

Consumption of Oral Beta-Receptor Agonists like Clenbuterol as a Thermogenic Fat Burner and Performance Enhancing Drug

Yash Kripalani¹, Shweta Thadeshwar²

¹Dr. D.Y. Patil University, School of Medicine, Navi Mumbai, India

²Nanavati Super Speciality Hospital, Mumbai, India

Abstract: Oral β -Agonists are known for their thermogenic effect which help in enhancing an individual's metabolism thus burning fat and improving performance. It is very popular among competitive athletes and thus non-competitive athletes trying to enhance weight reduction turn towards such drugs, neglecting the benefits of following a healthy lifestyle and training programme. This informative article will provide adequate knowledge about this class of drugs, its adverse effects and risks in order to bring about awareness amongst general population.

Keywords: clenbuterol, fat, burner, athlete, drug

1. Introduction to β -agonists and its receptors

The β -receptor agonists which belongs to the sympathomimetic class of drugs binds to the β receptors in the body and serves as a catalyst to various functions. Three types of beta agonists are present namely β 1, β 2 and β 3.

The β 1 receptors are predominantly found in the Heart, Kidney and adipose tissue. Triggering this receptor could increase heart rate, improve stroke volume and thus increase cardiac output ultimately improving an athlete's performance, furthermore, in the kidneys it triggers a cascade of reaction increasing blood supply, whereas, in the adipose tissue it targets adipocyte upregulation for lipolysis (breakdown of fats).

The β 2 receptors are located in the bronchioles of lungs and arteries of the skeletal muscles. Stimulating these receptors could relax the smooth muscle of the bronchioles, thus dilating it and increasing the inflow of oxygen, ultimately improving respiration. It is the drug of choice for asthma and chronic obstructive pulmonary disorders (COPD). It also improves blood flow to the skeletal muscle.

The β 3 receptors are located in the gastrointestinal tract, vascular endothelium and adipose tissues, where they are involved in lipolysis, glucose uptake and relaxation of colon, oesophagus, and bladder.

Drugs such as salbutamol, salmeterol, formoterol, clenbuterol are few examples of β -Agonists which are commonly consumed as oral tablets or in the form of a metered-dose inhaler.

2. Medical Uses

Beta adrenergic agonists are divided into 2 groups, short acting (SABA) and long acting (LABA) β -agonists. SABAs are used as a first line therapy for acute exacerbation of asthma and COPD. Whereas, LABAs are prescribed if

SABAs fail to control asthma with full dosage of corticosteroids. They are generally consumed in the form of a metered dose inhaler or by nebulisation. Salbutamol also provides aid in treatment of hyperkalaemia (increased potassium). Epinephrine is a combined α and β agonist which treats life threatening conditions like anaphylaxis, cardiac arrests, true asystole and is also used in ventricular fibrillation.

3. Clenbuterol

Amongst β receptor agonists, clenbuterol is a drug frequently consumed by competitive athletes to increase the upregulation of adipocytes for lipolysis (burning fat) and to enhance performance in sports. Generally consumed orally with a dosage range of about 80-120mcg OD. It is commonly found in the form of a hydrochloride salt, clenbuterol hydrochloride. It is a β 2 receptor agonist, a sympathomimetic amine, meant for consumption by patients suffering from COPD or asthma in order to prevent difficulty in respiration by acting as a bronchodilator. Its effects are more potent and longer lasting as a stimulant and thermogenic drug. It is classified by the world anti-doping association as an anabolic agent. Consumption of clenbuterol is illegal unless prescribed by a registered medical practitioner. Clenbuterol is consumed along with anabolic steroids and ephedrine-caffeine combination to optimally enhance performance by triggering muscle growth and lipolysis.

4. Routes of administration of β -agonists

Beta receptor agonists can be administered by various routes, most commonly parental route of administration is preferred using a metered dose inhaler or nebulisation. Tablets are available for oral consumption but generally not preferred due to its adverse effects. Drugs like epinephrine are administered intravenously to bypass first pass metabolism which also helps in immediate resuscitation for

patients in cardiac arrest as the drug would reach the heart comparatively faster than any other route.

5. Adverse effects of clenbuterol

Clenbuterol is banned in many countries due to serious adverse effects. It is meant for consumption by patients suffering from asthma or COPD, but availability of SABA and LABA inhalers cause lesser systemic side effects than oral consumption of the drug. This drug is known to cause anxiety, tremors, headache and abnormal sweating. It has serious adverse effects on heart muscle causing hypertension, hypertrophy palpitations, arrhythmias that can eventually lead to heart failure ultimately causing death. It is known to cause hypokalaemia leading to muscle cramps and spasms. Other side effects could include nausea, vomiting, insomnia, dry mouth and manic like symptoms.

6. Conclusion

The effects on clenbuterol on heart depends upon duration of consumption and its dosage. Studies have proven clenbuterol to be a hazardous drug due to its serious life threatening adverse effects. Hence, this drug has been banned in many countries but irrespectively people looking to enhance performance or weight loss turn towards such drugs and fall prey to addiction and serious long term effects. People between the age group of 18-25 years are known to consume clenbuterol illegally without prescription. Awareness should be brought about in society and people should be encouraged to pursue a healthy diet with consultation by a proper certified nutritionist to drop weight or enhance performance instead of turning towards drugs for the same.

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Author Profile



Dr. Yash Kripalani: Received M.B.B.S degree from Dr. D.Y. Patil University, School of Medicine in 2019. From 2013-2018 he studied as a medical student and completed rotatory internship by February 2019 and currently working in the department of Physiology in Dr. D.Y. Patil University, School of Medicine. He also is certified by International sports science association (ISSA), USA in specialist of sports nutrition since January 2019. He also is certified by American Heart association (AHA) as a BLS and ACLS provider.



Dr. Shweta Thadeshwar: Completed M.B.B.S in 2019 from Dr. D.Y. Patil University, School of Medicine and currently working in Nanavati Super Speciality hospital. She is also certified by American Heart association (AHA) as a BLS and ACLS provider.