

OPHTHALMIC HOSPITALIST INTEREST GROUP NEWSLETTER

Donna Kim, MD | Maggie Hymowitz, MD

Announcements

Join the Community!

Have a question or topic about inpatient/ER consults? Share on the AAO/OHIG community! Log in with your AAO username

OHIG Topic Wishlist

Have a case you would like to feature in an OHIG newsletter? We welcome your ideas and expertise. Email ohig@ohig.org...

Welcome New Members!

Thanks for joining OHIG! Please verify your information on the OHIG website.

New OHIG Resources and Library Center

Thanks for joining OHIG! Please verify your information on the OHIG website.



Articles

<u>Periorbital Facial Necrotizing Fasciitis in Adults: Case</u> <u>and Review of the Literature, J of Personalized Medicine,</u> 2023

A helpful review of nec fasc, a severe and aggressive condition with rapid progression and high morbidity. Early diagnosis is key.

Eyelid Necrosis and Periorbital Necrotizing Fasciitis, Ophthalmology 1991

Mortality rates and prognosis in nec fasciitis patients who are adversely affected by delayed diagnosis. Reconstruction of the eyelid with skin grafts is necessary for many cases.

Bilateral Periorbital Neccrotizing Fasciitis Associated with Invasive Group A Strep, BMJ Case Rep, 2020

Nec fasciitis patient with a prolonged ICU course including GAS anti-microbial and surgical management.

PEARLS

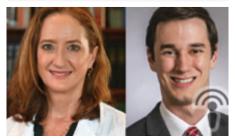
CONSULT ROUNDS



AAO Experts InSight Podcast

Dilute Hypochlorous Acid for the Treatment of Periorbital Necrotizing Fasciitis

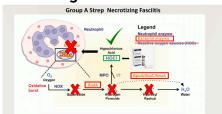




Dr. Louise Mawn and **Dr. Jonathan Siktberg** discuss the novel use of dilute **hypochlorous acid** to treat periorbital necrotizing fasciitis.

Click here

ASOPRS 2024 Insights: Dilute Pure Hypochlorous Acid -Game Changer for Periocular Necrotizing Fasciitis



An ASOPRS lecture presented by **Dr. Louise Mawn** from Vanderbilt University shares a paradigm shift in the management of necrotizing fasciitis using dilute hypochlorous acid.



Representative Image Source

You are paged about a 56 yo male with a history of CAD, HTN who sustains a ground level fall and right brow abrasion.

Over the next few days the patient develops increasing right eyelid swelling. His PCP starts him on a course of oral Augmentin but he continues to worsen over 48 hours. The patient is eventually admitted to an outside hospital for IV abx but he does not improve. He is now complaining of new right eye blurry vision. The patient is transferred to your tertiary care hospital for further subspecialty management.

You evaluate the patient at bedside. He has moderate right sided proptosis with periocular edema and "dusky erythema" involving the right and upper and lower eyelids. There is a visible area of necrosis along his brow wound with copious purulence. He has mechanical ptosis with diffuse EOM restriction. He is notably tender.

Vision is 20/50 in the right eye, 20/20 in the left, there is no obvious APD although his right pupil is sluggish. Funduscopic exam is within normal limits. CT imaging is notable for preseptal edema with orbital stranding without frank abscess or sinus disease.

You have seen a lot of orbital cellulitis at your hospital but this clinical appearance seems particularly worrisome. You discuss the case with Oculoplastics who are similarly concerned.

Click here 2



The patient is continued on broad spectrum IV Vanc and Unasyn. He is also taken urgently to the OR for wound debridement. Tissue cultures are positive for group A streptococcus (GAS).

Your Oculoplastics surgeon mentions that he just returned from his ASOPRS meeting where there is new "buzz" about using **dilute topical hydrochlorous acid** as an adjunct therapy for periocular cases of necrotizing fasciitis. The patient receives dressing changes soaked with this reagent twice daily.

The patient returns back to the OR for additional surgical debridements and eventually stabilizes during his hospital admission. He is eventually discharged back to his SNF on long-term antibiotics.

Case Comments: Periocular necrotizing fasciitis is a severe and highly invasive condition that requires both aggressive medical and surgical management, arguably similar to orbital Mucor. Timely diagnosis and treatment is key. Clinical features that should raise clinical suspicion include dusky/violacious hue or necrosis of the skin, pain out of proportion to clinical findings, poor response to antibiotics, rapidly progressive course, and LRINEC score. Newer adjuvant therapies including topical dilute hypochlorous acid are currently in use with promising results. It may be helpful to obtain this for use on your hospital formulary.



VANDERBILT UNIVERSITY MEDICAL CENTER

Dr. Louise A. Mawn, MD Professor, Ophthalmology and Neurological Surgery Department of Oculoplastics Vanderbilt Medical Center Nashville, TN

Q1) Could you share the rationale for using dilute hypochlorous acid for cases of necrotizing fasciitis. What kind of clinical response have you noted?

A1) The most common bacteria that are the cause of necrotizing infections of the periocular tissue and orbit have developed mechanisms to thwart our human defense system. Specifically, the bacteria have chemicals that prevent them from being killed by our white blood cells. In necrotizing infections, the bacterial toxins and superantigens, ultimately results in the enzymatic digestion of the body until severe damage or death. One example is how enzymes secreted by Group A Strep prevent the body from generating reactive oxygen species (ROS), leading to bacterial survival, continued toxin secretion, and



infection promulgation. Hypochlorous acid is one of the ROS produced by the body, and while GAS enzymes prevent its formation, they are not able to clear it as they do with superoxide and hydrogen peroxide. The rationale for using dilute hypochlorous acid for cases of necrotizing fasciitis is that we are able to put our troops back on the ground and win the infection war.

Q2) Could you share your hypochlorous acid protocol at Vanderbilt University?

A2) Our protocol varies by the severity of infection. We may flush the infected tissues twice a day or as frequently as once every 4 hours. If the lids are infected we commonly spray the solution over the infected lids. If the orbits are infected, we instill the solution through catheters. A key aspect of my protocol is that the toxins need to be flushed out so a Penrose drain needs to be placed as well.

In many cases we alternate, at first empiric local antibiotics, and then, once the sensitivities have resulted, we tailor the treatment to the pathogen and the sensitivities.

At Vanderbilt University Medical Center (VUMC), we have an Antibiogram at both the adult and children's hospital which assists us in decisions concerning antimicrobial therapy. The antibiogram shows the historic sensitivities for all the culture positive bacteria at VUMC.

Q3) Are there any contraindications or precautions for using dilute hypochlorous acid that ophthalmologists should be aware? Even before the patient specific sensitivities have resulted.

A3) Humans naturally produce pure hypochlorous acid in their white blood cells. It is safe and not toxic to human tissue. There are various commercial products available. Ideally the solution has a homogenous pH.

Q4) Do you have any further advice for the management of these challenging cases?

A4) Yes a team approach to make sure that all aspects of the patient's illness are optimized. For instance if the patient is a diabetic, the blood glucose must be normalized. If the patient is in multi-organ failure, an intensivist must be managing the patient to ensure lung function, kidney function and all other organs are maintained. The use of pure dilute hypochlorous acid can be a game changer in these very ill patients. Eliminating the toxins, torts the favor to the patient and allows the patient to survive this deadly condition. Pure dilute hypochlorous acid is readily available as the product Avenova (lid spray) which is 0.01% pure dilute hypochlorous acid. Additionally, PhaseOne is available as a 0.025% solution.









Alexa Van Brummen, MD Oculoplastics Fellow University of Washington Department of Ophthalmology

Q1) Academic tertiary care referral centers manage a high number of patients with preseptal/orbital cellulitis. What clinical findings should raise a suspicion for necrotizing fasciitis? How should Oculoplastics fellows be involved with these cases?

At) Early recognition, urgent initiation of medical management, and surgery are key aspects to proper necrotizing fasciitis management. The LRINEC score can be used to help identify cases of likely necrotizing fasciitis quickly. A C-Reactive Protein (CRP) value >150 mg/L should raise concern for necrotizing fasciitis in addition to elevated white blood cell counts. If you look at the scoring system of the LRINEC score, these two factors are the most heavily weighted, with CRP values above the 150 mg/L cutoff providing 4 points to the score. This in addition to signs of septic shock systemically should raise concern for necrotizing fasciitis. Finally, any indicators of involvement of Group A Strep in the infection should raise concern for necrotizing fasciitis, as this is the most likely pathogen involved. Even a recent sore throat before the onset of periorbital cellulitis may raise concern for Group A Strep involvement. Rapid detection and initiation of medical management with both wound management with ophthalmic hypochlorous acid and systemic treatment with intravenous antibiotics to target the bacteria and toxins helps minimize the amount of surgical debridement required. Medical and surgical management both need to be prioritized. This is how the discussion of necrotizing fasciitis is changing.

At the University of Washington, the infectious disease service recommends Linezolid rather than Clindamycin for systemic antitoxin effect given the recent resistance described to Clindamycin in Group A Strep. Infectious disease consultation for antibiotic management is essential. Linezolid decreases tissue damage from the strep toxins and systemic shock. This can be initiated before the patient is transferred if they are coming from a distant location and suspicion is high. Linezolid is usually given with Zosyn intravenously to cover for the most common pathogens of Necrotizing Fasciitis at this time per infectious disease protocol. Then, when the patient arrives at the University of Washington, we culture the wound and begin ophthalmic hypochlorous acid as below to help control the toxin burden in the tissue from Group A Strep endotoxins. Surgical debridement is carried out as soon as possible. Then, the CRP is trended to decide when repeat surgery is needed. After surgery, careful wound care is carried out to keep the wound moist. If the wound dries out, it is difficult to assess what needs further debridement. Moisture can be maintained with frequent erythromycin ointment (or other choices pending the



susceptibility of the specific growing bacteria), and a Tegaderm overlying the ointment for small areas of debridement. For larger areas of debridement, wet to wet dressing may be implemented with ointment in order to best optimize moisture of the wound.

Q2) Could you share your hypochlorous acid administration protocol at UW?

A2) For every patient, when they arrive, the weeping skin is immediately cultured. They are started in IV linezolid and zosyn with infectious disease consultation. Then, the face is debrided with a gentle scrub with 4x4 and sprayed with ocusoft hypochlorous acid at bedside q2-4 hours until urgent operating room debridement. We have the ocusoft hypochlor on formulary with pharmacy.

Where to Find Topical Hypochlorous Acid

- 1) Avenova
- 2) PhaseOne
- 3) Vashe
- 4) OcuSOFT Hypochlor
- 5) Neutrophase

Relevant Articles:

- 1) Flow Through Instillation of Hypochlorous Acid in the Treatment of Necrotizing Fasciitis
- 2) <u>Treatment of Acute Necrotizing Fasciitis Using Negative Pressure Wound Therapy and Adjunctive Neutrophase Irrigation Under the Foam</u>
- 3) NeutroPhase in Chronic Non-Healing Wounds
- 4) A Retrospective Health Economic Analysis of a Stable Hypochlorous Acid Preserved Wound Cleanser Versus 0.9% Saline Solution as Instillation for Negative-Pressure Wound Therapy in Severe and Infected Wounds



Oregon Health & Science University (OHSU) Inpatient Treatment Protocol for Necrotizing Fasciitis using dilute Hypochlorous Acid solution (Vashe, 0.033%)

I. Purpose:

To standardize the inpatient management of necrotizing fasciitis using surgical debridement, adjunctive wound irrigation with 0.033% hypochlorous acid (Vashe), and appropriate systemic therapies.

II. Patient Eligibility:

- Patients with a clinical diagnosis of necrotizing fasciitis supported by imaging, laboratory data, and/or intraoperative findings.
- Patients requiring adjunctive wound irrigation as part of comprehensive wound management.

III. Treatment Components:

1. Surgical Debridement:

- o Immediate and appropriate selective debridement of necrotic tissue.
- o Repeat debridement may be required based on clinical progress.

2. Wound Irrigation and Dressing Protocol:

o Irrigation:

- Alternate every 4 hours between:
 - 0.033% hypochlorous acid (Vashe): Instill 20 cc via wound catheter.
 - Penicillin G: Administer 2.5 million units diluted in 100 cc saline, instilling 20 cc via wound catheter.

Topical Application:

- Apply Tobradex ointment liberally to the wound and ocular areas every 4 hours.
- Spread a thin layer of Bacitracin ophthalmic ointment over exposed wound tissue. (Per discretion).

Wound Coverage: See comment

- Thin strip packing soaked in Vashe solution and packed in wound as tolerated
- Site covered with Vashe-soaked gauze
- Dressing secured with taped eye shield (or additional gauze as needed to keep in place and prevent inadvertent removal)
- May use Kerlix to secure dressings over larger areas
- Change packing and dressing 1-2x daily pending clinical course and drainage patterns (essentially this is a wet-to-dry dressing and removing the packing mechanically debrides the wound)

1. Ophthalmic Care (if orbital involvement):

o Vashe 0.033% Spray on exposed orbital tissues every 2 hours.



> Penicillin Ophthalmic Solution:

Instill 5 drops over the upper lid and superior orbit every 2 hours while awake, and 5 drops over the lower lid and inferior orbital soft tissues.

2. Systemic Antibiotic Therapy:

- o Expedited Infectious Disease Consult
- o Initiate broad-spectrum intravenous antibiotics as per Infectious Diseases recommendations.
- o Adjust the regimen based on wound culture and sensitivity results.

3. Supportive Management:

- o Provide multimodal pain management.
- o Monitor for signs of systemic infection, sepsis, or organ dysfunction.
- o Ensure nutritional support, with a focus on high-protein diets and necessary supplementation.
- o Avoid unnecessary NPO status

IV. Assessment and Monitoring:

1. Clinical Monitoring:

- Perform daily wound assessments and document changes in wound appearance, drainage, and signs of infection.
- Monitor for corneal exposure that may develop secondary to debridement of periocular tissue.
- o Reassess clinical status every 12-24 hours and adjust treatment accordingly.

2. LRINEC Score Calculation:

- Utilize the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) Score to help differentiate necrotizing soft tissue infection from other wound infections and to gauge severity.
- o Include laboratory values such as C-reactive protein, white blood cell count, hemoglobin, sodium, creatinine, and glucose in the calculation.
- The LRINEC Score can be calculated using the MDCalc tool (<u>LRINEC Score</u> Calculator).
- o A score ≥6 should raise concern for necrotizing fasciitis and prompt aggressive management.

V. References:

- Crew J. et al., Flow-through Instillation of Hypochlorous Acid in the Treatment of Necrotizing Fasciitis (WOUNDS, 2016).
- 2018 WSES/SIS-E Consensus Guidelines for the Management of Soft Tissue Infections.
- OHSU Standard Inpatient Treatment Guidelines.
- https://www.medline.com/media/catalog/Docs/MSDS/MSD_SDSD16859.pdf

VI. Approval & Review:

 This protocol is subject to review and approval by the OHSU Infectious Disease and Wound Care Committees.

Protocol Committee Members

John Ng, MD Davin Ashraf, MD Natalie Hoesly, MD Eric Steele, MD Marielle Mahan, MD

Date: 3/17/2025



OHIG Survey Question

Question: Do you currently use topical dilute hypochlorous acid for peri-orbital cases of necrotizing fasciitis at your institution? Who assists with reagent administration/dressing changes? What type of clinical results have you noted? Select all that apply:

- A) Yes, we currently use topical dilute hypochlorous acid
- B) No, we do not currently use this reagent
- C) No, we do not currently use this reagent but will try on future cases
- D) Ophthalmology Residents/Fellows assist with application/dressings
- E) Nursing assist with application/dressings
- F) Wound care service assist with application/dressings
- J) Other comments: please enter below

Please share your responses/questions on the AAO/OHIG community page: https://aao.mobilize.io/main/groups/47315/lounge

We would like to sincerely thank **Dr. Louise Mawn**, **Dr. Alexa Van Brummen**, and **Dr. John Ng** for sharing their protocols and expertise on this very important topic. It is exciting to know that we have new/additional treatment options to help combat this devastating disease in the hospital consult setting.