

Orbital Cellulitis from an Orbital Compressed Air and Diesel Explosion Injury

Dear Editor,

Toxic cellulitis caused by high-pressure diesel injury is uncommon. Damages caused by high-pressure air and diesel fuel explosion occur mainly at industrial sites. Although these injuries may not appear serious upon initial examination, they can quickly progress to a serious condition. Therefore, early diagnosis and treatment should be considered. The authors present a case of severe orbit injury due to compressed diesel and air injuries caused by a car engine explosion.

A 43-year-old healthy male car mechanic was admitted to our emergency room due to a right eye injury caused by a diesel engine explosion. At the time of admission, a full thickness laceration of the right lower lid, a lateral canthal laceration, and periorbital edema were present and were similar to the edema commonly encountered in orbital trauma patients. With regard to visual acuity, the patient could only see hand movements in the right eye and had 20 / 20 vision in the left eye. Intraocular pressure was 32 mmHg in the right eye and 14 mmHg in the left eye. Slit lamp examination showed severe corneal edema, lens dislocation, and subconjunctival hemorrhage. Facial computed tomography revealed medial and inferior blow out fractures. In addition, many low-frequency bubbles were observed, which resembled orbital emphysema with normal eyeball contour. The patient had no history of ophthalmic or systemic disease.

On the same day, saline irrigation mixed with antibiotics was applied, and the eye was examined for foreign bodies. Primary repair of the laceration wound was performed. Systemic and topical antibiotics were administered to counteract the risk of infection. After 12 hours, swelling of the right facial area including the periorbital region worsened and was accompanied by pain, redness, and discharge. The patient complained of nausea due to persistent diesel odor. The patient was treated for toxic cellulitis with methylprednisolone 1 g/day and underwent magnetic resonance imaging. Soft tissue swelling and inflammation of the right face and orbit worsened, and a change in eyeball

contour due to intraorbital pressure was observed. Additionally, skin necrosis of the upper eyelid was evident until the third day after admission. Orbit irrigation and debridement of the necrotic tissues were performed for decompression and removal of residual diesel fuel. The wound swab cultures revealed staphylococcus epidermidis but were overall inconclusive. Second and third rounds of pus drainage were performed due to the continued cellulitis and presence of a buccal abscess. During the fourth operation, transplantation of the skin necrosis site including the upper eyelid was performed (Fig. 1).

Orbital damage due to high-pressure fuel and air explosions is uncommon. Initially, the injury may appear less severe, but can take a different course depending on the type and degree of damage. First, a foreign body injury of the orbit must be assessed by examination and computed tomography. Fuel oil appears similar to air bubbles on a computed tomography scan. Therefore, the finding can be confused with orbital emphysema, especially in orbit wall fractures [1].

Similar cases have been reported for grease gun injuries to the orbit, and a lipogranuloma has been observed as a foreign body reaction after orbital penetration of grease [2]. Engine explosions can cause both mechanical and chemical injuries. Orbital damage due to an oil fuel explosion has been reported previously. Mellington et al. [3] reported orbital damage due to compressed air and a petroleum-based carburetor cleaner. Intravenous methylprednisolone (1 g) was administered for 3 days after the 5th day of the injury owing to persistent orbital necrosis and skin lesion necrosis, left endonasal medial orbital wall decompression, and lateral canthotomy and cantholysis. The vision and lesion improved 1 month after the operation. Rabinowitz and Goldstein [4] reported on orbital damage due to a diesel engine cylinder explosion. Ten hours after early suturing of the eyelid laceration, the patient received systemic steroid treatment, an urgent orbitotomy with extensive irrigation and debridement, and drainage placement. Scar revision was successful, but the final visual outcome was no light perception.

The orbital damage caused by the explosion of oily chemicals and high-pressure air vary in prognosis depending on the type of material and degree of damage. Therefore, early evaluation of chemical damage is critical, and both a surgical approach and rapid diagnosis and drug treatment are required.

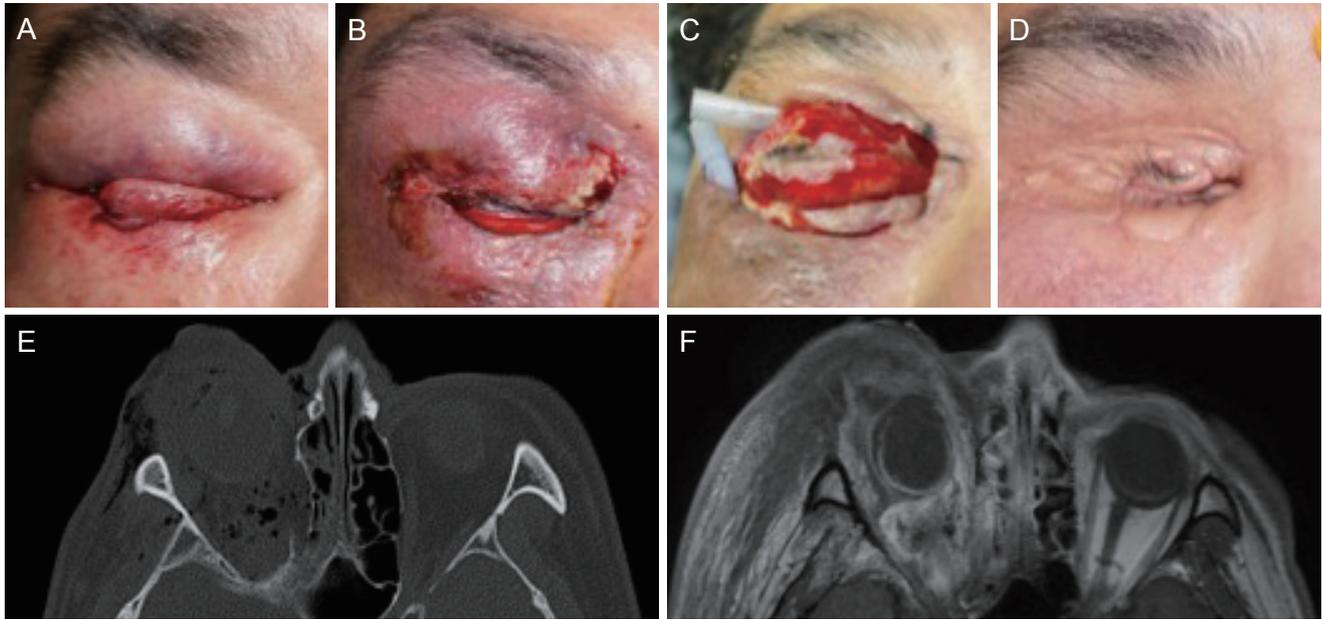


Fig. 1. Case 1. Serial photographs and images of the patient. (A) The day of injury, wound irrigation with antibiotics mixed with saline and systemic antibiotics were administered. (B) Three days after starting systemic steroid treatment. (C) Two weeks after the injury, irrigation and drainage were performed on three separate occasions. (D) Six months after the injury. (E) Computed tomography scan the day of injury, showing multiple oil droplets in the right orbit. (F) Orbital magnetic resonance image the day after the injury. Soft tissue swelling and inflammation of the right face were present with a worsening orbit. A change in eyeball contour was observed due to intraorbital pressure.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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