COPD and Lactate
6: COPD AND LACTATE

In 2013 Wirtz N, Wahl P et al studied 10 male subjects who performed 3 sets of resistance exercise within 4 separate sessions. Arm curl with 1 or 2 arms (AC1 or AC2), and leg extension with 1 or with 2 legs (LE1 or LE2). Each set was performed at a standard velocity and at a previously determined 10 RM load. Blood lactate samples were taken immediately before and after each set (pre1, post 1, pre 2, post 2, pre3, post3). Maximum (La) was significantly higher after LE2 and significantly lower after AC1 in comparison with the other exercise protocol (99).

Ge´rson F de Souza, Antonio AM et al in 2010, studied 16 COPD patients who performed unsupported arm exercise and assessed the metabolic, ventilatory and cardiovascular responses and observed that a significant increases in the mean blood lactate concentration, VO₂, VCO₂, VE and RR from the resting to the peak phase of UAE test. Unsupported incremental arm exercise in patient with COPD increases blood lactic acid levels (101).

In 2009 Abdoulaye Ba et al studied 20 healthy, 20 obese and 15 COPD patients in which each group performed a maximal cycling exercise. Most of the healthy subjects really performed a maximal exercise, whereas the performances were symptoms limited in obese and COPD. Peak post exercise LA (lactate) concentration was measured at 5th minutes of recovery in all subjects and there was no significant inter group difference in peak LA level (102).

In Feb 2009 Dante Brasil, Santos et al correlated the level of obstruction in COPD with lactate concentration and heart rate (HR) at rest and distance walked. 91 patients with all levels of obstruction were evaluated, HR and blood lactate increases significantly. The decrease in
peripheral saturation of hemoglobin to oxygen observed with 6MWT was also significant\(^{(103)}\).

Lori D. Calvert, Rhea Shelley, Sally J. Singh et al in 2008 done a study on 18 subjects with COPD who performed maximal cycle exercise after an intravenous infusion of DCA or saline (control). Exercise work output was determined, blood lactate and ammonia level were measured at rest, 1 and 2 minutes of post exercise. Result showed that DCA infusion reduced peak blood lactate level compared to control\(^{(104)}\).

Shaukat Ali, Rahat et al in 2008 done study on exercise, blood lactate and pH. The aim of this study was to observe the effect of intensity and duration of exercise on blood lactate and pH. Thirty male, adult subjects were divided into two groups. Subjects of each group were exercised on treadmill with different time, speed and grade. In conclusion they found that the magnitude of post-exercise changes in blood lactate and pH depend upon the intensity and duration of exercise\(^{(105)}\).

Didier Saey, Annie Michaud et al (2005) studied lactate accumulation in 2 group of COPD and studied 32 patients by measuring arterial blood lactate levels during constant work-rate cycling exercise. The lactate dehydrogenase activity and the arterial lactate level were significantly higher in fatiguers COPD group.\(^{(106)}\).

In 2005 A.J.Moorcroft et al studied 104 cystic fibrotic adult and 27 controls have performed progressive cycle ergometer to a symptom limited maximum, measurement taken at peak exercise included HR, ventilation, oxygen uptake, CO\(_2\) output, O\(_2\) saturation and blood lactate. Result showed similar exercise response in mild to moderate pulmonary disease patients and in controls. In contrast, those CF patients with severe lung disease had significant higher breathlessness, lower muscle
effort scores, lower peak lactate level, lower peak heart rate and a mean ventilation $^{(106)}$.

In 2000 Marielle PK et al studied 27 COPD patients and 22 control including physically inactive subjects (PI) and physically active (PA) subjects, each subject performed an incremental cycle test. Venous blood was sampled for lactate analysis. Vastus lateralis biopsy specimens were obtained. They conclude that in PA group muscle La, pyruvate, and glucose were not different than in the PI group but the La threshold was higher in the PA group. The COPD group had lower value for La threshold $(^{23,22})$.

In 1998 Franc, Ois Maltais studied 8 COPD patients and 8 ages matched normal individual who had performed standard incremental exercise test. No significant difference was found between the two groups in leg blood flow at rest or during exercise at the same power output but Blood lactate concentration was greater in COPD patients at all sub maximal exercise and it suggests that early muscle acidosis may be involved in early exercise termination in COPD patients $(^{14})$.

In 1996 F Maltais et al compared and correlated the increases in arterial lactic acid (La) during exercise and the oxidative capacity of the skeletal muscle in 9 COPD patients and in 9 normal subjects of similar age. Following a transcutaneous biopsy of the vastus lateralis, each subject performed a stepwise exercise test on an ergo cycle up to his or her maximal capacity. They concluded that in COPD the increase in arterial La is excessive, the oxidative capacity of the skeletal muscle is reduced $(^{14})$.

In 1992 Antonio Patessio, Mauro Carone and et al studied 19 patients with COPD who performed incremental cycle test as well as 2 square wave tests at a low and high work rate. Identical test were performed after an 8 weeks program of cycle ergometer training either
for 45 minutes/day at a high work rate or for a proportionally longer
time at a low work rate. For the high work rate training group, identical
work rates engendered less lactate and less VE after training, the low
work rate training group had significantly less lactate and VE decreases
\((107)\).