ISSN: 2687-8410
DOI: 10.33552/ACCS.2020.02.000548
Archives of Clinical Case Studies
Iris Publishers

Mini Review

Is High Intensity Exercise Safe for the Chronic Thoracic Aortic Dissection Patient?

Donald C DeFabio* and Christopher J DeFabio

Chiropractic physician, private practice, USA

***Corresponding author:** Donald C DeFabio, Chiropractic physician, private practice, USA.

Received Date: October 20, 2020
Published Date: November 23, 2020

Abstract

Exercise parameters for the chronic aortic dissection patient are broad and research detailing specific exercise protocols is limited. Nevertheless, for clinicians interested in designing a tailored exercise routine for physically active patients, the available literature on physical rehabilitation for patients with chronic aortic disease may be referenced. Moreover, it is of upmost importance that when developing an exercise program that a patient's particular cardiovascular pathology, including the distribution of the lesion, along with an understanding of hemodynamic principles, relative to the aorta, be respected. With these concepts applied, patients may safely return to recreational sport through the guidance of a thoughtful, clinically based, individualized exercise program.

Keywords: Chronic aortic dissection; Cardiovascular exercise; Physical rehabilitation

Abbreviations: Stanford Type A Dissection: TAD; Stanford Type B Dissection: TBD; Abdominal Aortic Aneurysm: AAA; Relative Perceived Exertion: RPE; High Intensity Training: HIT

Introduction

Acute aortic dissections are potentially life-threatening events. Moreover, clinical management is often based on the location and extent of the pathoanatomical lesion. The Stanford Classification system is the most prevalent model for categorizing aortic dissections. The Stanford type A dissections (TAD) involve the ascending aorta, and often require immediate surgical management, while Stanford type B dissections (TBD) may involve the arch, descending, or abdominal aorta, and respond more favorably to pharmaceutical intervention alone, compared to TAD [1].

Following the acute phase, strict blood pressure management, primarily through anti-hypertensive polytherapy protocols, for the chronic aortic dissection patient is necessary to support a favorable prognosis, as to minimize the risks for progressive aortic dilation and further dissection. Once blood pressure has been stabilized, patients with uncomplicated chronic aortic dissections may engage in exercise if they so desire.

Discussion

While exercise is an accepted conservative intervention for this demographic, guidelines for physical activity are expressed across a wide spectrum. Preliminary recommendations allow for walking and lifting up to 20 pounds, while more advanced exercise regimes allow moderate to vigorous cardiovascular activity and lifting up to 50% body weight [2]. Nevertheless, there is emerging evidence to suggest that individualized exercise programs for the chronic aortic dissection patient may be safely formulated to address patient specific functional deficits [3].

As reflected in a recent publication, a case report for a 61-yo male with a chronic TBD included an exercise program a high degree of specificity, that incorporated resistance training, cardiovascular exercise, and high intensity training. Details of the program are as follows: elliptical training, 3x/week for 30-45 minutes at a relative perceived exertion (RPE) 4-7/10; treadmill walk/run, 1-3x/week for 20-35 minutes (3 minutes on/off) at 4-7.5/10 RPE high intensity training (HIT); resistance training, 3x/week for 30 minutes at 30 pounds max weight with 30-90 second rest interval in between sets (of 1-3) for 15 reps; and core strengthening, 3-5x/week for 1-3 sets at 10-15 reps. It is worth noting that for this protocol the patient's blood pressure was taken every 10 minutes during cardiovascular activities and after each set of resistance training. Moreover, heart rate was kept below 115 bpm and blood pressure less than 140/90mmHg for all activities. Valsalva effects were avoided at all times as well. The authors further recognized that due to the scarcity of research solely for the TBD patient, the literature of exercise programs for similar aortic diseases (such as TAD, abdominal aortic aneurysms (AAA), and coronary artery dissections) was referenced when developing this physical rehabilitation program [3].

When developing a rehabilitation program for this demographic, of significance is identifying the presence of an underlying connective tissue disorder, such as Marfan syndrome or Elher's-Danlos syndrome. Furthermore, if this comorbidity is present, further caution should be taken when developing a treatment protocol. This may be successfully approached by modifying maximum blood pressure and heart rate to a reduced value [3]. In addition, the available literature underscores the necessity for the patient to synchronize RPE and real time cardiovascular findings of blood pressure and heart rate, especially in the early phases of physical rehabilitation. Thereby, achieving this will allow for cardiovascular physiology to be maintained within a homeostatic threshold. Furthermore, exercise routines for these patients should not include isometric exercises, due to their propensity for altering systolic, diastolic, and mean diastolic arterial pressure during activity.

Clinicians are encouraged to investigate aortic hemodynamics, nuances in aortic lesions, and presence of connective tissue disorders when developing an exercise routine. Considering the aforementioned may reduce the risk of adverse events including, further aortic dilation, aortic rupture, and malperfusion to vital organs [3].

Conclusion

The most common recommendation of a cardiovascular rehabilitation program for the patients with aortic disease is modest activity of approximately 30 minutes at an exercise frequency of 3-5 sessions per week with an average energy expenditure of 250-300 kcal/session (less than 1,000 kcal/week) and weight lifting exercises limited to 30 pounds [4-6]. The aortic dissection patient may follow these protocols, but higher intensity programs may in fact be both safe and offer greater cardioprotective benefits [3]. With the above principles in mind, a clinician may responsibly guide a patient through a physical rehabilitation program. The benefit of individualizing the exercise parameters is that the exercise protocol may directly address sport specific functional deficits, through safely introduced exercises.

Acknowledgement

None.

Conflict of interest

None.

References

1. Lempel JK, Frazier AA, Jeudy J, Kligerman SJ, Schultz R, et al. (2014) Aortic Arch Dissection: A Controversy of Classification. Radiology 271(3): 848-855.
2. Thijssen CGE, Bons LR, Gokalp AL, Van Kimmenade RRJ, Mokhles MM, et al. (2019) Exercise and sports participation in patients with thoracic aortic disease: a review. Expert Rev Cardiovasc Ther 17(4): 251-266.
3. DeFabio DC, DeFabio CJ (2020) Exercise parameters for the chronic type B aortic dissection patient: a literature review and case report. Postgrad Med 8: 1-6. doi: 10.1080/00325481.2020.1824728. Epub ahead of print. PMID: 32940109.
4. Myers J, Mcelrath M, Jaffe A, Smith K, Fonda H, et al. (2013) A randomized trial of exercise training in abdominal aortic aneurysm disease. Med Sci in Sprt and Exer 2-9.
5. Nakayama A, Morita H, Nagayama M, Hoshina K, Uemura Y, et al. (2018) Cardiac rehabilitation protects against the expansion of abdominal aortic aneurysm. J Am Heart Assoc 7(5): e007959.
6. Weber N, Weber A, Carbone P, Lawerence A, Bilbrey T, et al. (2018) High-intensity sport specific cardiac rehabilitation training of a 22-Year -old