



American Brachytherapy Society: Brachytherapy treatment recommendations for locally advanced cervix cancer for low-income and middle-income countries

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ABSTRACT

PURPOSE: Most cervix cancer cases occur in low-income and middle-income countries (LMIC), and outcomes are suboptimal, even for early stage disease. Brachytherapy plays a central role in the treatment paradigm, improving both local control and overall survival. The American Brachytherapy Society (ABS) aims to provide guidelines for brachytherapy delivery in resource-limited settings. **METHODS AND MATERIALS:** A panel of clinicians and physicists with expertise in brachytherapy administration in LMIC was convened. A survey was developed to identify practice patterns at the authors' institutions and was also extended to participants of the Cervix Cancer Research Network. The scientific literature was reviewed to identify consensus papers or review articles with a focus on treatment of locally advanced, unresected cervical cancer in LMIC.

RESULTS: Of the 40 participants invited to respond to the survey, 32 responded (response rate 80%). Participants were practicing in 14 different countries including both high-income (China, Singapore, Taiwan, United Kingdom, and United States) and low-income or middle-income countries (Bangladesh, Botswana, Brazil, India, Malaysia, Pakistan, Philippines, Thailand, and Vietnam). Recommendations for modifications to existing ABS guidelines were reviewed by the panel members and are highlighted in this article.

CONCLUSIONS: Recommendations for treatment of locally advanced, unresectable cervical cancer in LMIC are presented. The guidelines comment on staging, external beam radiotherapy, use of concurrent chemotherapy, overall treatment duration, use of anesthesia, applicator choice and placement verification, brachytherapy treatment planning including dose and prescription point, recommended reporting and documentation, physics support, and follow-up. © 2016 American Brachytherapy Society. Published by Elsevier Inc. All rights reserved.

Keywords:

Cervix cancer; Brachytherapy; Global oncology; Low-resource setting; Consensus guidelines

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Introduction

Cervical cancer is a large and growing problem in low and middle-income countries (LMIC). Cervical cancer is the fourth most common cancer diagnosed in women worldwide with nearly 530,000 cases diagnosed in 2012 (1). Of these, nearly 85% occurred in LMIC. The burden is disproportionately large in LMIC in part due to limited screening, lack of the human papilloma virus (HPV) vaccination, and co-infection with viruses predisposing to HPV infection, such as human immunodeficiency virus (HIV). In addition to the high burden of disease, a disproportionate number of cervical cancer deaths—nearly 90%—occur in LMIC (1). Due to lack of screening and public health awareness of cancer symptomatology, many women present with advanced stage disease (2). Timely access to appropriate cancer care may also be limited in many LMICs (3).

Cervical cancer treatment is stage dependent and often includes surgical resection, chemotherapy, radiotherapy, or a combination of these treatments (4). Cervical cancer is curable, even with locally advanced disease, and therefore the importance of stage-appropriate treatment cannot be underestimated. For locally advanced disease, concurrent chemoradiotherapy followed by brachytherapy has been the standard of care in the United States since the late 1990s when several clinical trials showing an improvement in survival with the addition of chemotherapy were published (5–8).

Brachytherapy is an essential part of cervical cancer treatment, as it allows the cervical tumor to be treated with very high-dose radiotherapy, while providing protection to the bladder, rectum, and sigmoid colon. Many studies have demonstrated improvements in local control and survival when incorporating brachytherapy as part of cervical cancer treatment paradigm (9–12). However, brachytherapy administration requires investment in equipment, as well as skills and expertise on the part of the radiation oncologist, physicist, and treatment team. Poor-quality brachytherapy implants have been shown to result in higher local recurrence (13). In the United States, most patients with intact cervical cancer receive brachytherapy as part of their cancer management plan (14). In countries that lack external beam facilities, brachytherapy alone may be the only curative option available. Brachytherapy advances in recent years have focused on using advanced imaging such as magnetic resonance imaging (MRI) to improve tumor localization and enhance treatment planning. However, high-quality brachytherapy can be delivered even in the absence of advanced imaging modalities (15).

The American Brachytherapy Society (ABS) has previously published articles on proper brachytherapy administration for locally advanced cervical cancer (16, 17). However, these guidelines are not intended for use in LMIC with limited radiotherapy resources. Given the high burden of cervical cancer in these countries, as well as the

disproportionately poor outcomes from cervix cancer (18), there is an urgent need to improve treatment availability and delivery. The International Atomic Energy Agency has issued a primer for radiation oncologists on management of cervical cancer in resource-limited settings (19). In addition, the National Comprehensive Cancer Network and the American Society for Clinical Oncology have issued guidance of management of cervix cancer in resource-limited settings (20, 21), however, these do not address brachytherapy specifically. The ABS aims to provide recommendations for brachytherapy administration for cervical cancer in resource-limited settings.

Methods

The 2012 ABS recommendations were reviewed by clinicians with expertise in radiotherapy and brachytherapy administration in LMIC. A survey was developed to identify practice patterns at the authors' institutions and was also extended to participants of the Cervix Cancer Research Network meeting held in Bangkok, Thailand in January, 2016. Of the 40 participants invited to respond to the survey, 32 responded (response rate 80%). The survey represents 14 different countries including both high-income (China, Singapore, Taiwan, United Kingdom, and United States), and low- or middle-income countries (Bangladesh, Botswana, Brazil, India, Malaysia, Pakistan, Philippines, Thailand, and Vietnam). Furthermore, the scientific literature was reviewed to identify consensus papers or review articles with a focus on treatment of locally advanced, unresected cervical cancer in LMIC. Recommendations for modifications to existing guidelines were reviewed by the panel members. The specific recommendations outlined in this article represent the consensus opinion of the panel members. This report was reviewed and approved by the Board of Directors of the ABS.

Results

Staging

The ABS recommends appropriate staging, defined as documentation of disease extent and volume. In addition to clinical examination, imaging modalities such as computed tomography (CT), MRI, and positron emission tomography (PET)/CT can be useful to understand the full extent of local and distant disease. However, in many resource-constrained settings, advanced imaging modalities are not available. Many centers use ultrasound for staging when cross-sectional imaging is not available. Clinical staging using the International Federation of Gynecology and Obstetrics (FIGO) version 2009 is appropriate. The FIGO staging system incorporates disease extent gleaned from clinical examination, cystoscopy, and proctoscopy/sigmoidoscopy when bladder or rectal

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