

Original research article

Strengthening vasectomy services in Rwanda: introduction of thermal cautery with fascial interposition

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Received 12 October 2011; revised 10 August 2012; accepted 10 August 2012

Abstract

Background: Recent developments in vasectomy research indicate that occluding the vas using cautery combined with fascial interposition (FI) significantly lowers failure rates and is an appropriate technology for low-resource settings. We report the introduction of this technique in Ministry of Health (MOH) vasectomy services in Rwanda.

Design: In February 2010, an international vasectomy expert trained three Rwandan physicians to become trainers in no-scalpel vasectomy (NSV) with thermal cautery and FI. The training took place over 5 days in five rural health centers.

Results: A total of 67 men received vasectomies (11–16 per day) and trainees successfully mastered the new occlusion technique. The MOH is now scaling up NSV with cautery and FI services nationwide. The initial cadre of trainers has subsequently trained 46 other physicians in this vasectomy technique across 27 districts of Rwanda.

Conclusions: No-scalpel vasectomy with thermal cautery and FI was successfully introduced in vasectomy services in Rwanda, and a similar initiative should be evaluated in other national vasectomy services worldwide.

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Keywords: Vasectomy; Cautery; Fascial interposition; Education; Family planning services; Developing countries

1. Introduction

Vasectomy is recognized as a simple, safe and effective contraceptive method. However, recent evidence shows that the choice of surgical techniques is key to improving the safety and effectiveness of the procedure. Vasectomy is performed in two steps: (1) isolating the vas deferens and (2) occluding the vas deferens. The no-scalpel approach, known as no-scalpel vasectomy (NSV), is the preferred technique for isolating the vas because, based on randomized trials, it decreases the risk of surgical complications such as bleeding

and infections [1,2]. However, NSV has no influence on the effectiveness of the procedure, which is determined by the technique used to occlude the vas deferens [2,3]. The most common vas occlusion method, ligation and excision (LE), consists of putting two ligatures on the vas and excising a small segment between the ligatures [4]. Recent and robust studies show that this technique is associated with a high risk of occlusive failure based on semen analysis results (8% to 13%), even when combined with fascial interposition (FI) (6%) [3]. The risk of contraceptive failure is also unacceptably high with simple LE, varying between 4% and 9% after three to 10 years, as reported in Asian countries [4]. Contraceptive failure (unwanted pregnancy) may adversely impact the perceptions and beliefs about vasectomy and negatively affect uptake of vasectomy services.

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Results from numerous large case series have shown that combining cauterization of the lumen of the vas deferens with FI results in the lowest risk of occlusive failure, well below 1% [2,3]. This technique is already widely used in North America [5]. Both the European Urology Association [6] and the American Urological Association [7] recommend combining cautery and FI to occlude the vas to reduce the risk of failure. Seamans and Harner-Jay have recommended that FI and thermal cautery be introduced into existing and new vasectomy programs and that providers be trained in this method to maximize the cost-effectiveness of ongoing programs [8]. Data on the appropriate use of cautery and FI in low-resource settings are very scarce [4,9]. This article describes the introduction of thermal cautery and FI in vasectomy services in Rwanda.

2. Methods

We designed a program to introduce the combined thermal cautery and FI technique for vas occlusion into vasectomy services in Rwanda. One of the authors (M.L.), an international trainer, conducted clinical training sessions with three providers in Rwanda with the goal of achieving proficiency in both performing and teaching occlusion of the vas with thermal cautery and FI on the prostatic end combined with the NSV technique currently used in Rwanda to expose the vas deferens. An illustrated description of the technique was published, [10] and a video is available at <http://www.youtube.com/watch?v=Pw80QNbnVig>. The new materials necessary for conducting the training and for providers to continue performing the technique consist of three elements:

1. Battery-powered thermal cautery devices with multiple-use cautery tips. (Fig. 1)
2. Locally made sterilizable cotton covers for the cautery device (Fig. 1).
3. Adson forceps to facilitate performing FI.

Each cautery device costs approximately US \$36 (Advanced Meditech International) and lasts for at least 500 vasectomies, based on the trainer's experience. It uses two AA alkaline batteries (approximately US\$ 1), and one set of batteries lasts for approximately 10 vasectomies. Each tip is supplied sterile with a plastic sheet as a disposable unit and costs approximately US \$5 (Advanced Meditech International). However, tips may be re-sterilized and reused, as recommended by the Program for Appropriate Technology in Health (PATH) [11]. Based on the trainer's experience, each tip may be reused on average of 20 times. Thus, the additional cost is approximately US \$0.42 per vasectomy. A total of 10 devices and 200 tips were initially supplied for the training.

Rwanda's Ministry of Health (MOH) nominated the three providers, who were already trained in NSV and who were expected to serve as master trainers in the future. Two weeks

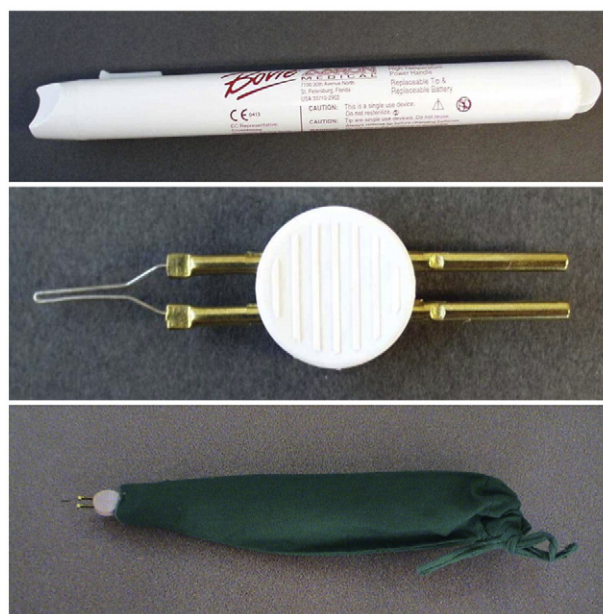


Fig. 1. Battery-powered thermal cautery device, cautery tip and sterilizable cotton cover.

prior to the training, local health workers conducted meetings to sensitize the community to vasectomy and the upcoming training in five rural health centers in three districts, and began recruiting patients. The goal was to ensure to have at least 20 (but ideally 50–60) vasectomy clients during the training period. This number is based on the consultant's experience for how long it takes to achieve competency as trainers in the new technique.

The 5-day training took place in February 2010. It started with a 2-h interactive workshop where the trainees shared their experience with their current vasectomy technique, reviewed the evidence on vasectomy occlusion techniques, watched videos on vasectomy techniques, manipulated the cautery device and tips and discussed how to integrate the new technique in their practice, including how to sterilize material. Over the next days, trainees practiced the technique on volunteer clients and were instructed on training other physicians in the technique.

Part of the training of trainers was implementing and evaluating each other's performances using a simple procedural checklist, created by the consultant, for each technical point of the vasectomy (Table 1). After each vasectomy, the consultant and trainees compared notes that were captured on the checklist to evaluate the vasectomies performed.

Additionally, two different nurses who were previously trained to provide vasectomy counseling supported the trainees. The nurse-counselors provided pre and post counseling to patients, and confirmed vasectomy eligibility according to MOH standards (over 30 years old, has three or more children), prepared the rooms in the rural health center and assisted the physicians during the surgery. All patients and their wives provided written consent to the surgery,

Table 1
Checklist of technical points of the vasectomy procedure

Technical points are assumed to be adequately mastered when fulfilling the following criteria:

1. Anesthesia: The man does not feel any pain during the surgery.
2. Grasping the vas: The vas is rapidly grasped by the ring forceps/the surgeon verifies that the vas is entirely circled by the ring forceps and adjusts the position of the ring forceps, as needed.
3. Exposing the vas: The vas is exposed in a single and smooth step, and is totally free of fascial tissues.
4. Cautery: The cautery tip is easily inserted in the vas lumen and cautery is stopped as soon as the vas segment is blanching.
5. Fascial Interposition: The ligated fascia covers entirely the abdominal end of the vas and the ligature on the fascia includes a portion of the fascia of the testicular end of the vas.
6. Hemostasis: the testicular end is totally bared (no vessel remains visible)/ additional ligature is put if a vessel is bleeding/no bleeding is observed before putting back the vas into the scrotum.

Comments may be added to facilitate feedback or to explain the success or failure of the performance of a specific technical point.

training and that an international consultant would be present during the surgery.

3. Results

3.1. During training

A total of 67 men had vasectomies — 11–16 per day — over the 5-day training program. Each of the three trainees performed about one-third of the vasectomies. The trainees' previous exposure to NSV facilitated quick learning. Improvement in trainees' skills was apparent with repetition. After the consultant demonstrated one case, they immediately started performing cautery on both ends and the FI technique on the prostatic end in the remaining patients, under supervision. The trainees were able to enter the lumen of the vas and cauterize the mucosa adequately after being supervised on two or three cases. However, mastering the FI technique took longer. After four or five cases, the three trainees were able to perform FI independently with occasional advice on fine tuning the technique.

By Day 2, the consultant mostly observed the procedures, demonstrating some steps on occasion or assisting only when there were more difficult cases. At the end of the second day, the consultant judged the trainees as ready to be trained as trainers in the new technique. Consensus was reached on which steps were already mastered (anesthesia, fixation of the vas, cautery and checking for bleeding) and the two steps that needed some improvement: first, isolating the vas by exposing it in one smooth step; and second, improving FI technique by not pulling too much on the testicular end and making sure that a portion of the fascia covering the testicular segment was included in the suture over the prostatic end. The NSV technique learned during participants' previous vasectomy trainings did not exactly correspond to the current standard described in a 2003 manual developed by EngenderHealth [12]. The participants

discussed how to improve the technique and were provided with recent articles, videos and computerized slide presentations on vasectomy.

Throughout the week, sterilization techniques in general were not optimal, particularly the decontamination of contaminated instruments. More specifically, cautery tips need high-level disinfection with bleach 0.5% [11]. Neither the trainees nor the nurses were acquainted with this method. The method was explained and performed using a dilution of 3.85% bleach, which is readily available in local stores. Steam sterilization was attempted on some cautery tips but, as observed by PATH, tips were damaged [11]. Although the tips remained functional, as recommended by PATH, this method is to be avoided with this specific tip [11]. Also, training/services were occasionally delayed due to organizational problems such as delays in availability of sterile material or delayed arrival of patients from remote villages. Sterilization and organizational issues were resolved over the week of training. Prior to arrival at the various remote health centers, the lead Rwandan physician (L.K.) called ahead to local staff about necessary supplies and anticipated sterilization needs.

3.2. After training

Following the successful training, the MOH and its development partners created a plan for national scale-up of vasectomy services. An additional 250 cautery devices and 1000 tips were ordered for all district hospitals in the country, which will cover approximately 20,000 vasectomies. District hospitals are responsible for performing vasectomies both on-site and regularly scheduling vasectomies to be performed in rural health centers.

In addition to material purchases, the scale-up process has trained an additional 46 additional physicians in NSV with thermal cautery and FI (five as trainers) across 27 health districts, conducted community sensitization activities and established standardized procedures to record vasectomy services. Community health workers and nurse-counselors were trained to counsel potential clients and their wives. Current records report that since the training described above there was a large increase in the number of men receiving vasectomy nationwide in Rwanda, from 172 and 219 in 2008 and 2009 to 779 and 910 in 2010 and 2011, respectively. The distribution of the 1689 men who received a vasectomy in 2010 and 2011 by health districts is shown in Fig. 2. These activities are being thoroughly monitored and will be reported by the MOH in 2013.

4. Discussion

The training program was successful in producing three physicians able to competently perform and teach the NSV technique, combined with the use of thermal cautery and FI on the prostatic end for more reliable vas occlusion. Most importantly, these providers eagerly adopted this technique

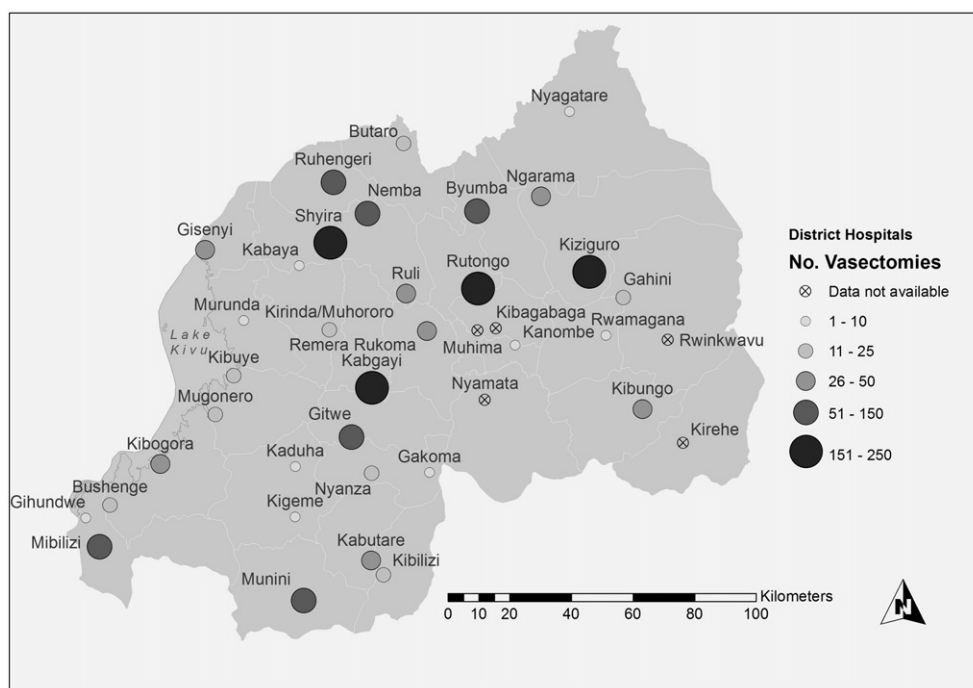


Fig. 2. Number of vasectomies performed in Rwanda using no-scalpel vasectomy with cautery and fascial interposition in 2010 and 2011 by health districts.

and were able to train others in using the new technique. The relatively small number of cases needed for these providers to master the new technique may reflect the fact that they were already experienced NSV trainers. Based on the consultant's experience, physicians who have never performed a vasectomy need more cases (approximately 20) to adequately master all the steps of vasectomy.

Availability of skilled providers performing the best surgical techniques based on scientific evidence is a key component of the successful introduction of vasectomy services in low-resource countries [13]. To our knowledge, this is the first time that the use of thermal cautery and FI on the prostatic end, documented as the most effective vasectomy occlusion method, has been introduced in a national vasectomy program in an African country.

This training program is, however, only one component of the global initiative taken by the Rwanda MOH to foster vasectomy services — and the use of other modern contraceptive methods — in the country [14]. Without strong commitment from the government, quality of services offered by the health facilities and high demand from the population, this single training activity would not have resulted in the exponential growth of the number of couples relying on vasectomy as their contraceptive method in Rwanda. Thus, this training program cannot be dissociated from other activities conducted to foster male sterilization in Rwanda.

Some organizational problems were encountered during the training week. These were probably amplified by the fact that the training activities moved from one location to another on a daily basis. Addressing sterilization of instruments has been incorporated into the scale-up activities

presently underway in Rwanda. Locating training centers in Kigali and perhaps in one or two other Rwandan cities could overcome some of these problems. In such centers, trainers (physicians, nurses, support personnel such as lab technicians and material sterilization staff) could treat enough men to provide superior, hands-on training on a regular basis, once vasectomy services are well implemented and men's request for the procedure is growing in large cities. Nonetheless, maximizing the number of sites during this training had the advantage of increasing vasectomy awareness in a larger area. If such central training centers were to be put in place, physicians and their assistants will need a plan and possibly some support in implementing vasectomy activities upon return to their local facility, particularly making visits to remote facilities to provide this service.

In conclusion, continuing monitoring of vasectomy scale-up efforts in Rwanda will further document the sustainability of this innovation and provide unique information on how to replicate and evaluate similar services in other countries with unmet needs regarding male sterilization.

Acknowledgments

The successes of this project are shared with Trinity Zan of FHI 360, who provided critical technical skills and guidance. This work is made possible by the generous support of the American people through the U.S. Agency for International Development (USAID). The views expressed are those of the authors and do not necessarily reflect those of FHI 360, USAID, and the United States Government. Financial assistance was provided by USAID under the

terms of Cooperative Agreement No. GPO-A-00-08-00001-00, Program Research for Strengthening Services.

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