

Teaching Cervical Cancer Surgery in Low- or Middle-Resource Countries

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Background: With the widespread implementation of screening programs internationally, there will be an increase in early stage cervical cancer cases. In response to this, the Ministry of Health in each country will need to plan strategies to provide care such as radical surgery or radiation for this potentially curable group of women.

Methods: The Gynaecologic Oncologists of Canada created a teaching module to intensively train a small number of locally identified gynecologists to perform radical hysterectomy and pelvic lymphadenectomy. The process was based on adult learning principles; it involved a Canadian gynecologic oncologist working in the low- or middle-resource country with the gynecologists and problem-solving local issues in health care delivery.

Results: The teaching process included a pretest and a posttest on the basis of the objectives of the module. There were 7 modules including preoperative evaluation of the patient, cone biopsy, radical hysterectomy, pelvic lymphadenectomy, ureteric injury, vascular injury, and follow-up after surgery. Each module was divided into background information, techniques, and complications. There were video clips imbedded in the modules. After the educational modules had been reviewed, the learners were walked through the surgical procedures repeatedly including a detailed assessment of performance after each case. Participants had the opportunity to provide feedback on the training program. The module was reviewed in Mongolia and implemented in Kenya.

Conclusions: In low- and middle-resource countries where there is an urgent need to provide a curative surgical option for the management of early cervical cancer, a focused high-intensity curriculum delivered by a trained surgeon can translate into immediate change in clinical and surgical practice.

Key Words: Surgery, Low- and medium-resource countries, Cervical cancer

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With the widespread implementation of screening programs internationally, there will be an increase in early stage cervical cancer cases. Sankar's randomized trial of a

single lifetime screen using 1 of 3 different screening strategies (visual inspection with acetic acid [VIA], PAP, human papillomavirus [HPV] testing) showed that when screening

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was implemented as compared with control, there was a shift from 5.9% stage 1A cervical cancers in the control group to 39.5% stage 1A cervical cancer in the HPV or cytology group. The rate of stage 1b disease did not change, but the rate of stage 2 or higher disease decreased from 70% in the control group to 30.7% in the HPV-screened group.¹

What does this mean for the country? In Mongolia, there has been an increase in the numbers of cancer cases and a stage shift from advanced disease to earlier stage disease (Fig. 1). Papanicolaou test screening was introduced to the country about a decade ago. Women who could pay had access to this technology. In 2001, VIA was introduced.² Opportunistic screening with PAP or VIA was offered by the private physicians or small nongovernmental organizations like the Rotary Club Daffodil Project. More recently, the Healthy Mongolian project mandated screening by a questionnaire for symptoms or VIA. Figure 1 shows the dramatic increase in the number of cervical cancer cases identified, which once identified, required treatment.

Mongolia had the infrastructure in place to meet this demand. They had access to both radiation services and gynecologic oncology surgeons to handle this change in disease profile. However, things are very different in other low- and middle-resource countries. For example, in Kenya, there is only 1 radiation unit in Nairobi. No one in the country had the surgical skills to provide radical hysterectomy and lymphadenectomy. Thus, in planning a cervical cancer prevention program, it is important either before or in conjunction with implementing the screening strategy that a strategy for treating cervical cancer be in place to realize the benefits of lives saved.

During the last decade, there has been an increasing interest on the part of individuals in the Society of Gynaecologic Oncology of Canada to offer their medical/surgical expertise in low- and middle-resource countries (including Cameroon, Egypt, Guatemala, Haiti, Kenya, Kosovo, Mongolia, Nigeria, Republic of Benin, and Tanzania). Since 2008, a small interest group met with the following terms of reference.

1. Any project we undertook would have the aim of decreasing death from gynecologic cancer. Within the spec-

trum of prevention through treatment into palliative care, we would focus on cancer treatment.

2. Gynecologic Oncology Canada Community of Practice on International Women's Health would work collaboratively with the Society of Obstetrics and Gynecology Canada International Health Committee. A memorandum of agreement has been created.
3. We would develop a tool that would be based on a train-the-trainer approach.
4. Any project would take a national perspective with an emphasis on linking with the country's Obstetric and Gynecologic society.
5. Rather than participating in short-term projects, we would invest in long-term relationships to move forward a cervical cancer prevention and treatment program.

In this article, we report on the processes involved in developing, piloting, and implementing a teaching program for delivering surgical care to women with early stage cervical cancer.

METHODS

To identify the available teaching tools for cervical cancer treatment in low- and middle-resource countries, we conducted a literature search in Google and PubMed. We also contacted major international groups (ie, Johns Hopkins Program for International Education in Gynecology and Obstetrics). Although there were many teaching resources for cervical cancer prevention, there were no formal teaching programs focusing on cervical cancer surgery. We set out to create such a tool by having a working group of practicing Canadian gynecologic oncologists and Master's-trained experts in adult education meeting over the next 2 years.

To understand the principles involved in Web-based medical education modules, we interviewed designers of these modules both at McMaster University and University of British Columbia. Although we could use lessons from the Web-based learning, the group felt that the teaching program needed to be based on building relationships with a 2-way

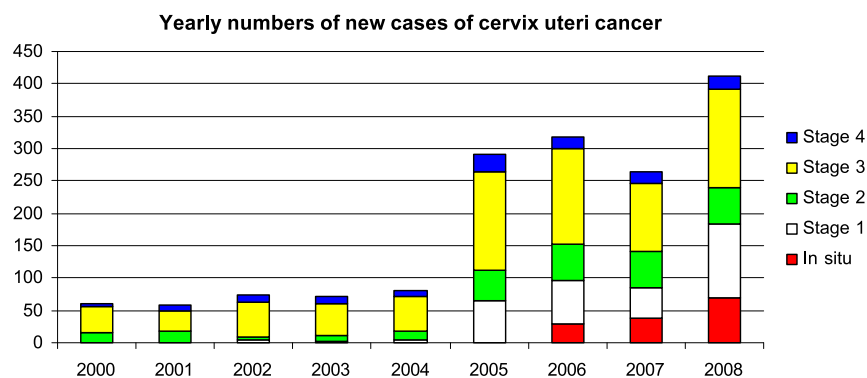


FIGURE 1. Data from Mongolia (EPOS, Millennium Challenge Corporation. Mongolian Ministry of Health. Danyo. National Institute for Health and Welfare. Institutional Technical Assistance Contractor for the Prevention and Control of Major Non-communicable Diseases and Injuries. Rapid Needs Assessment. Report and Annexes. Feb 2010, p. 8).

respect and specifically understanding the context of the low- or middle-resource countries.³⁻⁵ The program needed to be delivered live by at least 1 gynecologic oncologist who could gauge the learning in progress and identify issues. Thus, both a didactic component and a hands-on surgical principal component were designed to be delivered by an expert mentor.⁶ The assumption was that the attendees would not go to another country to complete a formal gynecologic oncology fellowship but rather that they could be trained over a short period to make good treatment decisions and focus on developing excellence in performing a single operation. The attendees were gynecologists identified by their peers (ie, local hospital, university, and Ministry of Health) to be excellent surgeons with a keen interest in developing the discipline of gynecologic oncology within their region. There needed to be a commitment by their peers (university, hospital, and Ministry of Health) to invest in the development of a gynecologic cancer program with resources directed toward the program.

The goal of the 2-week teaching program was to enable local gynecologic surgeons in low- or middle-resource countries to safely and competently perform radical hysterectomy and pelvic lymph node dissection when appropriate for the treatment of cervical cancer in the context of their own community. The expectation is that this surgery would be carried out in centers of high volume so experience and further training could be propagated.

The educational objectives for the teaching program are that the participants will

1. know and understand the indications for performing various surgical therapies for cervical cancer and its precursor lesions, including loop electroexcision procedures, cone biopsy, simple hysterectomy, and radical hysterectomy with pelvic lymph node dissection (vs demonstrating a high-level understanding of...);
2. be able to identify the surgical anatomic landmarks required to safely perform radical hysterectomy and pelvic lymph node dissection (vs demonstrating proficiency in identifying...);
3. know and understand the surgical technique involved in safely performing a radical hysterectomy and pelvic lymph node dissection (vs demonstrating competency/proficiency in safely performing...);
4. know and understand the principles involved in the postoperative management of patients after radical hysterectomy and pelvic lymph node dissection (vs demonstrating a high level of understanding of...);
5. review potential operative complications related to radical hysterectomy and pelvic lymph node dissection (vs demonstrating a high level of understanding of, and competency/proficiency in managing...);
6. be able to document their surgical experience and outcomes through maintaining a database using standardized forms provided to them; and
7. know and understand the principles involved in the long-term follow-up of patients treated with radical hysterectomy and pelvic lymph node dissection (vs demonstrating competency/proficiency in conducting long-term follow-up...).

Teaching modules have been completed for each objective and are posted on the Gynaecologic Oncologists of Canada Web site (<http://g-o-c.org/en.aspx>).

RESULTS

Before the sessions began, there was a pretest, and later, a posttest on the basis of the objectives. There were 7 modules each with specific objectives. The didactic sessions covered were as follows: (1) preoperative evaluation of the patient, (2) cone biopsy, (3) radical hysterectomy, (4) pelvic lymphadenectomy, (5) ureteric injury, (6) vascular injury, and (7) follow-up after surgery (Table 1). Laparoscopic video clips were imbedded in the teaching modules although the intention was to train the physicians to do radical hysterectomy by laparotomy. Each section has problem-based cases reflecting the principles in the module. The live surgical sessions were followed by specific written and oral feedback on each step in

TABLE 1. Teaching content

1. Preoperative evaluation of the patient
 - a. Who to treat with radiation and who to operate on
 - b. Preoperative assessment
2. Cone biopsy
 - a. Background
 - b. Technique
 - c. Complications
3. Radical hysterectomy
 - a. Anatomy
 - b. Definition
 - c. Technique
 - d. Background
 - e. Case discussion
4. Pelvic lymphadenectomy
 - a. Background
 - b. Anatomy
 - c. Indications
 - d. Technique
 - e. Complications
 - f. Case discussion
5. Genitourinary injury
 - a. Ureteric injury
 - i. Background
 - ii. Technique
 - b. Bladder injury
 - i. Background
 - ii. Technique
6. Vascular injury
 - a. Background
 - b. Technique
7. Follow-up after surgery

the operation in keeping with the model developed for the University of Toronto^{4,5} Gynaecologic Oncology fellows. The attendees completed a final written evaluation of the whole program. The teaching modules were left with the attendees on a CD which also includes PDFs of all the pivotal studies related to cervical cancer care up to 2009.

This program was pilot tested by 4 gynecologic oncologists from the National Cancer Centre in Ulaanbaatar. The 7 modules were rated on 9 parameters using a 5-point

Likert scale of extremely satisfied to unsatisfied. They were extremely satisfied for “being prepared for the learning session,” “achieving a greater understanding of the topic,” “their interest in the topic,” and “the material discussed was relevant,” and they were “confident that all important information was covered.” Variation occurred in the domains of “managing patients with the problems,” “paying attention during the session,” and being “motivated to learn before the session.” Their “overall impression” ranged from satisfied to

TABLE 2. Surgical technique evaluation: radical hysterectomy and node dissection

Component	Can Independently Perform	Needs Some Guidance	Needs a Lot of Guidance	Unsatisfactory
Preoperative preparation				
Positioning of patient				
Examination under anesthetic				
Abdominopelvic entry, exposure, and evaluation				
Incision				
Exposure/retraction				
Palpation of upper abdomen				
Palpation of parametrium, cervix				
Pelvic node dissection				
Development of paravesical spaces				
Development of pararectal spaces				
Identification of ureters				
Identification of external/internal iliac vessels				
Identification of obturator nerve				
Identification of “superior vesical” artery				
Identification of uterine artery origin				
External and internal iliac node dissection				
Obturator node dissection				
Radical Hysterectomy				
Mobilizing ureter from peritoneum				
Securing of infundibulopelvic ligament				
Mobilization of bladder from uterus/cervix				
Securing uterine artery at its origin				
Mobilizing ureter from parametria				
Mobilizing rectum from cervix and vagina				
Dividing uterosacral ligaments				
Dividing parametria				
Cutting uterus and cervix free from vagina				
Closure of vagina				
Management of minor pelvic bleeding				
Repair of cystotomy				
Repair major bleeding				
Other (comment):				
Summary:				
1. Overall performance:				
2. Areas to review:				
3. Reviewer/date				

extremely satisfied on each module. The cone biopsy module was the highest rated. Results on the “complications modules” had the widest spread of responses.

The program was launched on the basis of interest demonstrated by the hospital administration and gynecology service at Moi Teaching and Referral Hospital in Eldoret, Kenya.⁶ A program in Reproductive Health had been established through a partnership between the Department of Obstetrics and Gynecology of Moi University, the University of Toronto, the Indiana University, and the Academic Model for Providing Access to Healthcare. A Canadian gynecologic oncologist (BR) who had visited this facility on 1 prior occasion was the expert mentor. Two gynecologists (OO and PI) from the Moi Teaching and Referral Hospital were chosen by the Moi University Department of Obstetrics and Gynecology to participate in the training. Over a 2-week period, the teaching sessions were delivered.

These sessions included reviewing all the teaching modules in the classroom and then hands-on training in the operating room. They completed a pretest before teaching and collectively answered 20 or 32 questions correctly. They answered 30 of 32 questions correctly on the posttest. Seven radical hysterectomies were performed as part of the operative training, with the last one being done solely by the Kenyan physicians (ie, the mentor did not scrub). At the end of each operation, there was an in-depth debriefing (Table 2). The Kenyans then collected the data entry for each case including demographic information, details about the surgery, postoperative complications, pathology results, and ongoing follow-up information.

The Kenyan physicians have continued to do radical surgery, sending photographs back to their mentor and discussing issues raised during the case by e-mail.

At the time of submitting this article, 4 radical hysterectomies have been completed. Three of the 4 were completed without complication. In 1 case, there was a significant vascular injury. The patient recovered and left the hospital 12 days later.

DISCUSSION

Training for gynecologic oncology has been undertaken in high-resource countries. Individuals from low-resource countries need to meet individual program and country immigration requirements, gain acceptance to the program, and then train in a setting outside their own country. One of the difficulties with this approach is that the context to which the individual returns is very different in access to resources including operating room, hospital beds, and ancillary services such as radiology and pathology. Another drawback is the fact that some fellows choose not to return to their country of origin.

In this article, we describe an intense training program that was developed in Canada, reviewed by a country outside our formal Fellowship training schema but with resources to support a gynecologic oncology subspecialty (Mongolia),

and then piloted in a low-resource country (Kenya). It was delivered under the short-term direction of a board-approved expatriate gynecologic oncologist. It was based on the principle of mutual respect in that the gynecologic oncologist brings expert knowledge and skills in the disease of interest. The attendees bring a vision and motivation for improved care for women in their country. They also bring the important experience of providing obstetric and gynecologic medical and surgical care in the context of their own country. It is based on adult educational principles with auditory, visual, and tactile components. The modules have both a didactic and problem-based learning component. The teaching process focuses on 1 disease and 1 operation. The teaching can be completed in a compressed time frame with plans for follow-up visits by the mentor. It is important that before embarking on this teaching module that a governing body (ie, university or Ministry of Health) within the country has identified a need for this skill set and is motivated to collaborate. It is important that they are part of the decision making to invite the international expert into the country (ie, access to visas) but more importantly to provide ongoing support to develop the cancer care platform for the country (ie, provide salary support and provide resources to develop the cancer prevention and treatment program).

This module has been reviewed for face validity in Mongolia and has been pilot tested in Kenya. It provides a platform from which individual Gynaecological Oncologists or Societies can link over time with their counterparts from low- and middle-resource countries. Its usefulness over time will require interval assessment of successes and complications with coarse adjustments as necessary.

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