Electronic muscular stimulators: a novel unsuspected cause of rhabdomyolysis

We report the first case of rhabdomyolysis following the use of an electronic muscular stimulator for fitness. A 26 year old male student was referred to us in April 2002 suspected of having hepatitis because of severe asthenia and raised levels of transaminases. Over the preceding three months, laboratory tests showed persistent elevation of alanine transaminase and aspartate transaminase activities, reaching values of 125 U/l (normal range 10–60) and 58 U/l (normal range 24–79) respectively. Routine tests, including red blood cell count, haemoglobin concentration, white blood cell count, platelet count, alkaline phosphatase, bilirubin, creatinine, blood urea nitrogen, glucose, and serum protein electrophoresis, were all normal. All the causative agents of hepatitis (hepatitis A, B, C, E, and G viruses, cytomegalovirus, Epstein-Barr virus, HIV, auto-antibodies) were negative. t1 Antitrypsin, caeruloplasmin, copper, iron, and liver ultrasound were also normal.

A further investigation revealed that the patient used an electronic stimulator (Ab Tronic Tm) to exercise the muscles. This is one of many fitness devices that use electronic stimulation to contract and release muscles.

A further laboratory test showed creatine kinase activity of 2917 mU/ml (normal range 22–269), aspartate transaminase 58 mU/ml (normal range 5–50), alanine transaminase 54 mU/ml (normal range 10–40), and γ-glutamyl transpeptidase 46 mU/ml (normal value 64). Electrocardiography and echocardiography results were normal.

These data ruled out hepatitis, and a diagnosis of rhabdomyolysis was made. Fortunately kidney function was not impaired, and only hydration therapy was performed. When the use of the stimulator was stopped, the enzymes gradually returned to normal levels and the patient had recovered fully within one month.

The literature contains several cases of exertional rhabdomyolysis, a potentially dangerous condition that cause the release of intracellular contents from skeletal muscles in concentrations that may lead to renal and other systemic complications.1-4 The concern of the general public for body fitness has led to widespread frequenting of fitness centres and the use of widely advertised electronic devices, which can be readily purchased and used at home. Our patient was not a bodybuilder and did not take anabolic-androgenic steroids. He just used the electronic muscular stimulator at home. To our knowledge, this is the first report of rhabdomyolysis caused by an electronic stimulator. The purpose of this report is to assist clinicians in recognising this condition and to warn people against careless use of these devices.

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do: 10.1136/bjsm.2003.008540

References

COMMENTARY

This case presentation provides evidence of the possible misuse of “home electronic stimulators” resulting in appreciable injury to the user. These devices are advertised as an easy route to a “six pack” set of abdominal muscles. The reality is that there is little evidence to support their use in exercise to achieve cosmetic or strength changes. Important, there may be people that are susceptible to the injury defined in this case, particularly with prolonged use (using the stimulator for several hours daily rather than in a short term traditional exercise session).

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BOOK REVIEWS

Drugs in sport: the pressure to perform


This is a paperback book produced by the British Medical Association and is touted as “an invaluable aid.” I would beg to differ, and, in addition to several factual inaccuracies, the overall impression was that this had not been written by anyone who had been involved in the care of the elite athlete. Why can we write a text by reviewing relevant material, but you can tell if the authors have any intimate working knowledge of the topic. When I looked at the names of the editors and contributing authors, I could not recognise any name as a doctor involved in elite sports medicine in the UK despite this being a British book. Furthermore, the topic of doping is ever evolving, and it will become increasingly inaccurate with the adoption of the World Anti-Doping code for the 2004 Olympic Games. Doping is an area where accuracy of information is imperative. A lot of the information looks almost like a “cut and paste” from the IOC website, which, for accuracy at the time of production, is fine but the authors lack the ability to translate this into meaningful practical issues. For example, in discussing caffeine it states “because caffeine is so widely consumed in beverages... the IOC permits up to 12 mg/ml in urine”. So what might this mean in practical terms for the athlete? However, this is no longer pertinent because caffeine is now not restricted, its use only being monitored. With regard to information on local anaesthetics, it says “local anaesthetics are permitted in sport, when medically justified and subject to certain restrictions, principally relating to the route of administration.” What exactly would this mean to the young sports doctor trying to decide whether to use an injection or not? Yet again the evolving doping world does not place restriction on the use of local anaesthetics now. The detail on the IOC’s requirement for evidence of asthma is so sparse that the doctor would not know what evidence is required. The process of therapeutic use exemption (TUE) which is now required for notification of P2 agonists and other substances on the banned list required for therapeutic reasons had not started when the book was published, but is now one of the major logistical minefields that sports doctors face. It correctly states that pharmaceutical, chemical, and physical manipulation are prohibited methods of doping, but is unable to give the reader any examples of what this might mean, how athletes have tried to beat the tests in the past, and why the regulations on the sample collection procedure had to evolve as a result.

I became increasingly angry and frustrated as I continued to read this text. The issue on confidentiality of information seemed black and white to the authors. The dilemma for the team physician when one of the players admits in confidence to anabolic steroid abuse before a major game and, if tested positive, would result in the team being eliminated provides a scenario that requires a greater challenge to the management of the issue. This is particularly the case if the doctor is employed by the sport to care for the athlete, and the athlete is funded by the World Class Performance programme with money paid to them by their sport. The notion that the National Sports Medicine