Sports Medicine
FOR THE PRIMARY CARE PROVIDER

Marine Envenomation

BY SOURAV DAS, M.D., PENN STATE HERSHEY FAMILY AND COMMUNITY MEDICINE RESIDENT

CLINICAL VIGNETTE:

A 35-year-old healthy male presents to a weekend walk-in clinic six hours after spending the day at a sandy beach. He was kayaking and snorkeling along a reef when suddenly he felt a sharp pain in his right foot that radiated up his lower extremity. Upon examination, an erythematous and dusky wound was noted, still oozing with blood at the sole of his right foot. He has mild-moderate pain that's not palpable along his lateral thigh. Given the history, you suspect envenomation injury.

Why should I worry about envenomation injury and how common is it?
Envenomation injury by coral, sea urchins, spiny fish or stingrays are common painful occurrences that vary by species and the amount of venom injected. Envenomation can be associated with puncture wounds complicated by foreign bodies which can lead to contamination. Systemic infections may follow these injuries and can become life-threatening.

How do I recognize envenomation injury?
The diagnosis of marine envenomation is supported by a history of an encounter with coral, sea urchins, venomous fish, or stingrays during water activity. Patients usually describe the sudden onset of pain, and single or multiple puncture wounds depending on the culprit.

Marine skin lesions are primarily pruritic. Of the marine species, jellyfish stings are characterized by linear, red, urticarial lesions, and tentacle prints without puncture wounds. Blue-ringed octopus, sea snake, and cone snail bites are marked by neurological symptoms rather than pain. Severe pain is common after stonefish and stingray envenomation. Most of these wounds are superficial; however stingrays can cause deep penetrating injuries.

How do I treat it?
Treatment modalities revolve around pain control, removal of foreign materials, and wound irrigation. Pain control begins with hot water immersion (40-45 degrees Celsius) of the involved area for up to ninety minutes. Patients may also take oral NSAIDs/acetaminophen for mild pain or opioids (IV morphine) for moderate to severe pain. If pain persists beyond this, local or regional anesthesia may be required but should never be combined with hot water immersion. Stonefish envenomation may require anti-venom therapy; these patients should be monitored for allergic reactions and anaphylaxis which are known side effects of this therapy.

Finally, remember these important items when responding to a patient presenting with potential envenomation:
1) Wounds should be left open after irrigation, or undergo delayed primary closure;
2) Antibiotics are usually reserved for deep puncture wounds, especially those with retained foreign bodies; and
3) Penetrating wounds caused by stingrays should receive prophylactic antibiotics against Vibrio species and skin flora.

Dear Health Care Provider,

My name is Matthew Silvis. I am medical director of primary care sports medicine at Penn State Hershey. I have enclosed the 2014 summer edition of our *Primary Care Sports Medicine Newsletter*, a biannual newsletter of seasonal sports topics. We hope you find the information useful, and would appreciate any feedback you have to enhance our efforts. We have selected a variety of topics for this issue. Our guest writers are Sean Oser, M.D., and Tamara Oser, M.D., who offer clinical pearls in the care of athletes with type 1 diabetes.

If you'd like to receive this newsletter by email, please send your email address to my administrative assistant, Lynn Ratcliffe at lratcliffe@hmc.psu.edu. Please send any future topic ideas to Lynn Ratcliffe or myself at msilvis@hmc.psu.edu.

Enjoy,

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Rubbing the Lucky Penny: The Benefits and Potential Harms of Superstitions in Sports.

BY MARY TIERNEY, M.D., AND ADAE AMOAKO, M.D., CHIEF RESIDENTS, PENN STATE HERSHEY FAMILY MEDICINE RESIDENCY PROGRAM

An 18-year-old high school baseball player comes in for his college physical exam. His right shoulder is in a sling, having just had surgery on it three weeks ago. The athlete is due for a meningococcal vaccine. As the nurse prepares to administer the vaccination in his left shoulder, the patient shouts "STOP! Not that shoulder." Although he is right hand dominant, he explains that he has always felt his left protects the right, and as such "I keep it safe from everything." He was willing to postpone the vaccination if the left arm was the only option for vaccination.

The above scenario is sometimes encountered when treating athletes. It is important to understand such behaviors when we are faced with such situations. A sport ritual, or superstition, is a behavior or action that is routinely carried out by an athlete before, during, or after a competition with the belief that these behaviors bring him or her success. They are usually discovered in hindsight after a good or bad performance. They may range from using objects (such as an item of clothing) to talking to an inanimate object (such as a goal post).

Arguably, the greatest basketball player of all time, Michael Jordan wore his University of North Carolina shorts under his Chicago Bulls professional uniform in every game while leading the team to six NBA championships. One of the greatest goaltenders in the history of the NHL, Patrick Roy conversed with the goalposts, thanking them when a puck was deflected. Questions have been raised about why athletes engage in such behaviors. Two studies concluded that: "individuals use superstitions to gain control over uncertainty; to decrease feelings of helplessness; and because it is easier to rely on superstition instead of coping strategies."

"Superstitions can have potentially harmful physical and psychological effects."

Whatever the reason, it is apparent that there may be some benefits to such rituals and why athletes would not want to stop these behaviors, even if it can adversely affect their health. Studies have shown several benefits to superstitions in sports. Superstitions are "linked to concepts associated with self-efficacy, such as optimism, hope, and confidence." It has also been demonstrated that the more confidence people have in their abilities to master a given task, the better they perform in various motor and cognitive tasks. In one Canadian study, the best players were also shown to be the most superstitious. The real value in superstition is to boost confidence in preparing athletes mentally and physically for competition.

It has been shown that women are more likely to hold superstitious thoughts than men. These beliefs become more intense with higher levels of competition (i.e., professional versus amateur), as the tension for the win increases (i.e., championship versus pre-season game), and as the uncertainty of winning the game becomes a reality for the athlete. There is no way to tell at which point the superstitions become detrimental to the performance of the player, but in some situations, the player can become so stressed that by not performing such rituals, he or she actually underperforms and this can negatively impact his or her career.

Superstitions can have potentially harmful physical and psychological effects. Some could impose health risks, like athletes who wear dirty clothes; old socks, as an example, can lead to a risk of tinea and other skin infections. Kevin Garnet, on the other hand, has been known to hit his head on the basketball rim for his pregame ritual causing the potential for bodily harm, specifically concussion. Many sports psychologists feel that superstitions and obsessive compulsive disorder (OCD) may lie on the same continuum. By allowing such superstitious beliefs to take hold, an individual may increase his or her risk for OCD. Two professional athletes diagnosed with OCD include soccer player David Beckam and Canadian Olympic diver Kelly MacDonald. Due to her OCD, MacDonald was forced to withdraw from the 2008 Olympics. Other athletes suffer many years following retirement because of their OCD symptoms.

Given the benefits that superstitions may have for an athlete, it is important for primary care physicians to understand and respect them, but ensuring the health of the athlete above anything else. This is particularly important in instances where superstitions bring harm to the athlete. Recognizing these behaviors early may allow early interventions before lasting effects take hold, such as OCD or a resulting injury that may lead to the early termination of the athlete's career.

Clinical Pearls for the Type 1 Athlete

BY SEAN OSER, M.D., AND TAMARA OSER, M.D., PENN STATE HERSHEY FAMILY AND COMMUNITY MEDICINE

Exercise is an important part of health maintenance. For patients with type 1 diabetes, however, exercise can have variable effects on blood glucose. It can lower blood glucose by increasing insulin sensitivity and by increasing glucose uptake through increased blood flow to muscle. Production of hormones, such as cortisol, may also increase abruptly during certain forms of exercise (e.g., before or during competition) and cause glucose to rise. As a result, different exercise conditions may cause blood sugars to rise, fall, or remain unchanged. The effects of exercise on blood glucose can persist for twenty-four hours or more.

There are no standard guidelines for managing blood glucose in athletes with type 1 diabetes, and individualization is recommended. Ongoing studies are evaluating computer algorithms that could be used to assist with management, and small studies (n=35 patients) have been done to study the effect of reducing the meal time insulin given close to the activity.[1] Further research is needed, as fear of hypoglycemia prevents some patients with type 1 diabetes from exercising. However, with the advent of peer support via social media and an increasing number of role models, many athletes with type 1 diabetes are reaching the highest levels of performance.

Successful, high profile athletes with type 1 diabetes include Jay Cutler (NFL starting quarterback), Gary Hall, Jr. (three-time Olympic swimmer, ten-time Olympic medalist, including five gold medals), Kris Freeman (four-time Olympic cross-country skier), and Kendall Simmons (two-time Super Bowl champion). They are excellent role models for those with type 1 diabetes who aspire to excel in sports. Less well-known athletes can also serve as examples of what can be accomplished physically with type 1 diabetes: Sebastien Sasseville, who has summited Mount Everest, completed the Sahara Race (a self-supported seven-day, 250 kilometer race), is a six-time Ironman, and is currently in the midst of Outrun Diabetes—a solo 7,500 kilometer coast-to-coast run across all of Canada. As these and many other examples attest, type 1 diabetes, with or without an insulin pump, should not limit any athlete from participating in his or her sport of choice.

Athletes with type 1 diabetes are at high-risk for hypoglycemia. Team physicians should be prepared to help manage and prevent hypoglycemia. "Exercise and Pump Therapy"[2] provides algorithms for managing basal and bolus insulin via an insulin pump during exercise, with the goal to prevent hypoglycemia. Often the patient (and his or her family) is the best "expert" in managing his or her diabetes during exercise; management should always be individualized. Athletes should be encouraged to consider reducing their bolus insulin (injection or pump) with the meal prior to exercise, or utilizing the temporary basal feature of their insulin pump prior to and during exercise. With prolonged exercise, athletes should be encouraged to add weight- and duration-based carbohydrate replacement.[1,2] While attempting to prevent hypoglycemia, it is important to realize that significant hyperglycemia can lead to decreased performance, but is not as dangerous as hypoglycemia.

Some basic pearls recommended by the American Diabetes Association include:

- Check blood glucose prior to exercise. If blood glucose is lower than 100 mg/dL, exercise should generally be delayed.
- If blood glucose prior to exercise is lower than 150 mg/dL, and exercise is expected to last thirty minutes or longer, the athlete should have a 15 gram carbohydrate snack to increase blood glucose and reduce risk of hypoglycemia.
- If hypoglycemia is experienced during exercise, it should be treated immediately. Referees should be made aware of the athlete with type 1 diabetes, and a method should be used to alert the referee that the athlete is experiencing a low blood sugar.
- Low blood glucose during exercise should be treated with 15-20 grams of a fast acting carbohydrate (non-diet sports drink, regular soda, or glucose tabs/gel).
- The athlete should wait fifteen to twenty minutes and a blood glucose should be re-checked prior to return to play to assure the blood glucose is at least 100 mg/dL.
- If the blood glucose is still low, treatment should be repeated until blood glucose reaches at least 100 mg/dL.
- Glucagon should always be immediately available during activities and events, whenever an athlete with type 1 diabetes is present.
- If an athlete with type 1 diabetes becomes unconscious or begins seizing during play, a severe hypoglycemia reaction should be considered in the differential.
  - > Call 911;
  - > Turn the athlete on his or her side (as vomiting can occur); and
  - > Glucagon should be injected into the individual's buttock, arm, or thigh (team physician should be familiar with how to inject glucagon via the manufacturer's instructions).

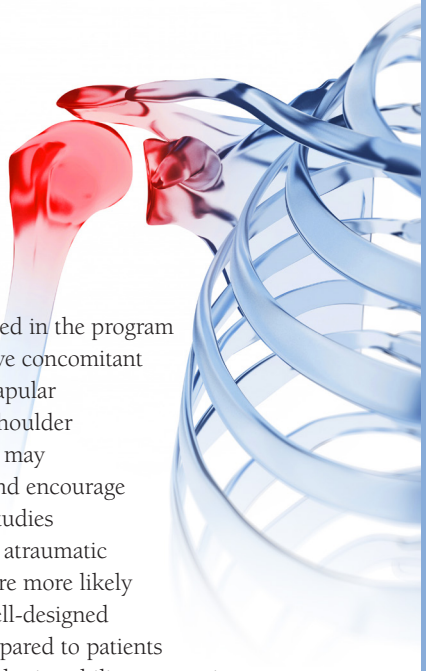
References:

1. Franc S, Dardari D, Biedzinski M, Requeda E, Canipel L, Hochberg G, Boucherie B, Charpentier G. Type 1 diabetes: dealing with physical activity. Diabetes Metab. 2012 Nov;38(5):466-9.

2. Scheiner, Gary MS,CDE. "Exercise and Pump Therapy." Putting Your Patients on the Pump. American Diabetes Association, 2012.

Posterior Shoulder Instability

BY AMAN DHAWAN, M.D., SPORTS ORTHOPEDICS (PENN STATE HERSHEY ORTHOPEDICS AND REHABILITATION)



Though posterior shoulder instability is less common than anterior shoulder instability (comprising approximately 10 percent of all shoulder instability), it is now recognized as a frequent cause of pain and dysfunction. Most commonly subtle atraumatic posterior shoulder subluxation and instability is the cause of pain and recurrent symptoms rather than posterior instability resulting from a traumatic event. Symptoms include a deep aching pain and weakness, especially posteriorly in the shoulder or superior aspect of the rotator cuff. Patients often report activity-related pain in the posterior shoulder and less frequently symptoms of mechanical instability. This often occurs after long periods of athletic or occupational exposure when dynamic stabilizers of the shoulder become fatigued.

Certain individuals are at increased risk for this type of instability including overhead throwers, volleyball, football, and tennis athletes, as well as swimmers and weight lifters. Football linemen on both the offensive and defensive sides of the ball are at the highest risk with one recent study demonstrating 14 percent incidence in collegiate offensive lineman.

History, physical examination, and select radiographic studies, especially MRI and CT can help elucidate the etiology of the patient's shoulder instability. These can be generally anatomically categorized into osseous and soft tissue etiologies. The most common causes of posterior instability include posterior capsular laxity and a retroverted posterior labrum, posterior labral detachments, glenoid hypoplasia, posterior glenoid osteochondral defects, and increased glenoid retroversion.

Patients with soft tissue etiologies to their posterior shoulder instability are ideal candidates for an aggressive physical therapy and rehabilitation program. This program focuses on dynamic glenohumeral stabilization with rotator cuff strengthening. In addition, scapular mechanics and closed chain scapular stabilization are stressed in the program as these patients frequently have concomitant scapular dyskinesis and periscapular muscular inhibition. Specific shoulder orthoses, such as the S4 brace, may improve scapular mechanics and encourage better dynamic stabilization. Studies demonstrate that patients with atraumatic posterior shoulder instability are more likely to successfully respond to a well-designed rehabilitation program, as compared to patients with traumatic posterior shoulder instability or anterior shoulder instability.

Surgery is considered for patients with continued pain and functional limitations who have not responded well to at least three months of appropriate rehabilitation and conservative management. Surgery can be divided similarly into soft tissue and osseous procedures, and is aimed at reconciling the anatomic etiology. The soft tissue procedures to address the labrum and the capsule often can be performed arthroscopically and include reverse bankart reconstructions, and arthroscopic capsular plications with or without suture anchors. Open procedures include an open posterior-inferior capsular shift, as well as procedures aimed to reconcile abnormalities in osseous anatomy including wedge osteotomies of the glenoid to correct increased glenoid retroversion (greater than 20 degrees), and bone block procedures for glenoid hypoplasia, glenoid deficiency or for failed soft tissue procedures. Outcomes after both open and arthroscopic treatments demonstrate high (89 percent) return to sport and 92 percent good-to-excellent patient satisfaction.

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U.Ed. MED 14-4100 FCM