

diagnosed with EILO; i.e. they had both conditions. Treatment for EILO resolved breathing problems in the majority.

Conclusions EILO is common in athletes, but too often referred to as 'mysterious breathing problems'. Asthma does not rule out EILO as comorbidities are common. Apparent persistence of respiratory symptoms must not lead to indiscriminate escalation of asthma treatment, as symptoms may be due to undiagnosed and treatable laryngeal obstruction.

294

PREVENTING INJURY TO THE FETUS: USING 3-DIMENSIONAL POWER FLOW DOPPLER ULTRASONOGRAPHY TO ANALYZE PLACENTAL BLOOD FLOW DURING RESISTANCE TRAINING IN PREGNANT ATHLETES TO GUARD AGAINST FETAL HYPOPERFUSION

^{1,4}Sara Gould, ²Chase Cawyer, ^{3,4}Louis Dell'Italia, ²Lorie Harper, ^{4,5}Marcas Bamman. ¹University of Alabama at Birmingham, Department of Orthopedics, Division of Sports Medicine, AL, USA; ²University of Alabama at Birmingham, Department of Obstetrics and Gynecology, Division of Maternal-Fetal Medicine, AL, USA; ³University of Alabama at Birmingham, Department of Medicine, Division of Cardiovascular Disease, AL, USA; ⁴Birmingham Veteran Affairs Medical Center, AL, USA; ⁵University of Alabama at Birmingham, Department of Cell, Developmental, and Integrative Biology, AL, USA

10.1136/bjsports-2021-IOC.271

Background Peak fertility and athletic performance coincide, placing a subset of women into competition with sparse guidance. The Valsalva maneuver has been hypothesized to increase maternal blood pressure and intra-abdominal pressure, resulting in decreased blood flow to the fetus during resistance training.

Objective We present a technique employing three dimensional (3D) power Doppler ultrasound analysis to evaluate placental blood flow during resistance exercise. This technique may be used to prevent fetal injury by guiding training parameters.

Design This is a proof of principal study describing the technique and documenting its use to determine placental blood flow.

Setting This research was conducted in an academic clinical enter. Participants varied from an actively exercising, former collegiate athlete, to participants who performed no scheduled physical activity.

Patients (or Participants) Four normal weight women less than 35 years of age with uncomplicated pregnancies were included.

Interventions (or Assessment of Risk Factors) One repetition maximum (1RM) via modified chest press was determined. Ultrasonography with power Doppler and 3D volume measurements were then performed on the visualized portions of the placenta. The vascular flow index (VFI) was then calculated for each phase.

Main Outcome Measurements VFI was measured during lifting and at rest. The paired t-test was used for statistical analysis. Z scores from previously established normative data (Noguchi, et al 2009) provided benchmarks.

Results VFI was not significantly different between lift and rest phase for any of our participants. All measurements were within a standard deviation of previously established normative data. There were no incidences of fetal bradycardia.

Conclusions 3D power flow Doppler imaging can guide resistance training during pregnancy to prevent fetal injury due to hypoperfusion. Resistance training up to an RM1 of 50lbs did

not result in a significant reduction in placental blood flow from resting state in the study population.

295

ABSTRACT WITHDRAWN

296

EFFECTS OF SALBUTAMOL PRIOR TO DIESEL EXHAUST EXPOSURE DOES NOT AFFECT DYSPNEA DESPITE REDUCING THE WORK OF BREATHING IN INDIVIDUALS WITH EXERCISE-INDUCED BRONCHOCONSTRICTION

¹Sarah Koch, ²Joseph Welch, ¹Andrew Ramsook, ¹Christopher Carlsten, ¹Jordan A Guenette, ¹Michael Stephen Koehle. ¹University of British Columbia, Vancouver, Canada; ²University of Florida, Gainesville, USA

10.1136/bjsports-2021-IOC.272

Background Individuals with exercise-induced bronchoconstriction (EIB) use inhaled β_2 -agonists prior to exercise to prevent respiratory symptoms. The resulting bronchodilation could increase the dose of inhaled pollutants and worsen dyspnea when exercise is performed in air pollution.

Objective To assess the effects of salbutamol, a β_2 -agonist, and diesel exhaust (DE) exposure during exercise on dyspnea and the metabolic cost of breathing in individuals with EIB.

Design Double-blind, randomised, repeated measures.

Setting Controlled human exposure study.

Participants Nineteen participants (9 women) with EIB (age 22–33 years).

Intervention Participants completed four exposure visits. After the inhalation of either 400 μ g of salbutamol or placebo, participants sat in the exposure chamber for 60min, breathing either filtered air (FA) or DE ($PM_{2.5}=300\mu g/m^3$). Following the rest period, participants cycled for 30min at 50% of peak work rate while breathing FA or DE.

Main Outcome Measurements Dyspnea was rated using the 0–10 category-ratio Borg scale at baseline, 7.5min and 27.5min into the cycling bout. Transpulmonary pressure was calculated as the difference between esophageal and mouth pressure. The work of breathing (WOB) was then determined by integrating ensemble averaged transpulmonary pressure-tidal volume loops.

Results Dyspnea increased significantly ($p<0.01$) from 0 ± 1 at baseline to 2 ± 1 at 7.5min and 3 ± 2 at 27.5min. Neither DE ($p = 0.71$) nor salbutamol ($p=0.45$) affected dyspnea. WOB increased with exercise duration, starting at 8.3 ± 6.8 J/min at baseline to 95.5 ± 35.9 J/min ($p<0.01$) at 7.5min and 105.0 ± 47.5 J/min ($p <0.01$) at 27.5 min. Exposure to DE did not affect WOB ($p=0.49$); however, salbutamol reduced WOB significantly ($p=0.049$). At 7.5min in the salbutamol trial, WOB was reduced by 10.8 ± 2.9 J/min compared to placebo ($p=0.048$). At 27.5min, WOB was reduced by 3.9 ± 1.3 J/min after salbutamol compared to placebo although this did not reach statistical significance ($p=0.12$).

Conclusions The use of salbutamol prior to exercise in DE does not appear to affect dyspnea despite reducing the WOB in individuals with EIB.