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REVIEW

A Review on an Unpopular Topic Among Radiation Oncologists: Radiotherapy in Kaposi Sarcoma

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SUMMARY

Kaposi sarcoma is a low-grade vascular neoplasm with heterogeneous clinical behavior and diverse epidemiologic subtypes, including classic, endemic African, iatrogenic, and AIDS-related forms. Radiotherapy has long been recognized as a highly effective local treatment modality in disease due to its marked radiosensitivity. This review comprehensively evaluates the role of radiotherapy in the management of Kaposi sarcoma, with a focus on dose-fractionation strategies, anatomic site considerations, and technical advancements. Retrospective studies consistently report high complete response rates (60–93%) across different anatomical sites, with acceptable toxicity profiles. While low-dose regimens such as 8 Gy in a single fraction may be suitable for palliation or limited life expectancy, fractionated regimens of 20–30 Gy are associated with higher local control and better cosmetic outcomes. In mucosal regions such as the oropharynx and conjunctiva, lower doses (15–20 Gy) are generally preferred due to increased mucosal toxicity, whereas higher doses (30 Gy) are commonly used for cutaneous lesions. Recent developments in radiotherapy techniques—including volumetric arc therapy and high-dose-rate brachytherapy—have enhanced dose conformity, reduced treatment duration, and improved outcomes in anatomically challenging regions. Despite the lack of prospective randomized trials, cumulative evidence supports radiotherapy as a well-tolerated and effective modality across all Kaposi sarcoma subtypes. This underscores the necessity of individualized RT planning based on lesion site, disease extent, and patient performance status to optimize therapeutic efficacy. Radiotherapy for Kaposi sarcoma stands out as a treatment modality with high local control rates and excellent tolerability in terms of toxicity.

Keywords: AIDS; HIV; kaposi sarcoma; radiotherapy.

INTRODUCTION

Kaposi sarcoma is a low-grade vascular tumor that first found its place in the literature with the description of 'idiopathic multiple pigmented sarcoma of the skin' by doctor Kaposi in 1872.[1,2] The disease is the most common neoplasm in patients with acquired immunodeficiency (AIDS) and is one of the most important causes of morbidity and mortality in AIDS patients. Human herpes virus 8 infection plays a role in the etiology of the disease.[2–4] This close association of the virus with the disease has led to the use of the disease as a model for understanding viral oncogenesis, carcinogenesis and angiogenesis.[5,6] Four different ep-

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idemiological-clinical forms of the disease have been described: The classical form, the African endemic form, the AIDS-related epidemic form, and the transplant-associated form.[2,4,7] The forms of the disease can vary considerably in terms of clinical course. Kaposi sarcoma lesions begin with an early patchy stage, which then progresses to a plaque stage and then to a tumor stage characterized by large nodules.[4] Kaposi sarcoma, a multifocal disease, tends to occur predominantly in mucocutaneous areas, although it can also involve lymph nodes and visceral organs.[4,7] There are also cases where the disease is seen in unusual localizations such as the musculoskeletal system, nervous system, larynx, eye and heart.[8,9] Clinical diagnosis alone has a low positive predictive value in diagnosing a patient with clinically suspected Kaposi sarcoma. Histopathological confirmation is the gold standard for disease diagnosis. The disease is staged according to the TIS system: T indicates tumor status, I indicates immune system status, and S indicates systemic disease status. If any of the poor risk factors defined for each are present, they are scored as 1, and if not, they are scored as 0. In patients receiving antiretroviral therapy (ART), stage I has lower prognostic significance than stage T and stage S. T1S1 staged disease has the worst prognosis.[10] The purpose of this review is to provide information about the place, dose and technique of curative radiotherapy in this disease, which is a serious cause of mortality in AIDS patients.

TREATMENT APPROACHES IN KAPOSI SARCOMA

Kaposi sarcoma is a highly heterogeneous disease, and many different treatment options are available. Therapies can vary significantly depending on the clinical type, stage, and immune system status of the disease. Distinguishing between limited cutaneous disease and advanced disease is an important step in selecting the treatment modality. While there is no definitively agreed-upon definition, limited cutaneous disease is considered to be present when there are up to five lesions or <5% of the body surface area.[10] Optimizing the immune system is a critical step in the treatment process in all clinical types and stages of the disease.[2,4,10] If possible, medications that may cause iatrogenic immunosuppression should be discontinued. People living with human immunodeficiency virus (HIV) benefit from appropriate ART.[10,11] One of the most significant side effects of ART is immune reconstitution inflammatory syndrome (IRIS), which can occur 3–6 months after starting treatment. IRIS is characterized by a paradoxical worsening of Kaposi's symptoms after starting ART. Patients taking glucocorticoids or those with severe immunodeficiency are at higher risk for IRIS.[10,12] The development of IRIS is an indication for the immediate initiation of systemic therapy. Topical treatments are a treatment option for limited cutaneous disease. Alitretinoin gel is the most commonly used topical treatment agent.[13] Imiquimod, an immunomodulator, is another topical treatment option with its antiviral activity.[14] Intralesional chemotherapy is a proven treatment option for limited mucocutaneous disease. The chemotherapeutic agent of choice is vinblastine or vincristine.[15,16] Cryotherapy is one of the treatment options for limited cutaneous disease. Cryotherapy is based on the principle of inducing necrosis by freezing cells. Liquid nitrogen is generally used for cryotherapy. Studies have shown that cryotherapy is a safe and effective treatment option for limited cutaneous disease.[17] Local excision is one of the treatment options that can be applied in limited cutaneous disease.[18] Literature data on local excision in Kaposi sarcoma has been described specifically for HIV-negative patients. Systemic treatment is also one of the treatment modalities that has proven its effectiveness in the disease.[19] Liposomal doxorubicin is the first-line agent for systemic therapy. Liposomal doxorubicin increases the risk of neutropenia. Another systemic treatment option is paclitaxel.[20] According to the randomized study, although there was no significant difference in efficacy between liposomal doxorubicin and paclitaxel, there was a difference in terms of side effect profile.[21] Kaposi sarcoma is considered a radiosensitive tumor. Radiotherapy is one of the treatment options for both limited cutaneous and advanced disease.

To briefly summarize treatment options based on disease stage: Asymptomatic HIV-positive patients with limited cutaneous involvement may receive ART alone. Symptomatic patients with limited cutaneous involvement may receive ART, radiotherapy, topical therapy, intralesional chemotherapy, cryotherapy, or local excision. For advanced cutaneous, oral, visceral, or nodal disease, the recommended treatment is ART combined with systemic therapy. Patients not suitable for systemic therapy may receive ART combined with radiotherapy.

Radiotherapy in Kaposi Sarcoma

When examining studies on radiotherapy in Kaposi sarcoma, the lack of prospective studies is striking. A retrospective study by Cooper et al.[21] evaluated 226

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lesions treated with radiotherapy. While the dose was 30 Gy/10 fractions in most patients, an 8 Gy/1 fraction regimen was preferred in patients with large tumors. At the 1-month post-treatment evaluation, the complete response rate was 68%. Local recurrence was detected in 9% of patients. The treatment objective, anatomic location, and patient performance score were found to be predictive factors for treatment response. It was emphasized that patient selection should be considered a factor affecting radiotherapy response. In a retrospective study conducted by Piedbois et al.[22] on 453 patients, patients were divided into two groups based on anatomic location. In the study, 4 MeV electron beam energy, 45–100 kV and 4 MV X-ray were used. Patients who received treatment for the conjunctiva, eyelid, lips, hands-feet, penis, oral mucosa and anal region were evaluated in the first group and a dose of 10–20 Gy was applied to this group (2.5 Gy/fraction; 4 fractions per week). Patients who received treatment for other skin parts were evaluated in the second group and a dose of 30 Gy was applied to this group (20 Gy in the first two weeks, 10 Gy after a 2-week break). In the first group, the overall rate of objective response was found to be 87.8%. Although tolerance to treatment was found to be good, the rate of mucosal side effects was found to be high in the oropharyngeal region. In the second group, the complete regression rate was found to be 85% and tolerance to treatment was found to be acceptable. 15.2 Gy was given to oral region lesions; 20 Gy was given to conjunctiva, eyelid, lips, hands-feet, penis and anal region lesions; In other cutaneous lesions, a dose of 30 Gy has been reported to provide high response rates with an acceptable toxicity profile. It has been stated that prophylactic antifungal therapy should be considered in the treatment of oropharyngeal lesions. In Kirova's retrospective study of 643 patients, a total of 6,777 sites were irradiated.[23] The study used 4 MeV electron beam energy, 4 MV, and 45–70 kV X-rays. Doses ranging from 10 to 30 Gy were applied. The objective response rate (complete + partial response) was found to be 92%. While the treatment was found to be tolerable for cutaneous lesions, mucosal reactions in oral lesions were observed to begin at relatively low doses. 15 Gy for oral lesions, 20 Gy for eyelid, conjunctival, and genital lesions, and 30 Gy for skin lesions were found to be effective treatment response rates. A retrospective analysis evaluated 1,482 lesions treated with radiotherapy.[24] Seven hundred eleven lesions were classic Kaposi sarcoma and 771 were HIV-associated Kaposi sarcoma. Doses ranging from 10 to 40 Gy (mean 29.2 Gy) were applied to the classic type, and doses ranging from 5 to 45 Gy were applied to the HIV-associated type. Based on a 13.5-year post-treatment analysis, the cure rate for the classic type was 98.7%. When cosmetic results were evaluated in the classic type patients with complete response, 75.6% had good cosmetic results, and 24.39% had acceptable cosmetic results. At 4 years of follow-up after the end of treatment, the complete response rate in the HIV-associated group was 91.43%. When cosmetic response was evaluated in the HIV-associated group with complete response, 20% of patients had good cosmetic responses and 80% had acceptable cosmetic responses. Of the 564 patients with acceptable cosmetic responses, 560 experienced hyperpigmentation, and 4 experienced hypopigmentation. The study concluded that radiotherapy is a safe and effective treatment modality for Kaposi sarcoma. A retrospective study of 17 patients from Taiwan evaluated the results of radiotherapy administered to patients diagnosed with classic Kaposi sarcoma.[25] All lesions treated with radiotherapy were in the lower extremities. The most commonly used radiotherapy regimen is 39 Gy/3 fractions. The complete response rate was found to be 76%. 5-year progression-free survival was 58%, and overall survival was 85%. An Italian study evaluated the results of radiotherapy applied to 38 lesions in 18 patients.[26] A total of 24–30 Gy was administered daily at 2 Gy with 6–18 MeV electron energy to 8 patients with multiple lesions on the arms and legs. One of these patients also had a lesion on the eyelid, which was administered a daily dose of 2 Gy and 30 Gy. Seven patients with single lesions on the arms and legs received daily doses of 20–36 Gy with 6 MV photon energy. Two patients received oral mucosal lesions at 2 Gy and 24–30 Gy. One patient received a daily dose of 3 Gy and 30 Gy to a single bone lesion in the spinal column. Complete response was observed in 83.8% of the lesions, and partial response in the remaining. The mean follow-up period was 51 months, and no recurrence of any lesion was observed during follow-up. The mean overall survival was 57.4 months. 65.7% of the patients achieved a good cosmetic response. No side effects requiring treatment discontinuation were observed. An effective palliative response was achieved except for lesions in the vertebrae and hard palate. The study concluded that radiotherapy is an effective treatment modality that can be the primary treatment modality in patients with cosmetic preservation concerns. With a complete response rate of 60–93% and a highly tolerable side effect profile, radiotherapy stands out as a treatment modality of choice for all stages and anatomic locations of Kaposi sarcoma. Studies on radiotherapy in Kaposi sarcoma and their results are shown in Table 1.

Table 1 Studies on radiotherapy in Kaposi sarcoma and their results

Studies	Study design	Target population	Localization	Energy-radiotherapy technique	Patients/number of lesions	Radiotherapy	Response rate	Recurrence rate	Toxicity rate
Cooper[21]	Retrospective	Epidemic KS	Mucosal and Cutaneous Sites	MeV, kV, MV	129/226	30 Gy/10 fr, 8 Gy/1 fr	CR: 68%, PR: 20%	9%	
De Wit[35]	Retrospective	Epidemic KS	Mucosal and Cutaneous Sites	MV, kV	31/74	8 Gy/1 fr	RR: 90%	64%	Mild Acute Toxicity
Geara[37]	Retrospective	Epidemic KS	Cutaneous Sites and Genitals	Mev, kV	149 pts	20 Gy/8 fr, 30 Gy/12 fr	CR: 63%, RR: 30%	64-100%	Dry Epidermitis:60%, Exudative Epidermitis: 26%,Exudative Epidermitis with Skin Ulceration: 8%
Ghabrial[43]	Retrospective	Epidemic KS	Eyelids and Conjunctiva	MeV, kV, MV	42/49	8 Gy/ 1 fr (Group 1), 15-36 Gy/5-17 fr (Group 2)	Group 1: CR: 32%, PR: 68% Group 2: CR: 22%, PR: 72%	22% Group 1, 39% Group 2	No Serious Complications
Stelzer[39]	Prospective	Epidemic KS	Cutaneous Sites	Mev	14/71	8 Gy/1 fr, 20 Gy/10 fr, 40 Gy/20 fr	CR: 83% (40 Gy), 79% (20 Gy), 50% (8 Gy)	52% (40 Gy), 67% (20 Gy), 88% (8 Gy)	No>G1 Acute-Late Toxicity
Piedbois[22]	Retrospective	Epidemic KS	Group 1: Conjunctiva, Eyelids, Lips, Hands, Feet, Penis, Oral Mucosa, Anal Region. Group 2: Other Cutaneous Parts	MeV, kV, MV	453 pts	10-20 Gy/2.5 Gy/fr (Group 1), 30 Gy/2.5 Gy/fr (Group 2)	Overall Rate of Objective Response: 87.8% (Group 1), CR: 85% (Group 2)	71%	Grade 3-4 (30 Gy]: 34% vs 31% Grade 3-4 (20 Gy): 17% vs 11%
Le Bourgeois [47]	Retrospective	Epidemic KS	Oral Cavity, Eyelids, Conjunctival and Genitals	MV, kV	146/186	10-30 Gy	Oral KS: CR: 11%, PR: 89%, Eyelid and conjunctival KS: CR: 54%, PR: 42%, Penile and scrotal KS: CR: 69.4%, PR: 30.6%	Oral: 22%, Eyelid and Conjunctival: 12.8%, Genitals: 45.4%	Severe Reactions: Oral:22%, Eyelids and Conjunctival: 2.9%, Genitals: 6%
Piccinno[44]	Retrospective	Epidemic KS	Mucosal, Cutaneous Sites, Eyelids, Genital	kV	65/594	5-45 Gy	CR: 68.3%, PR: 13.5%	2.40%	No Sequelae Observed Except in Two Patients
Stein[45]	Retrospective	Classic, Endemic and Epidemic KS	Mucosal, Cutaneous Sites, Eyelids	MeV, Kv	56/92	8-12 Gy/1 fr, 24-30 Gy/2 Gy/fr	RR: 80-100%		G1: 53%, G2: 4%
Metzmann[46]	Retrospective	Epidemic KS	Cutaneous Sites		15 pts	30 Gy/2-2.5 Gy/fr	RR: 80%		Toxicity Minimal
Saran[38]	Retrospective	Epidemic KS	Cutaneous Sites, Genital	MeV, MV	52/133	20 Gy/10 fr	CR: 32%, PR: 55%		G 1: 74%
Evans[31]	Retrospective	Epidemic KS	Cutaneous Sites	HDR Brachytherapy	16/120	8-20 Gy	RR: 80-86%		Minimal Toxicity Except for Patients Treated to 20 Gy
Syndikus[32]	Prospective	Epidemic KS	Palate	HDR Brachytherapy	6/7.	14.2-39.9 Gy/2-3 fr	CR: 100%	No Recurrence	Mild Mucositis
Kirova[23]	Retrospective	Epidemic KS	Mucosal, Cutaneous Sites, Eyelids, Conjunctiva, Genital	MeV, kV, MV	643/6777	10-30 Gy	Objective Response (CR + PR): Cutaneous: 92%, Oral Cavity: 100%, Eyelids, Conjunctiva, Genitals: 89%	71% (Cutaneous)	Cutaneous: G2: 61%, G3: 26%, G4: 5%, Oral Cavity: Severe Reaction:16%, Eyelids, Conjunctiva, Genitals: Severe Reaction: 8%

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Table 1 Cont.

Studies	Study design	Target population	Localization	Energy-radiotherapy technique	Patients/ number of lesions	Radiotherapy	Response rate	Recurrence rate	Toxicity rate
Harrison[36]	Prospective	Epidemic KS	Cutaneous Sites	kV	57/596	16 Gy/4 fr, 8 Gy/1 fr	Overall RR: 78.8%	42%	Mild-Moderate
Huang[25]	Retrospective	Classic KS	Cutaneous	MV	17/29	39 Gy/13 fr	CR: 76%	5 Y PFS: 58%	
Caccialanza [24]	Retrospective	Classic and Epidemic KS	Mucosal, Cutaneous Sites, Genital	kV	238/1482	5-45 Gy	CR: Classic: 98.7%, Epidemic: 91.4%		Well Tolerated
Singh[42]	Prospective	Epidemic KS	Mucosal and Cutaneous Sites	MV	47/65	24 Gy/12 fr (ARM A) vs 20 Gy/5 fr (ARM B)	RR: 96%		Acute Reaction: 54%
Oysul[41]	Retrospective	Classic KS	Cutaneous Sites		18/109	NTD2 Gy >20 vs NTD2 Gy <20	Overall RR: 88% (NTD2 Gy <20), 97% (NTD2 Gy >20)		4 pts Fibrosis and Edema
Chang[48]	Retrospective	Classic and Iatrogenic	Cutaneous Sites	MeV, MV	16/23	24-45 Gy/ 1.8-3 Gy/fr	CR: 9%, PR: 73%	13%	G2: 39%
Donato[26]	Retrospective	Epidemic KS	Mucosal, Cutaneous Sites, Eyelids and Bone	MeV, MV	18/38	20-36 Gy/2 Gy/ fr, 30 Gy/10 fr	CR: 83.8%, PR: 16.2	No Recurrence	G1: 23.6%
Kasper[33]	Retrospective	Endemic KS	Cutaneous	HDR Brachytherapy	5/16.	24-35 Gy/4-6 fr	CR: 100%	No Recurrence	Mild-Moderate
Tsao[49]	Retrospective	Classic and Epidemic KS	Cutaneous and Eyelids		17/97	6-8 Gy/1 fr, 20 Gy/ 5 fr, 30 Gy/10 fr	CR: 30%, PR: 57%	13%	Minimal Toxicity
Kandaz[40]	Retrospective	Non HIV Associated	Cutaneous	MeV, MV	92 pts	8 Gy/1 fr, 20 Gy/ 10 fr, 25 Gy/10 fr, 30 Gy/10 fr	CR: 91.6% (>20 Gy), 89.6% (8 Gy)		G1-2: 61.9%
Ruiz[34]	Retrospective		Cutaneous	HDR Brachytherapy	3/5.	25 Gy/5 fr	CR: 100%	No Recurrence	No Toxicity: 80%

KS: Kaposi Sarcoma; CR: Complete Response; PR: Partial Response; RR: Response Rate; FFR: Freedom From Relapse; PFS: Progression Free Survival

Radiotherapy Techniques, Dose/ Fraction Regimes in Kaposi Sarcoma

Electrons, kV photons and MV photons were used in the radiotherapy of Kaposi sarcoma, a disease that is very sensitive to radiotherapy.[21–27] Three-dimensional radiotherapy, intensity-modulated radiotherapy (IMRT), or volumetric arc therapy (VMAT) may be preferred as a planning technique. Park et al.[28] compared photon beam, electron beam, high dose rate (HDR) brachytherapy, VMAT, and IMRT techniques in patients with foot skin lesions. The study concluded that VMAT provides a dosimetric advantage in multitarget planes. Nicolini et al.[29] compared VMAT with electron beam techniques in patients with lower extremity lesions. The study concluded that VMAT provides greater bone protection than electron therapy, but also requires a shorter treatment time. One study published the early results of a second series of VMAT radiotherapy administered to a patient who had a relapse approximately 1.5 years after receiving radiotherapy for lesions in the right lower extremity.[30] The patient received 20 Gy/5 fractions in the first treatment and received 33 Gy/11 fractions in the second series of treatments. At the 4-week post-treatment follow-up, the lesion was observed to have completely resolved. The patient was noted to have mild edema and tenderness in the lower extremities. In patients undergoing external beam radiotherapy for Kaposi sarcoma, the appropriate energy and treatment technique should be selected based on the depth and extent of the lesion.[31]

Brachytherapy is one of the radiotherapy modalities of choice for Kaposi sarcoma. Studies have used HDR as the brachytherapy technique. In one study, high-dose Microselectron brachytherapy was administered to six patients with palatal Kaposi sarcoma.[32] A dose of 24 Gy/3 fractions was administered. Complete response was

observed in all lesions, with no side effects other than mild-to-moderate mucositis and no recurrence in the treated areas. Kasper et al.[33] evaluated the results of HDR with Ir-192 in 16 patients. Patients received doses of 24–35 Gy in 4–6 fractions. Complete responses were observed in all patients, and no local recurrence was observed in this study, with a median follow-up of 41 months. Side effect rates were found to be quite tolerable, with only one patient experiencing late skin side effects (telangiectasis, hypopigmentation). Ruiz et al.[34] evaluated the results of brachytherapy applied to five lesions with a Valencia applicator. All treated lesions were in the lower extremities, and a dose of 25 Gy/5 fractions was administered. Median follow-up was 15 months, and all lesions showed a complete response, and no local recurrence was observed in any patient. A noteworthy finding was the observation of grade 2 erythema in only one lesion. Studies indicate that HDR brachytherapy is a highly effective and safe treatment option for Kaposi sarcoma in appropriate patients. The appropriate dose-fractionation regimen for patients undergoing brachytherapy is unclear. Numerous different dose-fractionation regimens have been used in studies. A logical approach is to base decisions on the location, size, and clinical circumstances of the lesion.

In Kaposi sarcoma radiotherapy, numerous dose-fractionation regimens have been tested in the literature.[35–42] In the studies of Piedbois and Kirova, different doses were defined for lesions in different anatomical localizations.[22,23] In a prospective study of 57 patients conducted by Harrison et al.,[36] 16 Gy/4 fractions was compared with 8 Gy/1 fr. The study found no significant difference in response rates or skin pigmentation between the two regimens. The 8 Gy/1 fraction regimen was found to be an effective treatment for patients with limited life expectancy. In Geara's retrospective study of 149 patients, the 20 Gy/8 fraction regimen was found to have a lower response rate than the 30 Gy/12 fraction regimen.[37] In a study conducted by Saran et al.[38] on 43 patients, doses above 20 Gy administered with a conventional fractionation regimen were found to be significantly superior in terms of response rate compared to doses below 20 Gy. In a randomized controlled study conducted by Stelzer et al.,[39] 8 Gy/1 fraction, 40 Gy/20 fractions and 20 Gy/10 fraction regimens were compared. The complete response rate was significantly higher in the 40 and 20 Gy regimens compared to 8 Gy. The recurrence rate at the lesion site was found to be lower in the 40 Gy regimen compared to the other regimens. The loss of residual purple pigmentation was also found to be higher in the 40 Gy regimen compared to the other regimens. The study's results indicate that the response rate increases with higher doses of fractionated radiotherapy. In a retrospective study by Oysul et al.,[41] it was found that normalized total dose 2 Gy ≥ 20 Gy doses had a higher complete response rate than doses <20 Gy. In a randomized study by Singh, 24 Gy/12 fractions were compared with 20 Gy/5 fractions in 60 patients.[42] The study found no significant differences between the groups in terms of response rate, local control, acute toxicity, or late toxicity. Based on the literature review, it is not possible to establish a clear dose-fractionation regimen for Kaposi sarcoma radiotherapy. Numerous dose-fractionation regimens are available, depending on the patient's general condition, the number of lesions, and their location.[35–49] Multidisciplinary guidelines recommend doses of 30–36 Gy/2–3 Gy/fraction.[50] The NCCN guidelines also state that regimens of 6–8 Gy/1 fraction, 20 Gy/5 fractions, 24 Gy/12 fractions, 30 Gy/10–15 fractions, and 40 Gy/20 fractions can be used.[10] The rates and severity of side effects associated with radiotherapy can vary depending on the area being treated. Side effects may be more common and more severe in oral treatments than in skin lesions.[23,47] Radiotherapy-related side effects can be said to be mild and treatment tolerance is high.[10,27] The most common skin side effect is grade 1 radiodermatitis.

CONCLUSION

Radiotherapy for Kaposi sarcoma stands out as a treatment modality with high local control rates and excellent tolerability in terms of toxicity. While there is no definitive dose-fractionation regimen for the disease, one of the numerous treatment regimens reported in the literature may be chosen based on the patient's clinical presentation.

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REFERENCES

1. Kaposi M. Idiopathic multiple pigmented sarcoma of the skin. CA Cancer J Clin 1982;32:342–7.
2. Ruocco E, Ruocco V, Tornesello ML, Gambardella A, Wolf R, Buonaguro FM. Kaposi's sarcoma: Etiology and pathogenesis, inducing factors, causal associations, and treatments: Facts and controversies. Clin Dermatol 2013;31:413–22.
3. Chang Y, Cesarman E, Pessin MS, Lee F, Culpepper J, Knowles DM, et al. Identification of herpesvirus-like DNA sequences in AIDS-associated Kaposi's sarcoma. Science 1994;266:1865–9.
4. Radu O, Pantanowitz L. Kaposi sarcoma. Arch Pathol Lab Med 2013;137:289–94.
5. Douglas JL, Gustin JK, Dezube B, Pantanowitz JL, Moses AV. Kaposi's sarcoma: A model of both malignancy and chronic inflammation. Panminerva Med 2007;49:119–38.
6. Riva G, Barozzi P, Torelli G, Luppi M. Immunological and inflammatory features of Kaposi's sarcoma and other Kaposi's sarcoma-associated herpesvirus/human herpesvirus 8-associated neoplasias. AIDS Rev 2010;12:40–51.
7. Antman K, Chang Y. Kaposi's sarcoma. N Engl J Med 2000;342:1027–38.
8. Pantanowitz L, Dezube BJ. Kaposi sarcoma in unusual locations. BMC Cancer 2008;8:190.
9. Caponetti G, Dezube BJ, Restrepo CS, Pantanowitz L. Kaposi sarcoma of the musculoskeletal system: A review of 66 patients. Cancer 2007;109:1040–52.
10. Reid E, Suneja G, Alexiev B, Ambinder RF, Ard K, Baiocchi R, et al. NCCN Clinical Practice Guidelines in Oncology: Kaposi sarcoma. Version 2.2025. Available at: https://www.nccn.org/guidelines/guidelines-detail?category=1&id=1485. Accessed Jan 14, 2025.
11. Schneider JW, Dittmer DP. Diagnosis and treatment of Kaposi sarcoma. Am J Clin Dermatol 2017;18:529–39.
12. Volkow P, Cesarman-Maus G, Garciadiego-Fossas P, Rojas-Marin E, Cornejo-Juárez P. Clinical characteristics, predictors of immune reconstitution inflammatory syndrome and long-term prognosis in patients with Kaposi sarcoma. AIDS Res Ther 2017;14:30.
13. Dezube BJ. Management of AIDS-related Kaposi's sarcoma: Advances in target discovery and treatment. Expert Rev Anticancer Ther 2002;2:193–200.
14. Rosen T. Limited extent AIDS-related cutaneous Kaposi's sarcoma responsive to imiquimod 5% cream. Int J Dermatol 2006;45:854–6.
15. Vassallo C, Carugno A, Derlino F, Ciocca O, Brazzelli V, Borroni G. Intralesional vinblastine injections for treatment of classic Kaposi sarcoma in diabetic patients. Cutis 2015;95:E28–34.
16. Brambilla L, Bellinvia M, Tourlaki A, Scoppio B, Gaiani F, Boneschi V. Intralesional vincristine as first-line therapy for nodular lesions in classic Kaposi sarcoma: A prospective study in 151 patients. Br J Dermatol 2010;162:854–9.
17. Doupis J, Festas G, Tsekouras K, Seretis A, Fountzilas C. Cryotherapy treatment of cutaneous Kaposi sarcoma in a patient with B-cell chronic lymphocytic leukemia: A case report and short review of the literature. Wounds 2022;34:E1–6.
18. Cecchi R, Troiano M, Ghilardi M, Bartoli L. Kaposi sarcoma of the penis in an HIV-negative patient. J Cutan Med Surg 2011;15:118–20.
19. Cooley T, Henry D, Tonda M, Sun S, O'Connell M, Rackoff W. A randomized, double-blind study of pegylated liposomal doxorubicin for the treatment of AIDS-related Kaposi's sarcoma. Oncologist 2007;12:114–23.
20. Ercolak V, Sahin B, Gunaldi M, Duman BB, Afsar CU. Efficacy of paclitaxel in the treatment of Kaposi sarcoma. Eur Rev Med Pharmacol Sci 2015;19:4095–100.
21. Cooper JS, Steinfeld AD, Lerch I. Intentions and outcomes in the radiotherapeutic management of epidemic Kaposi's sarcoma. Int J Radiat Oncol Biol Phys 1991;20:419–22.
22. Piedbois P, Frikha H, Martin L, Levy E, Haddad E, Le Bourgeois JP. Radiotherapy in the management of epidemic Kaposi's sarcoma. Int J Radiat Oncol Biol Phys 1994;30:1207–11.
23. Kirova YM, Belembaogo E, Frikha H, Haddad E, Calitchi E, Levy E, et al. Radiotherapy in the management of epidemic Kaposi's sarcoma: A retrospective study of 643 cases. Radiother Oncol 1998;46:19–22.
24. Caccialanza M, Marca S, Piccinno R, Eulisse G. Radiotherapy of classic and human immunodeficiency virus-related Kaposi's sarcoma: Results in 1482 lesions. J Eur Acad Dermatol Venereol 2008;22:297–302.
25. Huang KM, Hsu CH, Cheng JCH, Lai MK, Jeng SC, Ting LL, et al. Radiotherapy of classic Kaposi's sarcoma in Taiwan, an area where classic Kaposi's sarcoma is not prevalent. Anticancer Res 2006;26:4659–63.
26. Donato V, Guarnaccia R, Dognini J, de Pascalis G, Caruso C, Bellagamba R, et al. Radiation therapy in the treatment of HIV-related Kaposi's sarcoma. Anticancer Res 2013;33:2153–7.
27. Niewald M, Rübe C. Kaposi's sarcoma—radiotherapeutic aspects. Front Radiat Ther Oncol 2006;39:50–8.
28. Park JM, Kim IH, Ye SJ, Kim K. Evaluation of treatment plans using various treatment techniques for the radiotherapy of cutaneous Kaposi's sarcoma developed on the skin of feet. J Appl Clin Med Phys 2014;15:4970.
29. Nicolini G, Abraham S, Fogliata A, Jordaan A, Clivio A, Vanetti E, et al. Critical appraisal of volumetric-modulated arc therapy compared with electrons

for the radiotherapy of cutaneous Kaposi's sarcoma of lower extremities with bone sparing. Br J Radiol 2013;86:20120543.
30. Chen Z, Daveluy S, Baran G, Joiner M, Miller S. Re-irradiation of a classic Kaposi's sarcoma using volumetric modulated arc therapy. Cureus 2024;16:e51782.
31. Evans MD, Yassa M, Podgorsak EB, Roman TN, Schreiner LJ, Souhami L. Surface applicators for high dose rate brachytherapy in AIDS-related Kaposi's sarcoma. Int J Radiat Oncol Biol Phys 1997;39:769–74.
32. Syndikus I, Vinall A, Rogers P, Spittle M. High dose rate microselectron moulds for Kaposi sarcoma of the palate. Radiother Oncol 1997;42:167–70.
33. Kasper ME, Richter S, Warren N, Benda R, Shang C, Ouhib Z. Complete response of endemic Kaposi sarcoma lesions with high-dose-rate brachytherapy: Treatment method, results, and toxicity using skin surface applicators. Brachytherapy 2013;12:495–9.
34. Ruiz MÁ, Rivero JQ, García JLM, Rodríguez JJC, Kavadoy YR, Carmona MFR, et al. High-dose-rate brachytherapy in the treatment of skin Kaposi sarcoma. J Contemp Brachytherapy 2017;9:561–5.
35. De Wit R, Smit WG, Veenhof KH, Bakker PJ, Oldenburger F, González DG. Palliative radiation therapy for AIDS-associated Kaposi's sarcoma by using a single fraction of 800 cGy. Radiother Oncol 1990;19:131–6.
36. Harrison M, Harrington KJ, Tomlinson DR, Stewart JS. Response and cosmetic outcome of two fractionation regimens for AIDS-related Kaposi's sarcoma. Radiother Oncol 1998;46:23–8.
37. Geara F, Le Bourgeois JP, Piedbois P, Pavlovitch JM, Mazeron JJ. Radiotherapy in the management of cutaneous epidemic Kaposi's sarcoma. Int J Radiat Oncol Biol Phys 1991;21:1517–22.
38. Saran FH, Adamietz IA, Thilmann C, Mose S, Böttcher HD. HIV-associated cutaneous Kaposi's sarcoma—palliative local treatment by radiotherapy. Acta Oncol 1997;36:55–8.
39. Stelzer KJ, Griffin TW. A randomized prospective trial of radiation therapy for AIDS-associated Kaposi's sarcoma. Int J Radiat Oncol Biol Phys 1993;27:1057–61.
40. Kandaz M, Bahat Z, Guler OC, Canyilmaz E, Melikoglu M, Yoney A. Radiotherapy in the management of classic Kaposi's sarcoma: A single institution experience from Northeast Turkey. Dermatol Ther 2018;31:e12605.
41. Oysul K, Beyzadeoglu M, Surenkok S, Ozyigit G, Dirican B. A dose-response analysis for classical Kaposi's sarcoma management by radiotherapy. Saudi Med J 2008;29:837–40.
42. Singh NB, Lakier RH, Donde B. Hypofractionated radiation therapy in the treatment of epidemic Kaposi sarcoma: A prospective randomized trial. Radiother Oncol 2008;88:211–6.
43. Ghabrial R, Quivey JM, Dunn JP Jr, Char DH. Radiation therapy of acquired immunodeficiency syndrome-related Kaposi's sarcoma of the eyelids and conjunctiva. Arch Ophthalmol 1992;110:1423–6.
44. Piccinno R, Caccialanza M, Cusini M. Role of radiotherapy in the treatment of epidemic Kaposi's sarcoma: Experience with sixty-five cases. J Am Acad Dermatol 1995;32:1000–3.
45. Stein ME, Lakier R, Spencer D, Dale J, Kuten A, MacPhail P, et al. Radiation therapy for non-AIDS associated (classic and endemic African) and epidemic Kaposi's sarcoma. Int J Radiat Oncol Biol Phys 1994;28:613–9.
46. Metzmann U, Rösler HP, Kutzner J. The palliative radiotherapy of Kaposi's sarcomas in AIDS patients. Strahlenther Onkol 1995;171:238–40.
47. Le Bourgeois JP, Frikha H, Piedbois P, Le Péchoux C, Martin L, Haddad E. Radiotherapy in the management of epidemic Kaposi's sarcoma of the oral cavity, the eyelid and the genitals. Radiother Oncol 1994;30:263–6.
48. Chang JH, Kim IH. Role of radiotherapy in local control of non-AIDS associated Kaposi's sarcoma patients in Korea: A single institution experience. Radiat Oncol J 2012;30:153–7.
49. Tsao MN, Sinclair E, Assaad D, Fialkov J, Antonyshyn O, Barnes E. Radiation therapy for the treatment of skin Kaposi sarcoma. Ann Palliat Med 2016;5:298–302.
50. Lebbe C, Garbe C, Stratigos AJ, Harwood C, Peris K, Del Marmol V, et al. Diagnosis and treatment of Kaposi's sarcoma: European consensus-based interdisciplinary guideline (EDF/EADO/EORTC). Eur J Cancer 2019;114:117–27.