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STUDY OF SERUM LEVEL OF VITAMIN C IN OSTEOARTHRITIC PATIENTS

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ABSTRACT
This study was aimed to determine the levels of serum vitamin C in osteoarthritic (OA) patients. This is a prospective case control study conducted at Basra province through a period of 6 months from April 2011 to October 2011, during which 50 patients with OA. The subjects who were admitted to the Orthopaedic Clinic of Basra General Hospital, were in the ages ranging from 40-75 years (17 males and 33 females). On the other hand 50 apparently healthy subjects (20 males and 30 females) who were in ages ranging from 38-70 years were participated as control group. Among two sex group serum vitamin C was significantly decreased ($p<0.05$) in male patients as compared with female. In conclusion, we have shown that there is a decrease in serum level of vitamin C in male patients and this decrease may be due to taking nonsteroidal anti-inflammatory drugs which can lower the level of vitamin or their diet was poor in vitamin C.

KEYWORDS: Osteoarthritis, Serum Vitamin C, ESR.

INTRODUCTION
Arthritis a joint inflammation, refers to group of disease that cause pain, swelling, stiffness and loss of motion in the joints. Osteoarthritis is the most common form of osteoarthritis and is a disease of cartilage degeneration [Poole AR; 1999]. OA also known as degenerative joint disease is a process of progressive deterioration of articular cartilage and formation of new bone (osteophyte) at the joint surface [Plaa GL, 1976]. Osteoarthritis was classified as primary when no case is obvious and secondary when it is follows a demonstrable abnormality [Apley AG., 1993; Buckwalter JA., 1997]. In general OA was a disease seen in advancing years and at the same time seen in young people also, if articular cartilage is damaged or subjected to abnormal stress from an early age [Mankin HJ. 1984].

OA commonly affected joint are knee & hip joint lipid peroxidation mediated by free radicals is considered to be the major mechanism of cell membrane destruction and cell damage. Free radicals are formed in both physiological and pathological conditions in mammalian tissue [Plaa Gl, 1976]. Vitamin C is an essential micronutrient required for the normal metabolic function of the human body. It is not synthesised in the humans and other primate, because of the lack of enzyme required for its synthesis via the glucoronic acid pathway [Gut brie HA., 1995]. Ascorbic acid (Asc) is required for the synthesis of the most abundant protein in cartilage, type II collagen. Ascorbate and ascorbic acid increases the protein and proteoglycan synthesis by articular chondrocytes [Gut brie HA., 1995; Daniel Jc, 1984]. Citrus fruits potatoes and green vegetable in general are good sources of vitamin C, and its absorption was in small intestine by means of specific energy dependent transport system [Tiku ML, 1999]. Vitamin C is a vitamin which is required for collagen and creatine synthesis, and also aids in tyrosine synthesis and catabolism, neurotransmitter and serotonin synthesis [Mayes PA. 1996]. Its most important function in the body is it acts as a natural antioxidant, which mean that it acts as reducing agent in aqueous solution, reverses oxidation and reduces hydroxyl, hydro peroxyl, super oxide, alkoxyl and peroxyl radicals which usually attacks and damages the cell membrane, DNA and cellular protein [Pryor WA. 1991].

MATERIALS AND METHODS
A prospective case control study was conducted at Basra province through a period of 6 months from April 2011 to October 2011 out of which 50 patients with OA who were admitted to the Orthopaedic Clinic of Basra General Hospital were included. Their age group ranged from 40-75 years (17 males and 33 females). The other 50 asymptomatic patients were (20 males and 30 females) whose age groups ranged from 38-70 years participated as a control group. For each patient and subject full information were obtained by using questionnaire that include name, ages, sex, occupation as well as the following questions about the medical history. Physical and radiological examination was done including X- rays to exclude secondary osteoarthritis and

laboratory investigation for erythrocyte sedimentation rate (ESR), white blood cell count, blood sugar and latex fixation were also done for all subject and patients participated in this study.

Venous blood samples were collected from each subjects and patients after an average fast of 12 hrs, and they were tested for vitamin C by reduction of colour dye 2,6 di hydro phenol indo phenol from a blue to colourless, and the amount of de colorization was determined photo metrically [Schwtz ER, 1977]. Statistical analysis with each group of subjects was performed by analysis of variance (ANOVA) and the results were expressed as mean ± SD. A P value ≤ 0.05 was considered as statistically significant.

RESULTS

The basic clinical characteristics of subjects participated in this prospective study regarding age and sex are shown in table 1. Table 2 show the results of measurement of vitamin C in OA and non OA subjects according to the age. Statistical comparison between the mean of serum vitamin C of all patients showed non significant difference at P > 0.01. The mean ± SD of serum vitamin C in osteoarthritis patient were grouped according to the sex and was shown in table 3. There was significant decrease (P< 0.05) in serum level of vitamin C in male patients as compared with female. Table 4 show the results vitamin C in OA and OA subjects according to their sex and a non significant finding was observed in this comparison.

Table 1: Table showing the Basic clinical characteristic of OA and non OA subjects. n=50 for both OA and non OA subjects.

		OA subject		Non OA Subject	
		n= 50	%	n=50	%
Age / year	≤ 50	32	64	30	60
	> 50	18	36	20	40
Sex	Female	33	66	30	60
	Male	17	34	20	40

Table 2: Table showing the levels of vitamin C in serum observed according to the age in OA and non OA subjects.

Age	OA	Non OA
≤ 50	1.36± 0.63	1.23± 0.54
> 50	1.38± 0.63	1.36± 0.53

Table 3: Serum level of vitamin C based on the sex in OA subjects. P^{*}=0.029

	Male 17	Female 33
OA	1.1± 0.682	1.51± 0.654

Table 4: Serum level of vitamin C according to the sex in OA and non OA subjects.

Sex	OA	Non OA
Male	1.1± 0.682	1.28± 0.586
Female	1.51± 0.564	1.28± 0.505

DISCUSSION

Our study shows that the mean of vitamin C (Ascorbate) were within normal range in comparison with those control groups. This result was disagreement with resent study in India, in which the mean of ascorbic acid was significantly decreased in osteoarthritic group as compared to control group [Toro G., 1975]. On the other hand, we noted that in the present study there where a significantly decrease in serum level vitamin c for male patients group compared to female patients. This finding was in agreement with resent study [Peterkofsky B, 1991]. The pathogenic mechanisms underlying the development of OA were not yet fully understood, likewise, those factors that sustain or impede the progressing of O.A are poorly identified. Vitamin C acts as an electron donor in the synthesis of type II collagen, primary structural component of cartilage. On the other hand vitamin C is involved in the hydroxylation of proline to form hydroxyl proline in the synthesis of collagen [Schwtz ER, 1977]. It also plays a part in glycosaminoglycan synthesis through its role as a carrier of sulphate group [Toro G., 1975]. Depletion of sulphate proteoglycans from the extracellular matrix of articular cartilage is one of the earliest manifestation of OA [Schwtz ER, 1977].

In conclusion, we have shown that there is a decrease in serum level of vitamin C in male patients and this

decrease may be due to taking nonsteroidal anti-inflammatory drugs which can lower the level of vitamin or their diet was poor in vitamin C. Although cartilage is destroyed in osteoarthritis no evidence suggests that taking vitamin C supplements will help treat or prevent OA [18] Further studies to be planned in future on other non enzymatic antioxidants like vitamin E and must be classified into groups of severe, mild and moderate OA.

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