Herpes Zoster in a World Class Triathlete: A Case Report and Evaluation of Training Schedules in Relation to Immune Status

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Herpes zoster, also known as shingles, is an eruption of latent varicella zoster viral particles, which classically leads to a dermatomal skin eruption. While the causes of this reactivation are still unknown, shingles usually affects older individuals or those who are immunocompromised due to other disease processes or pharmacotherapy following organ transplantation. We report a unique case of herpes zoster in a world class triathlete who developed a painful dermatomal rash following a period of particularly intense training, travel, and competition. His training schedule for three months following the illness and return to competition is documented. The athlete’s subsequent period of underperformance and profound fatigue suggested an inadequate recovery period. Review of the literature reveals a paucity of information about what is considered an appropriate period after herpes zoster before athletes return to training and competition.

Keywords: shingles; triathlete; underperformance; immunological markers

1. Introduction

Varicella zoster is a member of the herpes family of viruses and is most commonly associated with the childhood illness chicken pox. This disease presents as a crop of fluid-filled blisters on an erythematous base, is extremely pruritic, and is highly contagious until the blisters become desiccated. The primary rash commonly resolves with few other complications, and the virus then migrates to the dorsal root ganglia and cranial nerve ganglia, where it remains dormant until an unknown cue or certain state of decreased immunity allows its reactivation.

Secondary reactivation of the virus, usually in older individuals aged 60-70 yr, or patients with otherwise compromised immunity, is known as herpes zoster. The annual incidence of zoster is 1.5-3.5/1000 and the lifetime risk is estimated to be between 10% and 20% (Yih et al., 2005). The symptoms commonly associated with herpes zoster, also known as shingles, include unilateral pain and a dermatomal rash of grouped vesicles or urticarial plaques. The complications of zoster include, but are not limited to, myocarditis, paresis, vasculopathy, and postherpetic neuralgia (Poland, 2005). Zoster can also be described in terms of subtypes that affect different areas of the body. Ophthalmic zoster affects the cornea and can lead to loss of vision. Ramsay-Hunt syndrome can lead to a facial condition similar to Bell’s palsy or deafness (Sweeney and Gilden, 2001). Disseminated zoster involves more than three dermatomes and can also affect internal organs, leading to hepatitis, pneumonitis, or meningoencephalitis (Scheinfeld, 2005).

This variety and severity of consequences stemming from an outbreak of zoster, as well as the large number of individuals affected annually, has prompted a great deal of research on the disease. Recently, research has focused on the age-related decrease in cell-mediated immunity to herpes zoster, and more specifically on the function of natural killer (NK) cells (Poland, 2005), which are the key...
modulators of the body’s innate immune system. NK cells do not require previous exposure or activation but act to rid the body of cancerous or virally infected cells through direct lysis, antibody-dependent cell-mediated cytotoxicity, or release of cytokines such as interferon. In fact, complete lack of NK activity has been cited as the cause for recurrent zoster infections leading to the death of one patient (Etzioni et al., 2005).

While the specific triggers and state of immune dysfunction that allow herpes zoster to develop are still unknown, it is clear that alterations in the immune system play a role in its progression. Furthermore, it has been shown that extremely strenuous exercise and stress can have deleterious effects on the immune system (Reid et al., 2004), including increased rates of upper respiratory tract infections (Hughes, 1997), various effects on peripheral T-lymphocyte and NK cell counts (Beshgetoor et al., 2004, Mueller et al., 2001, Malm et al., 2004), and reactivation of Epstein-Barr virus (Pottgiesser et al., 2012, Yamauchi et al., 2011, Hoffmann et al., 2010). Competitive athletes are constantly forced to strike a balance between the risk of decreased immunity from excessive strain and maximization of their training to increase their level of performance. The literature has not provided any recommendations about return to training or racing endurance activities for athletes with herpes zoster. Here we describe one such case, along with details of the patient’s training schedule, in order to provide information that would be useful for other athletes who may be similarly affected.

2. Case report

A 27-year-old caucasian male triathlete presented with painful rashes on his left back and abdomen (Figures 1 & 2). The only symptom leading to the eruption had been approximately two weeks of increased fatigue. During this time, the patient had continued to train and participated in an intensive training camp immediately following a half-ironman distance triathlon (see Table 1).

Following the initial fatigue that had lasted two weeks, the patient noted pain in his back which he dismissed as muscle strain or pain due to a previous injury. A vesicular rash became apparent the following day, but this was dismissed as being due to possible exposure to poison oak. Over the next four days,

![Figure 1](image1.jpg) Presentation of rash on the back.

![Figure 2](image2.jpg) Presentation of rash on the left abdomen.

| Date     | Run     | Bike    | Swim    | Notes                      |
|----------|---------|---------|---------|----------------------------|
| March 18 | 78 min  | 148 min | 30 min  | 1/2 Ironman                |
| March 19 | None    | None    | None    | Travel day                 |
| March 20 | None    | 30 min  | None    |                            |
| March 21 | 21 min  | 90 min  | 60 min  |                            |
| March 22 | None    | 192 min | 60 min  |                            |
| March 23 | 50 min  | 150 min | 72 min  |                            |
| March 24 | 20 min  | 42 min  | 60 min  |                            |
| March 25 | 120 min | None    | None    |                            |
| March 26 | None    | 78 min  | 60 min  |                            |
| March 27 | 40 min  | 200 min | 90 min  |                            |
| March 28 | 51 min  | None    | 55 min  | First signs of back pain   |
| March 29 | 53 min  | 90 min  | 68 min  | Rash appeared              |
| March 30 | 47 min  | 240 min | 60 min  |                            |
| March 31 | None    | None    | None    | Rash well developed        |
| April 1  | 69 min  | None    | 60 min, 3300 m | ED visit, swollen axillary nodes and increased pain |
| April 2  | None    | None    | None    | Rash at maximum level, pain medication needed for sleep |
| April 3  | None    | None    | None    |                            |
Table 2  Post eruption return to activity.

| Date    | Run  | Bike | Swim | Notes              |
|---------|------|------|------|--------------------|
| April 4-9 | None | None | None | None               |
| April 10 | None | 40 min | None | None               |
| April 11 | 45 min | None | None | None               |
| April 12 | 57 min | 40 min | None | None               |
| April 13 | 130 min | None | None | None               |
| April 14 | None | None | None | None               |
| April 15 | 20 min | 65 min | None | None               |
| April 16 | 65 min | None | None | None               |
| April 17 | None | None | None | None               |
| April 18 | 20 min | 95 min | None | None               |
| April 19 | 64 min | None | None | Core 30 min        |
| April 20 | 60 min | 65 min | None | Gym 60 min         |
| April 21 | None | None | None | None               |
| April 22 | 72 min | None | None | 1/2 marathon        |
| April 23 | None | 120 min | None | None               |
| April 24 | 10 min | 72 min | 60 min | None               |
| April 25 | 139 min | None | None | None               |
| April 26 | 20 min | 195 min | None | Core 45 min        |
| April 27 | None | None | 60 min | Gym 60 min         |
| April 28 | 41 min | None | None | None               |
| April 29 | None | None | None | Mild pain          |
| April 30 | 10 min | 200 min | None | None               |
| May 1 | 200 min | None | None | None               |
| May 2 | 14 min | None | 60 min | None               |
| May 3 | None | None | None | Core 45 min        |
| May 4 | 10 min | 390 min | None | Gym 60 min         |
| May 5 | None | None | 56 min | None               |
| May 6 | 33 min | 53 min | None | Race, 1st place    |
| May 7 | 20 min | 319 min | None | None               |
| May 8 | 136 min | None | None | None               |
| May 9 | 10 min | 376 min | None | None               |
| May 10 | 60 min | None | None | None               |
| May 11 | 28 min | 137 min | None | Gym 60 min         |
| May 12 | None | None | 20 min | None               |
| May 13 | 29 min | 30 min | None | None               |
| May 14 | 46 min | 62 min | None | Duathlon, 1st place|
| May 15 | None | None | None | None               |
| May 16 | None | None | None | Travel day          |
| May 17 | 83 min | None | None | None               |
| May 18 | 30 min | 142 min | 60 min | None               |
| May 19 | None | None | 30 min | None               |
| May 20 | 85 min | 165 min | 26 min | 1/2 Ironman, 1st place|

the patient’s fatigue began to interfere with his ability to complete his daily training regimens. Swelling in the left axillary region and pain along the distribution of the rash led him to present at the Emergency Room five days after the onset of pain. The symptoms peaked on day six and remained severe for the next four to five days. The patient was given analgesics for symptom relief, but no antiviral therapy.

As zoster commonly affects older individuals or those with compromised immunity, the patient was screened for problems that might have contributed to an immunodeficient state. The results of these tests (gluten antibody test, food allergy test, stool culture, cortisol stress test, lipid profile, electrolytes, and amino acid assay) were within normal limits.

The patient recovered completely with no scarring or residual symptoms including post-herpetic neuralgia. He returned to his initial training regimen over the next five weeks (Table 2) and began competing successfully in international events. However, three months later, he subsequently developed profound fatigue, overtraining syndrome (Fry et al., 1991, Kuipers and Keizer, 1988), and an immunocompromised state. At the time of writing, 18 months later, the patient has not returned to competitive sports.

3. Discussion

Competitive athletes strive to maximize their potential while avoiding the pitfalls of over-training. An increased susceptibility to infection is one such pitfall, and can be an indication of an underlying immunocompromised state.

Very little is known about recovery following immune system depression as the result of endurance training. General recommendations do exist for health maintenance, but these are non-specific (Hue et al., 2002, Millet and Vleck, 2000, Cipriani et al., 1998, Bentley et al., 2007). First, training should be monitored carefully in terms of the type and time, with special attention to maintaining variety and strain. Loads should be increased over a period of time and there should be a dedicated time for rest and recovery (periodization) (Fry et al., 1992). Next, the athlete should attempt to control any exposure to adverse conditions such as excessive heat, cold, humidity, and altitude. Also, plans to acclimatize to conditions over time should be made when needed. In addition, attempts should be made to learn adequate ways of dealing with the emotional stresses of training and competition. Lastly, the athlete should minimize exposure to infections, undergo regular medical screening, and receive suitable prophylaxis when available (Pyne et al., 2000).

In cases of shingles, it is imperative that a prompt diagnosis be made following appearance of the eruption. Multiple reports have indicated the efficacy of antivirals in reducing the period of symptoms and the incidence of post-herpetic neuralgia in patients with herpes zoster, but the effectiveness of therapy is directly affected by the timely initiation of therapy.
(Pavan-Langston, 2008, Schmader and Dworkin, 2008, Friel, 2007). A number of regimens have demonstrated benefits in this respect, but no comparisons to date have indicated that some are superior to others. The patient described here presented for treatment after the initial 72-hour period usually thought to be the most beneficial time for antiviral therapy. However, the standard of care should be early recognition and early treatment in order to minimize the impact of the outbreak and decrease the chances of long-term complications.

Table 2 lists the training schedule that was ineffective for this particular athlete, and may serve as a point of discussion for others in a similar situation. In the period following an outbreak of herpes zoster, pain and fatigue are likely to be factors that limit athletic activity. The variety of factors that compel highly trained athletes to exercise so intensively and work through difficulties could be disadvantageous in this situation. Anecdotal reports of prolonged recovery time with subsequent dismal performances secondary to rapid return are common. A professional cyclist who contracted the Epstein-Barr virus in 2001 took a break from training but returned that same year within two months (Schlink, 2008). Although the training schedule leading to his successful return has not been publicly documented, the same cyclist has developed similar symptoms this year and will need to take another break from training. Our present patient was unable to return to competitive sports even 3 months after a slow, rebuilding approach to recovery.

For athletes with herpes zoster, we recommend as a general guideline that they take a period of complete rest until the lesions have erupted and subsequently crusted over. Three months is not sufficient for this period of recovery. Because laboratory values returned to the normal ranges after three months, this triathlete attempted to return to competitive training. Baseline studies during a healthy state may provide a better normative value specific for any given individual. Furthermore, a serological marker to detect full recovery from herpes zoster may aid physicians in determining the ideal time when athletes with shingles may be able to return to high-endurance sports. Currently, however, there are no specific and sensitive serological markers for herpes zoster that would allow this time point to be established. A test for Epstein-Barr virus, a member of the herpes family, used in patients with nasopharyngeal carcinoma for detection of lytic and latent antigens with good sensitivity and specificity (Tedeschi et al., 2007), could be potentially beneficial for detection of latent shingles.

Immunological markers may be helpful for revealing patients who are at risk for reactivation of herpes zoster. A study by Levin et al. using an interferon-γ enzyme-linked immunosorbent spot-forming cell (ELISPOT) assay in an elderly population (age > 60 years) showed that cell-mediated immunity can decline even in individuals who have received vaccinations 6 to 10 years earlier (Levin et al., 2003). This suggests that cell-mediated immunity can decline in certain patients, and that reactivation of herpes zoster can occur even if they have been unsusceptible to the virus previously. Investigations of immunological markers for latent herpes zoster may help to determine whether the virus is present in affected athletes and aid physicians in guiding them about return to competitive sports.

Consent

The Institutional Review Board of the medical school approved this study, and written informed consent for publication of this case report was obtained from the participant.

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