

# Air Bag Injury and the Dermatologist

Elizabeth Foley, MD, Buffalo, New York

Thomas N. Helm, MD, Buffalo, New York

*Most new car models have driver-side air bags and many also have passenger-side and side-impact air bags. Air bags are known to be dangerous to small children and may cause death, fractures, and cerebral spinal injury.<sup>1-3</sup> However, the cutaneous manifestations of air bag injury are less well known. Additional potential air bag injuries include retinal damage and high-frequency hearing loss. The following case report illustrates significant burns from a low-impact air bag injury and reviews the pertinent literature.*

**A**ir bags may be deployed even during low-speed collisions because impact sensors detect sudden deceleration. Sodium azide ignites, producing nitrogen gas that expands in a nylon bag within 25 to 40 milliseconds.<sup>4,5</sup> The airbag explosion produces strong forces that may injure small children. Children younger than 2 years are advised not to sit in seats where air bags may be deployed. Death and severe lower-extremity burns have been reported.<sup>6,7</sup> Persistent high-frequency hearing loss also has been noted,<sup>8,9</sup> and even facial nerve palsy<sup>10</sup> is evident in some cases. Air bags have been credited with saving between 4989 and 5899 lives as of August 2000, but also with causing the deaths of 97 children.<sup>5</sup>

## Case Report

A 32-year-old dermatology resident was driving on an unpaved road at 5 miles per hour when she hit a pothole. There was a very loud noise, the car stopped, and a gritty smoke-like substance filled the car. The driver and passenger were surprised and unsure of what had happened, but both were able to exit the car. The passenger's face was erythematous, but there was no evidence of lacerations. The left side of the driver's face, neck, and upper chest had multiple superficial erosions and abrasions on a background of erythema (Figure 1). Edema developed on the exposed skin, but the skin beneath the



**FIGURE 1.** First degree burns from sodium hydroxide exposure after air bag deployment.

seat belt was spared. The driver's right hand was swollen and difficult to move. Neither the driver nor the passenger had difficulty with breathing, ambulation, or extraocular muscle function. Visual acuity was normal. Topical treatment with bacitracin ointment and petrolatum led to gradual resolution of the cutaneous lesions. Applications were administered 6 times daily and then tapered over a 3-week period. No crust formed, but some postinflammatory hyperpigmentation developed. Topical broad-spectrum sunscreen was used to prevent further hyperpigmentation. The areas have now resolved entirely. The passenger was not affected.

## Discussion

Most car models now contain air bags, and air bag injury can happen to anyone at any time, even from low-impact collisions as shown here. Although it is well recognized that small children should not be in seats where air bags might be deployed, the mechanism of injury from air bags is not widely known. Shearing forces during the rapid inflation of air bags is thought to abrade the epidermis. During deflation, the abraded skin is exposed to sodium hydroxide and sodium azide. Dry sodium hydroxide is not very damaging, but once the sodium hydrox-

Drs. Foley and Helm are from the Department of Dermatology, State University of New York at Buffalo.

REPRINT REQUESTS to Department of Dermatology, Buffalo Medical Group, 6255 Sheridan Drive, Building B, Suite 208, Williamsville, NY 14221 (Dr. Foley).

ide becomes wet, it produces chemical burns. Powder should be brushed away first, and copious amounts of water should be used to thoroughly rinse the affected areas.<sup>5</sup>

Many individuals exposed to air bag injury will have irreversible hearing loss. The peak amplitude of noise from the air bag may reach 170 dB.<sup>9</sup> Persistent tinnitus, disequilibrium, and temporary threshold shifts in sound appear to be common. Burns may also develop. Cerebral spinal injury and asphyxiation with quadriplegia, priapism, and absent rectal tone have all been noted after stabilization. Fractures in individuals with osteoporosis have been noted and facial nerve paresis has been identified as well.<sup>11</sup>

Although air bags have been credited with saving many lives, it is important to be aware of the cutaneous manifestations of air bag injury. Children weighing less than 80 pounds must be kept away from seats with air bags. Many automobile dealers can now install switches that can turn air bags on or off.

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