Airbags are a safety mechanism proven to be effective in reducing the severity and fatality of traffic accidents. Nevertheless, airbag deployment has induced multiple injuries; superficial abrasions, contusions, lacerations, and thermal and chemical burns are the most common. A 21-year-old man was seen by the dermatologist on duty for facial burns and eye injury secondary to the sudden deployment and rapid inflation of the airbag in the vehicle he was driving. The injuries consisted of a well-delimited plaque on the forehead, with a very superficial, erosive appearance, sparing the deeper parts of the forehead.
Most airbag injuries are minimal and consist of superficial skin lesions on the face, neck, and upper limbs. However, serious injuries directly related to explosive inflation of the airbag have been observed: lacerations and other skin lesions, eye trauma, airbag-induced asthma, cranial, cervical, or limb fractures, and even death. Airbags are made of nylon and are housed in the center of the steering wheel. When the sensors detect rapid deceleration, an electrical mechanism is activated which triggers a series of chemical reactions that ignite a sodium azide (NaN₃) pellet. The pellet reacts with potassium nitrate (KNO₃) leading to the very rapid production of a large amount of high-temperature nitrogen gas, as well as sodium hydroxide and other gases, causing the bag to inflate within 20 hundredths of a second (300 km/h). Moments after the airbag inflates, the gas produced begins to dissipate through the small pores of the fabric. Deflation occurs in less than 2 seconds, allowing the occupants to move. The high-temperature gases (sodium hydroxide, CO₂, and other metal oxides) produce a corrosive alkaline aerosol able to cause alkali chemical skin burns and thermal burns. Thermal burns can also be caused by a direct mechanism when the skin comes into contact with high-temperature gases or by an indirect mechanism, secondary to clothing burning and melting. Irritant contact dermatitis due to the solid residues—talc and sodium hydroxide—has also been reported. Additionally, the corrosive effect of the gases has been implicated in alkali keratitis and other corneal lesions, and direct eye trauma induced by the airbag can cause retinal damage and a temporary or permanent loss of visual acuity.

Fortunately, most airbag burns are minor, superficial, and only require symptomatic treatment, but there are some reports of airbag burns that required aggressive debridement and skin grafts. After cleansing chemical and thermal burns with abundant water, treatment usually consists of topical and systemic antibiotic and corticosteroid therapy, followed by close monitoring due to the higher number of complications. Friction burns are less challenging and do not require such careful monitoring.

In conclusion, airbag burns are common but usually very mild. Dermatologists lack familiarity with this condition, which is often associated with keratitis and other eye injuries. The multiple mechanisms of the injuries produce diverse types of burns, sometimes in the same patient. Thermal and chemical burns require a different, more aggressive therapeutic approach than simple abrasions.

References

A 56-year-old man was in his second week of treatment with imiquimod 5% cream for superficial basal cell carcinoma on his back when he developed influenza-like symptoms accompanied by a desquamative erythematous eruption that started on his head and quickly extended caudally. Examination revealed erythroderma with small islets of healthy skin, incipient peau d’orange on the palms and soles, orange-colored erythema of the face, mild ectropion, and small keratotic follicular papules on the chest (Figure 1). The mucosas were not affected. Two skin biopsies—one from the abdomen and the other from a keratotic papule on the chest—revealed identical findings, namely, alternating areas of parakeratosis and focal dyskeratosis with acantholysis, discreet spongiosis, and a band-like lymphocytic infiltrate in the superficial dermis (Figure 2). Laboratory results were normal and HIV serology was negative. Treatment with imiquimod was stopped and acitretin (35 mg/d) started, leading to complete resolution of the lesions after 2 months. The patient refused to undergo an allergy workup to rule out a possible role for

Figure 1  A, Shiny erythematous skin on the legs. B, Erythroderma with sparing of skin islets (arrows). C, Orange keratoderma with a waxy appearance on the palms and soles. D, Keratotic follicular papules on the anterior thorax.