Archive of Obstetrics, Gynecology and Reproductive Medicine
AOGRM, 2(2): 40-42
www.scitcentral.com
ISSN: 2640-2297
Mini Review: Open Access

Chlorella and Treatment of Primary Dysmenorrhea: A Mini Review

Fatemeh Haidari[1*] and Behnaz Abiri[2]

*[*1]Nutrition and Metabolic Diseases Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*
[2]Department of Nutrition, Faculty of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Received January 30, 2019; Accepted February 07, 2019; Published May 10, 2019

ABSTRACT

Dysmenorrhea is one of the most usual causes of pelvic pain. It has negative effects on woman's quality of life and sometimes leads to daily activity restriction. Primary dysmenorrhea is menstrual pain without pelvic pathology. Abnormal bleeding, noncyclic pain, alteration in pain severity and duration, and abnormal pelvic examination findings propose secondary dysmenorrhea and need more assessment. Treatment options for primary dysmenorrhea are consist of non-steroidal anti-inflammatory drugs and hormonal contraceptives. Due to side effects related to such treatments, women seek complementary and alternative medicines. The aim of this paper is to evaluate the reasons for using chlorella to improve the side effects of primary dysmenorrhea.

Keywords: Primary dysmenorrhea, Chlorella, Systemic symptoms, Inflammation

INTRODUCTION

Primary dysmenorrhea explains the lower abdominal pain that is occurred during menstruation in young women of all races and without pelvic pathology [1,2]. It was estimated that 60-88% of young women suffer from primary dysmenorrhea [3-5]. Even though, primary dysmenorrhea is not life treating and does not lead to birth defects, but it has negative influences on woman's quality of life [6]. It has been reported that the initiation of primary dysmenorrhea to be basically associate to prostaglandin F2alpha (PGF2α), oxytocin and vasopressin [7]. The production and release of PGF2α in women suffering from dysmenorrhea may be significantly elevated, leading to the uterine tone and cramps and subsequently resulting in pain [8]. The overall goal of dysmenorrhea treatment is the decreased of reported pain and related systemic symptoms, ameliorated performance including fewer days lost from daily activities [9]. The primary pharmacological therapies have concentrated on reducing menstrual pain and returning physical performance by using of non-steroidal anti-inflammatory drugs (NSAIDs) or oral contraceptives [9]. However, the constant use of non-steroidal anti-inflammatory drugs and oral contraceptives was shown to be related to side effects including gasterointestinal discomfort or harms to the mucosa [9]. The side effects associated with such treatments have led patients to seek complementary and alternative medicines such as supplements.

Chlorella is a kind of unicellular green algae including high concentration of protein, lipid, vitamins, antioxidants such as lutein, α and β-carotene, ascorbic acid, tocopherol and minerals [10-12]. Chlorella has the capacity to wipe off free radicals and has advantageous impacts on regulating the physiological functions of body in malignant diseases resulted from stress [13,14]. In addition, chlorella can ameliorate lipid profile and reduce lipid peroxidation [15,16]. It has been demonstrated that chlorella decreased pro-inflammatory mediators and cytokines while preventing vascular disorders related to chronic inflammation [17,18].

This review aims to provide the reasons for using chlorella to improve the side effects of dysmenorrhea.

MECHANISMS OF ACTION

In the only clinical trial with the aim of evaluating the impacts of chlorella supplementation (1500 mg/day, for 8 weeks) on the systemic symptoms and serum concentrations of prostaglandins, inflammatory and oxidative biomarkers in women (aged 18-35 years) with primary dysmenorrhea,

Corresponding author: Fatemeh Haidari, Nutrition and Metabolic Diseases Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran, Tel: +986133738319; E-mail: haidari58@gmail.com

Citation: Haidari F & Abiri B. (2019) Chlorella and Treatment of Primary Dysmenorrhea: A Mini Review. Arch Obstet Gynecol Reprod Med, 2(2): 40-42.

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results of the intervention showed significant reduction in PGE2, PGF2α, hs-CRP and MDA, as well as systemic symptoms of dysmenorrhea (headache, fatigue, nausea, vomiting, and lack of energy) in chlorella supplemented group, compared to placebo group [19]. Hence, this study demonstrates that chlorella could decrease inflammation and lipid peroxidation. In agreement with the results of this study, it has been demonstrated that violaxanthin extracted from microalga chlorella ellipsoidea could suppress production of PGE2 and decreases COX-2 mRNA expression [20]. Chlorella vulgaris extract could inhibit pro-inflammatory mediators and prostaglandin E2 production [17]. It has been shown that COX-2 leads to the production of large concentrations of inflammatory mediators such as prostaglandins. PGE2 is a mediator with some apparently unrelated impacts that leads to swelling, pain, and stiffness. Thus, inhibition of PGE2 may consider as an advantageous approach for improving the treatment.

The results of different studies indicated that chlorella supplementation could decrease serum hs-CRP and MDA concentrations in non-alcoholic fatty liver patients [18,21]. The alcoholic extract of chlorella vulgaris reduced lipid peroxidation biomarkers in naphthalene exposed rats [22]. In another investigation, chlorella supplementation in hypercholestrolemic rats decreased inflammatory biomarkers and oxidative damage [23]. It was shown that in chlorella vulgaris fed mice the oxidant capacity ameliorated and plasma and liver concentration of MDA was reduced [24,25].

Chlorella contains a lot of amounts of carotenoids, chlorophyll, α-tocopherol, ascorbic acid and vitamin D; it has the complete vitamin B-complex, and is a rich source of antioxidant minerals which are important for the functions of biological systems within the body. Chlorella vulgaris has the capacity to decrease lipid peroxidation and can be due to the free radical scavenging effects of polyphenols and carotenoids available in this microalga. Carotenoids particularly α and β-carotene, clean radicals and cease the peroxidation process [26-28]. Vitamin E can hinder arachidonic acid oxidation and prostaglandins production. It has been reported that vitamin E decreased the severity and duration of primary dysmenorrhea [29,30].

CONCLUSION

In conclusion, it seems that chlorella supplementation could improve the systemic symptoms and inflammation associated with dysmenorrhea. This effect is resulted from anti-inflammatory and anti-oxidant properties of chlorella.

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