Dear Editor,

Technological advancements seek to minimize possible injuries in events of car accidents. Although the life-saving aspects of vehicle safety systems such as safety belts and airbags are undeniable, other types of injuries can occur. While deploying airbags can save passengers from a likely death, head trauma, or cervical trauma, they can also cause burn injuries, corneal damages, and rib or sternal fractures. Burn injuries can occur in the form of abrasions caused by the inflation or deflation of the airbag and thermal and chemical burns due to exposure to released chemical contents. Because gas is released from the sides and lower parts, airbags often induce burns on the upper and lower extremities.

This study presents a case of a burn injury to the face region and aims to discuss burn injuries induced by airbag explosion and the approach to their treatment.

A 29-year-old female driver was brought to the ER following an accident while driving at 80 kph in urban traffic. In her statement, the patient stated that she was wearing the safety belt and that she had, without moving herself, pushed the door wide open to avoid exposure to the hot white powdery substance pluming inside the vehicle. The airbag explosion was identified to have caused edema on her face and first-degree burns to the forehead, nose, nasolabial grooves, lip mucosa, and mentum (Figure 1a, b). No injuries were observed in addition to those identified in the physical examination and imaging. After irrigating with water for 15 min, the wounds were treated with fusidic acid ointment, and complete healing was achieved after 5 days.

Worldwide, airbags have become an indispensable safety system in automotive technologies. Airbags are typically sewn from a woven nylon fabric. They deploy in 10 ms in case of a sudden rapid deceleration, and within 2 s, gas is released through the ports located at three and nine o’clock. Although the safety provided by the system is undeniable, it also results in some complications. Deflation is often accompanied by the release of nitrogen, carbon monoxide, carbon dioxide, ammonia, hydrocarbons, and alkaline aerosol. Burn injuries are particularly induced by alkaline corrosives such as sodium hydroxide.

Besides skin cuts and abrasions, burns are the most frequently encountered types of injuries caused by airbags. Hallock has defined following three types of airbag-related burn injuries: (1) direct thermal burns from high-temperature gases and indirect thermal burns because of the melting of clothing, (2) burns from alkaline corrosives such as sodium hydroxide, and (3) friction-related burns. In our case, the patient stating the presence of pluming hot white powdery substance and the occurrence of edema on her face suggested that her face had come in direct contact with the airbag, leading to the effects of both chemical and thermal components.

Sodium hydroxide is a highly corrosive substance that when present in solid form, releases heat on contact with water. Nevertheless, the treatment of a sodium hydroxide-related burn injury involves ample irrigation of the skin and the eyes using water to remove the causative agent. In our case, the burned sites were profusely irrigated with water, and the wounds were treated with fusidic acid ointment.
Chemicals that induce such burn injuries are known to deepen the injury through cytotoxic influence. Therefore, these types of injuries need to be closely followed up. In our case, after removing the causative agent by irrigation in the ER, the patient was admitted to the ward for 1 day for close follow-up. Because they were first-degree burns, the injuries were treated with open dressing using an ointment that contained fusidic acid.

Because exposure to the gases released from an airbag may induce mucosal and even inhalation burns, patients should be evaluated for them. It is likely that our patient did not have an inhalation burn because she opened the vehicle's door on seeing the white powdery substance released from the airbag.

Released sodium hydroxide can further cause ocular trauma. Alkaline chemical keratitis has been reported to be associated with airbag-induced injuries. Airbag injuries can also lead to mechanical complications of the eyes, such as orbital fractures, vitreous hemorrhages, and corneal abrasions.

Although airbags fend off fatalities, they can lead to complications that require particular management.

While attending to major in-car accident injuries, complications that may be induced by safety systems such as airbags or safety belts should not be overlooked; the possibility of skin, eye, and inhalation burns should be considered, and such injuries should be followed up by a plastic surgeon.

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REFERENCES