Treatment of multifocal cutaneous Rosai-Dorfman disease with radiotherapy

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INTRODUCTION

Rosai-Dorfman disease (RDD) is an exceptionally rare form of non-Langerhans cell histiocytosis which can present either as systemic RDD with or without skin manifestations, or as cutaneous RDD (CRDD) limited to the skin.[1] In the skin, it presents as solitary or grouped papules, nodules, plaques, or a combination thereof.[1] CRDD is more common in middle-aged women and in patients of Asian or Caucasian descent.[2,3] There is a lack of generalized treatment guidelines for CRDD because of the extremely low prevalence and overall poor response to most therapies.[3,4] Here, we present a case of CRDD that showed significant partial response to localized radiotherapy.

CASE REPORT

A 43-year-old African American woman presented with an approximately 2-year history of pruritic papulonodules on the right buttock and left shoulder that had enlarged over time. Treatments prior to dermatology consultation included triamcinolone 0.1% ointment and mupirocin ointment without response, followed by 2 separate courses of 40 mg prednisone taper with only partial improvement followed by recurrence. An excisional biopsy of the left arm papules demonstrated a dermal and subcutaneous infiltrate of large S100-positive histiocytes with emperipolesis on a background of lymphocytes and plasma cells, consistent with RDD. She was referred to dermatology for further evaluation of the buttock lesion.

Abbreviations used:

RDD: Rosai-Dorfman disease
CRDD: cutaneous Rosai-Dorfman disease

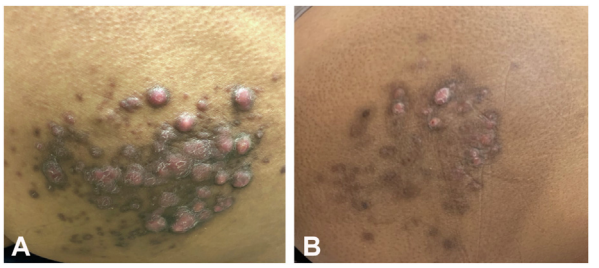

Fig 1. Clinical progression of cutaneous Rosai-Dorfman disease. **A**, Grouped pink-violaceous, scaly papulonodules and plaques on the right buttock at the time of the initial dermatology consultation **(B)**, Near-complete response with few residual papules and postinflammatory hyperpigmentation at 2-month follow-up after completion of radiotherapy.

On physical examination, there were clustered pink-violaceous papulonodules and plaques with overlying scale on the right buttock (Fig 1, *A*). At the site of the previous excisional biopsy on the left arm, there was an atrophic scar surrounded by few remaining pink-violaceous scaly papulonodules. Histopathology of the buttock biopsy similarly showed sheets of feathery histiocytes with emperipolesis, admixed with lymphocytes, plasma cells, and neutrophils, consistent with RDD (Fig 2). The

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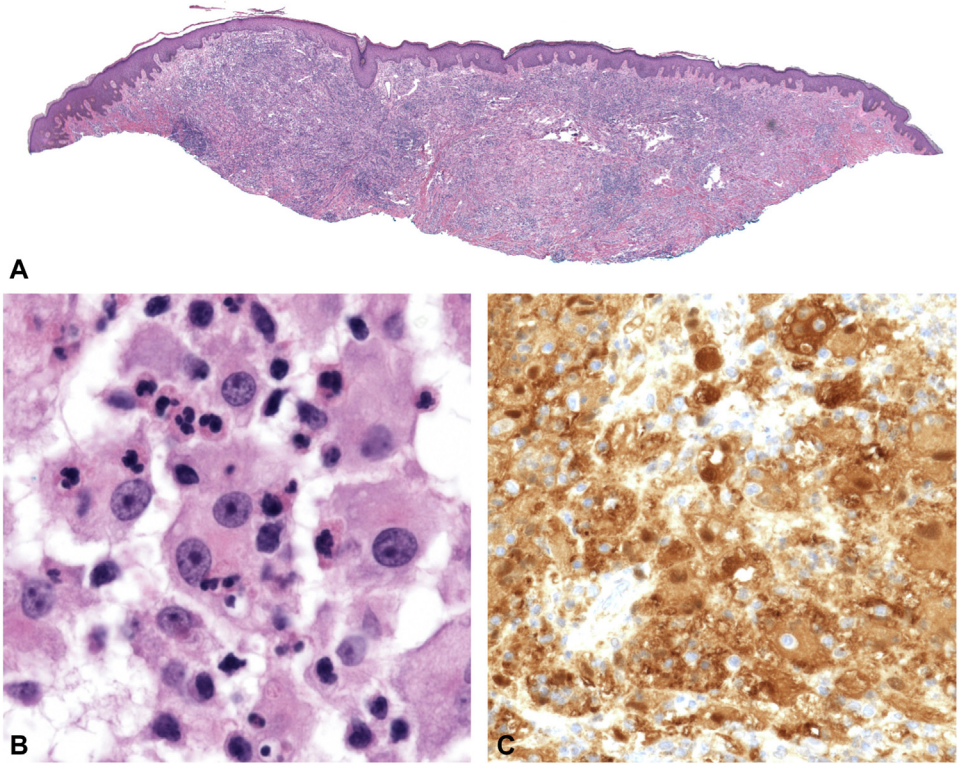

Fig 2. Histopathologic features of cutaneous Rosai-Dorfman disease. **A**, A dense infiltrate with pale and dark areas filled the biopsy specimen **(B)**, High magnification showed feathery histiocytes displaying emperipolesis of lymphocytes and neutrophils **(C)**, S100 staining confirmed the diagnosis. (**A-C**, Hematoxylin-eosin stain; original magnifications: **A,** ×20; **B,** ×600; and **C**, ×400.)

histiocytes were positive for S100, and microbial stains did not reveal any organisms.

Evaluation for systemic disease included computed tomography imaging of the neck, chest, abdomen, and pelvis, which was notable for mild cervical lymphadenopathy with no evidence of organ involvement. Laboratory work-up included a complete blood count, comprehensive metabolic panel, antinuclear antibody, and serum immunoglobulin levels, which were notable for mild leukocytosis (11,400/μL; normal range, 4000-10,000/μL) and a mild elevation in IgG4 (95.2 mg/dL; normal range, 3.9-86.4 mg/dL). Work-up of the leukocytosis revealed a negative V-β analysis on flow cytometry, signifying normal T-cell polyclonality. These findings supported a diagnosis of CRDD without evidence of systemic RDD.

After multidisciplinary consultation with radiation oncology and medical oncology, the decision was made to proceed with localized radiotherapy to a dose of 30 Gy in 15 fractions, with the radiation field encompassing a 2-cm margin around the visible disease. The lesions were observed to be thin during the treatment course, and the patient tolerated radiotherapy well with only minor radiodermatitis which self-resolved. At the 2-month follow-up after completion of radiotherapy, she had significant partial resolution of the treated lesions, and only a few residual papules with postinflammatory hyperpigmentation (Fig 1, *B*). At the 7-month follow-up, there was continued improvement, with just 2 residual pink nodules and postinflammatory hyperpigmentation.

DISCUSSION

While 10% of systemic RDD cases involve skin lesions, purely cutaneous RDD is a rare clinical entity and has notable differences from systemic RDD.[3,4] The age distribution of patients with CRDD is wide, with a mean of 43.5 years, which is significantly higher than the mean age of systemic RDD (20.6 years).[2,3] Furthermore, patients with CRDD lack massive lymphadenopathy, fever, night sweats, and lab abnormalities (commonly elevated erythrocyte sedimentation rate, C-reactive protein, various cytopenias) found in patients with systemic RDD.[3,4]

CRDD is a difficult entity to treat. A review reported the overall cure rate for CRDD as 28.6%, when considering all therapeutic modalities.[4] Potential treatments for CRDD include topical steroids, cryotherapy,

laser therapy, surgical excision, localized radiotherapy, prednisone, thalidomide, dapsone, methotrexate, isotretinoin, and imatinib.[5] Our case adds further support for the use of localized radiotherapy for treatment of CRDD. Only 2 cases of CRDD treated with radiotherapy have been reported previously, with radiotherapy more often employed for the treatment of RDD lesions of the soft tissue or bone that persist after surgical resection.[3,6,7] Standard dosing guidelines for radiotherapy treatment of CRDD and RDD are not available, but doses generally vary between 20 Gy and 40 Gy.[3] This range is similar to that for treatment of primary cutaneous lymphomas, for which the dose varies by subtype but generally ranges from 20 to 40 Gy.[8] A case series of 9 patients with various forms of RDD showed sustained response to radiation in 4 patients.[9] In conclusion, we suggest localized radiotherapy be considered as an effective therapeutic option for CRDD, especially in areas, which may be challenging to resect, or which are cosmetically sensitive.

Conflicts of interest

None disclosed.

REFERENCES

1. Rosai J, Dorfman RF. Sinus histiocytosis with massive lymphadenopathy: a newly recognized benign clinicopathological entity. *Arch Pathol*. 1969;87(1):63-70.
2. Brenn T, Calonje E, Granter SR, et al. Cutaneous Rosai-Dorfman disease is a distinct clinical entity. *Am J Dermatopathol*. 2002;24(5):385-391. https://doi.org/10.1097/00000372-200210000-00001
3. Abla O, Jacobsen E, Picarsic J, et al. Consensus recommendations for the diagnosis and clinical management of Rosai-Dorfman-Destombes disease. *Blood*. 2018;131(26):2877-2890. https://doi.org/10.1182/blood-2018-03-839753
4. Al-Khateeb TH. Cutaneous Rosai-Dorfman disease of the face: A comprehensive literature review and case report. *J Oral Maxillofac Surg*. 2016;74(3):528-540. https://doi.org/10.1016/j.joms.2015.09.017
5. Fang S, Chen AJ. Facial cutaneous Rosai-Dorfman disease: a case report and literature review. *Exp Ther Med*. 2015;9(4):1389-1392. https://doi.org/10.3892/etm.2015.2260
6. Annessi G, Giannetti A. Purely cutaneous Rosai-Dorfman disease. *Br J Dermatol*. 1996;134(4):749-753. https://doi.org/10.1046/j.1365-2133.1996.89803.x
7. Bunick CG, Leffell D, Bosenberg M, Yahalom J, Choi JN. Cutaneous Rosai-Dorfman disease of the right ear responsive to radiotherapy. *J Am Acad Dermatol*. 2012;67(5):e225-e226. https://doi.org/10.1016/j.jaad.2012.04.025
8. Specht L, Dabaja B, Illidge T, Wilson LD, Hoppe RT; International Lymphoma Radiation Oncology Group. Modern radiation therapy for primary cutaneous lymphomas: field and dose guidelines from the International Lymphoma Radiation Oncology Group. *Int J Radiat Oncol Biol Phys*. 2015;92(1):32-39. https://doi.org/10.1016/j.ijrobp.2015.01.008
9. Christopherson KM, Gunther JR, Hilal L, et al. Thirty year experience with Rosai Dorfman disease treated with radiation, chemotherapy, and/or surgery. *Int J Radiat Oncol Biol Phys*. 2018;102(suppl 3):e432. https://doi.org/10.1016/j.ijrobp.2018.07.1256