Assessment of vitamin D Concentration and Many Biochemical Parameters in Irritable Bowel Syndrome Patients in Kirkuk City

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Abstract: The present study was designed to show the correlation between Irritable Bowel Syndrome (IBS) and vitamin D concentration. 40 patients who had irritable bowel syndrome (IBS) and in addition to 20 blood samples for healthy people with age: 25-65 years, blood samples were collected from Kirkuk General Hospital from March 2016 to December 2016. The results of present study detects significant decreased ($P < 0.05$) in Vitamin D concentration in irritable bowel syndrome group compare with apparently healthy. Lipid profile (cholesterol, triglyceride, LDL and VLDL) has been increased, whereas HDL decreased, the patients suffering IBS show significant increasing ($P < 0.05$) in malondialdehyde while GSH showed decreased compare with apparently healthy. It has concluded that the Irritable Bowel Syndrome (IBS) lead to significant changes ($P < 0.05$) in vitamin D concentration and biochemical parameters.

Keywords: Irritable Bowel Syndrome (IBS); vitamin D; Lipid profile; Oxidative stress.

I. Introduction

Irritable bowel syndrome (IBS) is a major cause of abdominal pain and gut disorders. The universal spread of irritable bowel syndrome is proximately to be between 10% and 20% of the adult population ^[1], which shows IBS to be the major frequent diagnosis in gastroenterology ^[2]. A person with Irritable bowel syndrome is typically disordered by abdominal pain or and altered bowel movements (diarrhea and constipation).

Other problems are flatulence, bloating, urgency to defecate, a sense of incomplete evacuation of the bowel, early satiety, and sometimes nausea ^[1]. People with Irritable bowel syndrome represent 20-50% of all patients in gastroenterology care, and in primary care they represent 12% of all health care seekers ^[3, 4]. Research has looked into vitamin D's potential involvement with disease pathogenesis, severity and perhaps treatment ^[3, 5]. Vitamin D deficiency is a

global epidemic and has been a parallel change in the human intestinal microbiome thought to be linked to the increasing incidence of obesity, hypertension, high cholesterol, autoimmune disorders, and atherosclerotic heart disease [6, 8]. So the aim is study the level of vitamin D and lipid profile in irritable bowel syndrome patients.

2. Materials and Methods

2.1 Subjects

This study was conducted in Kirkuk General Hospital on 80 patients who had irritable bowel syndrome (IBS) and in addition to 40 blood samples from healthy people starting from July 2016 to December 2016. The clinical status of patients have been diagnosed by doctors specialized in digestive tract department. The questionnaires of patients have been filled in for every patients their ages ranged from (25 to 65) years.

2.2 Experimental design

60 subjects (40 with irritable bowel syndrome and 20 without irritable bowel syndrome) were divided as following:

- ❖ **Group 1:** It included a total of 40 patients (males); their ages ranged from (25-65) years. All patients are

suffering from Irritable bowel syndrome.

- ❖ **Group 2:** This group was include 20 apparently healthy subjects as control group (males), and their ages ranged from (25 to 65) years.

2.3 Sample collections

5 ml of blood were collected from the antecubital vein from patients and healthy volunteers and kept in plain tubes. After allowing the blood to clot at room temperature for 15 min, blood samples were centrifuged at 2500 rpm for 15 min. Serum were separated, divided into aliquots and frozen at -4 C° for estimation the concentrations of vitamin D and lipid profile.

2.4 Statistical analysis

The results of present study were analyzed statistically by using the test of Variance (ANOVA), in order to evaluate the variability significance between patients and healthy groups. The means of data were compared using Duncan's Multiple Range test [9].

3. Results & Discussion

3.1 Vitamin D concentration

Vitamin D in irritable bowel syndrome group (11.7 ± 3.4) show significant decreased ($P < 0.05$) compare with apparently healthy (22.67 ± 7.12) (fig: 1).

Figure (1): Vitamin D levels in patients and healthy men groups.

The areas of the gut involved in vitamin D absorption is centered predominantly in the ileum (70–80%)^[10], with most of the vitamin D receptors and regulatory mechanisms in the cecum and colon regions, the importance of vitamin D deficiency needs to be addressed seriously in IBS patients as well^[11,12]. Nwosu *et al.* (2017) referred to the correlation between IBS and vitamin D level. In their study, IBS subjects had significantly lower mean 25 (OH) D: 53.2 ± 15.8 nmol/L compare with control group 65.2 ± 28.0

nmol/L. they suggest that a high prevalence of vitamin D deficiency in IBS may due to a combination of factors such as restricted food choices, lifestyle habits that limit exposure to sunshine, and the possible role of hypoalbuminemia^[13]. Also, In study of *Khayyat and Suzan* (2015) referred that the mean serum level of total 25 (OH) D in IBS patients was 21 ± 12 nmol/L compared to the control group 31 ± 16 nmol/L. then, the frequency of vitamin D deficiency was found to be high in the IBS group (82%) and a significant negative correlation between IBS and vitamin D level was found^[14].

3.2 Lipid profile

Total cholesterol in irritable bowel syndrome group (252.26 ± 49.36) show significant increased ($P < 0.05$) compare with apparently healthy (134.54 ± 27.38) (fig: 2).

Figure (2): total cholesterol levels in patients and healthy men groups.

Also, Triglyceride levels show significant increased ($P<0.05$) in irritable bowel syndrome group (220.29 ± 14.96) compare with apparently healthy (79.27 ± 13.87) as show in (fig: 3).

Figure (3): Triglyceride levels in patients and healthy men groups.

HDL in irritable bowel syndrome group (25.66 ± 7.89) show significant decreased ($P<0.05$) compare with apparently healthy (44.01 ± 6.53) (fig: 4). While, LDL levels show significant increased ($P<0.05$) in irritable bowel syndrome group (135.29 ± 43.36) compare with apparently healthy (74.69 ± 8.1) (fig: 5). VLDL levels show significant increased ($P<0.05$) in irritable bowel syndrome group (46.17 ± 9.06) compare with apparently healthy (21.6 ± 6.07) (fig: 6).

Figure (4): HDL levels in patients and healthy men groups.

Figure (5): LDL levels in patients and healthy men groups.

Figure (6): VLDL levels in patients and healthy men groups.

In higher BMI, the production of the dermal 7-dehydrocholesterol is not altered, but fat tissue might modify its discharge from the skin into the systemic circulation. So, even though it is formed in the skin, vitamin D will remain as a deposit and will not reach the next passages to be further metabolized, but only to a lesser degree than in normal weighted individuals ^[15]. In study of *Steger (2013)* which designed to show the association between vitamin D status and blood lipid parameters. The lipid profile levels in patients with vitamin D less 20 ng/ml showed increased in the cholesterol (217.4 mg/dl), triglyceride (130.4 mg/dl) and LDL (131.2 mg/dl) with decreased of HDL levels (47.2 mg/dl), that is in agreement with results of present study ^[16].

Ponda et al (2012) analysis of vitamin D levels and serum lipids in a large clinical laboratory database found modest yet favorable differences between 25 (OH)₂D levels and total cholesterol (TC), LDL, HDL, and triglyceride (TG). They found increased in the levels of TC, LDL, TG and decreased in HDL levels with vitamin D deficiency patients ^[17].

In opposite studies that designed to show the relationship between increased in vitamin

D and lipid profile. *Spring (2016)* study the relation between vitamin D and lipid profile. The results show that a higher level of serum 25(OH) D in the blood was associated with a reduced risk of developing LDL-dyslipidaemia, a less reduction in HDL-C, and a less increase in TC-HDL ratio. The mechanisms by which vitamin D may influence lipid levels are uncertain and not well documented ^[18]. However some suggested mechanisms might be that vitamin D by itself or by suppressing the secretion of parathyroid hormone (PTH) to increase lipolysis ^[19], and thereby increase the breakdown of lipids. Other suggestions are the increase in calcium levels caused by elevated vitamin D levels, which may lead to a reduction in TG levels ^[20]. Lipid profile (cholesterol, triglyceride, LDL and VLDL) were increased when the vitamin D levels decreased. HDL show positive correlation with vitamin D deficiency. In several study showed the concentrations of serum 25 (OH) D are lower than those in normal weighted subjects ^[21, 23]. *McGill et al. (2008)* referred that the higher the BMI and waist circumference, the lower 25 (OH) D concentrations in a New Zealand obese population ^[24]. An American study found similar results in the obese participants; the 25 (OH) D values were

systematically lower in obese than in their normal weight counterparts ^[25].

3.3 Oxidative stress factors

MDA levels in irritable bowel syndrome group (252.26 ± 49.36) show significant increased ($P < 0.05$) compare with apparently healthy (134.54 ± 27.38) (fig: 7). While, GSH levels show significant decreased ($P < 0.05$) in irritable bowel syndrome group (74.47 ± 7.56) compare with apparently healthy (157.01 ± 48.66) as show in (fig: 8).

Figure (7): MDA levels in patients and healthy men groups.

Figure (8): GSH levels in patients and healthy men groups.

Sardar et al (1996) referred that vitamin D was an antioxidant as a result of an increase in hepatic GSH amounts in rats that have gotten cholecalciferol ^[26]. The results of a clinical trial showed combination of vit D supplementations made a more than reduction in malondialdehyde (MDA) plasma and a considerable increase in plasma total antioxidant capacity and GSH levels compared with calcium and vit D separately (*Foroozanfard et al. 2015*) ^[27]. In other study, *Baser et al. (2015)* referred to the relation between vitamin D and oxidative stress state. They found that the total antioxidant status (TAS) levels were 1.28 ± 0.11 and total oxidant status (TOS) levels were $4.98 \pm 4 \mu\text{mol/L}$ in patients with vitamin D deficiency ^[28] that is in agreement with the results of present study.

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تقييم مستوى فيتامين D وعدد من المعايير الكيموحيوية في المرضى المصابين بمتلازمة القولون العصبي في مدينة كركوك

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الخلاصة: صممت الدراسة الحالية لتوضيح العلاقة بين متلازمة القولون العصبي وتركيز فيتامين D، تم سحب الدم من ٤٠ شخص مصاب يعانون من متلازمة القولون العصبي بالإضافة الى 20 متطوع سليم (معدل العمر: ٦٥-٢٥ سنة). وقد بدأ جمع عينات الدراسة في مستشفى كركوك العام ابتداء من شهر اذار حتى شهر كانون الاول من سنة ٢٠١٦م. اظهرت نتائج الدراسة الحالية بان فيتامين D في مرضى متلازمة القولون العصبي قد انخفض معنويا ($P < 0.05$) مقارنة مع المتطوعين السليمين. ايضا اظهرت مستويات الكالسيوم انخفاض معنويا ($P < 0.05$) مقارنة مع المتطوعين السليمين. كما و اظهرت مستويات الدهون ارتفاع الكوليسترول والدهون الثلاثية و LDL و VLDL وانخفاض HDL في مرضى متلازمة القولون العصبي ارتفاعا معنويا ($P < 0.05$) مقارنة مع المتطوعين السليمين. يستنتج من هذه الدراسة بان متلازمة القولون العصبي قد ادت الى تغييرات معنوية في تركيز فيتامين D ومعايير كيموحيوية.

كلمات مفتاحية: متلازمة القولون العصبي، فيتامين D، مستويات الدهون وجهد الاكسدة.