Exercise Dependence in a Pregnant Runner

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Exercise has many benefits for both nonpregnant and pregnant patients; however, excessive repetitive exercise can be a sign of exercise dependence. Patients who are exercise dependent are at risk for physical injury and might exhibit psychosocial dysfunction similar to that experienced by patients with other dependencies. This case report describes an exercise-dependent patient who sustained a serious fracture when she continued a vigorous exercise program late into her pregnancy despite marked warning signs. Following a brief historical review, this article focuses on the clinical manifestation and management recommendations for patients with exercise dependence.

Case Report

A 28-year-old married woman pregnant with her first child was examined at 33 weeks' gestation for left hip pain. Her running, social, and past medical history were notable for recurrent compulsive and dependent behaviors. She began running when she was 16 years old and quickly progressed to a daily 8-mile run because it made her "feel good." During her late teens she experienced an episode of anorexia, used drugs recreationally, and became addicted to alcohol. She had numerous hospitalizations for acute alcohol intoxication and a suicide gesture and three inpatient alcohol treatment admissions before achieving sobriety several years later. She continued to run 1 hour daily, even while intoxicated, because it was the only thing that made her "feel better."

She married at 26 years and was unexpectedly pregnant within a year. She saw her family physician regularly, took prenatal vitamins, and gained 24 pounds by 35 weeks' gestation. She successfully reduced her cigarette consumption from one pack to two cigarettes per day, remained sober, and continued her long runs with her physician's knowledge.

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At 30 weeks' gestation she experienced aching pain in the left buttock and thigh, but continued running 7 to 8 miles daily with a limp. At 33 weeks' gestation a strained muscle was diagnosed, and she was told to rest. The pain progressed, and she was forced to stop running, but at 37 weeks' gestation she experienced sudden excruciating pain in the hip. Radiographs revealed a displaced fracture of the surgical neck of the femur. Although the patient had a number of risk factors for osteoporosis, diagnostic efforts did not establish these risk factors as contributing to the fracture.

She underwent an uncomplicated Cesarean section, which was immediately followed by open reduction and internal fixation of the hip. Within a month she was riding an exercise bike for an hour daily. The pins used to treat the fracture failed; she underwent a second surgery and was placed in a body cast for 3 months. During that time she was treated for depression and narcotic withdrawal. On the day she was allowed to resume running, she ran for 1 hour.

Discussion

Exercise provides a variety of health benefits to participants, including improved cardiovascular performance, weight control, and psychological well-being. Obstetric providers recommend low- to moderate-intensity exercise for their pregnant patients to improve cardiovascular fitness, glucose utilization, and sense of emotional well-being, and the American College of Obstetrics and Gynecology (ACOG) provides guidelines (Table 1) for exercise during pregnancy.[1-3] In addition, regular exercise has been associated with a shorter labor, less oxytocin augmentation, and fewer signs of fetal distress[4-6] without an increase in the frequency of spontaneous miscarriage, congenital anomalies, or preterm labor.[5,7,8]

Some authors have noted a subset of exercisers, variously described as running addicts, running anorexics, and morbid exercisers, who seem compelled to exercise even in the face of illness or injury.[9-11] Glasser[12] first described the negative affect in runners forced to stop training because of injury or other events. Withdrawal-like symp-

toms and symptoms of anxiety and depression were noted in a cohort of regular runners who interrupted their training for 2 weeks,[13] and changes in galvanic skin response, considered to be a physiologic measure of withdrawal-related tension, were found in runners who missed as little as 1 day of training.[14] Recent research has focused on the neurotransmitters dopamine, noradrenaline, and serotonin as the agents responsible for the mood-elevating effects of exercise.[15]

Some authors have examined compulsive exercise in the context of other known psychological disturbances. Yates et al[16] and Blumenthal et al[17,18] explored the characteristics of anorexics and obligatory runners. They noted similar demographics, personality traits, and preoccupation with food and lean body mass in the two groups. Anorexics had elevated scores for depression, anxiety, and hostility, but there was no psychopathology found in habitual runners as measured by the Minnesota Multiphasic Personality Inventory, even in the subset of runners who exercised when sick or injured. Although compulsive exercisers experience physical stress and exercise interferes with their social functioning, they do not meet the diagnostic criteria for having obsessive-compulsive disorder (OCD).[19] In OCD the intent of the exercise is to prevent some future untoward event, whereas in exercise dependence the exercise is merely an end in itself. The exercise addict has no desire to resist the compulsion to work out and specifically derives pleasure, not dissatisfaction, from the activity.

Veale[20] coined the term *exercise dependence* to describe compulsive exercisers and proposed criteria for its diagnosis. He chose the term to embody compulsive participants of all sports and to allow classification of the conduct with other similar compulsive behaviors. His initial criteria (Table 2) were based on the characteristics of alcohol- and drug-dependence syndromes described by the World Health Organization[21] and later incorporated into the *Diagnostic and Statistical Manual of Mental Disorders (DSM III) Third Edition*.[19] The central feature of the dependence syndromes is a negative affect experienced upon removal of a drug, object, or activity. Veale believed that attempts to label obligatory running as an affective disorder did not adequately address the impairment in physical or social functioning that occurs in exercise-dependent individuals. He differentiated between anorexia and exercise dependence by clarifying the aim of the exercise, ie, to control calories in a morbid fear of fatness in anorexia versus the exercise as its own end in primary exercise dependence. Veale did recommend that anorexia nervosa be excluded before a diagnosis of primary exercise dependence be made. Although several investigators have used research instruments to study exercise addiction, no clinically validated tool has been developed to diagnose or monitor the disorder.

Table 1. Recommendations for Exercise in Pregnancy and Postpartum

For women who do not have any additional risk factors for adverse maternal or perinatal outcome, the following exercise recommendations may be made:

1. Regular mild to moderate exercise (at least 3 times a week) is beneficial during pregnancy
2. Avoid prolonged motionless standing and prolonged exercise in the supine position after the first trimester
3. Modify the intensity of the workout according to maternal symptoms. Avoid exercising to exhaustion. Non-weight-bearing exercises are preferred
4. Avoid exercise that could cause loss of balance or abdominal trauma
5. Ensure an adequate diet
6. Avoid overheating by ensuring adequate hydration, appropriate clothing, and optimal environmental surroundings
7. Resume prepregnancy exercises gradually after delivery

Adapted from American College of Obstetrics and Gynecology Technical Bulletin #189, February 1994.[1]

The patient in this case exhibited a majority of the diagnostic signs and symptoms for exercise dependence as proposed by Veale, and her exercise behavior paralleled that of individuals dependent on alcohol or illicit drugs. She was compelled to run while intoxicated, during alcohol rehabilitation, and throughout her pregnancy, and her compulsive exercise habit took precedence over everything in her life. Her attempts to return rapidly to a high level of exercise after surgery could have contributed to the orthopedic hardware failure and fracture nonunion. She now has increased her exercise time to 2 hours daily except for the 1 day a week she rests. She plans her day around her morning exercise routine, making certain that any personal appointments are scheduled for later. Her description of withdrawal symptoms is classic for patients who have other types of dependencies. She stated that she "didn't feel alive" and described feeling "claustro-

Table 2. Proposed Diagnostic Criteria for Exercise Dependence.

1. Narrowing of repertoire leading to a stereotyped pattern of exercise with a regular schedule once or more daily
2. Salience with the individual giving increasing priority over other activities to maintaining the pattern of exercise
3. Increased tolerance to the amount of exercise performed over the years
4. Withdrawal symptoms related to a disorder of mood following the cessation of the exercise schedule
5. Relief or avoidance of withdrawal symptoms by further exercise
6. Subjective awareness of a compulsion to exercise
7. Rapid reinstatement of the previous pattern of exercise and withdrawal symptoms after a period of abstinence

Associated Features

8. Either the individual continues to exercise despite a serious physical disorder known to be caused, aggravated, or prolonged by exercise and is so advised by a health professional, or the individual has arguments or difficulties with his partner, family, friends, or occupation
9. Self-inflicted loss of weight by dieting as a means toward improving performance

From de Coverly Veale.[20]

phobic and itchy" during her postoperative recovery when she was unable to exercise. Her exercise has been the source of arguments with family members, and she has declined jobs because they would interfere with her exercise.

Although we might know exercise dependence when we see it, diagnosing it in a clinical setting could be difficult for two reasons. Because Veale's proposed diagnostic criteria have not been clinically validated and exercise dependence is not yet recognized as a psychiatric illness, clinicians have no objective criteria by which to establish a diagnosis. In addition, exercise-dependent patients are likely to continue exercising through an injury or illness rather than seek medical attention. Such was the case with runner and author Jim Fixx, who ran with symptoms of cardiac ischemia before his sudden death from a myocardial infarction while running.

This case of exercise dependence is of particular interest and raises unique questions because the patient was pregnant. Pregnancy could offer a greater opportunity to detect exercise dependence because of the need for regular prenatal visits. Most women reduce the intensity and duration of exercise when they become pregnant. Even in a group of newly pregnant women who were highly motivated to exercise, more than 60 percent quit exercising by 28 weeks' gestation; most did so within the first 18 weeks.[22] Patients who continue to exercise vigorously into the third trimester of pregnancy should raise concerns about exercise dependence. Is a woman whose body undergoes major morphologic changes during pregnancy and who maintains a high-endurance weight-bearing exercise regimen into the third trimester increasing the risk of musculoskeletal injury? Could exercise dependence be a marker for other pathologic conditions, such as anorexia nervosa and obsessive compulsive disease, or other dependencies such as drug or alcohol dependence? More studies are needed in both pregnant and nonpregnant patients to answer these questions.

This case reminds us of the wisdom of Benjamin Franklin's admonition for moderation in all things, including exercise. Patients complaining of chronic or recurrent exercise-related injuries or pregnant patients who are maintaining high-endurance exercise regimens in their third trimester should undergo close scrutiny of their exercise habits. Endurance exercise in the third trimester has been poorly studied, and safe recommendations for this subset of patients whose exercise regimens exceed ACOG guidelines do not exist. Exercise recommendations for patients who choose to exceed the guidelines should be tailored to each individual, monitored closely, and modified as the progress of the pregnancy dictates. All habitual exercisers should be advised to include periodic rest and to avoid a stereotyped pattern of exercise. Physicians likely will need to negotiate the terms of continued exercise with patients diagnosed with exercise dependence. Pharmaceutical management of exercise dependence has not been evaluated.

Moderate exercise is safe and has proven benefits for most patients including pregnant women. Pregnant patients wanting to exceed ACOG guidelines for exercise during pregnancy warrant a health assessment that includes evaluation for signs of exercise dependence. Any patient who fits the exercise-dependence profile should be counseled about a balanced training regimen. Until a specific definition and validated criteria for diagnosis of exercise dependence are universally adopted, physicians must rely on an appropriate index of suspicion, a good patient history, and

their experience and judgment to recognize and manage patients who are compelled to exercise to and beyond the point of injury.

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