Brief Communication

Evolving paradigm of illnesses presented to medical Intensive Care Unit in body builders: Cases from tertiary care center

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Abstract

Bodybuilding is the use of progressive resistance exercise to control and develop one's musculature. With the rise in number of persons adopting this activity, there is evolving paradigm of illnesses presented to intensive care in this population subset. Strict adherence to details of bodybuilding and avoidance of unsupervised medications are essential to prevent untoward effects.

Keywords: Acute pancreatitis, anabolic steroids, bodybuilder, rhabdomyolysis, tetanus

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Introduction

Bodybuilding is the use of progressive resistance exercise, and it involves drastic reductions in body fat while maintaining muscle mass. There is a tendency to think that there is a magic powder or supplement that will give you the physique of your dreams, but there is no substitute for hard work, commitment, and good diet. It requires continuous hard effort for years. It has beneficial effects also in terms of lower long-term disease risk but doing unscrupulously can be harmful and may lead to more severe illnesses, injury and even mortality.

Case Reports

Case 1

A 35-year-old male who presented to us with a history of severe pain in both thigh and unable to walk for last around 3 days after having strenuous exercise activity in the gym. He also had vomiting and decrease oral in take thereafter. Though he was a regular visitor to the gym but he did a new exercise in the form of more than 500 sit-ups. Before visiting us, he took consultation outside and received analgesics but little relief in pain. On admission, he was conscious, maintaining vitals and having pain and tenderness in both thigh. Laboratory evaluation at time of admission showed hemoglobin (Hb) 14.8 g/dL, total leukocyte count 12,400, urea 128 mg/dL, serum creatinine 4.8 mg/dL, sodium 133 mmol/L, potassium 4.55 mmol/L, calcium 7.8 mg/dL, creatine phosphokinase (CPK) 87,000 U/L, total bilirubin 1.2 mg/dL, serum glutamic oxaloacetic transaminase (SGOT) 1160 U/L, serum glutamic pyruvic transaminase (SGPT) 404. He was passing adequate amount of urine after fluid resuscitation in the hospital. Diagnosis of rhabdomyolysis due to strenuous exercise leading to acute kidney injury was made based on the temporal profile, clinical presentation, lab reports and ruling out other common causes like severe sepsis. He required multiple sessions of dialysis during his 11 days stay in our hospital. Though he was improving, but he opted to shift to some other hospital of his nearby area.

Case 2

A 28-year-old male who was regular at the gym for bodybuilding presented to us with 1-day history of

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epigastric pain radiating to back, recurrent vomiting and abdominal distension. On admission his heart rate was 160 per min regular, respiratory rate was around 40 per min, blood pressure 100/80 mmHg, abdomen was diffusely distended and mildly tender. Initial lab evaluation showed Hb 18.7 g/dL, total leukocyte count 6200, serum creatinine 0.8 mg/dL, urea 34 mg/dL, sodium 138, potassium 4.3 mmol/L, total protein 6.1 g/dL, albumin 3.7 g/dL, SGOT 29, SGPT 26, alkaline phosphatase 145, lipase 104, serum amylase 760 U/L, prothrombin time (international normalized ratio) 1.23, activated partial thromboplastin time 38 s, serum calcium 9.4 mg/dL, serum triglyceride 148 mg/dL. Arterial blood gas analysis reveal pH 7.33, pCO_2 35, pO_2 80 mmHg on oxygen through face mask at 8 L/min, lactate 3.7 mmol/L. On Ultrasonography abdomen, pancreas was swollen with mild peritoneal collection, diffuses inflammatory changes with no evidence of gall stones or biliary sludge.

On detailed history including alcohol intake and examination we could not find obvious reason of acute pancreatitis other than his history of taking androgenic anabolic steroids (AAS) and protein supplements for body building since other less common causes which includes hypercalcemia, hypertriglyceridemia or post-endoscopic retrograde cholangiopancreatography was also not there and corticosteroids are known etiological agent for acute pancreatitis.

After initial improvement over the period of 5–7 days patient's condition start worsening again, and he was shifted to bigger center where he died after 2–3 days.

Case 3

An 18-year-old male presented to us with a history of 1-day of stiffness of jaw, neck, back and difficulty in swallowing. There was also associated history of sweating over face and neck. Over the next few hours, he developed frequent sudden jerky movement of the body. As he developed spasm and hypoxia, he was intubated and kept on mechanical ventilation. He was requiring paralyzing agent in addition to diazepam infusion because of severe and frequent tetanic spasm. There was no history of fever, no evidence of poisoning or trauma, but he was on self-medication as part of body building and taking regular intramuscular injection of anabolic steroid. In the absence of any other clue, we attributed tetanus due to intramuscular injections. He improved and discharged after around 6 weeks of hospitalization. He remained on a ventilator with a paralyzing medication for more than 4 weeks with daily interruption of paralysis to observe for tetanic spasm.

Discussion

Our first case was patient of rhabdomyolysis leading to acute kidney injury. It was suspected on the basis of high-intensity exercise in otherwise routine gym visitor, followed by pain in both thigh with tenderness, deranged lab reports which include very high level of CPK, alanine and aspartate aminotransferases, low level of calcium and after exclusion of other common causes including severe sepsis.

Rhabdomyolysis may develop in an individual after strenuous activity even who are athlete as it was in our patient. He did more than 500 sit-ups at stretch that too first time along with his daily gym activity. Moreover, he took analgesics for muscle pain, which in association with poor oral intake worsens acute kidney damage. Exertional rhabdomyolysis is more likely to occur when strenuous exercise is performed under high temperatures and humidity. Other factors include improper hydration, inadequate recovery between bouts of exercise, intense physical training, and inadequate fitness levels for beginning high-intensity workouts. As he did his activity in the gym, high temperature seems to be unlikely contributor. Intense physical training and inadequate fitness level for beginning high-intensity workouts appear to be more logical explanation for rhabdomyolysis in our patient.

Rhabdomyolysis is an important cause of acute renal failure (ARF), and main pathophysiological mechanisms are renal vasoconstriction, intraluminal cast formation, and direct myoglobin toxicity.[1,2] Around 33% of the episodes of rhabdomyolysis lead to ARF.[3] Daher Ede *et al*. reported a similar case of rhabdomyolysis leading to acute kidney injury after strenuous exercise.[4]

Our second patient was a case of acute pancreatitis. It was diagnosed on the basis of raised amylase level with ultrasonographic findings of swollen pancreas with inflammatory changes in patient of epigastric pain, which was later confirmed on computed tomography scan.

Androgenic anabolic steroids have grown in popularity amongst athletics and bodybuilders due to their ability to enhance performance, muscle mass, and aesthetic reasons. They are easily available and perceived to be safe. Recent estimates place AAS use in the USA at 1% of the population. These agents have numerous side effects. Pancreatitis as a complication of AAS is not much reported but of corticosteroids is well documented. The usual causes of pancreatitis were excluded in our patient on the basis of history, lab reports, and ultrasonography.

Researchers have recently discovered evidences that suggest anabolic steroids may demonstrate potentially new and serious adverse consequences.

Evidence obtained from a clinical trial suggests that acute pancreatitis and acute kidney injury can be caused by the use of anabolic steroids like methandrostenolone. Rosenfeld *et al*. reported a case of 50-year- old man who develop acute pancreatitis and acute kidney injury which was attributed to AAS.[5]

Samaha *et al*. described a case report of multi-organ damage after the use of anabolic steroids. They suspected anabolic steroid causes hypercalcemia. They also suspected that besides hypercalcemia, acute pancreatitis have resulted from overuse of amino acid supplements.[6] Though hypercalcemia was not present in our patient but he was on protein supplements. Arginine was shown to be a potent secretagogue for anabolic hormones in addition to inducing pancreatic acinar damage.[7,8]

Our third case was a patient of tetanus. It was diagnosed on the basis of typical clinical picture consisting of the jaw, neck, back stiffness and difficulty in swallowing. There was also associated history of sweating over face and neck. Later on, he developed typical recurrent tetanic spasms, for which he was intubated and kept on mechanical ventilation. Diazepam along with the atracurium infusion was given.

He was regularly taking AAS intramuscular injection as a self-prescribed and self-injected medication, as part of bodybuilding activity. There was no evidence of mode of transmission for tetanus other than intramuscular injection. This mode of transmission for tetanus is well reported in the literature.[9] Our patient required mechanical ventilation for about 5 weeks with continuous diazepam infusion. He also required continuous infusion of the paralyzing agent for almost 4 weeks. There was complete recovery.

As the people engaged in bodybuilding are on a continuous rise, with more data collection or planning an observational study will help to better understand this population subset.

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