ORIGINAL RESEARCH

Surgery camp for Colostomy reversals at a referral hospital in Lilongwe, Malawi

Vanessa Msosa[1*], John Sincavage[2], Baker Henson[3]

1. Department of Surgery, Kamuzu Central Hospital
2. Malawi Surgical Initiative, UNC Project-Malawi
3. Access Health Africa

***Correspondence to:** Vanessa Msosa**, Email**: vjmsosa@gmail.com

Abstract

Aim

An end colostomy is a potentially life-saving surgical intervention, but postoperative ostomy management is challenging in resource-limited settings. Socioeconomic, health system, and surgical capacity barriers may delay colostomy reversal. A surgery camp model for addressing the burden of unreversed colostomies has not previously been undertaken in Malawi. The study aims to present our institution's experience with the surgery camp model, assess patient outcomes, and identify improvement strategies for future efforts.

Methods

The surgery department at Kamuzu Central Hospital (KCH) carried out a two-day surgical camp in partnership with Access Health Africa (AHA) to reduce the local burden of reversible colostomies and train KCH surgery registrars in stapled end-to-end anastomosis (EEA). New, standardized preoperative and postoperative order sets for colostomy reversal were developed and implemented. Patient records were retrospectively reviewed, and descriptive analysis was performed. 13 patients underwent colostomy reversal via exploratory laparotomy. Twelve patients were male, median age was 41 (IQR 27 – 51), and average delay to reversal was 4.3 ± 6.6 months after clinical readiness.

Results

Sigmoid volvulus was the most common indication for Hartmann's procedure (62%) among patients undergoing reversal. One major complication was reported, a return to theatre for suspected anastomotic leak with no adverse findings. Patients were discharged 5.3± 2.8 days after surgery. Operating theatre staff successfully prepared for increased surgical volume, and standard pre- and postoperative order sets remain in use. Distribution of administrative responsibility and communication between visiting and host teams were noted as targets for improvement.

Conclusion

Given the clinical, educational, and organizational success of the two-day surgery camp, a second, expanded effort is anticipated. Goals include inclusion of ileostomy patients, advanced notification in district facilities and clinics, and additional administrative support with case allocation, supply acquisition, and personnel coordination.

Keywords: General surgery, Colostomy, Malawi, Africa South of the Sahara, Education

Introduction

A Hartmann's procedure with end colostomy is a potentially life-saving surgical intervention performed in cases of bowel obstruction or perforation secondary to sigmoid volvulus, diverticulitis, and trauma, among other causes. The postoperative management can be challenging, particularly in a resource-limited setting. The risks of complications related to colostomy placement, such as skin irritation, ischemia, parastomal hernia, retraction, and prolapse may occur in up to half of patients[1]. These complications contribute significantly to decreased quality of life and are exacerbated in settings where pouching supplies are unavailable[2]. Timing of colostomy reversal is often surgeon-dependent, but common practice includes a waiting period of weeks to months for resolution of bowel inflammation and preparation for reversal. However, many colostomy patients may not be evaluated for reversal due to socioeconomic and health system barriers. Several studies in the United States and Europe have demonstrated that advanced age, colon versus ileal ostomy, co-morbid conditions, and lower socioeconomic status were significant predictors of delayed reversal[1,3-5]. The literature otherwise lacks characterization of specific barriers to and strategies for increasing rates of successful reversals, particularly in sub-Saharan Africa.

Kamuzu Central Hospital (KCH) is a 900-bed tertiary care hospital in Lilongwe serving the central region of Malawi with a catchment area of six million people. KCH performed 638 abdominal surgeries between June 2018 and June 2019 for a diagnosis of acute abdomen including bowel obstruction (44.2%), peritonitis (16.9%), perforated viscus (12.2%), incarcerated hernia (9.9%), volvulus (8.6%), and acute appendicitis (8.2%). For patients with colostomies, non-medical barriers to reversal may be substantial, including geographical distance from health care facility, out-of-pocket costs, lack of surgeons and operating theatre staff, and poor healthcare literacy among patients. In addition to these factors, frequent cancellations of elective procedures for emergent cases and a temporary reduction in operating

https://dx.doi.org/10.4314/mmj.v36i4.2

capacity due to renovations in 2017 further exacerbated the burden of potentially reversible colostomies among KCH patients. In response to this burden, an external surgical team was invited to carry out a two-day intensive surgery camp focused on colostomy reversals. The purpose of this camp was to address the local burden of overdue colostomy reversals in addition to training KCH surgery registrars in the procedure. Here we report our center's experience with colostomy reversal, barriers to successful reversals, and a focused colostomy reversal camp to both reduce the burden of colostomies and increase our institution's capacity to perform successful reversals.

The Unmet Need for Colostomy Reversal

Between June 2018 and June 2019, 54 end colostomies had been completed at KCH for mostly emergent indications including 37 bowel obstructions (68.5%), 12 cases of peritonitis (22.2%), and four cases of sigmoid volvulus (7.4%) However, few colostomy reversals had been carried out. A recent audit in the KCH surgery department revealed that 28 colostomy reversals were done over a 1 year period from January 2019 to January 2020. End colostomy reversals are elective surgical procedures, well within the surgical capacity of Kamuzu Central Hospital. However, emergent procedures on a daily basis routinely take priority over elective cases despite the significant physical, psychological, and socioeconomic consequences of chronic ostomy maintenance[2,6]. In addition, the time, personal capital, and opportunity cost of presenting to KCH for a scheduled reversal, particularly for colostomy patients living outside Lilongwe, further emphasizes the need for interventions that prioritize colostomy reversals.

Colostomy Reversal Camp

The concept of a surgical camp has been deployed at numerous institutions in sub-Saharan Africa to simultaneously address the local burden of surgical disease and increase host institution capacity by training local surgeons and staff[7-11]. Camps may adopt a broad scope of practice at the host institution or instead direct efforts at a specific disease or patient population. In some settings, they are regularly used to periodically alleviate high surgical workloads[9-12], and increases in operative caseloads and surgical complexity have been maintained in the absence of the visiting surgery team[10]. The short-term nature of the surgical camp model limits its ability to address structural challenges to surgical capacity at the host institution[13], such as equipment shortages and limited operating room availability, but has been well-suited to address local training needs when educational goals are built into the camp[9].

Methods

In response to recognition of the need for prioritization of colostomy reversals, the author VM, a consultant surgeon at KCH, coordinated a partnership with author BH and Access Health Africa, a United States-based NGO with operations in Malawi, to apply the surgical camp model. Access Health Africa was responsible for providing surgeons, anesthetists, and nurses to work pro bono for the duration of the partnership. The visiting surgical team consisted of two surgeons, three anesthetists, six scrub nurses and nurse technicians, all volunteers. Four local consultants and six registrars participated in the camp. The dates of the surgical camp were designated as June 27-28, 2019, and enrollment began four weeks in advance. It was decided that two of the six operating theatres at KCH could be reserved and operationalized for two days for colostomy reversals. Only patients presenting to any of the twice weekly surgery clinics at KCH for temporary Hartmann colostomy follow up during the intervening time were eligible for enrollment in the camp. Enrollment of the colostomy reversal patients began 2 months prior to the time the camp was carried out. Patients with other types of colostomies and those with permanent colostomies were excluded from enrollment, in addition to those unfit for open abdominal surgery. Twenty-one patients presenting to surgery clinic were identified as preliminary candidates, and 16 were ultimately selected for reversal during the camp. Informed consent was given by each one of the patients in this camp. All patients received the prescribed preoperative regimen of oral normal saline (NS) in addition to NS enemas into the stoma and rectal stump for bowel preparation prior to surgery.

Coordination on behalf of KCH staff was considerable, and permission was granted by the hospital director and management team prior to undertaking planning. Due to chronic bed shortages in the surgical wards, coordination with ward nursing staff was imperative in preparing to accommodate 16 additional surgical patients requiring several days of inpatient preoperative care as well as postoperative care, in addition to the usual influx of emergency cases. The operating room staff were briefed on the anticipated caseload in order to secure and reserve sufficient sterile supplies and equipment for reversals. KCH surgery registrar education was a priority for the reversal camp, and learning objectives were prepared in advance (Figure 1). Educational materials regarding the procedure and preoperative bowel preparation were secured and provided to registrars prior to the camp. In particular, instruction on stapled bowel anastomosis technique was arranged, as standard practice at KCH had been and is currently hand-sewn anastomosis due to resource limitations.

Analysis was performed using basic descriptive statistics tools in Excel 2016 (Microsoft, Redmond, California). Mean and standard deviation (SD) were used to characterize parametric data, and non-parametric data were described by the median and interquartile range (IQR). Due to the small sample size, no statistical comparisons were made in this descriptive study.

Results

Over the course of the reversal camp, thirteen of the 16 selected patients ultimately underwent an end colostomy reversal via exploratory laparotomy under general anesthesia. Of the three patients who did not undergo surgery, one failed to attend surgery, another was deferred due to hypertension, and a third was declared ineligible for surgery due to poor bowel prep and malnutrition. The third patient was planned for follow up in general surgery clinic for rescheduling for surgery when nutritionally fit. Patients were admitted to the inpatient surgery ward for two days preoperatively to undergo bowel preparation (Figure 2). Preoperative bowel preparation consisted of a diet of clear fluids three days prior to surgery, as well as doing a saline enema at both the rectal stump and stoma the night prior to surgery. One gram of ceftriaxone and 500 mg of metronidazole were administered intravenously to all patients within 60 minutes before skin incision.

https://dx.doi.org/10.4314/mmj.v36i4.2

Table 1: Patient demographics and surgery outcomes

Variable	*N = 13*
Age, median (IQR), yrs	42 (27 - 51)
Weight, mean (SD), kg	57.9 (7.7)
Gender, n (%)	
Male	12 (92.3%)
Female	1 (7.7%)
Indication for colostomy, n (%)	
Sigmoid volvulus	8 (61.5%)
Compound volvulus	3 (23.1%)
Colonic trauma	1 (7.7%)
Delay from planned reversal, mean (SD), mos	4.3 (6.6)
Length of surgery, mean (SD), mins	102 (38)
HIV serostatus: reactive, n (%)	2 (15.4%)
Preoperative hemoglobin, mean (SD), g/dL	13.5 (1.9)
In-hospital complication, n (%)	1 (7.7%)
Length of hospital stay, mean (SD), days	5.3 (2.8)

- ☐ Write orders for prescribed bowel preparation
- ☐ Safely perform initial incision
- ☐ Mobilize the descending colon and splenic flexure
- ☐ Mobilize the rectal stump
- ☐ Perform stapled end-to-end anastomosis (EEA)
- ☐ Describe and manage the postoperative complications of reversal

Fig 1: Surgical Registrar Learning Objectives for Colostomy Reversal with Stapled Anastomosis; Registrars were provided learning and skills objectives and materials with which to prepare for the colostomy reversal camp; (no statistic required)

Twelve of 13 patients who underwent surgery were male (Table 1). The median age was 41 (IQR 27 – 51) and average weight was 57.9±7.7 kg. Sigmoid volvulus was the most common indication for Hartmann's procedure, present in 62% of patients, followed by compound volvulus (23%) and colonic trauma (7.7%). One patient, it was noted in theatre, had an ileostomy rather than a colostomy, which was reversed. On average patients lived with their colostomies for an additional 4.3±6.6 months after their initially scheduled reversal. Colostomy reversals are scheduled to have a colostomy reversal three months following the initial surgery.

All patients except two underwent a stapled anastomosis, and the remainder had handsewn anastomoses. A KCH consultant surgeon was present and scrubbed for every surgery. The majority of patients were discharged without documented complication (85%) an average of 5.3± 2.8 days after reversal procedure. No patients required postoperative admission to a high-dependency or intensive care unit.

Discussion

We report our institution's first experience with a surgery camp dedicated to alleviating the burden of overdue colostomy reversals with an emphasis on surgical registrar education. The surgical camp reversed twelve patients' colostomies and

Preoperative Orders

- ❑ Clear fluids only for 3 days prior to day of surgery
- ❑ 250 ml NS PO, twice daily x 2 days prior to surgery
- ❑ Enema at stoma site, twice daily x 2 days prior to surgery
- ❑ Enema at the rectal stump, twice daily x 2 days prior to surgery

Postoperative Orders

- ❑ Monitor vital signs and urine output
- ❑ NPO x 2 days
- ❑ IV fluids: 3L Ringer's lactate in 24 hrs
- ❑ Pethidine 100mg, three times daily x 48 hrs
- ❑ Diclofenac 50 mg, three times daily x 5 days
- ❑ Tramadol 100 mg, three times daily x 5 days
- ❑ Early ambulation

Figure 2; Preoperative and Postoperative Order Sets for Colostomy Reversal Camp; Both order sets were carried out by nursing staff on the surgical wards. Patients were admitted to the surgical ward two days prior to surgery and stayed at least two days afterward; (no statistics required)

one ileostomy, specific pre- and post-operative protocols were more broadly adopted in the surgical wards, and KCH achieved proof-of-concept for a surgical camp model. With focus on addressing the described logistics and personnel challenges, we aim to replicate and expand on the surgical camp model at our institution.

Strengths

The colostomy reversal camp required significant organizational and operating time from the KCH consultant surgeons, and the effort was met with strong investment on their part. Specifically, consultants advocated for the addition of patients to the camp roster, prepared education materials for registrars, and negotiated with other hospital staff to accommodate the planned influx of surgery patients. Four local consultants and six registrars participated in the camp. The visiting surgical team arrived with a fully operational team consisting of two surgeons, three anesthetists, six scrub nurses and nurse technicians. The local team and the visiting team collaborated for joint efforts in forming the workforce for the camp. The visiting team supplemented operating theatre supplies with EEA staplers for colorectal anastomosis and disposable sterile drapes. The main advantage of EEA staplers was reduction of operating time and anastomosis is quicker. The stapler anastomosis skill is required in the training of surgery registrars, useable throughout their careers, in addition to handsewn anastomosis.

Prior to the surgery camp, there was no standard protocol for preoperative preparation for elective bowel surgery at KCH. The author VM collaborated with the deputy head of department of surgery to establish a preoperative protocol based on recommendations from reputable surgical texts modified for the resource constraints of KCH. These orders were printed and distributed to the ward nurses prior to arrival, and all patients received the prescribed preoperative regimen of oral normal saline (NS) in addition to NS enemas into the stoma and rectal stump. Two months after the camp, KCH surgery consultants attest that the new regimen is part of routine preoperative bowel care. The camp was also the first time KCH surgery registrars had exposure to and

https://dx.doi.org/10.4314/mmj.v36i4.2

training with stapled colon anastomoses.

From a patient perspective, in-hospital complications were limited. One patient returned to theatre for a laparotomy due to suspected anastomotic leak. Intraoperatively the anastomosis appeared to be healing well, and a diagnosis of postoperative ileus was ultimately made. Surgery may have been avoided in this case with the use of reliable imaging such as CT scan or a barium enema, both of which were unavailable at our institution at the time of the camp. No patient developed a surgical site infection prior to discharge. No planned surgeries were cancelled or delayed due to shortages of supplies or available personnel. The two patients whose reversal operations were cancelled were deemed unfit for surgery at presentation, despite available resources.

Challenges and Limitations

Surgical camps carried out in resource-limited settings must expect to confront the challenges of providing care at its host institution, complicated by an unfamiliar surgical team and system. In interprofessional undertakings, it is challenging to foster productive team dynamics between surgeons and anesthetists from the visiting and host institution, particularly in short interval. In our experience, specifically, due to high turnover required for the anticipated case volume and local anesthetist familiarity with theatre resources, limited communication was reported between the visiting and local anesthetist. In contrast, communication between the surgeons and registrars was noted to be productive and involved intraoperative anatomy and technique reviews in addition to new skills training. Interpersonal challenges are not unusual, and a review of the literature concerning neurosurgical surgical camps in such settings found that cultural differences between the visiting and host surgical and anesthesia teams may pose challenges to bilateral exchange and educational objectives[14].

While operating theatre time and supplies were secured in advance through the work of nursing staff in preparation for the camp, encountered additional organizational challenges were encountered. This was the first time our institution had employed the surgical camp model to address a backlog of cases and provide specific training to surgical registrars. As such all protocols, registrar learning objectives and resource allocation plans were devised largely at the personal expense of the lead author. At present, no procedure exists to request and obtain material and administrative support to conduct such an undertaking. Furthermore, staplers for end to end anastomosis are not currently sourced from within Malawi, preventing their more routine use in the absence of an accessible supply chain and appropriate budget.

Before and after the operation, the rapid influx of 13 surgical patients was borne heavily by the ward nurses. The patient census in the surgery ward regularly exceeds capacity and nursing staff shortages are often the rule rather than the exception. The specific bowel preparation and post-reversal care, while beneficial to patients, appreciably strained the ancillary staff, particularly in the context of the ward's high volume.

Finally, assessment of postoperative complications was possible only until the time of discharge. Patients discharged after surgery at KCH are often asked to return for a 2-week postoperative visit, but there is currently no system that records these patient encounters in the clinic. This surgery camp did not seek additional follow up with patients following discharge, and thus the rate of postoperative complications may underrepresent the true rate.

Future Directions

In order to replicate and expand the camp model at KCH, the aforementioned challenges must be met. First, the nursing staff shortage faced at KCH is representative of the situation at large in Malawi, due to a combination of health worker migration, poor reimbursement, and overwhelming workload[15,16]. Anticipatory hiring of locum nurses for short term assignments may allow KCH to absorb the increased workload of a future surgery camp. The past decade in Malawi has seen demands for increases in locum remuneration, and adequate funding would have to be secured from host institution or contributed by the visiting teams. Further assessment of the value of the camp in terms of quality of life gained and avoided ostomy complications may help make the case for financial investment in further surgical camps.

In addition to staff shortages, ward space at KCH is severely limited particularly in the surgery wards. Diversion of surgery camp patients to wards with extra capacity may be feasible for the duration of a short camp. Negotiation with ward leaders as well as resource reallocation plans established in advance would be required to estimate the volume of patients that our institution could safely enroll and accommodate in a future surgery camp. Furthermore, establishment of efficient internal protocols for resource requisition and coordination may prevent the concentration of administrative burden on one or two consultant surgeons. Specific needs include support with case allocation, acquiring sufficient sterile gowns and drapes, ensuring maintenance of vital equipment including the autoclave, and coordination of all preoperative anesthesia evaluations, among others.

Provided that additional institutional support can be organized, a future surgical camp at this institution would aim to expand both its case volume and inclusion criteria to include ileostomy patients due for reversal. For anastomosis cases a safe option is to conduct them in the tertiary hospital to manage anastomotic leak with critical care in the event of leak occurrence.This first surgical camp was not advertised outside of KCH, and the 21 patients evaluated for inclusion were identified in previously-scheduled clinic appointments. After determining a reasonable volume for a future camp, notification of the camp may be sent to surrounding district facilities and clinics. Indeed, seven of the 13 patients who underwent reversals lived outside the Lilongwe district. Additionally, because the dual mission of the surgical camp included both alleviating disease burden and registrar education, efforts are currently underway to assess the educational value of the experience. A comparison between the frequency of pre-camp reversals and post-camp reversals, extractable from currently maintained KCH surgery registries, may offer insight into the capacity-building potential of the surgery camp.

References

1.Resio, B., et al., Association of Timing of Colostomy Reversal With Outcomes Following Hartmann Procedure for Diverticulitis. JAMA Surgery, 2019. 154(3): p. 218.

2.Muzira, A., et al., The socioeconomic impact of a pediatric ostomy in Uganda: a pilot study. Pediatric Surgery International, 2018. 34(4): p. 457.

https://dx.doi.org/10.4314/mmj.v36i4.2

3.Daluvoy, S., et al., Factors associated with ostomy reversal. Surgical Endoscopy, 2008. 22(10): p. 2168.

4.Tokode, O., A. Akingboye, and O. Coker, Factors affecting reversal following Hartmann's procedure: Experience from two district general hospitals in the UK. Surgery Today, 2011. 41(1): p. 79.

5.Zafar, S.N., et al., Race and socioeconomic disparities in national stoma reversal rates. American Journal Of Surgery, 2016. 211(4): p. 710.

6.Mols, F., et al., Living with the physical and mental consequences of an ostomy: a study among 1–10-year rectal cancer survivors from the population-based PROFILES registry. Psycho-Oncology, 2014. 23(9): p. 998.

7.Galukande, M., et al., Improving Surgical Access in Rural Africa through a Surgical Camp Model. Surgery Research and Practice, 2016. 2016.

8.Blair, G.K., et al., Pediatric Surgical Camps as One Model of Global Surgical Partnership: A Way Forward. Journal of Pediatric Surgery, 2014. 49(5).

9.Leidinger, A., et al., The challenges and opportunities of global neurosurgery in East Africa: the Neurosurger

y Education and Development model. Neurosurgical Focus, 2018. 45(4): p. E8.

10.Haglund, M., et al., Surgical Capacity Building in Uganda Through Twinning, Technology, and Training Camps. World Journal Of Surgery, 2011. 35(6): p. 1175.

11.Mugalo, E. and C. Powell, Challenges of Training General Surgery Residents to Do Urology in the Developing World. Current Bladder Dysfunction Reports, 2018. 13(4): p. 234.

12.Maki, J., et al., Health Impact Assessment and Short-term Medical Missions: A Methods Study to Evaluate Quality of Care. BMC Health Services Research, 2008. 8(1).

13.Fuller, A., et al., Building neurosurgical capacity in low and middle income countries. Eneurologicalsci, 2016. 3(C): p. 1.

14.Almeida, J.P., et al., Global neurosurgery: models for international surgical education and collaboration at one university. Neurosurgical Focus, 2018. 45(4): p. E5.

15.Manafa, O., et al., Retention of health workers in Malawi: perspectives of health workers and district management. Human Resources For Health, 2009. 7(1): p. 65.

16.Muula, A.S. and F.C. Maseko, How are health professionals earning their living in Malawi? Bmc Health Services Research, 2006. 6: p. 97.

https://dx.doi.org/10.4314/mmj.v36i4.2