commonest operation of the genitourinary system.

In their study, Barlow et al¹ found that 48.5% of the GU emergencies were due to acute retention of urine secondary to BPH, and prostatic resections were done during the admissions. Farugi et al⁵ also showed that there was an increase

in redesignation of prostatectomy from open transvesical to transurethral prostatectomy.

Fractures, diabetic foot and peripheral vascular disease causing gangrene were other indications for surgery among our patients. A total of 39 (19.6%) of the patients under review had co-existing diseases. In their study, Seymour and Vaz found that a third of their patients had co-existing respiratory diseases, 1-3% had myocardial infarction, and 5-10% suffered heart failure while another 2-5% had renal disease. All those co-existing diseases contributed to their mortality.

The rate of post-operative complications in our cases was 36.4%. Most of them occurred in the elderly patients who had elective surgery but the difference was not statistically significant (p -value = 0.19). Wound infections were seen in 17.8% of our patients. Only 3.0% each had respiratory and neurological complications. In their studies, Seymour and Vas⁶ and Miettinen et al³ reported that most complications followed the emergency more than in the elective surgical procedures. Other studies from elsewhere have shown that most complications involve the respiratory and cardiovascular systems^{6,7}.

The mean duration of post-operative stay for patients who had elective surgery was longer (12.52 days) than that for emergency operations (9.81 days). The difference was statistically significant (p -value = 0.02). The mean post-operative stay was also longer (13.56 days) than for the aged (10.36 days) and this difference was also of statistical significance (p =0.021).

There was no statistically significant difference in the mortality rate among the elderly (7.6%) and the aged (2.0%). More deaths occurred among the elective (5.1%) than in the emergency operation cases (4.5%) but the difference was statistically insignificant (p =0.089). Barlow et al¹ found an average mortality rate of 7.8% in the

elderly and 5.6% in the aged. Most deaths (68.4%) recorded in the present study were related to gastrointestinal surgery. Only seven of the 19 deaths had post-mortems performed. In those seven, the causes of deaths were recorded as hypovolaemic shock (3 cases), renal failure (2 cases), pneumonia (1 case) and pulmonary embolism (1 case). In their studies, Farugi et al⁵, Carp⁹ and Gilchrist et al¹⁰ reported that 50% deaths in the elderly and aged in UK were associated with respiratory infection, myocardial infarction heart failure, deep vein thrombosis, pulmonary embolization and renal failure. Although no prophylactic anticoagulants were given to our patients, only one death was attributable to pulmonary embolism.

This study has shown that provided pre-operative medical, anaesthetic and surgical assessments and investigations are done properly and any co-existing conditions handled appropriately,

surgery among the elderly and aged is safe. Old age per se should not be a contraindication to both emergency and elective surgery.

References

1. Barlow A P, Graham R. Changing patterns of surgery in the elderly. *J Roy Coll Surg Edinb* 1988; 33:182-184.
2. Ministry of Finance and Economic planning, Uganda. Population and Housing Census 1991 Analytical report. Vol 1: 27- 30, 78-80.
3. Miettinen P, Pasanen P, Salonen A, Lahtinen J, Alhava E. The outcome of elderly patients after operation for acute abdomen. *Ann Chir Gynaecol* 1996; 85:11-5.
4. Linn B S, Linn M. Evaluation results of surgical procedures in the elderly. *Ann Surg* 1982; 195:91-96.
5. Farugi R, Galland R B, Williams J. An audit of surgical emergencies in the very old. *Ann Roy Coll Surg England* 1991; 73:285-288.
6. Seymour D G, Vaz F G. A prospective study of elderly general patients and postoperative complications in aged. 1989; 18: 316-326.
7. Diana G, Gatanzaro M, Gvercio G. The prognosis of surgery in the elderly: Proposal for parameter evaluation. *Minerva in Chir* 1998; 53:251.
8. Cutler C W. Emergency geriatric surgery admissions. *Ann Surg* 1947; 126:763-7.
9. Carp L. Mortality in geriatric surgery. *Brit Med J* 1950; 2:1198-1201.
10. Gilchrist R, de Pyeyster F. Mortality in geriatric surgery. *Surg Clin North Amer* 1980; 60: 1391.