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.

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.

REFERENCES

1. Osayande AS, Mehulic S (2014) Diagnosis and initial management of dysmenorrhea. Am Fam Physician 89: 341-346.
2. Koninckx PR, Ussia A, Adamyan L, Keckstein J, Wattiez A (2017) Primary dysmenorrhea. J Obstet Gynecol Can 39: 578-579.
3. Kural M, Noor NN, Pandit D, Joshi T, Patil A (2014) Menstrual characteristics and prevalence of dysmenorrhea in college going girls. J Fam Med Prim Care 4: 426-431.
4. Polat A, Celik H, Gurates B, Kaya D, Nalbant M, et al. (2009) Prevalence of primary dysmenorrhea in young adult female university students. Arch Gynecol Obstet 279: 527-532.
5. Aksoy AN, Laloglu E, Ozkaya AL, Yilmaz EP (2017) Serum heme oxygenase-1 levels in patients with primary dysmenorrhea. Arch Gynecol Obstet 295: 929-934.
6. Celik H, Gurates B, Parmaksiz C, Polat A, Hanay F, et al. (2009) Severity of pain and circadian changes in uterine artery blood flow in primary dysmenorrhea. Arch Gynecol Obstet 280: 589-592.
7. Akerlund M (1993) The role of oxytocin and vasopressin in the initiation of preterm and term labor as well as primary dysmenorrhea Regul Pept 45: 187-191.
8. Gao L, Jia C, Zhang H, Ma C (2017) Wenjing decoction (herbal medicine) for the treatment of primary dysmenorrhea: A systematic review and meta-analysis. Arch Gynecol Obstet 296: 679-689.
9. Ryan SA (2017) The treatment of dysmenorrhea. Pediatr Clin North Am 64: 331-342.
10. Guzman S, Gato A, Calleja JM (2001) Anti-inflammatory, analgesic and free radical scavenging activities of the marine microalgae *Chlorella stigmatophora* and *Phaeodactylum tricornutum*. Phytother Res 15: 224-230.
11. Yamagishi S, Nakamura K, Inoue H (2005) Therapeutic potentials of unicellular green alga Chlorella in advanced glycation end product (AGE)-related disorders. Med Hypotheses 65: 953-955.
12. Jeong H, Kwon HJ, Kim MK (2009) Hypoglycemic effect of Chlorella vulgaris intake in type 2 diabetic Goto-Kakizaki and normal Wistar rats. Nutr Res Pract 3: 23-30.
13. Queiroz ML, Da Rocha MC, Torello Co, de Souza Queiroz J, Bincoletto C, et al. (2011) *Chlorella vulgaris* restores bone marrow cellularity and cytokine production in lead-exposed mice. Food Chem Toxicol 49: 2934-2941.
14. Yun H, Kim I, Kwon SH, Kang JS, Om AS (2011) Protective effect of *Chlorella vulgaris* against lead-induced oxidative stress in rat brains. J Health Sci 57: 245-454.

15. Shibata S, Hayakawa K, Egashira Y, Sanada H (2007) Hypocholesterolemic mechanism of chlorella: Chlorella and its indigestible fraction enhance hepatic cholesterol catabolism through up-regulation of cholesterol 7alphahydroxylasein rats. Biosci Biotechnol Biochem 71: 916-925.

16. Vijayavel K, Anbuselvam C, Balasubramanian MP (2007) Antioxidant effect of the marine algae *Chlorella vulgaris* against naphthalene induced oxidative stress in the albino rats. Mol Cell Biochem 303: 39-44.

17. Sibi G, Rabina S (2016) Inhibition of pro-inflammatory mediators and cytokines by *Chlorella vulgaris* extracts. Pharmacogn Res 8: 118-122.

18. Shrafi A, Ebrahimi Mamaghani S, Kakaei F, Javadzadeh Y, Asghari Jafarabadi M (2014) The effect of complex *Chlorella vulgaris* microlevel on inflammatory factors in patients with non-alcoholic fatty liver: A double-sided clinical trial. Journal of Mazandaran University of Medical Sciences 24: 113-121.

19. Haidari F, Homayouni F, Helli B, Haghighizadeh MH, Farahmandpour F (2018) Effect of Chlorella supplementation on systematic symptoms and serum levels of prostaglandins, inflammatory and oxidative markers in women with primary dysmenorrhea. Eur J Obstet Gynecol Reprod Biol 229: 185-189.

20. Soontornchaiboon W, Joo SS, Kim SM (2012) Anti-inflammatory effects of violaxanthin isolated from microalga *Chlorella ellipsoidea* in RAW 264.7 macrophages. Biol Pharm Bull 35: 1137-1144.

21. Ebrahimi-Mameghani M, Aliashrafi S, Khoshbaten M, Allahverdi Mamaghani B (2013) The effect of microalgae *Chlorella vulgaris* supplementation on lipid profile and lipid peroxidation in non-alcoholic fatty liver disease: A double-blind randomized clinical trial. Journal of Mazandaran University of Medical Sciences 23: 9-18.

22. Vijayavel K, Anbuselvam C, Balasubramanian MP (2007) Antioxidant effect of the marine algae *Chlorella vulgaris* against naphthalene induced oxidative stress in the albino rats. Mol Cell Biochem 303: 39-44.

23. Renju GL, Muraleedhara Kurup G, Saritha Kumari CH (2014) Effect of lycopene from *Chlorella marina* on high cholesterol induced oxidative damage and inflammation in rats. Inflammopharmacol 22: 45–54.

24. Kim YJ, Jeong S, Kwon S, Kim MK (2009) Effect of chlorella vulgaris Intake on Anti-oxidative capacity in rats oxidatively stressed with dietary cadmium. Food Sci Biotechnol 18: 1055-1062.

25. Yun H, Kim I, Kwon SH, Kang JS, Om AS (2011) Protective effect of *Chlorella vulgaris* against lead-induced oxidative stress in rat brains. J Health Sci 57: 245-454.

26. Valdivia VB, Butron RO, Reynoso MP, Garcia AH, Europa EC (2011) *Chlorella vulgaris* administration prevents HgCl2-caused oxidative stress and cellular damage in the kidney. J Appl Phycol 23: 53-58.

27. Son YA, Shim JA, Hong S, Kim MK (2009) Intake of Chlorella vulgaris improves anti-oxidative capacity in rats oxidatively stressed with dietary cadmium. Ann Nutr Metab 54: 7-14.

28. Lee SH, Kang HJ, Lee HJ, Kang MH, Park YK (2010) Six-week supplementation with Chlorella has favorable impact on antioxidant status in Korean male smokers. Nutrition 26: 175-183.

29. Ziaei S, Zakeri M, Kazemnejad A (2005) A randomised controlled trial of vitamin E in the treatment of primary dysmenorrhoea. BJOG 112: 466-469.

30. Yaghmaei M, Myrtymvry M, Mokhtari M, Mohammadi M (2007) Comparison of mefenamic acid and vitamin E with mefenamic acid on the pain. J ReprodInfertil 6: 187-193.