

**Cervical Brachytherapy Exchange: Steps Toward Oncology Capacity Building in Botswana**

Memory Bvochara-Nsingo, Surbhi Grover, David P. Gierga, Remigio Makufa, Jason A. Efstathiou, Nayha Dixit, Rebecca H. Clayman, Anthony H. Russell, Lilie L. Lin and Joseph Kasese

*The Oncologist* published online June 13, 2014

The online version of this article, along with updated information and services, is located on the World Wide Web at:  
<http://theoncologist.alphamedpress.org/content/early/2014/06/13/theoncologist.2013-0393>

## Cervical Brachytherapy Exchange: Steps Toward Oncology Capacity Building in Botswana

In the past three decades, the number of cervical cancer cases globally has increased from an estimated 378,000 cases in 1980 to 454,000 in 2010, with 17% of these cases in Sub-Saharan Africa [1]. Sub-Saharan Africa is burdened by more than 60% of all human immunodeficiency virus (HIV) cases in the world [2]. With increased utilization of antiretroviral therapy as HIV-infected patients live longer, rates of malignancies in this population are rising [3]. HIV-infected women have a higher risk of human papillomavirus (HPV) infection and, consequently, the development of invasive cervical cancer [4]. In Botswana, where 18% of the population is HIV positive, cervical cancer is the leading cause of cancer-related death in women.

Because of the lack of widespread screening, a majority of patients in Botswana present with advanced disease at diagnosis. The primary treatment for locally advanced cervical cancer is radiation therapy (RT) with or without cisplatin-based chemotherapy. Curative RT generally consists of external-beam RT delivered with either a linear accelerator or a cobalt-60 unit with brachytherapy.

Brachytherapy is an essential component of the treatment of cervical cancer and increases the likelihood of cure; however, it is not readily accessible in Africa [5]. A recent review highlighted that only 20 countries in Africa have brachytherapy services; 75% of these facilities are concentrated in Northern Africa and in South Africa [6]. Brachytherapy is commonly delivered using low-dose-rate or high-dose-rate (HDR) sources. Using a HDR source allows for more rapid completion of treatment and a higher volume of treatments in an outpatient setting but requires specialized equipment and shielding, imaging, software, and training for the physician, the physicist, and support staff [7].

Local practitioners in Botswana and international collaborators [8, 9] identified cervical cancer as one of several areas for high focus. In Botswana, Gaborone Private Hospital (GPH), the only radiation oncology facility, acquired an HDR brachytherapy unit in February 2011 and started its treatment program in 2012, drawing patients countrywide. To help share technical knowledge of brachytherapy and the care of patients with cervical cancer, a series of visits was organized from Massachusetts General Hospital (MGH), followed by the University of Pennsylvania. Visits were focused on clinical care, brachytherapy planning, and nursing. Exchange at GPH was conducted through participation in clinical care with the radiation oncologist and nurses and highlighted insertion techniques and symptom management, treatment planning with physicists and dosimetrists, and focused didactics on clinical issues of interest to the staff. MGH facilitated a donation of applicators to GPH through Mick Nuclear (Mick Radio-Nuclear Instruments, Inc., Mount Vernon, NY, <http://www.micknuclear.com>).

As a result of these visits, the following necessary future steps were recognized: procurement of an ultrasound machine

for visualization during insertions; standardization of treatment-approval, safety, and quality-assurance processes; development of patient education material; and future exposure and training in interstitial brachytherapy technique for gynecological cancers.

By 2030, more than 70% of cancer patients will be diagnosed in the developing world [10]. In addition to the implementation of screening programs, cancer-care capacity building is essential to address the increasing burden of disease. Clinical visits such as those described are an important step in the effort to build capacity while facilitating the exchange of knowledge and learning between institutions in developing and developed countries. There are many other examples of similar collaborations between Western academic institutions and providers in low- and middle-income countries to establish effective facilities for cancer treatment, and such exchanges should be forged with a long-term relationship in mind.

### MEMORY BVOCHARA-NSINGO

Department of Radiation Oncology, Gaborone Private Hospital, Gaborone, Botswana

### SURBHI GROVER

Department of Radiation Oncology, University of Pennsylvania, Philadelphia, Pennsylvania, USA

### DAVID P. GIERGA

Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts, USA

### REMIGIO MAKUFA

Department of Radiation Oncology, Gaborone Private Hospital, Gaborone, Botswana

### JASON A. EFSTATHIOU

Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts, USA

### NAYHA DIXIT

Department of Radiation Oncology, University of Pennsylvania, Philadelphia, Pennsylvania, USA

### REBECCA H. CLAYMAN

Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts, USA

### ANTHONY H. RUSSELL

Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts, USA

### LILIE L. LIN

Department of Radiation Oncology, University of Pennsylvania, Philadelphia, Pennsylvania, USA

### JOSEPH KASESE

Department of Oncology, Bokamoso Private Hospital, Gaborone, Botswana

### Disclosures

**Lillie Lin:** University of Pennsylvania (E); Varian Medical Systems (H); **Jason A. Efstathiou:** Bayer, Medivation/Astellas (C/A). The other authors indicated no financial relationships.

(C/A) Consulting/advisory relationship; (RF) Research funding; (E) Employment; (ET) Expert testimony; (H) Honoraria received; (OI) Ownership interests; (IP) Intellectual property rights/inventor/patent holder; (SAB) Scientific advisory board

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<http://dx.doi.org/10.1634/theoncologist.2013-0393>

