ABSTRACT

TITLE:	The Effects of Pulmonary Hypertension on Athlete Performance in Cyclists at High Altitude
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ABSTRACT: The adverse effects of high altitude on the performance level of endurance athletes is widely recognized, yet under researched. The purpose of this study was twofold. Firstly, to identify significant changes in power output (watts) and pulmonary vascular resistance (PVR) between medium (1,981m) and high (3,139m) altitude. Secondly, to determine if a correlative relationship existed between changes in PVR, and power output (watts), when endurance cyclists performed a VO2max test at medium and high altitudes. Elevated PVR values are indicative of pulmonary hypertension, which reduces right ventricular outflow tract velocity, and may decrease O2 exchange rate. The validated model utilized to calculate PVR was as follows: PVR (dynes-cm-sec-5) = 1.2 x 80 x (PASP/right ventricular outflow tract VTI). Doppler measurements were taken prior to the VO2max test and were repeated immediately post exercise prior to acquiring two-dimensional image and again after two-dimensional image acquisition at the tricuspid valve to assess peak regurgitation velocity. The cohort included 8 subjects with a PVR of 190.41 +/- 48.64(dynes-cm-sec-5) at medium altitude and a PVR of 177.38 +/- 24.59(dynes-cm-sec-5) at high altitude. The cohort demonstrated a Power Output of 354.38 +/- 51.51(watts) at medium altitude and a Power Output of 311.88 +/- 43.75(watts) at high altitude. The paired T-test for two sample means demonstrated a statistically significant decrease in power output (p = 0.054-2), and no significant changes (p = 0.169) in relative PVR. There was a moderate correlation between max Power Output and PVR (r = 0.48) at medium altitude as well as a weak correlation between max Power Output and PVR (r = 0.27) at high altitude. This research aims to extend high altitude cardiopulmonary physiological research from medical to elite athlete populations.