The European Research Journal
http://www.eurj.org
Case Report
e-ISSN: 2149-3189
DOI: 10.18621/eurj.357187

Quadriceps tendon rupture associated with anabolic steroids and growth hormone: a case report

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ABSTRACT

Androgenic and human growth hormone derivatives have to potential to increase athletic performance despite increased risk of serious adverse effects. The risk of tendon rupture is very high in the anabolic androgenic steroid users. A 51-year-old male admitted to the emergency department with left knee pain following sport training. He had a history combination of androgenic hormones and insulin growth factor -1 use. Magnetic resonance imaging showed swelling, heterogeneity and partial discontinuity of the quadriceps tendon. Use of performance enhancing drugs has become a serious public health problem. Due to increase of abuse today it is possible to encounter more side effects in the future and has to be considered as a growing public health problem.

Eur Res J 2018;4(3):251-253

Keywords: quadriceps tendon rupture, androgenic hormone, growth hormone

Introduction

Quadriceps tendon rupture is a rare condition in the absence of systemic disease. Some athletes use hormonal drugs to improve their performance, personal appearance and to increase their muscle mass [1]. Especially, the use of androgenic and derivative of biosynthetic human growth hormone has become serious global health problem despite controls and injuries related with them. These drugs showed increased risk of tendon ruptures who are relatively common in bodybuilders [2]. We report partial rupture of quadriceps tendon rupture in a bodybuilder who had taken anabolic steroid and growth hormone for years.

Case Presentation

Our patient is 51-year-old, healthy, white male, previously professional national class bodybuilders. He ranked first place in his weight class in Turkey national body-building championship, two years ago. He was admitted to our emergency department with left knee pain following sport training. He experienced sudden severe pain in his right knee after attempting front squat 150 kg of weight. He reported a history combination of androgenic (nandrolone) and insulin growth factor-1 use that he had stopped before 6 months. He had also been previously insulin resistance, cardiac hypertrophy and left biceps tendon rupture (20 years ago).

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Received: November 23, 2017; Accepted: December 26, 2017; Published Online: February 6, 2018

On examination he was unable to walk and straight leg raise. He has also hematoma and swelling in left knee. Magnetic resonance imaging (MRI) of the left knee joint was performed using a 3T unit. Sagittal and axial T1-weighted and proton- density weighted images with fat saturation were obtained. MRI showed swelling, heterogeneity and partial discontinuity of the quadriceps tendon (Figure 1). Partial tear of the quadriceps tendon was diagnosed. Immobilization with full extension was recommended.

Discussion

Use of performance enhancing drugs has become a serious public health problem. The overall lifetime prevalence for use of the androgenic hormones rate was 6.4 percent in men, 1.6 percent in women [3]. Performance enhancing drugs are anabolic androgenic steroids, androstenedione, human growth hormone, erythropoietin, diuretics, creatine and stimulants. Frequently, the anabolic androgenic steroids that body-builders use are synthetic modifications of testosterone. The most commonly used androgens are testosterone, trenbolone and boldenone [4]. They assist athletes by facilitating efforts to gain strength and muscle mass for increased muscular endurance and power. They promote an increased nitrogen concentration in muscle; which promote anabolic state. Usually they can be taken as injections and pills. It is estimated that 1 million men have experienced these drugs [5].

There are many adverse effect of anabolic steroids and some can be serious and mortal. Case reports describe sudden death in young athletes who were taking androgens [6]. The most important and common side effects of anabolic steroids are gynecomastia, infertility, impotence in men [7] and a deeper voice, increased body hair, cliteromegaly, infrequent or absent menstrual periods in women [8]. Both men and women also have increased risk of severe acne, liver abnormalities and tumors, high blood pressure, heart circulatory problems [9], increased aggressiveness [10], psychiatric disorders [11], injection disease such as HIV or hepatitis [12] and decrease serum high density lipoprotein (HDL) and increase low density lipoprotein (LDL) [13].

Human growth hormone is a hormone that has an anabolic effect. Athletes take it to improve muscle mass and performance like testosterone derivatives. It is only administered by injection. Growth hormones like androgenic hormones, has been used, approximately 5 percent of United States high school students report using these [14]. The most common adverse effect related to growth hormone are joint pain, myopathy, carpal tunnel syndrome, impaired glucose regulation, sodium retention, cardiomegaly, high cholesterol and high blood pressure [15, 16]. Usually the degree and the severity of these side

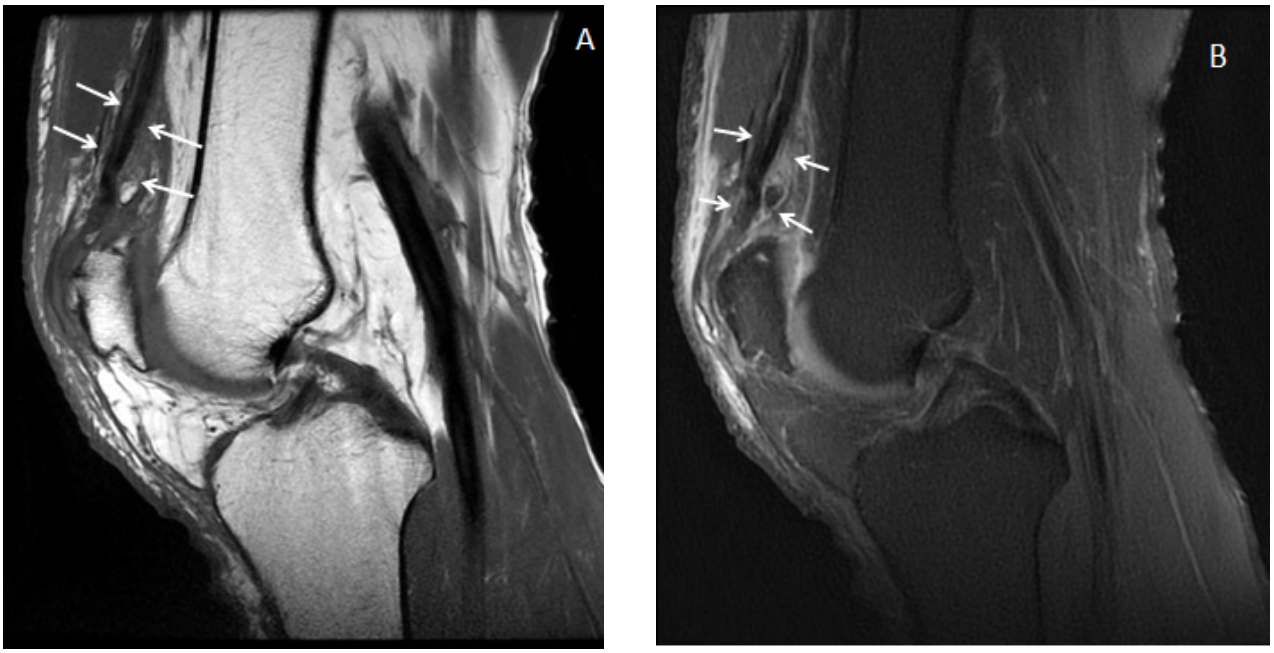

Figure 1. Sagittal T1 weighted image (**A**) and sagittal proton-density fat suppressed image (**B**) reveal enlarged and edematous quadriceps tendon and a fluid collection within the tendon (arrows), suggestive of partial rupture of the quadriceps tendon.

effects are often decrease with the cessation of the drug use. But it should not be forgotten that individuals will respond differently depending on each person's unique body physiology.

Some of the side effects that are associated with steroid use are tendinitis and tendon ruptures [17, 18]. There are several case reports regarding tendon ruptures associated to the anabolic steroids but very few of them are in the quadriceps tendon. The risk of tendon rupture is 9.0 times greater in the anabolic androgenic steroid users. The incidence of lover extremity tendon ruptures is much less than that for upper extremity ruptures. Simultaneous quadriceps rupture occurs commonly between ages 27 and 54. Quadriceps tendon rupture is usually associated with some chronic diseases like renal failure, diabetes, and gout. In addition, case of performance enhanced drug use have also been reported. The most common cause of quadriceps tendon rupture appears to be sudden contraction of the quadriceps with knees.

Conclusions

Performance-enhanced drug abuse has a substantial public health problem. The use of androgens, growth hormone and other drugs have an increased adverse effect. Although these drugs are prohibited, their use are very common. Due to increase of abuse today it is possible to encounter more side effects in the future and has to be considered as a growing public health problem.

Informed consent

Written informed consent was obtained from the patient for the publication of this case report.

Conflict of interest

The authors declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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