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## BACKGROUND

- Heart Failure with Preserved Ejection Fraction (HFpEF) is characterized by diastolic dysfunction, which reduces diastolic filling time of the ventricles due to stiffening and higher diastolic pressures<sup>5</sup>
- Patients with HFpEF present with exertional dyspnea and fatigue due to reduced cardiac output and is responsible for upwards of 300,000 deaths per year in America alone<sup>4</sup>
- Diagnosis of HFpEF requires clinical, echocardiogram, and hemodynamic abnormalities to be present<sup>5</sup>
- Pharmacological treatments have not proven to be effective in treating HFpEF and exercise interventions, although not well studied, have shown promising results.

## PURPOSE

The purpose of this presentation is to explore the potential benefits of exercise at varying intensities on patients with HFpEF.

## METHODS

- **Angadi et al.<sup>1</sup>:**
  - 14 participants with HFpEF were randomly assigned to either a High intensity interval training (HIIT) group or a Moderate intensity aerobic continuous training (MIACT) group.
  - The HIIT group performed 4x4min 85%-90% peak HR training with 3min active recovery bouts and the MIACT group performed 30min at 70% peak HR 3 times a week for 4 weeks.
- **Edelmann et al.<sup>2</sup>:**
  - 64 patients randomized into either an ET/RT program (n=44) or usual care group (n=20) for 3 months.
  - ET/RT group performed 20-40 min. sessions of cycling 2x/week at 50-60% of peak VO<sub>2</sub> for first 4 weeks, and increased to 20-40 minute sessions 3x/week at 70% peak VO<sub>2</sub> for the remainder of study.
  - Starting in week 5 resistance training was added 2x/week. 15 repetitions per exercise were performed (bench press, leg press, leg curl, rowing machine, tricep dip, and lat pull down)
- **Kitzman et al.<sup>3</sup>:**
  - 46 patients completed and had been randomized into an ET program (n=24) or a control group (n=22) for a 16 week long intervention.
  - ET group exercised 3x/week for 16 weeks. Exercise consisted of walking on a track and cycle ergometry. Sessions ranged from 40-70% HRR and lasted a total of 60 minutes including warm up/ cool down.

## RESULTS

- **Improvements in LVDD grade and LAV index<sup>1,3</sup>**
  - HIIT group improved left ventricular diastolic dysfunction grade (pre 2.1 ± 0.3; post 1.3 ± 0.7; P=0.02). No significant changes in MIACT group.
  - The HIIT group also showed an improvement in reduced left atrial volume index over the moderate intensity group (3.3 ± 6.6 vs. 5.8 ± 10.7 ml/m<sup>2</sup>; P=0.06). No significant changes in MIACT group.
  - No changes in LV functioning based on echo-doppler measures after 16 weeks in the ET group.
- **Improvements in NYHA Class<sup>2</sup>**
  - When compared to controls ET/RT had a significant change in NYHA class (p= 0.009). In the ET/RT group 10 went from class II to I, and 4 went from class III to II, no changes seen in controls.
- **Improvements in VO<sub>2</sub>peak/6MWD<sup>3,2,1</sup>**
  - ET group had a significant improvement in VO<sub>2</sub>peak (ml/min) when compared to the control group (p=0.0002) with 67% of ET exceeding the 10% clinically meaningful threshold compared to only 27% in the control group. Significant improvements were also seen in 6MWD in the ET group compared to the control group (p=0.002).
  - A mean increase of 2.6 ml/kg/min was found in the ET/RT group and a decrease of 0.7 ml/mg/min was found (p= 0.001) including an increase of 24m in the ET/RT for the 6MWD (p> 0.05).
  - HIIT training and were shown to improve VO<sub>2</sub>peak (pre 19.2 ± 5.2 ml/kg/min; post 21.0 ± 5.2 ml/kg/min; P=0.04) and no significant changes in MIACT group.

## CONCLUSION

- Exercise training interventions have shown significant effects when used in HFpEF patients. Both moderate intensity and HIIT interventions have shown significant improvements in characteristics such as exercise capacity and NYHA classification.
- One major difference seems to be the time it takes to see improvements, with HIIT showing effects in as little as 4 weeks, and moderate intensity showing effects in 3 months. Another significant difference is that only HIIT has seen results in improving left ventricular diastolic dysfunction..
- While the effects seen with pharmacotherapy interventions have been modest, exercise has shown significant results, and therefore should be considered in those with HFpEF.

## REFERENCES

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