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Toxic Epidermal Necrolysis in an Irradiated Patient Treated with a Nanocrystalline Silver Dressing

Tamara Z. Vern-Gross^a Areta Kowal-Vern^b
Stathis J. Poulakidas^b

^aDepartment of Radiation Oncology, Wake Forest Baptist Health, Winston-Salem, N.C., and ^bDepartment of Trauma, Sumner L. Koch Burn Center, John H. Stroger, Jr. Hospital of Cook County, Chicago, Ill., USA

Key Words

Toxic epidermal necrolysis syndrome · Radiotherapy · Nanocrystalline silver dressing · Anticonvulsants

Abstract

Toxic epidermal necrolysis syndrome is a severe exfoliative condition, which may be triggered by anticonvulsant medication. We report a case of toxic epidermal necrolysis syndrome in a 43-year-old female who was receiving radiotherapy for brain metastases from a recurring breast cancer and phenytoin. She had 80% total body surface area involvement and recovered successfully with the application of a nanocrystalline silver dressing.

Introduction

Toxic epidermal necrolysis syndrome (TENS) is a severe desquamative skin condition first described by Lyell in 1956 and has a high mortality rate [1, 2]. Usually, patients have ≥30% total body surface area (TBSA) involvement of the skin and mucosal surfaces with a positive Nikolsky sign of sloughing epidermis upon rubbing the skin surface [3]. Although this condition can be triggered by any medication, it has a high association with antibiotics, anti-inflammatory agents, and anticonvulsants [4]. Patients undergoing radiotherapy for primary brain tumors or metastases are at risk for developing TENS if they have been medicated for seizures or prophylaxis with phenytoin, phenobarbital, or carbamazepine [4].

Case Report

In 1996, a 43-year-old Hispanic female was diagnosed and treated for breast cancer. After a recurrence 11 years later, she underwent a bilateral mastectomy in 2007. In January 2008, she complained of a 2-week history of worsening headaches, photophobia, and vertigo. Computed tomography and magnetic resonance imaging showed metastases to the occipital and parietal brain and spine. On February 3, 2008, she was started on palliative cranial irradiation of 45 Gy delivered in 22 fractions at 2 Gy/fraction. At that time, she had the following medications: a tapering dose of dexamethasone (4 mg 4 times daily), phenytoin (100 mg 3 times daily) for seizure prophylaxis, and antacids. Twenty-three days later, she had developed facial swelling and a diffuse maculopapular eruption of the head, scalp, and upper body. She was initially diagnosed with cellulitis and treated with clindamycin (900 mg i.v. 3 times daily) and levofloxacin (750 mg i.v. daily), along with methylprednisolone (125 mg i.v. 4 times daily). Twenty-six days after the start of her radiation therapy, she developed intractable vomiting and blisters, requiring admission for further evaluation. She had completed 3 weeks of cranial irradiation, receiving 32 Gy of a planned 45-Gy regimen. Despite initiation of antibiotics, her facial swelling worsened and blisters progressed to involve her ears. She also experienced odynophagia and dysuria. Phenytoin was discontinued 2 days after admission due to a suspicion of a possible drug reaction. Intravenous fluconazole (200 mg daily) was given for oral candidiasis and enoxaparin for deep-vein thrombosis prophylaxis. On March 5, 2008, she was transferred to the burn center for treatment of TENS. The patient had diffuse erythema and bullae with sloughing of facial and scalp epidermis, bilateral conjunctivitis, xerostomia, and oral mucosal ulceration with sloughing of the hard and soft palate, and dorsal tongue surface. Widespread bullae with a positive Nikolsky sign spread laterally with pressure, to the face, chest, breasts, abdomen, back, upper extremities, pelvis, perineum, buttocks, and bilateral thighs, involving 80% TBSA ([fig. 1](#)). Skin biopsy confirmed the diagnosis of TENS. Due to respiratory failure, the patient was intubated on the second day of admission and underwent a tracheostomy to maintain patency of her airway. Her laboratory values were within the normal range except for the following (normal values are indicated in parentheses): hemoglobin 11.7 (11.5–15.5) g/dl, Hct 33% (35.0–45.0), MCV 79.9 (81.1–96.6), white blood count $3.2 (4.5–13.0) \times 10^3/\text{mm}^3$ with 84% neutrophils, 12.8% lymphocytes, 1.9% monocytes, 0.1% eosinophils, 0.3% basophils, platelets $174 (185–395) \times 10^3/\text{mm}^3$, PT 14.5 (11.8–13.8) s, INR 1.19 (2.0–3.0), PTT 36.3 (25.6–34.4) s, fibrinogen 525 (196–457) mg/dl, D-dimer 4.89 (0.22–0.43), C-reactive protein 27.01 (0.0–0.50) mg/dl, prealbumin 8 (18–45) mg/dl, BUN 9 (10.0–20.0) mg/dl, creatinine 0.4 (0.6–1.4) mg/dl, calcium 7.3 (8.5–10.5) mg/dl, glucose 159 (65–110) mg/dl, phosphorus 2.4 (2.5–4.5) mg/dl, GGT 130 (3.0–60) mg/dl, LDH 246 (85–210) mg/dl, and Na 129 (135–145) mEq/l.

She became coagulopathic (PT 17.4 s, PTT 38.3 s). Sheet-like sloughing of her skin progressed, including the entire back. Her wounds were cleaned and covered with a silver dressing (Acticoat™; Smith and Nephew, St. Petersburg, Fla., USA). Dressing changes occurred every 3–4 days. Bacitracin with zinc oxide was used to lubricate the face, scalp, and neck. She received a 5-day course of intravenous γ globulin at 5 mg/kg/day. Corticosteroids were continued, and parenteral nutrition was initiated. After 2 weeks of electrolyte correction, fluid resuscitation, and topical wound care, she was stabilized, extubated, and her skin reaction resolved; the hospitalization lasted 23 days.

Discussion

Due to the extensive skin loss, patients with TENS are at risk for hypothermia and infection. They require wound care, pain control, nutrition, and supportive care while they regenerate their skin surface, which takes anywhere from 2 to 3 weeks, and is best provided in a Burn Center [5]. Our patient was treated effectively with a nanocrystalline silver antimicrobial dressing (Acticoat). Literature reports have indicated that this dressing improves pain control and decreases the risk of infection, and the number of dressing changes required for wound coverage until complete healing occurs in burn patients [6, 7]. There have also been reports of Acticoat as successful wound coverage for patients with TENS [8–10]. Our patient received

intravenous γ globulin as a treatment for TENS. The nanocrystalline silver dressing was mainly a barrier against infection of the open wounds. It was tolerated by the patient and was unlikely to have influenced the course of the primary disease.

There are two cautions with this patient. Current recommendations are that patients undergoing radiation therapy for primary brain tumors or brain metastases should be diligently assessed and avoid the most frequent triggers of TENS among the anticonvulsant medications: phenytoin, phenobarbital, and carbamazepine [11]. Among the rashes that occur in patients undergoing radiotherapy (although rare), TENS should be considered, especially if the erythematous rash extends outside the radiation field. Early referral to a Burn Center to curtail the occurrence of a wound or other infection, or ichthyma gangrenosum would benefit the patient in recovery and survival from this devastating disease.

Disclosure Statement

The authors declare that they have no conflict of interest.

Fig. 1. Complete sloughing of the skin from the torso of the patient with TENS and 80% TBSA involvement.

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