Identifying Gaps in the Surgical Training Curriculum in Rwanda Through Evaluation of Operative Activity at a Teaching Hospital

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OBJECTIVE: To define the operations performed by surgical residents at a tertiary referral hospital in Rwanda to help guide development of the residency program.

DESIGN: Cross-sectional study of all patients operated by surgical residents from October 2012 to September 2013.

SETTING: University Teaching Hospital of Kigali (Centre Hospitalier Universitaire de Kigali [CHUK]), a public, tertiary referral hospital in Kigali, Rwanda.

PARTICIPANTS: All patient data were entered into the operative database by surgical residents at CHUK. A total of 2833 cases were entered into the surgical database. Of them, 53 cases were excluded from further analysis because no surgical resident was listed as the primary or assistant surgeon, leaving 2780 cases for analysis.

RESULTS: There were 2780 operations involving surgical residents. Of them, 51% of procedures were classified under general surgery, 38% orthopedics, 7% neurosurgery, and 4% urology. Emergency operations accounted for 64% of the procedures, with 56% of those being general surgery and 35% orthopedic. Further, 50% of all operations were trauma, with 71% of those orthopedic and 21% general surgery. Surgical faculty were involved in 45% of operations as either the primary or the assistant surgeons, while the remainder of operations did not involve surgical faculty. Residents were primary surgeons in 68% of procedures and assistant surgeons in 84% of procedures.

CONCLUSIONS: The operative experience of surgery residents at CHUK primarily involves emergency and trauma procedures. Although this likely reflects the demographics of surgical care within Rwanda, more focus should be placed on elective procedures to ensure that surgical residents are broadly trained. (J Surg 72:e73-e81. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgical education, Rwanda, global health, internship and residency, teaching hospitals

COMPETENCIES: Patient Care, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Surgical care encompasses a wide range of specialties, including general surgery, orthopedics, urology, neurosurgery, obstetrics, ophthalmology, and otorhinolaryngology. Surgical care is now considered an important component of the public health care system in low- and middle-income countries. Most sub-Saharan African (SSA) countries have a serious shortage of fully trained staff in all of these specialties. Surgical procedures in SSA are often performed by personnel with varied levels of training. In an effort to improve surgical care in SSA, several countries have initiated or strengthened their surgical residency training programs.[1-3]

Rwanda, located in East Africa, has a population of more than 11 million people.[4] In 1994, after a devastating genocide against the Tutsi, nearly 20% of the population was killed and countless others were left with permanent disabilities.[5] In the past decade, Rwanda's health care system has greatly expanded and improved. For example, under-5 mortality has decreased from 151 to 55 deaths per 1000 live births.[5] Life expectancy at birth has increased from 33 to 63 years.[5] There are 80,000 surgical procedures recorded annually in Rwanda, which equates to 510 major operations per 100 000 population[6] compared with 11,110 major procedures per 100 000 population reported in high-income countries.[7]

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Health centers are the backbone of the health system and the first point of care; patients are referred to district, provincial, and finally national referral hospitals if they need further treatment. Currently, there are 45 hospitals in Rwanda, which include 41 district and provincial hospitals and 4 national referral hospitals.[6,8,9]

Rwanda has approximately 625 physicians, most of whom are general practitioners.[10] In Rwanda, general practitioners provide most of the surgical care, with 82% of general surgery and obstetric procedures performed at the district hospital, the majority being cesarean deliveries.[6] There are approximately 50 fully trained surgeons (0.49 total surgeons per 100 000 population compared with 44.6 per 100 000 in the United States).[6,11] More specialized surgical care, such as orthopedics and neurosurgery, is provided primarily at referral hospitals by fully trained surgeons.[8]

Given the shortage of physicians in all health disciplines, the Rwandan Ministry of Health implemented the Human Resources for Health (HRH) Program in 2012.[12] This program was designed to increase the quantity and quality of physicians within Rwanda. One facet of this program has been the training of specialists in surgery in addition to several other disciplines. The University of Rwanda (UR) offers medical training as an undergraduate degree with specialty training as a Master of Medicine. In 2005, a surgical residency program was initiated.[8] Before 2005, Rwandan surgeons were trained abroad, either in other African countries or in Europe. Over the last few years, the residency program has grown dramatically. In 2012, there were 18 first-year surgical residents, triple that of 2011.

Residents complete a year of basic surgical training before specializing in general surgery, orthopedic surgery, urology, or neurosurgery. Other surgical disciplines such as otolaryngology and obstetrics and gynecology have separate training programs. The greatest proportion of surgical residents is expected to specialize in general surgery, with the anticipation that every district hospital in the country will eventually be staffed with a general surgeon. Orthopedic surgeons, neurosurgeons, and urologists are expected to work primarily at provincial and referral hospitals. Currently, the surgical residency program offers rotation at the 4 referral hospitals.

University Teaching Hospital of Kigali (Centre Hospitalier Universitaire de Kigali [CHUK]) is the national referral hospital and the main teaching site. The surgical residency program includes general surgery, urology, orthopedic, and neurosurgical training. Approximately half of the surgical residents are rotating there at any given time. CHUK has 565 hospital beds and 6 main operating theaters shared by the departments of general surgery, orthopedics, urology, neurosurgery, and otorhinolaryngology. Obstetrics/gynecology and ophthalmology perform cases in separate operating blocks. In 2010, there were 4164 major operative cases at CHUK, encompassing general surgery, orthopedics, urology, neurosurgery, otorhinolaryngology, and obstetrics/gynecology.[6] In the 2012-2013 academic year, there were 12 full-time consultant surgeons in the surgical training program: 5 general surgeons, 5 orthopedic surgeons, and 2 urologists. In addition, there were surgeons for 2 to 3 months in pediatric surgery, thoracic surgery, trauma, and orthopedics and 2 neurosurgeons for 3 to 6 months.

As the UR surgical residency program has scaled up rapidly, the objectives of this study were to describe and evaluate resident operative cases at CHUK to identify curriculum gaps and improve training.

MATERIALS AND METHODS

This retrospective review included all procedures by surgical residents at CHUK over a 1-year period from October 2012 to September 2013. An electronic database was established and it included patient, surgeon, and procedure data. A resident was defined as a postgraduate surgical trainee and a consultant was defined as a fully trained surgeon. Procedures not including surgical residents as primary or assistant surgeon were excluded. Procedures were classified under general surgery, orthopedics, urology, or neurosurgery. "Initial" procedure was the first operation performed during an admission and subsequent procedures during the same admission were classified as "repeat." Referral province was determined based on location of the referring hospital.

Data were extracted and analyzed using STATA 13 (Irving, TX). The primary outcomes were the number and percentage of cases performed by residents stratified by diagnosis category, emergency status, trauma status, and initial vs repeat operation. Secondary outcomes included the most common diagnoses and procedures for each specialty.

The National Health Research Committee (Kigali, Rwanda), CHUK Ethics Committee (Kigali, Rwanda), Brigham and Women's Hospital Institutional Review Board (Boston, MA), and Rwanda Ministry of Health (Kigali, Rwanda) approved the study.

RESULTS

There were a total of 2833 operations. Of these, 53 operations were excluded from further analysis because no surgical resident was listed as the primary or assistant surgeon, leaving 2780 operations for analysis. Patient characteristics are shown in Table 1. The median age was 28 years, and 66% of patients were men. Patients were primarily referred from within Kigali City (50%). Further, 51% of cases were classified under general surgery, 38% orthopedics, 7% neurosurgery, and 4% urology (Table 2). Emergency cases accounted for 64% of operations; these included general surgery (56%) and orthopedics (35%). Additionally, 51% of all cases were classified under trauma; these included orthopedics (71%) and general surgery

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