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RESEARCH ARTICLE

Effects of simultaneous integrated boost radiotherapy on kaposi's sarcoma

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ABSTRACT

Kaposi's sarcoma (KS) is an tumor proliferation cells derived from lymphatic endothelium infected with human herpes virus 8 (HHV-8) on immunosuppressed patients. Between 2014 and 2017, 12 patients who came to Radiation Oncology Clinic of Bezmialem Vakif University for radiotherapy were examined. The results obtained are discussed in the light of the literature.

Keywords: *Kaposi's sarcoma; Treatment; Radiotherapy and Chemotherapy*

INTRODUCTION

Kaposi's, known as idiopathic multiple pigmented sarcoma, idiopathic multiple hemorrhagic sarcoma also known as Kaposi's angiosarcoma manifested as multiple vascular nodules on skin or organs (1-3).

The most frequent location is the lower extremities. Generalized disease can result to death because cachexia, hemorrhage by tumor growth (4, 5).

Kaposi's sarcoma (KS) is an tumor proliferation cells derived from lymphatic endothelium. The KS was occurred by muticentric cells wich infected with human herpes virus 8 (HHV-8) on immunosuppressed patients (6-8). The classical form typically affecting elderly men of Mediterranean and the endemic ones presence in Southern Africa. The epidemic form was showed in patients which infected HIV (9).

Treatment of KS depends on based to eliminating the factors maintaining immunosuppression (10). Local treatments are radiotherapy, photodynamic therapy can be applicated for lesions with a significant risk of recurrence (11). for HIV infected patients must be treated with antiretroviral therapy (10). Chemotherapy can be uses rapidly progressive, with visceral lifethreatening disseminated forms of KS (11).

KS lesions may be seen in as tumors or plaque with painless wide range of colours, from pink to blue. When the lesions progress, the plaques can be turns into nodules and can join together. In some patients, the lesions growth is slow from month to month. In others, the lesion growth can be more rapid from week to week. Swelling of the lower legs, arms, face and genital regions can occur as a result of the blocked lymphatics. Lung edema was obtained by accumulation of fluid accompanied with coughing and breathlessness. Oral and gastrointestinal lesions can cause edema or bleeding (1).

The aim of treatment is palliative and improving the quality of life. KS may resolve with highly active antiretroviral therapy (HAART). The RT improved to nodules and plaques of KS especially for larger lesions. Chemotherapy (CT) may be necessary especially with visseral involvement of KS when HAART or local therapies not enough (12-16) vinblastine and vincristine, alone or in combination with bleomycin most using CT ajents for KS with objective responses ranged between 10 and 75% (16). A randomized study comparing Liposomal doxorubicin (LD) and HAART were evaluated for KS associated with HIV shoved to encouraging responses and low toxicity than vinblastine with bleomycin (17, 18). The LD has also effectives in the classical form of KS with average objective response was 71-80% with a median response of 9-25 months and low toxicity in early and advanced stages respectively (15-19). The second line treatment with paclitaxel or

docetaxel showed to 50-60 % complete and 27% partiel response, in studies (20, 21).

HHV-8 viral genome, play an important role in the activation of VEGFR 2 and VEGF (22). The treatment with daily Imatinib showed to 60% clinical pathological and biological response after 4 weeks of treatment (23).

The RT must be applicated to nodules and plaques of KS especially for larger lesions. when HAART or other local therapies not enough (12-14). Therefore we evaluated to our KS patients retrospectively for assessment to RT effects.

METHODS

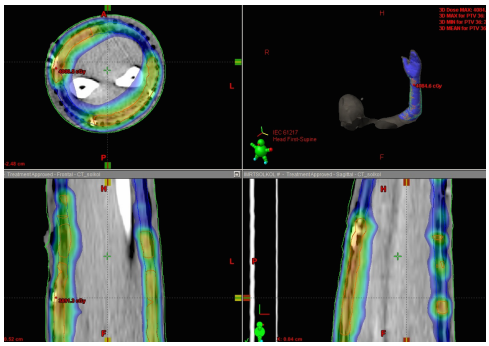
Between 2014 and 2017, 12 patients who came to Radiation Oncology Clinic of Bezmialem Vakif University for RT were examined as retrospective. The ECOG (Eastern Cooperative Oncology Group) performances of patients ranged from 1-3, ages 23-76, stage I-III, without metastases and treated by RT and/or CT. One of the patients had a black, crusted lesion on his 2nd finger on his ulcer. Other patients had multiple lesions on both lower legs. All of the patients were treated with external radiation therapy. The patient, who had warts, had been on heavy CT for 16 years. Since it did not benefit from CT, it was sent to us for RT. Except for this patient, full response was obtained in all. Surgical operation was performed after partial response in the patient with warts. There was no recurrence of 2.5 years in the right lower leg applied surgical excision. Second series RT applicated because of recurrence in the left foot. A complete response was obtained in lesions after RT. Six months later, new KS lesions were detected in the left lower arm. This patient had common warts in the hands, milimetric condiloma accuminatum lesions on perianal region, and dysplasia in the cervix when relapsing occur. Complete response was obtained after RT was applied to the left lower arm region of the patient. It was observed that the warts remaining in the RT area were completely disappeared after the RT and the white stains remained in their places. The obtained results of these 12 patients were discussed in the light of the literature.

Radiotherapy

RT applicated with LINAC based Varian Linear Accelerator (MNT, Health Care and Trade Corporation, Turkey, Bozlu Holding) device. The contrast-enhanced brain CT simulation was utilized to define the organs at risk and target volumes with coronal and axial contrast-enhanced multi-detector computerized tomography (MDCT).

In this study, tumours were treated with dynamic IMRT (Intensive Modulated Radiation Therapy) method with MLC (Multi Leaf Collimator) blocked fields. The field that encompass nodules and plaques with 2 cm margins included in radiation fields with Planning Tumour Volume (PTV). Target volume coverage and maximum point dose were assessed as the volume of PTV receiving at least 95% and 105% of the prescribed dose. The prescribed radiation dose was 24 Gy in 12 daily fractions of 2 Gy to plaque areas. Simultaneus boost treatment applicated to 36 Gy in 12 daily fractions of 3 Gy to nodules with using 0,5cm bolus (Figure 1).

Figure 1: İzodose distribution of radiation planning on kaposi's patients



RESULTS

91.7% of patients presented with leg lesions (1 patient), and 12.5% (2 patients) presented with arm lesions. All lesions responded to treatment, with a complete response rate of 83,4% and a partial response rate of 16,6%. Acute toxicity was observed grade I dermatitis only 8,3% (1 patient) (Table 1). Late toxicity was observed grade I-2 fibrosis of 8,3% (1 patient). RT toxicity determined according to RTOG (Toxicity criteria of Radiation Therapy Oncology Group) (24).

Table 1: Radiation Therapy response rates of patients with kaposi's

Lesions	RT Dose (cGy)	Complete response rates (%)	Partiel response rates (%)
Skin nodules	36	83,4	100
Skin plaques	24	100	100

DISCUSSION

Different treatment methods can applicated to KS such as intralesional interferon alpha, hormone therapy, infrared coagulation and radiotherapy cryotherapy, laser removal, systemic chemotherapy, according to clinical forms (25). KS sensitive to radiation therapy wich improves the quality of life with doses greater than 20 Gy (26, 27). Standard dose of KS treatment not

assessed because its different clinical variations.

Hypofractionation radiotherapy was used some studies which demonstrate to same results according to recurrence-free survival, toxicity, and local control (28). The patients with a limited life expectancy one fraction with 800 cGy has shown to successful outcomes (29). Once weekly total and subtotal skin electron beam therapy for Kaposi's sarcoma showed to same results with other studies (28).

Our study showed to complete response rate of 83,4% and a partial response rate of 16,6%. Acute toxicity was observed grade I dermatitis only 8,3%. These results more good than the literature evidences. The one of the important difference of our study was used of SIB RT (Simultaneous Integrated Boost Therapy). But study population was too small and heterojenous.

The clinical feasibility, dosimetry and safety of simultaneous integrated boost (SIB) was evaluated and obtained excellent dosimetric outcome with minimal toxicity (30, 31).

CONCLUSION

Radiotherapy is an effective treatment modality for KS with minimal toxicity.

Prevention of viral infections, HIV and HHV-8 KS and antiangiogenic therapies are important part of the treatment and prevention of KS.

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