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Vaginal brachytherapy for postoperative endometrial cancer: 2014 Survey of the American Brachytherapy Society

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ABSTRACT

PURPOSE: Report current practice patterns for postoperative endometrial cancer emphasizing vaginal brachytherapy (VBT).

METHODS AND MATERIALS: A 38-item survey was e-mailed to 1,598 American Brachytherapy Society (ABS) members and 4,329 US radiation oncologists in 2014 totaling 5,710 recipients. Responses of practitioners who had delivered VBT in the previous 12 months were included in the analysis. Responses were tabulated to determine relative frequency distributions. χ^2 analysis was used to compare current results with those from the 2003 ABS survey.

RESULTS: A total of 331 respondents initiated the VBT survey, of whom 289 (87.3%) administered VBT in the prior 12 months. Lymph node dissection and number of nodes removed influenced treatment decisions for 90.5% and 69.8%, respectively. High-dose-rate was used by 96.2%. The most common vaginal length treated was 4 cm (31.0%). Three-dimensional planning was used by 83.2% with 73.4% of those for the first fraction only. Doses to normal tissues were reported by 79.8%. About half optimized to the location of dose specification and/or normal tissues. As monotherapy, the most common prescriptions were 7 Gy for three fractions to 0.5-cm depth and 6 Gy for five fractions to the surface. As a boost, the most common prescriptions were 5 Gy for three fractions to 0.5-cm depth and 6 Gy for three fractions to the vaginal surface. Optimization points were placed at the apex and lateral vagina by 73.1%. Secondary quality assurance checks were performed by 98.9%.

CONCLUSIONS: VBT is a common adjuvant therapy for endometrial cancer patients, most commonly with HDR. Fractionation and planning processes are variable but generally align with ABS recommendations.

Keywords: Vaginal brachytherapy; Endometrial cancer; Vaginal cuff brachytherapy; Vaginal cylinder; Vaginal cuff

Introduction

In the United States, endometrial cancer is the most common gynecologic malignancy with an expected 54,870 new diagnoses and 10,170 deaths in 2015 (1). Total abdominal hysterectomy with bilateral salpingo-oophorectomy is the primary management, although controversy exists regarding the role of pelvic and para-aortic lymphadenectomy (2–5). The first Post-Operative Radiation Therapy in Endometrial Cancer (PORTEC-1) and Gynecologic Oncology Group 99 (GOG 99) studies showed that pelvic radiotherapy decreased the risk of vaginal and pelvic recurrence for intermediate-risk early stage endometrial cancer patients. The vagina was the dominant location of local failure in these studies (3–5). PORTEC-2 subsequently demonstrated that, in high intermediate-risk endometrial cancer patients, the vaginal recurrence rate was

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not inferior with vaginal brachytherapy (VBT) compared with pelvic external beam radiotherapy (EBRT) (6).

In 2003, the American Brachytherapy Society (ABS) conducted a pattern-of-practice survey for VBT (7). Since this survey was reported, surgical trends in management have changed, with an increase in lymphadenectomy comprising ≥10 nodes from 20% of cases in 2000 to 80% in 2004 (8). The results of PORTEC-2 and the increased surgical assessment of pelvic and para-aortic lymph nodes may decrease the propensity to deliver pelvic radiotherapy (6, 9).

The purpose of this study was to update the pattern-of-practice survey for the adjuvant management of endometrial cancer with an emphasis on VBT.

Methods and materials

In 2014, a 38-question survey was developed based on the original 2003 survey (7). This current survey focuses on patterns of practice and technical delivery of VBT for postoperative endometrial cancer (Appendix 1). Patterns of practice for cervical brachytherapy were jointly surveyed and results reported separately. The survey was electronically mailed three times to 1,598 ABS members with available email addresses in January and February 2014. The survey was amended in July 2014 for the second mailing so that the respondent's profession question was mandatory, and the survey was discontinued for nonattending physicians at that time. This survey was then electronically mailed to 4,329 US radiation oncologists three times from July to September 2014. The survey was sent to a total of 5,710 individuals. Because it is unknown how many of these physicians treat more than one VBT case per year, we were unable to determine a true response rate. Responses were accepted only from those who treat endometrial cancer with VBT, so a low response rate was anticipated.

The survey contained questions relating to both high-dose-rate (HDR) and low-dose-rate (LDR) VBT. We only present HDR results due to the very low utilization of LDR. Two-proportion z-tests were used to assess changes in practice between the 2003 and 2014 surveys. All observations in the 2003 and 2014 surveys were assumed to be independent. Corrections for multiple comparisons were not made because the results were considered exploratory.

This report was reviewed and approved by the Board of Directors of the ABS.

Results

Study population

The survey was sent out to all ABS members and additional US radiation oncologists, a total of 5,710 potential participants. A total of 370 individuals responded to the combined cervical and VBT cancer survey, and 331 initiated the VBT survey. The first two questions of the survey were required: "Do you treat postoperative endometrial cancer with brachytherapy?" and "Have you treated postoperative endometrial cancer with brachytherapy in the last 12 months?" Only those answering "yes" to both questions proceeded to the remainder of the survey. For this 2014 survey, 289 (87.3%) individuals met these criteria, whereas for the 2003 survey, 551 of 757 (72.8%) met these criteria ($p < 0.001$). We asked respondents to describe their profession, with 215 (74.4%) attending physicians, 11 (3.8%) resident physicians, 6 (2.1%) other, and 57 (19.7%) no response. The remainder of this survey had a 94.8% completion rate for each question.

The demographics of the sample completing the survey are listed in Table 1. Of the 370 responses to the survey, 138 (37.3%) were initiated as a result of the mailing to ABS members and 232 (62.7%) from the mailing to US radiation oncologists.

Lymph node practice

Three questions were asked to evaluate practice patterns regarding lymph node dissections. A total of 90.5% responded affirmatively that a lymph node dissection influences treatment recommendations. Furthermore, 69.8% responded that the number of nodes removed influences recommendations. The results for the average number of lymph nodes dissected are shown in Fig. 1 along with a comparison to the 2003 survey. An average of 6−10 nodes are removed in 40.0% and 11−20 nodes are removed in 42.0% of those surveyed in 2014.

Depth of invasion and histology

Survey participants were asked whether they classify depth of myometrial invasion (MMI) by halves (inner 1/2 vs. outer 1/2), thirds (inner 1/3, middle 1/3, and outer 1/3), or continuously. MMI is classified by halves by 75.3%, thirds by 17.4%, and continuously by 7.3%. Practitioners treat with VBT for high-risk histologies such as clear-cell carcinoma or serous carcinomas but 50.2% only do so with chemotherapy, although 14.0% use VBT alone.

Table 1
Demographics of survey responders

Demographics	Percentage
Experience in practice, y	
≤5	32.8
6−10	14.4
11−20	26.1
≥20	26.7
Primary practice affiliation	
Academic hospital based	47.2
Private hospital based	35.4
Academic free-standing	1.7
Private free-standing	14.6
Other	1.1