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Brachytherapy ■ (2017) ■

BRACHYTHERAPY

Brachytherapy as part of the conservative treatment for primary and recurrent vulvar carcinoma

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ABSTRACT

PURPOSE: There are only scarce data on the place of brachytherapy (BT) for treatment of vulvar carcinoma. Our institutional experience of interstitial BT for vulvar carcinoma patients is reported.
METHODS AND MATERIALS: Clinical records of patients receiving low-dose-rate or pulsed-dose-rate BT as part of the primary treatment for primary/recurrent vulvar squamous cell carcinoma or as part of postoperative treatment between 2000 and 2015 were included. Patients, tumors, and treatment characteristics as well as clinical outcome were examined.
RESULTS: A total of 26 patients treated with BT were identified. BT was delivered as part of primary intent treatment for locally advanced/recurrent cancer in 11 patients and as part of postoperative treatment in 15 patients. Median age at time of BT was 63 years (range, 41−88 years). Pulsed-dose-rate and low-dose-rate were used in 15 patients and 11 patients, respectively. BT was performed as a boost to the tumor bed following external beam radiotherapy (n = 13) or as the sole irradiation modality (n = 13). Total median dose at the level of primary tumor was 60 GyEQD2 (range, 55−60 GyEQD2). With mean followup of 41 months (range, 5 months−11.3 years), 11 patients experienced tumor relapse, and in two of them, site of relapse was only local. Three-year estimated disease-free survival and overall survival rates were 57% (95% confidence interval: 45−69%) and 81% (95% confidence interval: 72−90%), respectively. All toxicities were Grade 2 or less.
CONCLUSIONS: Interstitial BT used as part of the primary or postoperative treatment of vulvar carcinoma is feasible with a satisfactory toxicity profile. Prognosis remains, however, dismal, with a high frequency of failures in patients with locally advanced tumors.

Keywords: Brachytherapy; Vulvar carcinoma; Pulse dose rate; Low dose rate

Introduction

Vulvar carcinoma is a rare cancer, accounting for approximately 4% of all gynecologic tumors, but with increasing incidence over the past 40 years (1−4). The primary intent treatment is surgery, with a radicality that ranges from excision or partial vulvectomy to radical vulvectomy, depending on the tumor extent (5). Approximately 60% of vulvar cancers are diagnosed at an advanced stage, when a conservative surgery cannot be performed, because of frequent extension toward adjacent perineal structures, including the lower vagina (1, 3, 6).

Radiotherapy has an important role in the primary, adjuvant, or salvage treatment of patients who are not candidates for surgery or who decline it. However, the vulvar, vaginal, and perineal toxicities associated with external beam radiotherapy (EBRT) are significant concerns and limitations to this conservative strategy (3−5).

There are only scarce data on the place of brachytherapy (BT) for treatment of vulvar carcinoma. Few retrospective studies with vulvovaginal tumors suggested that BT could

Received 13 November 2016; received in revised form 22 December 2016; accepted 12 January 2017.

Financial disclosure: The authors declare no conflict of interest relative to this work.

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1538-4721/$ - see front matter
http://dx.doi.org/10.1016/j.brachy.2017.01.005

be incorporated as part of the radiotherapeutic management of these patients, either as a boost to the tumor after EBRT or as sole irradiation modality. But most of these studies had only a very low number of patients after excluding primary vaginal cancers (7–9).

We report our 15-year institutional experience of interstitial BT for vulvar carcinoma patients. Patterns of relapse and toxicities were examined.

Methods and materials

Inclusion criteria

Clinical records of patients treated in our institution and receiving BT as part of the treatment of a histologically proven primary or recurrent vulvar carcinoma between 2000 and 2015 were examined. Patients with sarcoma or melanoma histology were not included. Patients and treatments characteristics (previous surgery, EBRT technique, BT characteristics) as well as treatment outcomes were examined. The study was conducted in accordance with the Helsinki Declaration.

BT indications

Primary intent local treatment for vulvar carcinoma was surgery consisting of partial vulvectomy or radical vulvectomy with at least 0.8 cm margins. BT was delivered in two indications:

(*1*) Patients who had a primary or recurrent locally advanced vulvar carcinoma and who were not eligible for a primary intent radical surgery (because of contraindication, patients refusal, or local extension requiring mutilating surgery) received EBRT to the vulva, groins, and pelvic lymph nodes, then a BT boost. In case of pelvic and/or inguinal nodal metastases, a concurrent chemotherapy could be delivered, depending on the patient's general medical condition.

(*2*) Patients who underwent a primary surgery and who had an indication for postoperative treatment because of microscopically involved margins (R1 margins) received an adjuvant BT, alone or combined with EBRT (in case of nodal metastases at lymph node dissection).

BT procedure

BT procedure was performed under general anesthesia and consisted of a perineal interstitial implantation, following the Paris system rules. In case of extension to the lower part of the vagina, the vaginal mold technique could be also used in combination with interstitial implantation. The target volume encompassed the gross tumor volume (or the tumor bed in case of postoperative BT) plus a safety margin ranging from 5 to 10 mm. The distance between needles varied between 12 and 16 mm, and the number of needles was determined to allow an adequate coverage of target volumes. If required for adequate target coverage, exterior surface needles could be used. Needles were secondarily replaced by connecting plastic tubes (Fig. 1).

For treatment planning, computed tomography scans were acquired in the supine position, slice thickness 1.5 mm. Axial images were imported to the Plato BPS treatment planning system (Nucletron, Veenendaal, The Netherlands), and a three-dimensional set was reconstructed. Before 2007, low-dose-rate (LDR) BT was used, through ^{192}Ir wires. From 2007, treatments were delivered using pulsed dose rate (PDR) with ^{192}Ir stepping sources. Length of activation (for LDR treatment) or dwell positions (for PDR treatments) in the implant catheters were chosen depending on the clinical target volume to be treated. Doses were prescribed at the reference isodose (85% of the minimal dose rate between the planes), according to the Paris

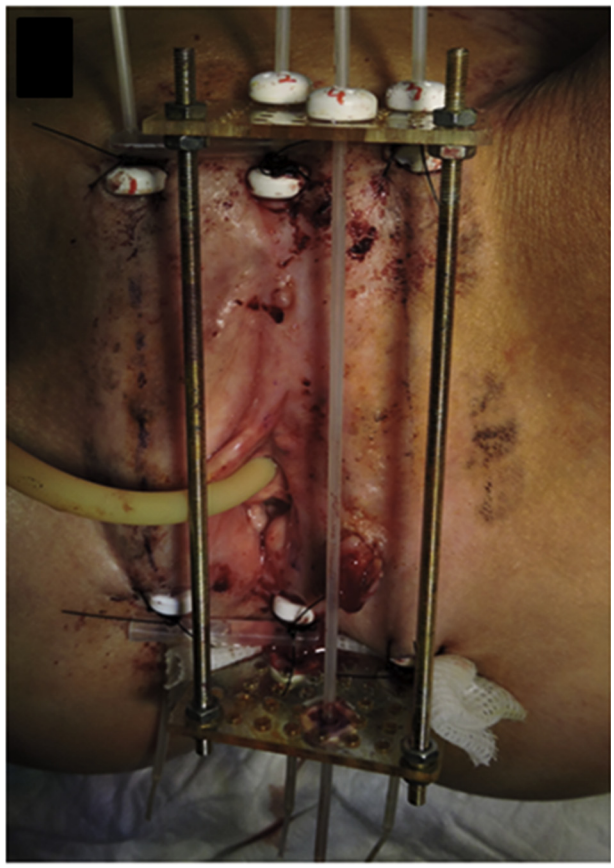

Fig. 1. Illustration of an implantation for a vulvar cancer treated with pulse-dose-rate brachytherapy. The patient presented with a bulky vulvar cancer at diagnosis measuring more than 8 cm in greatest dimension, involving the whole vulva. She had an excellent response to chemoradiation (45 Gy in 25 fractions) but persistence of a multifocal residual disease. A perineal interstitial implantation was done to cover the residual disease, following the rules of parallelism between needles, then needles were replaced by plastic tubes. A total of four catheters in two planes were used, including one catheter for plesiotherapy to appropriately cover the largest tumor residue. A plastic template was used to maintain the geometry of implant.