You're the Flight Surgeon

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You are the flight surgeon at an Air Force base in Europe. The nearest emergency services and specialties require an off-base consult to a local hospital 4 mi south. A 32-yr-old male fighter pilot was recently assigned to be the project manager of a large international F-16 exercise with multiple high-ranking officials in attendance. You run into him at the squadron with a quarter-sized bandage on his forehead. Upon removing the bandage you observe a 1-cm papule with a 1.5-cm ring of erythema. He believes a spider bit him the night prior and then the bite became infected. He complains of itching, tingling, subjective fevers, and minor pain at the site. Because of his busy schedule, he decided to forego a visit to the flight surgeon and instead self-medicated all day with a topical antibiotic. This treatment did not relieve his symptoms. You instruct him to present to Flight Medicine Clinic at the end of the day to see you.

At 17:50 he finally shows up to the clinic. He just finished a meeting and needs to return to the squadron to complete multiple time-sensitive assignments. The more focused exam showed a 0.8-cm vesicle located on the left side of the forehead, notably not crossing the midline. A 1.5-cm area of erythema surrounds the vesicle. He rated his pain 1/10 at rest and 3/10 with palpation. He was treated with Bactrim 800 mg twice a day and the edges of the erythema were marked with a pen. He was placed on duty not involving flying (DNIF) status, which he readily accepted since it "would take the schedulers off my back" and allow him to focus solely on the upcoming exercise.

That evening the pain increased to 6/10 with light touch and the erythema grew 2 cm past the pen markings. He presented to the local emergency room and underwent an incredibly painful 10/10 washing with normal saline as they attempted to dilute a bacterial infection. He walked out against medical advice at 02:00 and called you to help with the pain, which is now 7/10.

You meet him in your clinic and he looks exhausted. The erythema on his forehead is expanding vertically to the upper portion of the forehead and inferiorly to the tip of his nose. It grew laterally 2 cm, but it does not cross the forehead's midline. In addition, there are now five new vesicles that are approximately 0.2–0.3 cm.

1. What is the most likely cause of this pilot's pain?

A. Methicillin-resistant *Staphylococcus aureus* infection.
B. Toxin.
C. Contact dermatitis.
D. Varicella zoster.

ANSWER/DISCUSSION

1. D. Herpes zoster affects approximately one million Americans a year.[9] It is caused by the varicella zoster virus, which initially presents as chicken pox. Upon resolution of the initial rash, the virus enters a dormant state in the sensory dorsal root ganglion.[6] During a time of decreased immune status, the virus will reemerge and cause the symptoms associated with a zoster infection. Prior to the rash development, the patient may feel pain, itching, or tingling at the infected site.[2] A painful erythemic rash will develop, following a dermatomal distribution. The rash may contain vesicular lesions as demonstrated with our pilot. He presented with one vesicle that initially appeared pustular. On the second day his rash developed multiple clear vesicles that are normally associated with herpes zoster. His previous medical history did not show any indication for a depressed immune system, but the stressors/time of planning the high-visibility exercise allowed for activation of the virus. One clear indication that this was a herpes zoster infection was the dermatomal distribution that did not cross the midline of his forehead.

2. The involvement of the tip of the nose is known as Hutchinson's sign. Which concern is a priority with this symptom?

A. Infection of the maxillary sinus.
B. Infection of the middle turbinate.
C. Loss of vision.
D. Painful inhalation through the nose.

ANSWER/DISCUSSION

2. C. Hutchinson's sign is a high-risk predictor of ocular involvement that may cause a loss of vision.[6] It indicates an infection of the external nasal component of the trigeminal nerve, which also innervates the globe.[6] Treatment of oral acyclovir (800 mg, five times daily) within

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the first 72 h decreases the risk of serious inflammatory complications associated with acute herpes zoster ophthalmicus.[4]

3. The pilot is started on acyclovir and calls 2 h later because the pain has increased. Which treatment should you not prescribe?

A. Topical anesthetic eye drops.
B. Cool compresses.
C. Oxycodone.
D. Nonsteroidal anti-inflammatory drugs.

ANSWER/DISCUSSION

3. A. In this scenario topical anesthetic drops may cause corneal toxicity. A cool compress can be placed on the skin rash to relieve pain. Oral analgesics are the primary treatment for herpes zoster pain control.[6] Acetaminophen and ibuprofen can be used for minor pain, but our pilot is experiencing severe pain. With no known drug allergies, a strong opioid could be used for a short duration.

You are concerned with his vision and call the local hospital to set up an Ophthalmology consult. The ophthalmologist informs you that there is no sign of infection in the eye and to hold off on any topical steroid drops. The pilot is relieved to hear that he will not go blind and reluctantly accepts his quarters restriction, mainly because he can perform his temporary duty (TDY) preparation from home. After 3 d, his pain has decreased but the vesicles remain. He returns to your clinic for a disposition. You explain that the vesicles will scab over in about 7 d and the rash will linger for 2-4 wk.[2] He feels as though he is ready to return to flying status (RTFS), since the exercise begins in 3 d and he planned on flying a jet to the training site.

4. Which does NOT influence your decision whether or not he should RTFS?

A. The continued use of medications.
B. The pain associated with wearing a helmet/mask.
C. The spreading of the virus.
D. His possible vision deterioration.
E. None of the above.

ANSWER/DISCUSSION

4. E. None of the above. The pilot is still on antiviral medication and opioids. Both medications are grounding. Patients may return from acyclovir treatment once the rash will no longer interfere with flying duties. This rash is still in the vesicular range and very painful. Since the pain is decreased, you may discontinue the opioids and begin treating with nonsteroidal anti-inflammatory drugs or Tylenol. Because the rash is still in the vesicle form, he is able to shed active virus. A person is not able to spread shingles to another individual, but can transmit the virus to an individual who never had chickenpox or the chickenpox vaccine.

During the clinic visit you explain to the pilot that he will not be returned to flying until he is cleared by the ophthalmologist, off all medications, and able to wear a helmet and aviator mask. He should also isolate himself from his 8-mo-old son, who has not received the chickenpox vaccine. He understands but requests to go to the TDY in 3 d by commercial flight (a 6-h flight). He has worked incredibly hard and put in countless hours into this exercise and requests the opportunity to attend but not fly.

5. What do you tell him?

A. He cannot leave the local area until all medication is completed.
B. He cannot participate in the exercise's ground operations while DNIF.
C. He will infect multiple people at the TDY location.
D. He can attend with proper dressings.

ANSWER/DISCUSSION

5. D. He can attend the exercise with the proper dressings to protect others from the viral shedding. Once the vesicles have scabbed over, the virus no longer is transmittable.[1] Until that time, he can perform contact precautions and travel without restrictions. You discuss the importance of rest and inform him that the most likely cause of the virus reactivation was his stress and fatigue from the exercise preparation. The prognosis appears good, as the vesicles are encrusting and his pain is decreasing, but patients have a 10–15% chance of post-herpetic neuralgia. It normally occurs 1-5 mo after the resolution of the rash.[4]

The U.S. Army, Navy, and Air Force do not specifically address the diagnosis of herpes zoster. The main limiting factors in this case to RTFS are the significant pain experienced by the pilot with direct pressure on the rash and his continued use of pain medication. Per all three military waiver guides, a pilot must be placed on DNIF status for the use of opioids. With antiviral medication, the Navy and Air Force require a mandatory 3-d DNIF. All three military branches note that any skin condition that interferes with the use of aviation clothing or life support equipment is grounding. A waiver is not necessary if all symptoms resolve and no disqualifying medication is required.[5,7,8] Post-herpetic neuralgia is a common adverse outcome that may persist for years after resolution of the rash.[4] If chronic pain control or an alteration to clothing/equipment is needed, then a waiver may be required.[5,7,8] The Federal Aviation Administration is similar in that it does not specifically discuss herpes zoster, but the infection would fall under the guideline of a condition that makes a person unable to safely perform the duties or exercise the privileges of the airman certificate held.[3]

The F-16 pilot had a complete resolution of his rash at 13 d after presentation and was returned to flying status. In the squadron a month later he confided in you that a tingling sensation continued for 10 d after the rash, but he experienced 0/10 pain. He did not require an intervention and you instructed him to follow up with Flight Medicine if his symptoms returned.

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