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SURGICAL ADMISSIONS TO THE RIFT VALLEY PROVINCIAL GENERAL HOSPITAL, KENYA

N Masiira-Mukasa, MBChB (Muk), MMed (Surg), Consultant Surgeon, Rift Valley Surgical Consultation Clinic, P.O. Box 10178, Nakuru and B.R. Ombito, MBChB (UoN) MMed (Surg), Consultant Surgeon, Rift Valley Provincial General Hospital, P.O. Box 71, Nakuru, Kenya

Request for reprints to: Dr. N. Masiira-Mukasa, Consultant Surgeon, Rift Valley Surgical Consultation Clinic, P.O. Box 10178, Nakuru, Kenya

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N. MASIIRA-MUKASA and B.R. OMBITO

ABSTRACT

Objective: To describe the pattern of surgical admissions to the Rift Valley Provincial General Hospital and in particular the epidemiologic characteristics of trauma admissions.

Design: Retrospective study.

Setting: Rift Valley Provincial General Hospital, Nakuru from (1st January 1998 – 31st December 1999).

Subjects: All patients admitted to the various surgical wards (excluding eye-patients) during the stated period and whose medical records were available and complete.

Methods: Medical records of all surgical patients admitted during the period of study were retrieved using admission data from casualty, surgical out-patient and Annex Hospital registers. Further medical data were obtained from wards admission registers, nurses report books and records from theatre and radiology books. A special data-form was used to collect the required information. The data was subjected to simple statistical analysis.

Results: There were 5907 surgical admissions of whom 3411 cases seventy three point five percent were trauma admissions, 1499 cases (25.4%) were non-traumatic emergency surgical admissions and 997 cases (16.8%) were elective surgical admissions. 73.5% of all trauma admissions were males and 57.6% were in the 21-60 year age-group. The most common injuries were soft-tissue injuries, fractures, burn injuries and head injuries, while the leading causes of trauma were road traffic accidents (32.7%), assaults (23.8%), falls (15.5%) and burns (13%). Fifty one point seven percent of all performed surgical operations were trauma-related. The mean length of hospital stay for trauma patients was 10.4 days. Trauma was the leading cause of death (6.6%) among all surgical admissions.

Conclusion: Trauma, particularly due to road traffic accidents and violence is a growing public health problem in this region that urgently calls for specific intervention measures. Further studies of disability levels as well as costs of trauma care are recommended.

INTRODUCTION

Disease incidence studies in our region present formidable challenges to researchers, not only because of the scarcity of population-based data, but also because of inadequate documentation, poor records, hospital overcrowding and lack of research funding. Notwithstanding, a number of hospital-based studies, notably on causes of surgical admissions have been undertaken in this region the majority being mainly trauma-related(1-8).

The usefulness of surgical admissions data as a reflection of surgical disorders in our region is generally limited, not only because of the relatively large numbers of surgical patients who do not normally seek hospital treatment(2,9), but also because the pattern of surgical diseases amongst patients seeking hospital treatment may not necessarily represent the disease patterns in the region. The absence of population based data however, makes surgical admission studies the only

source of easily available data on surgical disorders in this region.

A number of studies undertaken in this region in the recent past have documented the increasing importance of trauma not only as a major cause of surgical admissions, but also as a significant cause of morbidity, mortality and serious permanent disability as well(1-3,5,6,10,11).

In Kenya there is evidence of a steady increase in the number of injuries particularly from road-traffic accidents(2,5,10) and violence(5,12). Indeed trauma from all causes is ranked as the fifth commonest cause of hospital admissions in this country behind malaria, child delivery, pneumonia and diarrhoeal diseases(13).

Nordberg estimated injuries from all causes to be the fifth commonest disease in the East African region behind diarrhoeal diseases, malaria, pneumonia and tuberculosis(2).

Trauma is important to our region not only because of the morbidity, mortality and the financial

burden it exerts on individuals, families and communities (especially given the extended nature of most of our local family structures), but also because of the huge financial burden it exerts on the economy in terms of loss of production, hospital and insurance costs, vehicle maintenance and disability costs(1,2,5,10,14).

Rift Valley Provincial General Hospital has a very high rate of trauma admissions, probably related to its proximity to the busy Trans-African Highway as well as its position as the main referral hospital of a region recently affected by serious political and inter-ethnic violence.

The objective of this study was to document the pattern of surgical admissions to the Rift Valley Provincial General Hospital with particular emphasis on trauma admissions.

MATERIALS AND METHODS

Rift Valley Provincial General Hospital is a 650-bed public hospital located in Nakuru Town approximately 160km West of Nairobi along the eastern end of the Trans-African Highway. It is the third largest hospital in Kenya and the main referral hospital for the entire Rift Valley Province; a region with an estimated population of 7 million people. The Department of Surgery is the largest department of the hospital with approximately 200 beds.

The study involved retrieving medical records of all surgical patients who were admitted to various surgical wards between January 1st 1998 and December 31st 1999, using admission data from casualty, surgical out-patient, and Annex Hospital registers.

Records were analysed for age, sex, diagnosis, date of admission, investigations, operation/anaesthesia (where applicable), surgeon, immediate post-operative complications and date of discharge/abscond/death. In cases where the retrieved medical records did not contain all the necessary data, the missing information was looked for from wards admission registers, nurses report books, theatre operation registers and radiology record books. Only those patients whose medical records were available and complete were included in the study. All patients whose required medical data was incomplete or whose files were missing were excluded from the study as were patients with eye diseases including eye trauma.

A special data form was used to collect and record the required information. All data was collected and recorded personally by the authors. The data was then subjected to simple statistical analysis.

RESULTS

During a two-year period between 1st January 1998 and 31st December 1999, a total of 6,415 surgical patients were admitted to various surgical wards of the Rift Valley Provincial General Hospital. However medical records for 508 surgical admissions (7.9%) were either unavailable, or found to be incomplete. The study therefore was based on 5,907 surgical admissions (92.1%) whose medical records were complete and

available, and who, for the purpose of this study, were classified into three admission categories. Table 1 shows the distribution of surgical admissions according to admission categories.

Table 1

Distribution of surgical admissions

Admission category	Number of cases	%
Trauma admissions	3,411	57.7
Non-traumatic emergency surgical admissions	1,499	25.4
Elective surgical admissions	997	16.9
Total	5,907	100

Three thousand four hundred and eleven admissions (57.7%) were due to trauma, 1,499 admissions (25.4%) were due to non-traumatic surgical emergencies and 997 admissions (16.9%) were for elective surgical procedures. Seventy three point five percent (2,508 cases) of all trauma admissions were males, and 26.5 % (903 cases) females; giving a male: female ratio of 2.7: 1. Their ages ranged from three days to 103 years; with a mean age of 25.6 years for males and 24.2 years for females. The age-distribution shown in Figure 1 and to a lesser extent the age/sex distribution analysis given in Figure 2 shows two peaks, at 0-10 years age-group and 21-30 years age bracket. Fifty seven point six percent of all trauma patients were in the economically active age-group of 21-60 years. From the peak of 21-30 years, trauma incidence declined markedly with increasing age so that less than 10% of all injuries occurred in patients aged 60 years and above.

Figure 1

Age distribution - trauma admissions

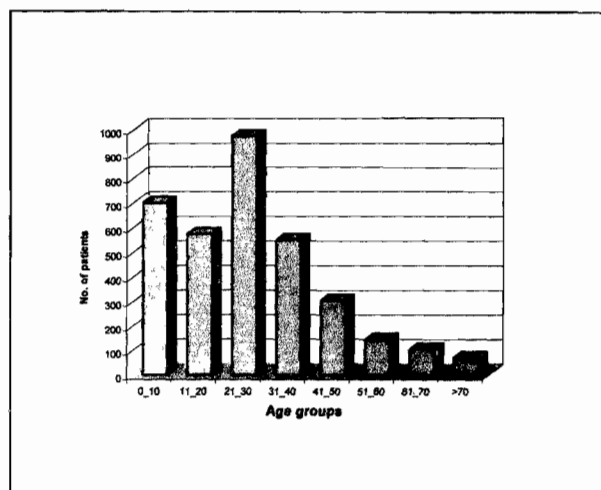


Figure 2

Age/sex distribution - trauma admissions

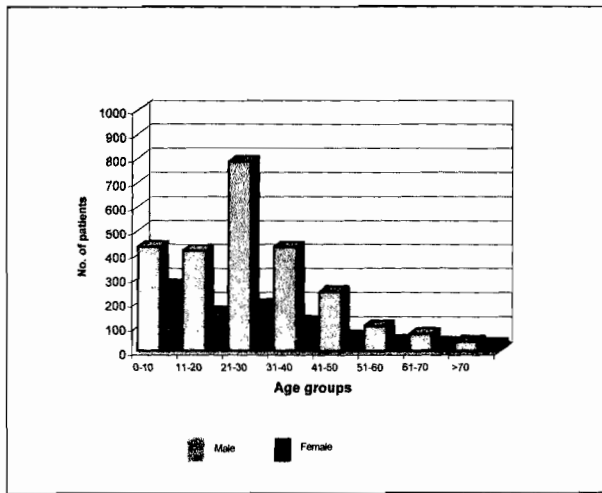


Table 2

Main types of traumatic injuries

Type of injury	Number of cases	%
Soft tissue injuries	1,151	19.5
Fractures and dislocations (other than skull or spine)	791	13.4
Burn injuries	442	7.5
Head injuries	412	7.0
Internal injuries	202	3.4
Multiple injuries	154	2.6
Foreign body injuries	126	2.1
Spinal injuries	59	1.0
Snake bites	51	0.8
Others	23	0.4
Total	3,411	57.7

As indicated in Table 2, soft-tissue injuries were the most common type of injuries (approximately one-third of all injuries), followed by fractures and dislocations (approximately one-quarter), burn injuries (approximately one eighth) and head injuries (slightly under one-eighth).

Other important but relatively less common types of injuries documented were those caused by foreign bodies and snake-bites, as well as multiple injuries.

The significance of multiple injuries lay in their relatively high morbidity and mortality as well as long hospital stay.

Spinal injuries included subluxations, dislocations, fractures and fracture-dislocation with or without spinal-cord injury, the majority of which were due to road traffic accidents and falls and occurred predominantly in male young adults.

Road-traffic accidents were the leading cause of trauma in this study accounting for 32.7% of all injuries (Table 3). Assault was the next most frequent cause of injuries (23.8%), followed by falls (15.5%) and burns (13%).

Whereas road-traffic accidents, assaults and falls affected mainly young males in the 20-40 year age-group, burn injuries and to a lesser extent foreign-body injuries, affected mainly the 0-10 year age-group. Occupational injuries occurred exclusively among young males and were mainly factory-related, though a few were from commercial farms and "Jua-Kali" workshops and garages. Snake-bites and animal-related injuries occurred predominantly in young children and adult women particularly from rural areas.

Table 4 gives the breakdown of performed surgical operations among all surgical admissions. Two thousand nine hundred thirty five admitted surgical patients (49.6%) underwent one or more surgical operations, of which 51.7% (1,518 cases) were trauma-related surgical operations. Sixty five point five percent (995 cases) of all trauma-related surgical operations were minor operations the majority of which were carried out either

Table 3

Main causes of trauma

Cause of trauma	Male	%	Female	%	Total	%
Road traffic accidents	835	24.5	279	8.2	1114	32.7
Assault	695	20.4	115	3.4	810	23.8
Falls	349	10.2	180	5.3	529	15.5
Burns	265	7.8	177	5.2	442	13
Struck by objects	113	3.3	27	0.8	140	4.1
Foreign bodies	78	2.3	48	1.4	126	3.7
Self inflicted	51	1.5	7	0.2	58	1.7
Snake bites	21	0.6	30	0.9	51	1.5
Machinery/industrial	50	1.4	0	0.0	50	1.4
Animals	19	0.5	21	0.6	40	1.1
Sports-related	10	0.3	0	0.0	10	0.3
Miscellaneous	22	0.7	19	0.5	41	1.2
Total	2508	73.5	903	26.5	3411	100

Table 4*Performed surgical operations*

Admission category	Minor operations		Intermediate operations		Major operations		Total number of cases	
	No. of cases	%	No. of cases	%	No. of cases	%	of cases	%
Trauma admissions	995	33.9	288	9.8	235	8.0	1,518	51.7
Non-traumatic emergency surgical admissions	418	14.2	215	7.4	128	4.4	761	26.0
Elective surgical admissions	86	3.0	401	13.6	169	5.7	656	22.3
Total	1499	51.1	904	30.8	532	18.1	2,935	100

Table 5*Mortality by Admission categories*

Admission category	Number of cases	Number of deaths	Mortality %
Trauma admissions	3,411	227	6.65
Non-traumatic emergency surgical admissions	1,499	95	6.3
Elective surgical admissions	997	53	5.3
Total	5,907	375	6.3

at the casualty or on the ward under local anaesthesia and/or sedation.

There were 227 trauma-related deaths in this study (mortality of 6.6%), 95 deaths amongst non-traumatic surgical emergencies (mortality of 6.3 %) and 53 deaths amongst elective surgical admissions (mortality of 5.3%). The overall mortality for all surgical wards was 6.3%. Eighty three percent of trauma-related deaths were males; the leading causes of death being assault (32.2%), road-traffic accidents (30.6%), burns (22.2%) and falls (8.4%). There were seven deaths resulting from unintentional injuries by missiles and falling objects, two from foreign-bodies in the bronchi, two from snake-bites and one animal-related death. The mean length of hospital stay for trauma patients was 10.4 days. The mean length of stay for non-traumatic surgical emergencies was 6.4 days, and that for elective surgical admissions was 11.3 days. The mean length of hospital stay for all admitted surgical patients was 9.5 days.

DISCUSSION

Studies of surgical admissions in our region have been relatively few considering the amount of surgical

work carried out in most of our hospitals, particularly in urban centres. However, their importance as indicators of surgical disorders in our region cannot be over-stated given the existing lack of population based surgical data. The generally poor quality of data found in most of our hospitals, in particular missing or incomplete medical records, and inaccurate or incomplete clinical diagnosis(1,2,5,10,15) presents a serious impediment to most surgical admission studies. However their simplicity and relative low costs, makes them an important source of readily accessible data on surgical disease patterns.

Whilst the extent and causes of trauma in most developed countries are well known and documented(2,12), the same cannot be said of our local situation. However, with the growing evidence of a steady increase in the number of injuries in this country, particularly from road-traffic accidents(5,10), and violence(5,9,12), the need for comprehensive study of trauma epidemiology, prevention and control has considerably grown.

Several factors prompted us to undertake a trauma-related study at the Rift Valley Provincial General Hospital, namely; the apparent high rate of trauma admissions to this hospital, the general perception among surgeons working at this hospital that most of their surgical work was largely trauma-related, and the need to obtain reliable epidemiological data on trauma in this region.

Results from this study shows trauma to be the commonest cause of surgical admissions to the Rift Valley Provincial General Hospital, accounting for 57.7 % of all surgical admissions. This incidence is higher than the 55% reported by Nyarango at Kitale District Hospital(8), the 42% reported by Haq at the Coast General Hospital(7), or the 35.4% found by Ghebrat at Gondar Teaching Hospital in North Western Ethiopia(4). A number of factors may have been responsible for the high rate of trauma admissions to the Rift Valley Provincial General Hospital; notably its proximity to the busy Trans-African Highway, the political and inter-ethnic violence which recently affected

several parts of this region, particularly Nakuru District and its environs and a general increase in the number of patients seeking treatment at this hospital particularly surgical patients which accompanied the marked improvement in the delivery of health care that followed the introduction of cost-sharing programme by the government(13).

Like what has been observed elsewhere(1-3,5,10,16), results from this study shows the majority of trauma patients to be predominantly males in the economically-active age group of 21-60 years with a peak at 21-30 years. We attributed this male predominance to male domination of most of the hazardous occupations, as well as their increased susceptibility to assaults and this presented a significant depletion of economically productive population. On the other hand, the high incidence of trauma we found among the 0-10 year age-group and which has also been observed in similar studies elsewhere(1,2,6,17-20) was largely as a result of domestic injuries such as burns, falls, and foreign-bodies and to a lesser extent to road-traffic accidents all of which in our view were largely preventable.

Soft-tissue injuries were the most common type of injuries observed in this study, followed by fractures, burn injuries and head injuries. Nyarango(8) and Ruta *et al*(1) reported a similar distribution of injuries.

Over two-thirds of all fractures (excluding the head and spine), occurred in males. Lower limbs were involved in 52% of all fractures and dislocations, and upper limbs in 20%, most of which were managed by plaster casts. Open reduction and internal fixation was carried out in 12% of all fractures and dislocations. The majority of burn injuries in this study were due to domestic scalding, and in line with findings from other comparable studies(1,17,19), occurred predominantly in children below ten years of age.

Nearly three-quarters of all head injuries occurred in male young adults, 42.2% of which were as a result of road traffic accidents, 38% as a result of assaults and 14.5% as a result of falls. Similar results have been observed elsewhere (3). Approximately 49% of all head injuries required some form of surgical intervention ranging from simple suture of scalp wounds under local anaesthesia to evacuation of intracranial haematoma under general anaesthesia.

The commonest causes of trauma were road-traffic accidents (RTAs) (32.7%), assaults (23.8%), falls (15.5%) and burns (13%) (Table 5). These causes differ slightly from those observed in comparable studies elsewhere(2,5,9).

RTAs are an important cause of morbidity, mortality and disability and are estimated to comprise between 45% and 60% of all admissions in surgical wards in this country and upto 75% in the National Spinal Injury Hospital(10). The majority of RTA victims in our study were male young adults though we also observed a number of school-going children as well.

It was not possible for us to establish the most common types of vehicles involved in RTAs as this information was not included in the admission records. Clearly the proximity of the Rift Valley Provincial General Hospital to the busy Nairobi-Nakuru-Kisumu (or Eldoret) road which is part of the Trans-African Highway, contributed significantly to the high RTA-related trauma admissions to this hospital, though being a regional referral centre, a number of RTAs victims were also admitted from other areas of the Rift Valley Province.

We found the majority of assaults in this study to have been related to robberies, attacks by unknown assailants and fights. There was however a substantial number of assault victims from the so-called tribal clashes which affected several parts of Nakuru District in 1998. Assaults related to domestic violence were relatively few. Other less common but nevertheless important causes of injuries observed in this study included foreign-bodies, snakes, machinery/ industrial and animals. We were surprised by the relatively small numbers of industrial/machinery injuries given the fact that Nakuru is an urban centre with several large industries and commercial farms. Several factors may have contributed to this low incidence, namely: low injury-report rates, mis-diagnosis of injury causes at the hospital and misconception of what constitutes occupational injuries in our local set-up(2).

fifty one point seven percent of all performed surgical operations were trauma-related (Table 4). Trauma-related surgical operations rates in our region are largely unknown, as no proper studies have been undertaken(2). Moreover, a large proportion of trauma patients in need of surgical intervention do not seek hospital treatment. There is also the added problem of poor surgical records in several of our hospitals and health centres(1,2,5). The problems of trauma-related surgery in developing countries has been well reviewed by Loeffler(21).

Contrary to expectations, results from this study showed the mean length of hospital stay for trauma patients to be shorter than that for elective surgical admissions. This was noted to have been mainly due to the generally long pre-operative hospital stay which most elective surgical admissions endured on the wards often occasioned by frequent cancellations of surgical operations for a variety of reasons. The majority of trauma patients on the other hand, happened not only to have short staying soft tissue injuries but also had plaster cast manageable fractures.

In keeping with results from similar studies elsewhere (2, 10,11), trauma was the commonest cause of death among all surgical admissions (mortality of 6.3%, 83% of whom were males. The leading causes of trauma - related deaths in this study were assaults (32.2%), road-traffic accidents (30.6%) and burns (22.2%). In contrast, Rutta *et al* found the leading causes of trauma-related deaths at Bugando Medical

Centre to have been RTAs (40%), assaults (22%), falls (19.2%) and burns (15.1 %)(1) which are not very different from Nordberg's estimates for the entire East African region(2).

The 6.3% overall mortality found in this study is significantly higher than that found in comparable studies elsewhere(4,7). In particular, the 5.3% mortality for elective surgical patients is quite high for this class of patients. We attributed this high mortality to the large proportion of neoplastic cases (32%) among elective surgical admissions whose mortality particularly in patients with malignancies was invariably high. The data we analysed in this study did not include disability levels, which are particularly important in our region given the extended nature of most of our family structures. Long-term disabilities are common among trauma victims especially those who have been hospitalised, and the consequences to the family of severe disability affecting a leading family member can, in some instances, be quite serious. This study therefore highlights trauma particularly due to road - traffic accidents and violence (i.e. assaults) not only as a significant cause of surgical admissions to the Rift Valley Provincial Hospital, but as a growing public health problem in this region as well. The study also draws attention to the burden of trauma care in terms of bed utilization by trauma patients and trauma-related surgical operations whose cost must have been substantial. This is the first comprehensive trauma - related study to be undertaken at the Rift Valley Provincial General Hospital and it is hoped that the results from this study will act as a stimulant to similar studies being undertaken in other regional hospitals. It is recommended that further studies be undertaken to determine trauma disability levels as well as costs of trauma management to the Rift Valley Provincial General Hospital and its impact on the hospitals health delivery system particularly general surgical care.

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