Austin Pain & Relief

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Mini Review

When Pain Persists, Disability in Elders Can Begin

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Received: October 12, 2016; **Accepted:** January 11, 2017; **Published:** January 18, 2017

Abstract

Among the most tragic endpoints during aging are disability and dependency. To prevent these situations, the early detection of possible risk factors needs to be properly standardized in daily clinical practice. Pain is one of the most common causes of medical visits, and it should be identified as a target to prevent its long-term consequences. Recently, an association between chronic pain and frailty has been found. Frailty is a syndrome found in elderly patients that predisposes individuals to physical limitation and death. Possible pathophysiological pathways triggered by chronic pain that predispose individuals to physical limitation are discussed.

Keywords: Chronic pain; Frailty; Elders; Disability

Introduction

Human aging is a gradual and adaptive process characterized by the loss of physical and cognitive capacities without any evidence of a defined disease. Pain is by far one of the most common symptoms presented in daily clinical practice. When pain persists for longer than three months, it is defined as Chronic Pain (CP), and it can transform from a symptom to an independent medical condition. In geriatric patients, the management of CP becomes increasingly complicated because of age-related homeostatic imbalances, especially in systems related to pain perception, pain inhibition and pain interpretation [1]. The assessment of CP in elders becomes a challenge for many reasons, including cognitive impairments, lack of family support and/or abuse, the existence of comorbidities and polypharmacy; such factors can cause CP to be underestimated in this population [2]. In addition to the implications of unidentified or incorrectly treated CP for life quality and mood equilibrium, its recent association with frailty in elders makes it a potential risk factor for an established and irreversible functional limitation state.

Chronic Pain (CP)

When CP is established, regardless of its cause, general alterations in the organism are triggered, as many authors have noted [3-5]. Nevertheless, when considering elder patients from an integrated geriatric point of view, there are main factors and systems involved that could play a key role in the predisposition to develop frailty. Two main aspects need to be addressed: the perception of pain and the pathophysiological adaptation to CP.

Regarding the perception of pain in elderly patients with preserved cognitive functions, physiological changes in the somatosensory system have been described, such as demyelination and remyelination of Aδ fibers [6] that results in an increase in the pain threshold. This means that elders have a reduced ability to detect harmful signals. However, when a stimulus is perceived, the threshold of pain tolerance is mostly diminished, and pain rapidly becomes unbearable [4]. If we consider this situation together with the facts that up to 38% of this population might present major depression disorder and up 40% of depressed patients are under-diagnosed, we have a situation where "unbearable pain" affects a person who already feels depressed in most of cases [7]. Moreover, depression has been demonstrated to mediate functional limitation in patients with low incomes [8].

Regarding the pathophysiological changes that take place after CP is established, three main systems are affected: the autonomic nervous system, the hypothalamo-pituitary-adrenal axis and the immune system [3]. The main alterations observed, respectively, are: 1) decreased parasympathetic activity, which correlates with poor health and low life expectancy; 2) altered cortisol levels, either increased or decreased, which affect circadian rhythms and mood regulation; and 3) impaired inflammation responses that shift the balance toward either a pro- or anti-inflammatory status for longer periods and lead to altered cytokine secretion [3]. All these changes represent a spending of the homeostatic reserve, which, depending on genetics, the level of comorbidities and polypharmacy, will place the individual at a higher risk of becoming frail.

Frailty

Frailty is a syndrome that develops during aging. It refers to a reduction of the homeostatic reserve that reduces the individual's resistance to any type of stress, a term known as homeostenosis [9]. This situation increases elders' vulnerability to all types of health threats, such as falls, hospitalization or illness. The importance of frailty resides in fact that it is a direct predecessor of disability that can be reversed, thus preventing a frank limitation state if it is diagnosed and managed in a timely way. Its prevalence is age-dependent and varies between 7 -12%among different populations [10]. Additionally, depending on the tools used for the assessment further differences in the prevalence are observed [11].

Citation: Jiménez-Garduño AM, Castañeda-Morales VM and Ortega A. When Pain Persists, Disability in Elders Can Begin. Austin Pain Relief. 2017; 2(1): 1006.

The assessment tools for frailty rely on two main pathophysiological hypotheses: the frailty phenotype, based on a sarcopenia model proposed by Fried, et al. [12], and the frailty index, proposed by the Canadian Study of Health and Aging [13]. Both represent good evaluation options but should be chosen according on the goal of research. The frailty phenotype considers five criteria: weight loss, exhaustion, low energy expenditure, walking slowness and weakness [12]. It classifies individuals as robust (no criteria met), pre-frail (1-2 criteria met) or frail (3 or more criteria met) and is a very practical tool that any physician can easily apply in daily clinical practice. In comparison, the frailty index gives a numerical value and is a more complex clinical evaluation that can be performed only by geriatricians [13].

If we consider the frailty phenotype, we find that a frail person will have a 10-times higher risk of becoming functionally limited or dependent and a 6-times higher risk of death compared with the non-frail elderly population [12]. The health costs of disability and dependency make frailty one of the best cost-benefit diagnoses for preventing the physical deterioration of patients and protecting the emotional health of patients and their social/familial network.

Pain and frailty

The association between pain and physical limitations was observed even before the frailty concept was described. However, the concept of frailty allowed a standardized classification of patients to provide a specific prediction of the disability and death risk and the establishment of concrete therapeutic goals.

The association between pain and frailty has been studied by many authors and carefully reviewed elsewhere [14]. In most of the studies, frail subjects showed more severe pain when compared with pre-frail or robust individuals. However, the different evaluation tools for detecting pain vary dramatically from one study to another, making it difficult to establish a clear correlation. Even more, in almost all studies, acute pain was evaluated, and a causative association was difficult to determine [15-17].

We propose that regardless of the type of pain, the most widespread factor when considering pain as a risk factor for frailty is its duration. The persistence of pain challenges the homeostatic reserves of any individual, and when aging, comorbidities and polypharmacy are added, it is easier to reach the homeostenosis state. We recently described for the first time a positive association between CP and frailty in a population of Mexican elders as a first approach to evaluating the role of CP in the physiopathology of frailty [18]. Future aims to clarify this relationship between conditions are to analyze the association using the frailty index and to follow a cohort in which a real causative association between CP and frailty can be established.

Conclusion

In conclusion, the identification of CP in elderly patients needs to become a priority in geriatric clinical practice. CP is a condition that affects individuals in the bio-psycho-social sphere and has devastating consequences for life quality. Its recent association with frailty also makes it a potential risk factor for developing disability if it is not detected and managed in a timely manner. Efforts towards the identification and targeted management of CP need to be encouraged in any clinical practice attending elderly patients.

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Austin Pain Relief - Volume 2 Issue 1 - 2017
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