

Can Physical Activity Help in Hepatitis C Treatment? A Mini Review

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Conflict-of-interest statement: The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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Received: August 4, 2018

Revised: November 16, 2018

Accepted: November 19, 2018

Published online: February 21, 2019

ABSTRACT

Hepatitis C (HCV) is a major public health problem worldwide and can lead in many cases to liver transplants. The liver condition

of the patient is multifactorial, with genetic, biochemical profile immune system and lifestyle as a protagonist of such a process which has as one of the clinical outcomes hepatic fibrosis, increasing the progression of the cell subject to hepatocellular carcinoma. These parameters directly influence the fibrous framework of HCV patients that may be worsened by maintaining physical inactivity frame and biochemical profile disruption, since it favors the inflammatory and fibrogenic process. Since studies with patients with HCV and physical activity are quite scarce, they demonstrate the efficacy of physical activity on the fibrotic and hepatic condition of patients with hepatitis C virus, since this requires a prescriptive planning with quality and adequate for these individuals. Thus defining the best type of physical activity or exercise that will bring the best effects to patients with hepatitis C and other hepatic comorbidities, which can condition the lifestyle of these individuals and thus lead to better pathophysiological stages, avoiding the progression of the disease, providing an improvement of their health, and psychosocial since the physical activity and / or exercise guarantee the activation of elements linked to the neuroendocrine axis activating the secretion of endorphins guaranteeing the well-being of the patients with this pathology. Thus the objective of this review is to describe the main benefits of physical activity within the pathophysiological processes found in patients with HCV.

Key words: Motor Activity; Hepatology and Exercise

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de Sousa Fernandes, de Lima EA, da Silva LO, Oliveira TL, Santos GCJ, da Costa Ribeiro I, de Siqueira ERF, de Lira CTC, de Lucena Simões e Silva L. Can Physical Activity Help in Hepatitis C Treatment? A Mini Review. *Journal of Gastroenterology and Hepatology Research* 2019; **8(1)**: 2789-2792 Available from: URL: <http://www.ghrnet.org/index.php/joghr/article/view/2394>

INTRODUCTION

Hepatitis C is a major public health problem worldwide and can lead in many cases to liver transplants^[1]. The adequate liver condition of the patient is multifactorial, with genetic, biochemical profile

immune system and lifestyle as a protagonist of such a process which has as one of the clinical outcomes hepatic fibrosis generated by collagen deposition in the extracellular matrix of hepatocyte, increasing the progression of the cell subject to hepatocellular carcinoma^[2-4] demonstrated that regular physical activity can positively modulate the levels of enzyme components to the clinical condition of young adult patients. In addition, the anthropometric profile appears in a mutual way, aiding in the screening of cardio metabolic comorbidities, which are a double cause of aggravation in his health^[4].

These parameters directly influence the fibrous framework of HCV patients that may be worsened by maintaining physical inactivity frame, lifting anthropometric and biochemical profile disruption, since it favors the inflammatory and fibrogenic process^[5] activating stimulation pathways to this process, demonstrating how much the practice of physical activity and physical fitness assessment are necessary to generate quantitative and qualitative change in liver morphology and function^[6].

Since studies with patients with HCV and physical activity are quite scarce, they demonstrate the efficacy of physical activity on the fibrotic and hepatic condition of patients with hepatitis C virus, since this requires a prescriptive planning with quality and adequate for these individuals, Thus defining the best type of physical activity or exercise that will bring the best effects to patients with hepatitis C and other hepatic comorbidities, which can condition the lifestyle of these individuals and thus lead to better pathophysiological stages, avoiding^[5,7,8].

The progression of the disease, providing an improvement of their health, and psychosocial since the physical activity and / or exercise guarantee the activation of elements linked to the neuroendocrine axis activating the secretion of serotonin and endorphins guaranteeing the well-being of the patients with this pathology^[2].

The proposal of a program of hepatic, cardiovascular and metabolic activity through physical activity and / or exercise, which would benefit patients not only with hepatitis C, but also with other liver diseases, in their clinical management, reducing the processes associated with establishing the chronic of such pathology^[8].

Therefore, the objective of this mini review is to describe the main benefits of physical activity within the pathophysiological processes found in patients with hepatitis C.

DEVELOPMENT

Hepatic fibrosis and inflammation caused per hcv virus

In the current context extensive research has shown a direct relationship between a population of inflammatory cells and the advancement of liver fibrosis process in experimental models, where the immune system can regulate both the progression and regression of liver fibrosis^[2].

It is possible that this population of immunological cells extensively studied in hepatic fibrosis is the population of macrophages. In fibrous livers, macrophages are in the vicinity of activated my fibroblasts, in areas of scar tissue^[9,10]. In the liver, there is a population of macrophages that can be defined as resident, called Kupffer Cells. In cases of absence of liver injury Kupffer cells predominate and constitute the largest population of macrophages resident in the body^[11,12].

Liver fibrosis is associated with major changes in both the quantity and composition of the extracellular matrix (ECM). In advanced stages the liver contains about 6 times more ECM than normal, including collagens (I, III and IV), fibronectin, laminin, hyaluronic

acid and proteoglycans^[13]. The accumulation of ECM is a result of the imbalance between increased synthesis of inhibitors of metalloproteinases (TIMPs) and decreased degradation of the fibrous mesh (matrix metalloproteinases) MMPs^[14,15].

The maintenance of this pro-fibrotic condition is mediated by positive feedback involving autocrine and paracrine effects of cytokines and growth factors and cell-cell and cell-matrix interactions. It is likely that the process that determines whether a will cause injury in a self-limited or pathogenic scar repair, such as fibrosis, involve several factors, among which the balance of lymphocyte response T helper 1 and 2 (Th1 and Th2), subpopulations pro-inflammatory and pro-operative macrophages and the response of lymphoid cells^[14,15].

Hepatic c and physical activity: benefits at hepatic level

It is not known today that the increase in daily physical activity levels generates innumerable benefits to the organism such as glycemic, lipid profile regulation, hemodynamic modulation and body mass control being significant for the number of NCDs. In the intrahepatic environment, studies show that a change in the lifestyle of the patient with hepatic pathology generates positive changes in biochemical and organic levels, improving the hepatic condition in a global way, being extremely important in the control of chronic pathological processes in liver^[4].

A study in Mexico, conducted by (Vandyck *et al* 2007), evaluated 17 HCV-infected individuals without drug treatment, where they were investigated: anthropometric standards, metabolic status and immunological response of these patients, submitted to a walking protocol for six months. The results showed that 70.0% of them were obese or overweight and 77.0% had peripheral resistance to insulin (INR). Plasma levels of ALT were observed to decrease (106 ± 93 U / L vs 59 ± 32 U / L, $p < 0.01$), in the ALT / AST rate (1.04 vs 0.70 , $p < 0.01$), in triglycerides (165 ± 86 mg / dL vs 124 ± 49 mg / dL) and peripheral resistance to insulin (4.0 vs 2.7).

In addition to reports of 88.0% of the individuals who felt better health at the end of the six-month protocol. Another extremely relevant result of this study was the reduction in viral load detected in four individuals, this is due to modulation of the exercise^[8].

In the present study, the use of HCV in the prevention and treatment of HCV infection has been shown to increase the risk of HCV infection. In another study^[16], evaluated the combined effect of diet plus exercise (30 min of moderate activity walking, jogging with light intensity and cycling - three to seven times a week) over a period of 12 months. In the low calorie and hypolipidic diets associated with exercise on body mass, lipid and hepatic profile.

In addition, they achieved a reduction in insulin resistance and in the severity of steatosis and hepatic fibrosis. However, studies that perform such associations between Hepatitis C and physical activity are very scarce, however, it has been demonstrated that a range of the most varied types of physical activity and exercise in several protocols have brought innumerable benefits to the hepatic and systemic levels in a transversal and longitudinal way.

Other benefits of exercise and / or exercise are related to the reduction of oxidative stress in a review of the literature by^[17], demonstrated that exercise in different types and with mild to moderate intensity can modulate stress pathways oxidative and the production of reactive oxygen species such as hydrogen peroxide, super anions, among others, besides mitigating mitochondrial disturbances that lead to a decrease in the energy flow at cellular and organic level.

In addition, the regular practice of aerobic exercise increases

the maximum volume of oxygen through cellular modulations in the production of red blood cells, culminating in an increase in the number of hemoglobin^[17]. In addition, it is believed that it can modulate the multiple^[17], already in patients infected with HCV, suffer from oxidative-reductive disorders and require more energy in the form of adenosine triphosphate (ATP) to combat the comorbidities generated per HCV.

PHYSICAL ACTIVITY

Modulation of hepatic fibrogenesis

Within the liver pathologies there are several elements that compose its physiopathology, one of these elements is hepatic fibrosis that is characterized by an increase by deposition of collagen in the extracellular matrix of the hepatocytes^[2], stimulating in this way a cascade of Immunological reactions mediated by inflammatory processes.

These processes lead to cell differentiation, where a healthy hepatocyte is affected by the virus and progressive deposition of collagen until it is transformed into myofibroblast by the stimulation of macrophages of the M1 species, activating the immune machinery, which has repercussions^[2]. Such a cell has as a functional characteristic a lower level of elasticity, leading the hepatocyte to the lower of its functionality, cell apoptosis as it is transdifferentiated in a stellate cell (hepatic biomarker for intrahepatic apoptosis)^[18]. On the basis of a study conducted by Oh, S *et al* 2014 and coworkers demonstrated in patients with non-alcoholic fatty liver disease that the practice of physical activity, in the form of walking with a quantitative of 240 minutes per week that decreased liver stiffness o Which demonstrates that this element is properly applied and supervised can modulate the fibrogenic profile of these patients.

The practice of exercise in appropriate environments preserves the extracellular matrix of events linked to oxidative stress that results in an excessive release of the reactive oxygen species (ROS) that can disrupt the cellular functionality that in this way cannot control the deposition of fundamental membrane proteins Such as keratin, collagen, elastin, among others, and this may be due to the performance of HCV after its installation or cellular environment, as the ROS production is replicated increases and potentiates this phenomenon^[17].

However, the exact mechanism by which collagen modulation occurs through physical activity and / or exercise and other lifestyle factors is still totally misunderstood, however, it is assumed that fibrogenic modulation is due to decreased expression of non-bound genes (COL1A1), decorin (DCN), fibronectin (FN1) and fibromodulin (FMOD) and this decrease occurs as the collagen is removed, but also the extracellular matrix as collagen type I alpha Increase in the levels of daily physical activity, since physical activity and / or exercise interfere in metabolic reactions related to these elements, positively modulating the morpho-functionality of the organ^[8,2].

In hepatitis C studies between the fibrogenic pathways and physical activity and / or exercise are scarce since they are often not related to such processes, however intervening with physical activity in an HCV infected patient may prevent the progressivity of the fibrotic picture of the individuals leading to a better quality of life.

Patients with hepatitis C in the initial fibrotic group may be more favored by an intervention with physical activity than those who are in more advanced conditions, due to the locomotor state in which they are, being unfit for the participation of a practice of physical activity and physical exercises that It lacks an adequacy under its prescription structure to encompass the different age groups with

different neuromuscular conditions.

PHYSICAL ACTIVITY

Modulation of the biochemical profile

In the medical clinic certain biomarkers are analyzed to identify a pathology, within hepatic diseases it is no different. In hepatitis c specifically are analyzed are AST and ALT which are two hepatic transaminases that measure a series of metabolic reactions for homeostatic maintenance, the As HCV is installed, it begins to generate a characteristic inflammatory process, signaling the presence of an antigen if the levels of these biomarkers are significantly increased, which leads to a hepatic serious^[2].

Another evaluated marker is the total bilirubin that is summarized in a pigment produced by the breakdown of the heme group and the reduction of circulating biliverdin in the blood plasma, high levels of this substance can lead to a classic symptomatology in patients with jaundice hepatitis, characterized by the aspect Yellowish in the body and eyes. Alkaline phosphatase is found in the blood and liver is found at the edges of the cells that bind to form bile ducts, small tubes that drain bile from the liver to the intestine, where it is needed to aid in the digestion of Fats. Bone alkaline phosphatase is produced by osteoblasts, cells that are involved in bone formation, excess of this enzyme can lead to systemic disorders.

GGT is an enzyme found in various organs of the body, such as kidney, liver, gall bladder, spleen and pancreas. Among these, the liver is the main source of GGT in the blood. The GGT test measures the amount of this enzyme in the blood and evaluates liver function. The GT range is present in the cells of the bile ducts, and the injury of these cells causes the elevation of their enzymes in the blood^[6].

However, the GT gamma examination is not as specific since the enzyme can be found in large quantities in several other organs. Therefore, it is common for this test to be done together with the dosage of alkaline phosphatase, and the two high results are more indicative of problems^[6,8].

Another important biomarker at hepatic level is alkaline phosphatase (AF), this enzyme hydrolase participates in metabolic reactions important for the removal of phosphate groups, known as dephosphorylation and this process occurs within a large number of molecules such as proteins, nucleotides and alkaloids^[6,8,16].

The FA is important in laboratory practices related to the diagnosis of numerous diseases such as hepatitis B and C, osteoporosis and raquistism, the latter mentioned diseases that disturb the levels of the calcium ions present in the organism, seeming to have an inversely proportional relation, because when the Alkaline phosphatase is at high levels causing osteogenesis by reducing the uptake of calcium and vitamin D^[16].

However, it is seen in the literature that exercise and / or physical activity modulate calcium metabolism and its uptake, in addition to instigating osteogenesis within the most diverse maturational states, but confirmatory studies are required to demonstrate that it can modulate the levels of phosphatase causing benefits both to the liver, and throughout the body.

CONCLUSION

Indeed, physical activity can play an important role in the control of the pathophysiological processes of hepatitis C, acting as a first line therapy in these patients in the prevention, control and treatment of their comorbidities. More experimental studies are needed to prove these benefits.

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