NEGATIVE RESONANCES OF ANTIALGIC MEDICATION IN ATHLETES

Article DOI: https://doi.org/10.35219/efms.2018.1.08

Hagiu B.A.[1], Mungiu O.C.[2]

[1] "Alexandru Ioan Cuza" University of Iaşi
[2] "Gr. T. Popa" University of Iaşi

Abstract

The body of athletes and the specificity of activity determine a particular reactivity to some analgesic and anesthetic drugs, and the use of prohibited substances in sports results in serious adverse reactions to the use of anesthetic medication. Opioids and cannabinoids, illegal substances, which at the same time have ergolytic effects, can be used for analgesic purposes. Injectable anesthetics may have negative repercussions when the injection is made in the tendon. Some non-steroidal anti-inflammatory drugs can determine the prolongation of the effort due to the elimination of painful sensation but in turn affect the exercise capacity by inhibiting the mitochondrial complex I.

Key words: opioids, cannabinoids, anesthetics, anti-inflammatory

1. Introduction

It is known that performance athletes who have long used anabolic steroids, due to the administration of anesthetic medication, may have psychiatric disorders (aggression, hypomania, psychosis, depression), blood hypercoagulability and polycythemia (with subsequent myocardial infarction, cerebrovascular accidents), effects due to cardiovascular changes (variations in blood pressure) and acute encephalopathy as a result of hepatic lesions [2].

Adverse effects of analgesics and anesthetics in athletes

With regard to the use of analgesics and anesthetics in sports, a recent editorial points out the following [10]:

- if, since 1967, narcotics and analgesics were banned from sports, WADA declared them banned in competitions in 2017;
- the most common analgesics, including non-steroidal anti-inflammatory drugs, paracetamol, local anesthetics, and even some weak opioids (such as tramadol and codeine) are not forbidden;
- there is no well-defined demarcation line between health risks and the ergogenic potential of cannabinoids and narcotics and the most commonly used analgesics;
- opioids and cannabinoids are actually ergolithic, both of which can be prescribed for pain management, and both can be illegally acquired and their management accompanied by significant health risks, including addiction;
- however, the health risks of opioids and cannabinoids have never been assessed in a rigorous scientific manner - account must be taken of the negative effects on coordination and decision-making;
- although no athlete should risk short-term or long-term adverse health outcomes by participating in competitions when using medications whose risk has not been fully evaluated, the reality contradicts this desideratum;
- one of the most effective ways to mask the pain caused by a localized lesion is to inject a local anesthetic, which has led to quite small controversies in the sport world as long as the athlete has been fully informed of the risks, and the use is carefully analyzed;

Injecting into or near soft tissues (muscles, tendons, scholarships, fascia) to treat pain and a rapid return to competitive condition has become a common practice in the field of sports medicine, but is not without risks [7]:

- corticosteroids, local anesthetics and ketorolac trometamine (Toradol) are the most commonly used drugs for injectable use in athletes;
- the use of some of these injectables has proven efficacy in some diseases, while the clinical benefits of others remain questionable;
- for all injections in soft tissues for analgesic or antiinflammatory purposes, there are serious side effects that have to be considered, especially precompetitive;

- for the injection of local corticosteroids and anesthetics into the tendon, there is an increased risk of tendon rupture;
- intramuscular administration of Toradol, with a significant analgesic effect, presents a bleeding risk that has not yet been quantified;

A review study on pain management in elite athletes showed that oral nonsteroidal anti-inflammatory drugs were reported as common medication, being used in some international sports events by more than 50% of athletes [3].

Recently they have emphasized the effects of increasing sports performance by certain analgesics used by athletes [4]:

- analgesics are widely used in sports for the treatment of pain and inflammation associated with lesions, with increased evidence that some athletes can administer these substances in order to increase performance;
- paracetamol has been suggested to improve endurance by reducing the activation of higher brain structures involved in pain perception and cognitive-affective processing;
- non-steroidal anti-inflammatory drugs affect both peripheral and central pain perceptions, but investigating their ergogenic effects on muscle development has resulted in equivocal results;
- the therapeutic effect of glucocorticoids is unquestionable, but there are clear evidence of performance-enhancing effects after short-term oral administration;
- with regard to Tramadol and opioids, research into the potential of these drugs to increase sports performance is reduced in number;

It can be concluded that an "adverse" effect of analgesics can also be falsifying sports performance.

It should be noted that, according to the literature, non-steroidal anti-inflammatory drugs such as aspirin, indomethacin, diclofenac, piroxicam and ibuprofen are able to inhibit mitochondrial complex I [8]. So, by disturbing muscle energy, performance is affected.

During surgery, athletes with developed muscle mass may require more oxygen and anesthetic agents; some of which are resistant to non-depolarising neuromuscular blocking agents due to a higher density of nicotinic receptors [9].

The anesthetist should be aware of the eventual anabolic steroid abuse of a sports performance patient, because in this situation may be present atherosclerosis, hypercoagulability, hepatic dysfunction, mental and behavioral disorders [5]. Of course, in the presence of such comorbidities, the effects of anesthetics can be amplified, diminished or paradoxical.

For athletes, anesthetics forbidden in competitions are Fentanyl, Sufentanil, Alfentanil, Morphine, Pethidine, Cocaine, Pentazocine, Ephedrine, Adrenaline, Pseudoephedrine, Beta-blockers (in some sports); adverse reactions may also occur if anesthetics are considered safe [6]:

- in case of surgery, Sevoflurane is associated with QT prolongation and propofol is better avoided in patients with prolonged OT (not forgetting that some athletes suffer from cardiac hypertrophy)
- In the case of intravenous anesthesia, propofol causes vasodilation greater than volatile anesthetics, and with regard to post-exercise hypotension, which may persist for more than 4 hours after stopping, volatile anesthetics are preferred (in case of imminence of an intervention surgical)

2. Discussions

From the data presented, the particular reactivity of athletes to analgesics and anesthetics may be due to the abuse of prohibited substances (such as anabolic steroids) or to the special anatomo-physiological characteristics of the trained body.

Thus, in the case of a surgical intervention, volatile anesthetics are preferred, since those administered by injection may cause cardiovascular side effects. Oral nonsteroidal anti-inflammatory drugs are widely used by athletes but inhibit the mitochondrial respiratory chain with the above-mentioned consequences.

Overall, close monitoring is the only way for the timely detection of safety issues regarding analgesics [1].

3. Conclusions

1. Opioids and cannabinoids are substances with ergolytic effects that can be obtained illegally and used for pain management.
2. For athletes, injectable anesthetics may have side effects, especially if administered on the background of chronic consumption of anabolic steroids. A particular situation is a mechanical lesion, when the injection is made directly into the tendon.
3. Studies on the effects of non-steroidal anti-inflammatory drugs on performance have resulted in equivocal results. On the one hand, they allow for sustained effort, due to elimination of the painful sensation, on the other hand it inhibits the mitochondrial complex I.

References

1. Cazacu I, Mogosan C, Loghin F. Safety issues of current analgesics: an update. Clujul Medical. 2015;88(2):128-136.
2. Dzendrowskyj P. Anaesthesia and the athlete, Aspetar, Sport Medicine Journal, online article, http://www.aspetar.com/journal/viewarticle.aspx?id=173#.W5PjnvZ9jIU accesat septembrie 2018.
3. Harle CA, Danielson EC, Derman W, Stuart M, Dvorak J, Smith L, Hainline B. Analgesic Management of Pain in Elite Athletes: A Systematic Review, Clinical Journal of Sport Medicine, 2018, 28(5):417–426.
4. Holgado D, Hopker J, Sanabria D, Zabala M. Analgesics and Sport Performance: Beyond the Pain-Modulating Effects. PM R. 2018;10(1):72-82.
5. Kam PC, Yarrow M. Anabolic steroid abuse: physiological and anaesthetic considerations. Anaesthesia. 2005;60(7):685-92.
6. Nadar K. Anaeshesia for the athlete, Anaesthetics UKZN 2018, online article available at file:///C:/Users/Bogdan/AppData/Local/Temp/Anaesthesia+for+the+Athlete+-+K+Nadar+-+11+May+2018.pdf.
7. Nepple JJ, Matava MJ. Soft Tissue Injections in the Athlete. Sports Health. 2009;1(5):396-404. doi:10.1177/1941738109343159.
8. Sandoval-Acuña C, Lopez-Alarcón C, Aliaga ME, Speisky H. Inhibition of mitochondrial complex I by various non-steroidal anti-inflammatory drugs and its protection by quercetin via a coenzyme Q-like action. Chem Biol Interact. 2012;199(1):18-28.
9. Sharma M-P, Chalmers A. Anaesthetic implications of performance-enhancing drugs, BJA Education, 2016;16(7): 247–251.
10. Vernec A, Andrew Pipe A, Slack A. A painful dilemma? Analgesic use in sport and the role of anti-doping, British Journal of Sport Medicine, 2017, 151 (17), 1243-1244.