

Thrombocytopenia and Physical Activity among Older Adults: The Tenuous Line between Bleeding Prevention and Physical Functional Decline



Lucelia Luna Melo-Diaz*

University of Pelotas, Brasil

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***Corresponding author:** Brazilian Company of Hospital Services - University Hospital Federal University of Pelotas, Rua Professor Doutor Araújo, 538, Centro, Pelotas, Rio Grande do Sul, Brasil, Tel: 55-53-3284-4900; Email: mluluna@gmail.com

Abstract

While the treatment of cancer has improved significantly in the last decades contributing to an increase in survival rates, it also associated with a variety of side effects including thrombocytopenia. Although representing a serious condition to all age groups, as low levels of platelets can cause bleeding, thrombocytopenia may present a threat to older adults' overall activity levels and mobility if lower cut off points for the practice of physical activity aren't properly set. Therefore the objective of this mini review is to examine the literature in the issue of thrombocytopenia and physical activity among older adults in order to provide guidelines to health care practitioners about the practice of physical activity and rehabilitation. Results show that very few studies addressed this issue. There isn't a consensus regarding cut off points of low platelets for safely performing physical activity. Moreover, there isn't a low limit cut off point for suspending all types of activity, and therefore minimizing further physical functional decline among older adults.

Keywords: Low platelets; Mobility; Activity guidelines; Cancer; Exercise

Introduction

According to the World Health Organization estimate, 14.1 million new cases of cancer occurred worldwide in 2012 [1]. It is a disease more prevalent among older adults compared to younger adults [2,3]. The incidence of cancer tends to increase among those aged 75 to 90 years of age [4], and it is anticipated that there will be a 67% increase in incidence among older adults by 2030 [5]. The disease can severely affect quality of life among older adults and a variety of physical and psychological symptoms may occur. Pain, swelling, bleeding, urinary difficulties, fatigue, weight loss, changes in bowel habits (diarrhea or constipation), cough, shortness of breath, nausea and vomiting among others may occur depending on the type and location of the cancer [6].

Although cancer is the second leading cause of death globally, accounting for 8.8 million deaths in 2015 [7], mortality rates have shown a slight decline since 1990. Reasons for this occurrence are improvements in early screening and treatment [8]. The most common types of treatments are surgery, systemic therapies, such as chemotherapy, and hormone and immune therapies [9]. Although these types of treatments can increase survival rates, they can also cause a variety of side effects that are

similar to cancer symptoms, such as fatigue, nausea, vomiting, pain, as well as signs and symptoms, such as alopecia, peripheral neuropathy and thrombocytopenia [10].

Thrombocytopenia is a condition characterized by abnormally low platelet levels in the blood. The normal platelet count among adults is between 150,000 and 450,000 platelets per microliter of blood [11]. This condition is a common side effect among patients who undergo chemotherapy. As a consequence, patients have a higher tendency for bleeding, particularly when platelet levels drop below 50,000 per microliter of blood [11]. Therefore, patients often have to limit activity levels in order to avoid bleeding.

Although thrombocytopenia represents a serious condition for all age groups, this issue may be more prominent among older adults who undergo chemotherapy, particularly those who are hospitalized, for important reasons: 1- This age group experiences a series of age-related physical and cognitive changes. Some of the main changes include a reduction in cardiorespiratory capacity [12], reduction in neuromuscular performance partly due to sarcopenia, which affects muscle

strength and power [13], and reduction in the speed of nerve conduction [14]. In addition, bone health [15], and overall metabolism may be severely affected [16]. These age-related changes commonly happen in association with other comorbidities. 2- Hospitalization may require an extended bed rest bringing negative consequences for older adults. Mobility limitation is linked with negative outcomes, such as loss of independence [17], higher risk for mortality [18], and occurrence of falls [17]. Therefore, suspending physical activity due to thrombocytopenia may present detrimental consequences for older adults.

While bed rest is needed to prevent bleeding, for older adults, the question remains, what is the tenuous line between resting to prevent bleeding and performing physical activity in order to prevent further physical and function decline, particularly those in a hospital setting? Is there a cut off point in which it is safe to suspend all physical activity? Therefore, the objective of this mini review is to examine the literature in this regard, and to provide guidance to health professionals, especially those in the physical rehabilitation field, about existing guidelines on physical activity for older adults with thrombocytopenia in hopes to guide practice.

Summary of the findings

In order to better understand the recommended types of physical activity among patients with thrombocytopenia, particularly those undergoing chemotherapy, a literature review was conducted using the following search terms: thrombocytopenia or low platelets and physical activity or exercise or rehabilitation, and older adults. Guidelines from National Cancer agencies were also included in this review. The Leukemia/Bone Marrow Transplant Program of British Columbia provides exercise recommendations for different levels of thrombocytopenia. When the blood count is less than 15,000 platelets per microliter, patients are advised to limit all activity. When platelets levels are 15,000 to 20,000 patients may do gentle exercising without resistance, such as exercising while sitting or standing, gentle stretching or taking an easy walk. When platelet levels are between 20,000 to 40,000, patients may use light resistance, such as weights or latex bands as well as faster walking and stair climbing. At platelet levels of 40,000 to 60,000 patients may perform gentle aerobic activity, such as stationary cycling. Higher levels of platelets, which are still considered low, allow patients to perform aerobic exercise, such as biking and jogging, with use of proper gear and with caution against injury [19]. The National Cancer Institute states that platelet levels below 25,000 per microliter of blood are a life threatening adverse event, but no further recommendation regarding physical activity performance is provided [20].

Sekhon and Roy [21], in an evaluation and management paper about thrombocytopenia, state that when platelet counts are below 10,000/L there is a risk for spontaneous mucocutaneous bleeding (gingival bleed, epistaxis, menorrhagia,

petechiae and ecchymoses) and risk for intracranial hemorrhage or gastrointestinal bleeding. When platelet levels are above 20,000/L, clinical manifestations are generally mild, such as easy bruising. The management of thrombocytopenia does not include performance of physical activity [21].

The American College of Sports Medicine (ACSM) had a roundtable about exercise guidelines for cancer survivors, but no specific guidelines were provided regarding exercise for patients with low platelets [22]. An updated ACSM exercise guidelines for cancer survivors recommended that exercise should be performed with caution in patients with thrombocytopenia, but no specific recommendations were made for types and intensity of exercise among those with low platelet count, or a low cut off point of thrombocytopenia to safely suspend exercise [23]. Recently, the ACSM has made exercise recommendations for persons with chronic diseases and disabilities with a consideration about thrombocytopenia. When platelet levels are between 20,000 and 50,000, patients should be limited to use elastic bands, stationary cycles, range of motion, and ambulation. Vigorous exercise is contraindicated when platelet levels are below 50,000/mm³. However, this recommendation is made subjectively, as the ACSM acknowledges that there are no studies in relation to exercise with patients who have low platelet levels [24].

The Seattle Cancer Care Alliance provides specific cut off points of low platelet levels and recommended activities for each level. For platelet levels below 10,000, only walking around the room (e.g. going to the bathroom) is allowed. For platelet levels between 10,000 and 19,999, strength training without weights and cardiovascular exercise, both without strain are allowed, if no signs of bleeding are present. For platelet levels between 20,000 and 49,999 strength training with weights and cardiovascular exercise are allowed without strain, if the patient has no signs of bleeding [25].

Discussion and Practical Implications

The objective of this review was to provide guidance to health professionals about guidelines for physical activity among older adults with thrombocytopenia, particularly those undergoing chemotherapy. Based on the findings presented in this review, very few studies addressed the issue of physical activity or exercise for older adults with thrombocytopenia. The existing guidelines are inconsistent and lack scientific rigor and testing. Additionally, there is no lower limit, under which it is safe to suspend physical activity.

Given the inconsistency of these guidelines, the choice between physical activity and rest is arbitrary. The health care practitioner's decision to suspend all types of physical activity may prevent excessive and dangerous bleeding, but may also cause further damage to physical function, and other fitness-related components, such as strength and endurance. Considering that older adults are a vulnerable group due to physiological age-

related changes, coupled with other co-morbidities, the decision to suspend all physical activity can pose a serious health threat to mobility. For those undergoing chemotherapy, and who are hospitalized, the situation may be even more complex. Blood count starts to drop after chemotherapy, taking from 7 to 10 days to reach the lowest count, and it can take from 2 to 3 weeks for the patient to recover [21]. The inexistence of effective guidelines for physical activity may present a detrimental effect on older adults' mobility and autonomy, as rapid physical reconditioning may occur. As chemotherapy treatment happens in cycles, thrombocytopenia can occur frequently.

Conclusion

Existing guidelines on physical activity among older adults with thrombocytopenia lack empirical evidence. Future studies in this area are needed in order to safely establish physical activity performance by cut off points of thrombocytopenia. Other physical activity measurement parameters, such as frequency, intensity, type, and duration should also be considered by each cut off point. There is a particular need for establishing a low limit of platelet levels in which physical activity must be suspended. The lower cut off point would avoid dangerous bleeding, and yet minimize further functional decline among older adults.

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