Exploring the Role of Physical Activity and Exercise for Managing Vascular Comorbidities in People with Multiple Sclerosis: A Scoping Review

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Background

- Vascular comorbidities are prevalent among people with multiple sclerosis (MS) and have adverse disease-related consequences:
  - These include diagnostic delays, increased relapse risk and disability progression, reduced health-related quality of life, and increased mortality risk (1).
- In the general population, physical activity (PA) and exercise training have proven highly beneficial at all levels of vascular disease risk management (2).
- People with MS participate in less PA and have lower physical fitness levels compared to non-dis eased individuals, and both PA and fitness have been associated with improved status and disease progression (3). Consequently, PA and exercise represent behavioral targets for potentially managing vascular comorbidities and their consequences in people with MS.

Objective

To conduct a scoping review of existing evidence linking PA and exercise training to potential modification of vascular comorbidities and related risk factors in people with MS.

Methods

- Five electronic databases were searched from inception to Nov 2017.
- Search terms: “multiple sclerosis” AND “physical activity” OR “exercise” OR “fitness” OR “sedentary” OR “sitting” AND “vascular comorbidity” OR “obesity” OR “body mass index” OR “hyperlipidemia” OR “cholesterol” OR “heart disease” OR “atherosclerosis” OR “hypertension” OR “high blood pressure” OR “diabetes” OR “glucose resistance”.
- Data were summarized by both vascular comorbidity subcategory and study design (observational vs. intervention).

Results

- Observational Studies (n=17)
  - Total Comorbidity (n=3) Obesity (n=12), Hyperlipidemia (n=2), Vascular Comorbidity/Hypertension (n=1), Diabetes (n=1)
  - Data supporting a beneficial role for PA/fitness could be drawn from each comorbidity category.
- Interventional Studies (n=17)
  - Obesity (n=17), Hyperlipidemia (n=3), Vascular Comorbidity/Hypertension (n=4), Diabetes (n=4)
  - Modality highly variable (aerobic vs. resistance vs. combination vs. specialty (e.g. yoga, behavioral!))
  - 8-32 wks; 2-3 x/wk; <30-90 mins/session

Conclusions

- Cross-sectional data offers the most consistent, compelling evidence for the potential benefits of PA on vascular disease risk factors.
- The efficacy of exercise training in limiting vascular comorbidity risk and burden was dependent upon intervention type and duration.
- Obesity-related risk factor management
  - Role for PA/fitness—exercise supported by ≥15 studies (51.7%)
  - Improvements in body composition seemed to require an intervention duration of ≥12 weeks. BMI was unaffected in each study
- Diabetes-related risk factor management
  - Role for PA/fitness—exercise supported by ≥3/5 studies (60.0%)
  - High intensity aerobic training was more effective at limiting diabetes-related risk factors than mild-to-moderate training or resistance training alone.
- Hyperlipidemia- and Hypertension/Vascular Function-related risk factor management
  - Role for PA/fitness—exercise supported by ≥1/5 studies (20.0%, hyperlipidemia) and ≥2/5 studies (40.0%, vascular function/hypertension)
  - Triglycerides, but not other lipids, were consistently ↓ with ↑ PA/exercise
  - Overall, the extracted evidence for hyperlipidemia and hypertension was promising but limited/mixed, preventing conclusive conclusions

Future Directions

- Evidence points to a potential relationship between PA/exercise and risk factors related to vascular comorbidities in people with MS. PA and exercise training interventions may represent an effective therapeutic strategy for managing vascular comorbidities in people with MS, justifying further investigation
- Future studies aimed at supplementing interventional evidence should:
  - Be designed to measure vascular disease risk factors as a primary outcome
  - Include larger cohorts and heterogeneous MS populations (man, woman, RRMS, SPMS, PPMS)
  - Use appropriate, validated measurements for vascular disease factors
  - Include long-term follow-up after completion of the intervention
  - Define which training regime is most effective in managing each comorbidity

References


Acknowledgements

This work was completed as part of an endMS interdisciplinary learning project while BE, MD, and EP were enrolled in the Scholar Program for Researchers in Training (SPRINT). SPRINT is part of the endMS National Training Program funded by the Multiple Sclerosis Society of Canada through its related Multiple Sclerosis Scientific Research Foundation.