JAMA Ophthalmology Clinical Challenge

Facial Swelling After External Dacryocystorhinostomy

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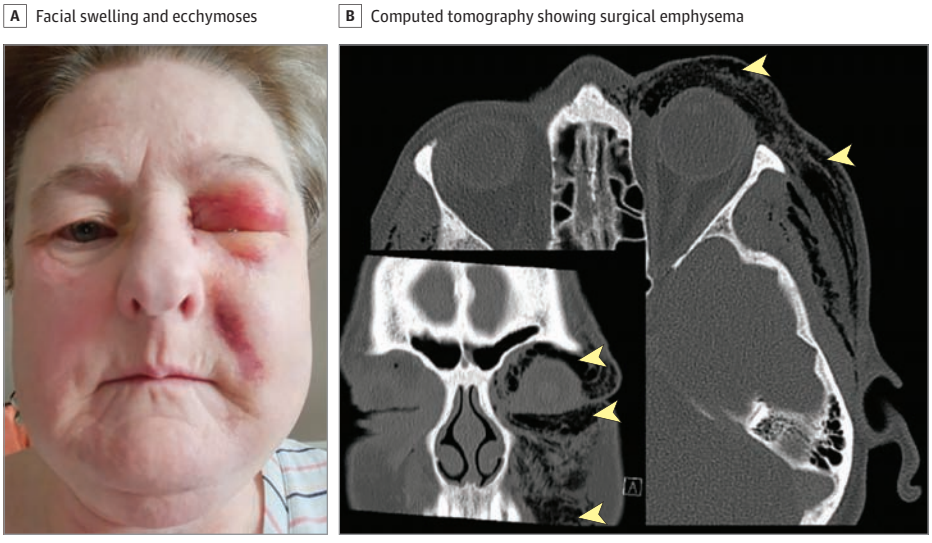

Figure. A, Color photograph showing facial swelling and ecchymoses. B, Computed tomography coronal image (bottom left) and axial image of the head showing extensive surgical emphysema (indicated by the arrowheads) that is more prominent on the left side.

A 67-year-old woman underwent an elective left external dacryocystorhinostomy to treat her symptomatic nasolacrimal duct obstruction. The procedure was completed successfully without any intraoperative complications. On the third postoperative day, the patient presented to the emergency department due to persistent cervicofacial swelling and ecchymoses of the left eyelids and left cheek, which had been present since the first postoperative day (**Figure**, A). On examination, visual acuity in both eyes was 20/30, which was slightly worse than her baseline of 20/25 bilaterally. The left pupil was noted to be mildly larger than the right (by 0.5 mm) in both dark and light, with no relative afferent pupillary defect observed. Intraocular pressure was elevated in the left eye (24 mm Hg, relative to 16 mm Hg in the right eye). Extraocular motility in both eyes was normal, though pain with extraocular movement was present (worse on the left). Crepitus was confirmed with palpation under the left eyelids and left cheek. Dilated fundus examination showed clear and quiet vitreous bilaterally. Slitlamp examination and globe position were within normal limits, and no signs of chemosis were present.

A computed tomography (CT) scan of the patient's head revealed extensive emphysema throughout the soft tissues of the face and neck (Figure, B). The globes, extraocular muscles, and optic nerves appeared normal.

WHAT WOULD YOU DO NEXT?

A. Perform an emergency decompression via needle evacuation

B. Consider empirical antibiotics and manage the patient's symptoms expectantly

C. Perform surgical exploration and possible debridement

D. Order magnetic resonance imaging of the orbits and sinuses

CME Quiz at jamacmelookup.com

Diagnosis

Cervicofacial subcutaneous emphysema

What to Do Next

B. Consider empirical antibiotics and manage the patient's symptoms expectantly

Discussion

Despite crepitation being noted under her left eyelids, an emergency decompression via needle evacuation (choice A) would not be the preferred next step because there were no immediate signs of orbital compartment syndrome (ie, reduced extraocular motility, warmth, proptosis, and relative afferent pupillary defect coupled with increased orbital pressure and decreased visual acuity). Surgical exploration for possible debridement (option C) would not be the preferred answer because the CT did not show signs of gas-forming bacteria (ie, fascial thickening, fat stranding, and abscess formation). Magnetic resonance imaging (option D) would not be necessary as a next step as there was no indication to further characterize

the emphysema, and the diagnosis was made clinically with supportive information from the CT scan.

Further questioning after the CT revealed that the patient had chronic sinusitis, which she managed by blowing her nose. The patient explained that her swelling seemed to worsen after clearing her nose, suggesting that the emphysema was likely linked to her nose blowing. Given her persistent symptoms and pain with extraocular eye movement, however, the presence of an allergic and/or infectious component could not be fully ruled out. The patient commenced loratadine treatment to manage any allergic component contributing to her emphysema, as well as erythromycin and amoxicillin/clavulanate to manage any cellulitis component (option B). She was discharged home with instructions to use cold compresses and lubricating drops to manage her symptoms. Close follow-up was arranged, and instructions were provided to seek emergency medical care if she developed signs suggestive of an infection (ie, fever, warmth, erythema, or worsening pain).

Subcutaneous emphysema is a rare but known complication associated with dacryocystorhinostomy.[1-3] The connection that is made between the nasal mucosa and the lacrimal sac creates a susceptibility for forced air to become trapped within the subcutaneous tissues. This likely occurs due to disruption in the mucosal barrier following the procedure, which can act as a one-way valve to trap air. It may also be more likely with more anterior bone removal creating a plane to the subcutaneous tissues of the eyelids. While most cases tend to be self-limiting in nature,[3] there are important exceptions to be aware of. The spread of air can involve the orbits,[4-7] which can raise the intraorbital pressure and pose immediate risk to the optic nerve, which requires emergency decompression when present.[7] In extreme scenarios, subcutaneous emphysema can extend to the chest wall, posing risk for airway compromise and tension pneumomediastinum.[2] Lastly, subcutaneous emphysema can mimic necrotizing fasciitis.[1] Surgical procedures introduce the risk for postoperative infection, with rates of cellulitis after external dacryocystorhinostomy estimated to be between 1.2% and 7.9% based on whether systemic antibiotic prophylaxis is used or not.[8] When cellulitis occurs, it introduces the potential for gas-producing organisms to spread rapidly and cause necrosis of subcutaneous tissue.[9] If necrotizing fasciitis is suspected based on fitting clinical symptoms and supporting investigations (ie, elevated white blood cell count, low serum sodium concentration, and positive cultures), treatment warrants aggressive debridement of necrotic tissue, broad-spectrum intravenous antibiotics, and possible hyperbaric oxygen therapy.[9,10]

Patient Outcome

The patient returned for follow-up on the fifth postoperative day, where her emphysema was continuing to improve. The patient made a full recovery within 2 weeks and did not require further follow-up with ophthalmology. Unfortunately, the patient had an allergic reaction during her second postoperative week, suspected to be linked to the course of antibiotics prescribed, resulting in a return to the emergency department for management of her symptoms.

ARTICLE INFORMATION

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Published Online: April 18, 2024. doi:10.1001/jamaophthalmol.2024.0799

Conflict of Interest Disclosures: None reported.

Additional Contributions: We thank the patient for granting permission to publish this information.

REFERENCES

1. Ghosheh FR, Kathuria SS. Massive subcutaneous emphysema mimicking necrotizing fasciitis after dacryocystorhinostomy. *Ophthalmic Plast Reconstr Surg*. 2005;21(5):389-391. doi:10.1097/01.iop.0000176267.81599.d8

2. Esmail K, Chan S, Gilberg S. Potentially life threatening complication of conjunctivo-dacryocystorhinostomy. *Can J Ophthalmol*. 2019;54(6):e280-e282. doi:10.1016/j.jcjo.2019.03.008

3. Akingol Z, Karslioglu S, Serin D. Cervicofacial emphysema following unilateral external dacryocystorhinostomies: a case report. *Indian J Ophthalmol*. 2018;66(5):722-724. doi:10.4103/ijo.IJO_1107_17

4. Ajit R, Inkster C, Tuck J, Mortzos P. Orbital emphysema: an unusual complication of balloon dacryocystoplasty. *Br J Radiol*. 2004;77(924):1057-1058. doi:10.1259/bjr/86898521

5. Ginat DT, Freitag SK. Orbital emphysema complicating jones tube placement in a patient treated with continuous positive airway pressure. *Ophthalmic Plast Reconstr Surg*. 2015;31(1):e25. doi:10.1097/IOP.0000000000000299

6. Wojno TH, Walter K. Subcutaneous emphysema of the eyelids after dacryocystorhinostomy. *Am J Ophthalmol*. 1993;115(5):671-672. doi:10.1016/S0002-9394(14)71470-9

7. Rico Santos E, Campos Mollo E, Cabrera Beyrouti R, Navarro Hernández E. Orbital emphysema after transcanalicular laser-assisted dacryocystorhinostomy treated with needle decompression. *Orbit*. 2020;39(5):365-367. doi:10.1080/01676830.2019.1688360

8. Dulku S, Akinmade A, Durrani OM. Postoperative infection rate after dacryocystorhinostomy without the use of systemic antibiotic prophylaxis. *Orbit*. 2012;31(1):44-47. doi:10.3109/01676830.2011.569630

9. Knudtson KJ, Gigantelli JW. Necrotizing fasciitis of the eyelids and orbit. *Arch Ophthalmol*. 1998;116(11):1548-1549. doi:10.1001/archopht.116.11.1548

10. Knežević M, Rašić D, Stojković M, Jovanović M, Božić M. Acute post-surgical bilateral orbital gas-producing infection—a case report and literature review. *Graefes Arch Clin Exp Ophthalmol*. 2012;250(9):1403-1406. doi:10.1007/s00417-012-2047-z