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CASE REPORT

Anabolic steroid abuse causing recurrent hepatic adenomas and hemorrhage

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Abstract

Anabolic steroid abuse is common among athletes and is associated with a number of medical complications. We describe a case of a 27-year-old male bodybuilder with multiple hepatic adenomas induced by anabolic steroids. He initially presented with tumor hemorrhage and was treated with left lateral hepatic segmentectomy. Regression of the remaining tumors was observed with cessation of steroid use. However, 3 years and a half after his initial hepatic segmentectomy, he presented with recurrent tumor enlargement and intraperitoneal hemorrhage in the setting of steroid abuse relapse. Given his limited hepatic reserve, he was conservatively managed with embolization of the right accessory hepatic artery. This is the first reported case of hepatic adenoma regrowth with recidivistic steroid abuse, complicated by life-threatening hemorrhage. While athletes and bodybuilders are often aware of the legal and social ramifications of steroid abuse, they should continue to be counseled about its serious medical risks.

Key words: Anabolic steroids; Adenoma; Liver; Hemorrhage

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INTRODUCTION

Anabolic steroid abuse is common among athletes and is associated with a number of medical complications[1-3]. Reported hepatic complications include cholestasis, elevation of aminotransferases, jaundice, benign hepatic adenomas, and rare cases of hepatocellular carcinoma[4-6]. Histologic findings include peliosis hepatis, a lesion characterized by hepatic sinusoidal dilatation that is often cystic[7,8]. Rupture of these cysts can cause fatal internal hemorrhage[9]. We report the first case of adenoma regrowth and hemorrhage after relapse of androgen abuse.

CASE REPORT

A 27-year-old man with a 5-year history of anabolic steroid abuse presented to the emergency room with 2 d of midepigastric pain and nausea. His only medications were oral androstenedione and intramuscular nandrolone. He was a police officer and competitive bodybuilder. He denied use of alcohol, tobacco, and intravenous drugs. Physical examination disclosed midepigastric tenderness and tender hepatomegaly. Laboratories were notable for 2.2 mg/dL total bilirubin, 1.3 mg/dL direct bilirubin, 2457 U/L ALT, 431 U/L AST, and 275 U/L alkaline phosphatase. Hematocrit was 50.5%. Abdominal computed tomography (CT) on admission showed a round, heterogeneous-appearing 9.9 cm × 9.6 cm mass in the left lobe of the liver. Magnetic resonance imaging (MRI) with gadolinium contrast demonstrated multiple hepatic masses, the largest of which measured 10.6 cm × 10.6 cm. The largest mass had an enhancing capsule and demonstrated signal heterogeneity, characteristic of an adenoma with intralesional hemorrhage (Figure 1A). The patient underwent left lateral hepatic segmentectomy with open cholecystectomy. Pathologic examination revealed an adenoma with peliosis hepatis, 25 cm in diameter. The patient was instructed to discontinue steroid use. On MRI 3 mo later, the adenomas appeared 40% smaller (Figure 1B). The patient subsequently

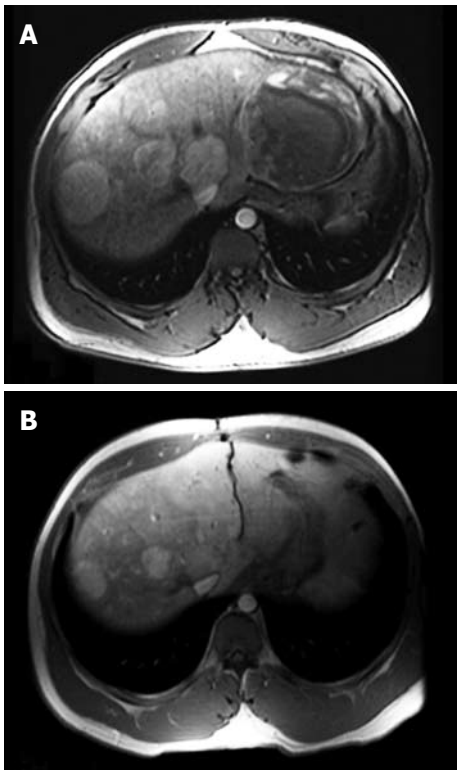

Figure 1 T1-weighted magnetic resonance imaging (MRI) of multiple hepatic adenomas. **A**: MRI at initial presentation demonstrates a heterogeneous-appearing, well-circumscribed mass measuring 10.6 cm x 10.6 cm in segments 2 and 3 of the liver and several smaller masses in the right liver. The largest mass has an enhancing capsule and demonstrates areas of internal T1 hyperintensity and hypointensity, as well as T2 hyperintensity, characteristic of an adenoma with intralesional hemorrhage; **B**: Three months after left lateral segmentectomy and steroid cessation, the lesions in the right liver appear approximately 40% smaller and enhance more homogeneously on T1-weighted MRI, indicating regression. Images have been electronically adjusted to illustrate lesions.

resumed oral androstenedione only.

Approximately 3 years and a half after his first presentation, the patient returned to the emergency room with sudden-onset, right-upper quadrant pain in the setting of recurrent injection nandrolone use 6 wk earlier. Vital signs were within normal limits, and there was tender hepatomegaly. Laboratories were notable for ALT 625 U/L, AST 398 U/L, and normal alkaline phosphatase and total bilirubin. Prothrombin time (PT) was 13.1 s; international normalized ratio (INR) was 1.1. The hematocrit was 38.7%. Abdominal CT revealed several lesions in the right lobe of the liver, the largest of which had increased in size to 7.7 cm × 7.2 cm and demonstrated intralesional hemorrhage, accompanied by a subcapsular hematoma and intraperitoneal hemorrhage. CT angiogram on hospital day 2 showed no contrast extravasation, but the hematocrit dropped to 24.9%. On hospital day 3, the right upper quadrant pain worsened, and he became tachycardic. Repeat abdominal CT showed expansion of the hematoma, with new anterior subcapsular and subphrenic components (Figure 2). The hematocrit was 24.4%. Because of his limited hepatic reserve and ongoing steroid abuse, he was felt to be a poor candidate for either hepatic resection or liver transplantation. He, therefore, underwent angiographic embolization of the accessory right hepatic artery. Four units of packed red blood cells were transfused. The serum ALT exceeded 10000 U/L after the procedure but declined over several days. After transient oliguric renal failure, he was discharged to home on post-procedural day 5.

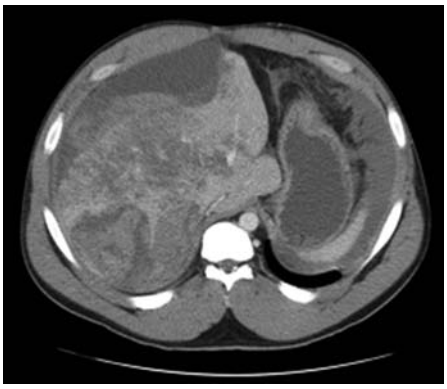

Figure 2 Abdominal CT at second presentation with abdominal pain after resumption of steroid abuse. A heterogeneous-appearing, right hepatic mass measuring 7.2 cm x 7.7 cm and a large subcapsular hematoma are seen, indicating that one of the hepatic adenomas has enlarged since the previous presentation and has hemorrhaged spontaneously. Image has been electronically altered.

DISCUSSION

We report a rare case of hepatic adenoma regrowth with recidivistic steroid abuse, complicated by life-threatening hemorrhage. This case underscores the potentially life-threatening complications of anabolic steroid abuse, and calls for a high index of suspicion among health care providers for hepatic complications if a history of steroid use is elicited.

The risk of androgen-associated liver tumors appears to correlate with the cumulative androgen dose and the potency of the steroid used[10]. Our patient self-administered both oral androstenedione, which has relatively weak androgenic potential, and parenteral nandrolone, which is particularly potent due to C10 hydroxylation. Since androstenedione has not been associated with liver tumors, it is likely that the nandrolone promoted development of his hepatic adenomas. This is consistent with the recurrence of his symptoms soon after resumption of nandrolone.

Both nandrolone and androstenedione have been classified as Schedule Ⅲ controlled substances in recognition of their abuse potential[11,12]. Despite these legal restrictions, anyone can still obtain these drugs with little difficulty over the Internet.

By resuming anabolic steroid consumption after his first hospitalization, our patient clearly demonstrated a pattern of substance abuse. Risk factors for anabolic steroid abuse in male bodybuilders include body-image disturbances, history of childhood conduct disorder, and poor father-son relationships[13]. Had our patient's condition deteriorated and necessitated consideration

of liver transplantation, he would have been required to demonstrate a commitment to abstinence from steroids, in a manner analogous to the alcoholic patient[14].

Patients and physicians must be reminded that the sequelae of anabolic steroid abuse are life threatening. While athletes and bodybuilders are often aware of the legal and social ramifications of steroid abuse, they should also be counseled about its serious medical risks. In the context of an addictive behavior pattern, assiduous surveillance for neoplasms should also be undertaken.

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