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Review article

Improving quality of care and timely access to radiation therapy for patients with invasive cervical cancer at the National Cancer Institute Paraguay

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ABSTRACT

The purpose of this report is to describe the interventions implemented between 2012 and 2017 at the National Cancer Institute Paraguay (NCI Paraguay) to improve treatment quality and efficiency for patients with cervical cancer, with an emphasis on radiation quality and access. The NCI Paraguay requested collaboration with Health Volunteers Overseas (HVO), an international volunteer organization, to improve the care of patients with cervical cancer. This report is based on site visits to NCI Paraguay by HVO volunteers in 2012, 2013, and 2016, with a follow-up report from the site in 2017. During the study period, increased access to external beam radiation and brachytherapy led to a decrease in wait time to start radiation from 2 to 3 months to 4–6 weeks. The center transitioned from 2-dimensional (2D) to 3-D planning and was able to offer concurrent chemotherapy and radiation, including brachytherapy, to patients with locally advanced cervical cancer. Based on the American Society of Clinical Oncology's resource-stratified clinical guidelines, from 2012 to 2017, the practice transitioned from a “basic setting” to an “enhanced setting”.

1. Introduction

Access to cancer care in low- and middle-income countries (LMIC) is a global problem; effective solutions are likely to be local and institutional. This report describes a collaborative effort to improve the quality of cervical cancer treatment and access to timely radiation therapy at the National Cancer Institute Paraguay (NCI Paraguay). While some of the details focus on changes in radiotherapy access and practice, the overall approach was comprehensive and included changes in availability of diagnostic and imaging services as well as implementation of multidisciplinary collaboration.

There is a global imbalance in access to information and resources. Information is easily transmitted, but resources are unevenly distributed. Healthcare personnel in many LMIC can obtain developed-world recommendations for cancer treatment but do not have access to modern facilities, radiation therapy, chemotherapy, and targeted therapy. European and North American treatment guidelines may not be practical in resource-limited areas. The American Society of Clinical Oncology (ASCO) and other groups have created clinical guidelines for optimal cancer care in resource-limited settings (Chuang et al., 2016), yet each locale has unique constraints and opportunities.

Two-thirds of cancer cases in the next decade are expected to occur in LMIC. In Latin America and the Caribbean region, an estimated 1.7 million cases will be diagnosed in 2030 (Goss et al., 2013). While overall cancer incidence is lower in Latin America than in North America and Europe, the cancer burden is greater because of advanced stage at diagnosis and lack of access to treatment. Access to medical care varies between countries and regions in Latin America, with worse access and health outcomes in rural areas.

Paraguay is a landlocked country in the heart of South America with a population approaching 7 million people. Paraguay's per capita gross national income is the 2nd lowest on the continent after Bolivia. Over the past decade, the Paraguayan economy grew at an average rate of 5% (The World Bank, 2017). The economy has grown in recent years because of increased agricultural exports and production of hydroelectric power, and Paraguay is currently considered a middle-income country (The World Bank [2017].

The Paraguayan government initiated healthcare reform in 2008 and implemented a cancer control policy that year. To date, there is no national cancer registry (Globcan, 2012).

Seven percent of Paraguay's population of 6.1 million currently has private health coverage, 20% are covered by the health services of the

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social security institute (the Instituto de Previsión Social), and the rest depend on the public health system.

Since the majority of patients do not have private insurance and have uneven access to cancer screening, they often present with advanced stage disease requiring multimodal care.

The obstacles to cancer treatment are numerous and include inadequate screening, distance from medical facilities, lack of facilities, and logistic and cultural barriers to treatment. Paraguay's transportation system ranges from adequate to poor, largely depending on the region of the country. The country has a network of roads, railroads, rivers, and airports, but significant infrastructure and regulation improvements are needed. The highway is comprised of single lane roads, which makes it difficult and time consuming to commute between cities. NCI Paraguay, where the government radiation facility is housed, is approximately 1 h outside of the capital city, Asuncion, which makes access to radiation treatment challenging for many people. Radiotherapy units are 1 per 2–3 million people in Paraguay, compared with 1 per 500,000 people in Uruguay (http://nigatom.org.ng/wp-content/uploads/2017/12/Radiotherapy-in-Cancer-Care-Facing-the-Global-Challenge.pdf, nd). There are 4 radiotherapy centers in the country. Based on estimates by the International Atomic Energy Agency (IAEA), only 44.2% of patients in Paraguay who need radiotherapy have access to this modality (Pan American Health Organization, 2013). In Paraguay, breast cancer is the most common cancer in women, followed by cervical cancer. Clinical breast examination and mammography are available but not free, and mammography facilities are not abundant. Mammography units are 0.42 per 100,000 people in Paraguay, compared with 12.97 per 100,000 people in St. Vincent and the Grenadines (Pan American Health Organization, 2013). Lack of screening partly explains the high incidence of advanced-stage breast cancer in Paraguay.

According to a Pan American Health Organization (PAHO) report, there is a national cervical cancer prevention and control plan in place (Pan American Health Organization, 2013). Clinical practice guidelines are available for cancer treatment, and there is a referral system established for which NCI Paraguay is the major public referral center. Pap is the screening test included in the program. Despite the availability of these programs, the country is experiencing difficulties dealing with the challenges posed by prevention programs based exclusively on cytology. In a resource-limited environment like Paraguay, with low coverage, difficulties in providing follow-up, and deficient or incomplete quality control systems, PAHO recommends that alternative cervical cancer screening technologies are needed.

While breast cancer is the most common cancer in women in Paraguay, cervical cancer is the number one of cause of death. The mortality rate from cervical cancer in Paraguay is among the highest in Latin America. The incidence is 34.2/100,000, and the mortality is 15.7/100,000 (Globcan, 2012).

NCI Paraguay initiated a collaboration with Health Volunteers Overseas (HVO), an international volunteer organization, in 2012 to improve the process of care for patients with cervical and breast cancer. HVO is a volunteer-based organization dedicated to improving the availability and quality of healthcare in resource scare countries through education, training, and professional development. Healthcare providers join HVO on a volunteer basis to provide teaching and service rather than direct clinical care.

2. Methods

This report describes interventions initiated by NCI Paraguay, in collaboration with HVO, to improve the process of care for patients with cervical cancer and some outcomes of this intervention. The project addressed the diagnosis, evaluation, and treatment of patients with cervical cancer with a focus on improvement in access to radiation therapy and improved quality of radiation therapy. The interventions were implemented by NCI Paraguay between 2012 and 2017. The report is based on site visits by HVO volunteers to NCI Paraguay in 2012, 2013, and 2016, with a follow-up report from the site in 2017. During each site visit, HVO volunteers served as educators and consultants. The visits lasted approximately 1 week and included attendance in clinics and surgery; interviews with staff, leadership, and residents; and participation in seminars and presentations. Interventions to improve patient care were initiated and implemented by the physicians and leaders of NCI Paraguay.

2.1. NCI Paraguay

NCI Paraguay, Instituto Nacional del Cancer de Paraguay, is the only cancer center in Paraguay and the primary site for training in cancer medicine specialties. It is 1 of 3 centers for medical oncology training, the single site for surgical and radiation oncology training in Paraguay, and provides training in gynecology.

The hospital has 200 beds and a large outpatient clinic capacity. The gynecology department sees around 8000 patients a year. In 2017, the NCI had 603 new cervical cancer cases. The NCI clinics uses paper records.

The center was established in 1986 by the government in Capiata, a rural area approximately 18 miles outside the capital city of Asuncion. Patients are referred to NCI Paraguay from all over the country, usually with a confirmed cancer diagnosis or high suspicion of cancer. The cancer center does not provide transportation. Free lodging is located on the hospital grounds, and off-site lodging is available. Treatment is covered by the government under the universal healthcare system.

Cervical cancer is the leading cancer diagnosis at NCI Paraguay, with 4212 cases seen from 2000 to 2010 (range, 345–479 cases per year); breast cancer numbers were 2245 for the same period (range, 182–334 cases per year). Ovarian cancer is the 2nd most common gynecologic malignancy, with 300 cases seen in 10 years (range, 11–49 cases per year). Data are not available for stage distribution, treatment outcomes, or survival.

The physicians at NCI Paraguay (surgical, medical, and radiation oncologists) are well trained and have access to international treatment guidelines. Oncology specialists complete additional training after medical school. Radiation oncologists complete a 4-year residency. Gynecologic and surgical oncologists have additional specialty training after surgical residency. Many specialists obtain additional training in the United States and other Latin American and European countries.

Most physicians at NCI Paraguay work part time. They have a private practice to support their income and work at the cancer center 2–5 days a week.

NCI Paraguay collaborated with HVO to improve the delivery of care to patients with cervical cancer. The stated goals of the project included: assisting in developing diagnostic and treatment pathways for cervical cancer, including triaging patients for immediate access to radiation and brachytherapy, and reinforcing a multidisciplinary approach to the diagnosis and treatment of cervical cancer.

During the site visits, the volunteers, staff, and center leadership discussed interventions to improve the existing system and make it more efficient without the need for major spending. The team focused on developing diagnostic and treatment pathways and reinforcing a multidisciplinary approach.

2.2. Initial visit and assessment

An initial site visit to NCI Paraguay was made in 2012. At that time, radiation oncology was staffed by 3 part-time radiation oncologists and 1 resident. A single linear accelerator at the facility operated from 7 am to 7 pm. Radiation planning was clinical, based on external anatomic landmarks, or based on 2-dimensional (D) imaging (i.e., X-rays). Time from radiation oncology referral to consultation was 3–4 weeks. Waiting time for a diagnostic computed tomography (CT) scan and biopsy results took an additional 3–4 weeks. Pathology reports took up