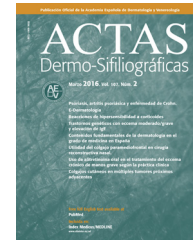




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## REVIEW

# Inflammatory Skin Conditions Associated With Radiotherapy<sup>☆</sup>

I. Hernández Aragüés,<sup>\*</sup> A. Pulido Pérez, R. Suárez Fernández

*Servicio de Dermatología, Hospital General Universitario Gregorio Marañón, Madrid, Spain*

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### KEYWORDS

Radiotherapy;  
Radiation-induced skin reactions;  
Radiotherapy-induced skin reactions;  
Radiodermatitis;  
Erythema multiforme after radiation;  
Eosinophilic polymorphic pruritic eruption associated with radiotherapy syndrome;  
Recall phenomenon; erythema multiforme associated with phenytoin and cranial radiation therapy syndrome;  
Radiation-induced morphea;  
Sclerodermiform-like panniculitis after radiation

**Abstract** Radiotherapy for cancer is used increasingly. Because skin cells undergo rapid turnover, the ionizing radiation of radiotherapy has collateral effects that are often expressed in inflammatory reactions. Some of these reactions—radiodermatitis and recall phenomenon, for example—are very familiar to dermatologists. Other, less common radiotherapy-associated skin conditions are often underdiagnosed but must also be recognized.

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<sup>\*</sup> Corresponding author.

E-mail address: [ignaciohdezaragues@gmail.com](mailto:ignaciohdezaragues@gmail.com) (I. Hernández Aragüés).

**PALABRAS CLAVE**

Radioterapia;  
 Dermatitis  
 radioinducidas;  
 Dermatitis  
 radioterapia;  
 Radiodermatitis;  
 Eritema multiforme  
 posradioterapia;  
 Síndrome erupción  
 pruriginosa polimorfa  
 eosinofílica asociada  
 a radioterapia;  
 Fenómeno de recall;  
 Síndrome *erythema  
 multiforme  
 associated with  
 phenytoin and cranial  
 radiation therapy*;  
 Morfea radioterapia;  
 Paniculitis pseu-  
 doesclerodermiforme  
 postirradiación

**Dermatitis inflamatorias asociadas a radioterapia**

**Resumen** La radioterapia es una técnica de uso creciente en el campo de la oncología. Debido al alto recambio celular cutáneo, la radiación ionizante afecta colateralmente a la piel y encontramos de forma frecuente dermatosis inflamatorias asociadas a radioterapia. Algunos de estos cuadros, como la radiodermatitis o el fenómeno de recall, son bien conocidos por el dermatólogo. Es importante reconocer otros cuadros cutáneos asociados a radioterapia que aparecen de forma menos frecuente y que en muchas ocasiones son infradiagnosticados.

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**Introduction**

Radiotherapy is used often in oncology: it is prescribed for nearly half of cancer patients as monotherapy or in combination with other treatments. In the skin, where the rate of cell turnover is high, ionizing radiation has collateral effects that make adverse reactions very common. Up to half of patients reportedly develop at least mild radiodermatitis,<sup>1</sup> and there is a small percentage of patients who also present more serious skin conditions affecting large surface areas.

We propose a classification system for skin conditions that appear exclusively in the context of radiotherapy and that may or may not be dose dependent (Table 1). Thus, we also discuss radiation-induced or radiation-exacerbated conditions without a clear dose-dependent relationship.

Although this review focuses on inflammatory dermatoses that follow radiotherapy, we also warn of the long-term risk for secondary tumors in the irradiated field<sup>2</sup> and for angiosarcoma in breast cancer patients who receive radiotherapy<sup>3</sup> as well as risk for so-called atypical vascular lesions<sup>4</sup> and acquired lymphangiectasis.<sup>5</sup>

Because many of these conditions are probably underdiagnosed or erroneously assumed to be more widely known syndromes like radiodermatitis, it is important to be aware of their individual clinical features. Beyond the issue of diagnosis itself, we should remember that appropriate

initial management of some of these conditions can improve prognosis.

**Table 1** Proposed Classification System for Inflammatory Skin Conditions Associated With Radiotherapy.

**Conditions induced exclusively by radiotherapy***Dose dependent conditions*

Radiodermatitis (acute, chronic)

*Conditions without clear dose dependency*

Recall phenomenon

Radiotherapy-associated eosinophilic, polymorphous, pruritic eruption syndrome

Sclerodermiform-like panniculitis

**Skin conditions triggered or exacerbated by radiotherapy**

*Exudative erythema multiforme, Stevens–Johnson syndrome, postradiation toxic epidermal necrolysis*

*EMPACT syndrome*

*Radiation-induced autoimmune blistering diseases*

*Radiation-induced lichen planus*

*Radiation-induced morphea*

*Other: Lupus erythematosus, neutrophilic dermatosis, GVHD, milium cysts, lichen sclerosus et atrophicus*

Abbreviation: EMPACT, erythema multiforme associated with phenytoin and cranial radiation therapy; GVHD, graft-vs-host disease

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