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Evaluation of Ghrelin Hormone, Erythrocyte Sedimentation Rate and C-Reactive Protein in Women Patients with Knee Osteoarthritis Thi-Qar Province / Iraq

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***Abstract*— Degenerative joint disease usually results from articular cartilage deterioration and gradual loss. Degenerative joint disease usually results from articular cartilage deterioration and gradual loss. It is especially prevalent in older men and women. Primary and secondary osteoarthritis are the two types that can affect the knee. This study measured C-reactive protein, ghrelin hormone, and erythrocyte sedimentation rate in order to assess serum ghrelin in female patients with osteoarthritis in the knee. Samples of blood were taken from (48). Women with KOA were split into two age-based groups: twenty-four older patients (ages 51–70) and twenty-four other patients (ages 30–50). A control group of forty-eight healthy women was also included. Additionally, individuals were split into two age-based groups: (24) There are elderly women (ages 51–70) and others (ages 30–50) in this group. Findings: Compared to the control group, all patient groups with osteoarthritis in the knee had significantly higher levels of the hormone ghrelin, CRP, and ESR.**

***Keywords*— Ghrelin hormone, C-reactive protein, Erythrocyte Sedimentation Rate, Knee osteoarthritis.**

I. INTRODUCTION

Knee osteoarthritis (KOA), Also referred to as a degenerative joint disease, usually results from articular cartilage deterioration and gradual loss. It is especially prevalent in older men and women. Primary and secondary osteoarthritis are the two types that can affect the knee. Primary osteoarthritis is characterized by arthritic deterioration that has no apparent underlying etiology. Secondary osteoarthritis can be caused by either abnormal articular cartilage, as in rheumatoid arthritis (RA), or an abnormal concentration of force across the joint, as in post-traumatic causes [1]. Osteoarthritis is typically a degenerative disorder that can lead to disability over time. The severity of the clinical symptoms may vary from person to person. However, they typically get worse, happen more often, and become more incapacitating over time. Additionally, everyone advances at a different pace [2]. Knee stiffness and edema, pain that develops with time, discomfort during extended periods of sitting or rest, and knee pain that starts slowly and gets worse with activity are common clinical indicators. Conservative treatments are the first line of treatment for osteoarthritis in the knee; if these don't work, surgery can be an option. The therapy of osteoarthritis in the knee still lacks approved disease-modifying drugs, despite the fact that drugs can help delay the progression of RA and other inflammatory illnesses [3].

Ghrelin, a unique 28-amino acid peptide with an n-octanoyl modification on serine position 3, was isolated from the stomach of rats in 1999 [4 5]. Ghrelin is the only peptide hormone known to have been modified by a fatty acid. The fundus mucosa's endocrine X/A-like cells, which comprise around 20% of the human stomach mucosal cells, produce ghrelin [6–7]. Ghrelin naturally binds to the growth hormone secretagogues (GHSs) receptor (GHS-R), which was cloned in 1996 [8]. Acyl ghrelin makes up less than 10% of the circulating ghrelin, while des acyl ghrelin makes up more than 90% [9]. However ghrelin's acyl group is However to GHS-R and the subsequent activation of the calcium/inositol triphosphates pathway [5]. The duodenum, jejunum, ileum, colon, lung, heart, pancreas, kidney, testis, pituitary, and hypothalamus all express ghrelin in addition to the stomach [4–10]. Growth hormone release, hunger and food intake stimulation, stomach acid secretion, motility regulation, and ghrelin's primary physiological role of regulating endocrine and exocrine pancreatic secretion.

C-reactive protein, or CRP Due to its reactivity with the capsular (C)-polysaccharide of Pneumococcus, Tillet and Francis discovered this homopentameric acute-phase inflammatory protein, a highly conserved plasma protein, when they examined the sera of patients with acute Pneumococcus infection in 1930 [11]. The traditional complement pathway of innate immunity is initiated when CRP binds to the phosphocholine (PCh) of bacteria and activates C1q in the presence of calcium [12]. CRP has many homologs in vertebrates and some invertebrates [13], and it is a member of the pentraxin family, which also includes other structurally related substances including serum amyloid A [14]. Increased levels of inflammatory cytokines, especially interleukin-6

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(IL-6), cause the CRP gene to be transcriptionally activated primarily in hepatocytes in the liver [15].
Erythrocyte sedimentation rate (ESR) is a supplementary test to identify disorders since it is a non-specific marker that does not allude to a particular illness. When paired with the patient's clinical history and physical examination, it can serve as a guide to aid in the diagnosis, management, and follow-up of a number of autoimmune illnesses, acute and chronic infections, and cancers [16]. The conventional ESR test measures the distance that erythrocytes settle in a test tube over time. Standardized conditions allow anticoagulated whole blood to settle in an upright tube for this test. The ESR measures how much the erythrocytes have dropped over that time, measured in millimeters. Although there are numerous factors that impact ESR, The plasma proteins and erythrocytes linked to tissue injury and inflammation are the most clinically significant.

II. MATERIALS AND METHODS

All samples were taken from patients who attended Al-Hussein Teaching Hospital and specialized clinics in the southern Iraqi province of Thi-Qar, and the College of Science's Biochemistry Laboratory served as the study's locations. All of the study's samples were gathered from November 2019 to June 2020. Ninety-six (96) women were the study's target population; they were split into two groups: 48 blood samples were taken from patients who had osteoarthritis in their knees, and (48) blood samples were taken from healthy women as a control group. Twenty-four older female patients (years 51–70) and twenty-four other patients (ages 30–50) make up the two age-based groups of patients. Furthermore, two age-based groups were created from the normal participants (control): older women (ages 51–70) and others (ages 30 and 50). The specialist medical staff had previously determined that the women had osteoarthritis (KOA) in their knees based on clinical examination and symptoms. Neither hormone therapy nor any other form of treatment, nor any other ailments, were administered to the participating women.

After mixing alkaline peptone water with feces and incubating it for 6-8 hours at 37 C, we distributed a 10 µl Due to its reactivity with the capsular (C)-polysaccharide of Pneumococcus, Tillet and Francis discovered this homopentameric acute-phase inflammatory protein, a highly conserved plasma protein when they examined the sera of patients with acute Pneumococcus infection in 1930 [11].
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A. *Blood Sample Collection*

Five milliliters (5 mL) of blood samples from individuals with knee osteoarthritis (KOA) and controls were obtained by vein puncture; two milliliters were placed in an EDTA tube, and the other three milliliters were gradually drained into a disposable plane tube filled with separating gel. ESR analysis had to be performed using the blood sample in the EDTA tube. In contrast, a blood sample in tubes with gel was left to coagulate at room temperature before being centrifuged for 15 minutes at 3000xg . The serum was then extracted and kept at -20˚C until needed.

B. *Statistical Analysis*

Version 23 of Software known as the Statistical Package for the Social Sciences (SPSS) was used to conduct the statistical analysis. The data were expressed using mean ± standard deviations (mean ± SD).The T was used to compare parameters across the various study groups. Using Pearson's correlation (r), the relationship between the current study parameters was determined. P-values below 0.05 were considered statistically significant.

III. RESULTS AND DISCUSSION

A. *Ghrelin Hormone*

Table (1) shows a significant increase in the concentration of serum ghrelin in patients of older women and other groups in comparison with the control older women and Ghrelin levels in patients did not significantly differ from those in control or other groups, respectively ($P \leq 0.05$) older women and other groups ($P \leq 0.05$). Furthermore, it was found that t Ghrelin levels in the control older women and control other groups did not differ significantly ($P \leq 0.05$). Ghrelin affects a lot of bodily processes. According to several studies, ghrelin was a prospective therapeutic agent for the treatment of inflammatory illnesses and injuries since it demonstrated anti-inflammatory effects both in vitro and in vivo [17] [18]. However, in human models of a number of inflammatory disorders, including inflammatory bowel disease, spondylitis, sepsis, pancreatitis, and arthritis, serum levels of ghrelin were elevated [19].

Table (1):- Serum ghrelin levels of controls and patients Groups

Groups	No	Ghrelin Mean± SD	Groups	No	Ghrelin Mean± SD	P. value
older women	24	2.19±0.39	controls older women	24	0.80±0.12	0.005
Other	24	1.91±0.34	controls other	24	0.78±0.15	0.009
P. value		0.923	P. value		0.267	

B. *Erythrocyte Sedimentation Rate (ESR)*

Table (2) shows a significant increase in the levels of ESR in patients of older women and other groups in comparison with the control older women and control other groups respectively ($P \leq 0.05$). It was found that there was no significant difference in the levels of ESR in patients older women group in comparison with patients

in other groups (P≤0.05) . Additionally, it was found that The ESR levels of the control elder women and the control other did not differ significantly (P≤0.05). According to earlier research, patients of older women and other groups had higher ESR levels than the control older women and control other groups [20]. Clinical signs of pain, edema, and patellar ballottement were associated with ESR in the KOA group of patients. These results are consistent with earlier studies where patients' clinical findings were reflected in higher ESR (KOA).

Table (2) ESR levels of controls and patients groups

Groups	No	ESR Mean± SD	Groups	No	ESR Mean± SD	P. value
older women	24	17.67±1.37	controls older women	24	15.83±2.40	0.041
Other	24	17.58±2.35	controls other	24	15.79±2.41	0.037
P. value		0.821			0.866	

C. SerumC-Reactive Protein Concentration(CRP)

Table (4) shows a significant increase in the levels Of CRP in patients of older women and other groups in comparison with the control other groups and older women, respectively (P≤0.05). The values of CRP in elderly women patients did not differ significantly from those in other groups (P≤0.05). Additionally, there was no discernible variation in the CRP levels between control older women and control other groups(P≤0.05) was observed. From Table(4) it was found that there was a slight elevated in the concentration of (CRP)in the patients with (KOA)compared to the healthy (Control). The concentration of (CRP) increases in patients with (KOA) who are in the early stages. This elevation may be caused by some factors, such as clinical features (swelling, stiffness, and dysfunction), trauma exposure from an accident, or abnormally high focus on the joint due to the nature of work. Chronic arthritis may also be the cause of this strong focus.

Table (3): CRP levels of controls and patient groups

Groups	No	CRP Mean ±SD	Groups	No	CRP Mean± SD	P. value
older women	24	4.82±0.56	controls older women	24	3.86±0.46	0.016
Other	24	4.72±0.59	controls other	24	3.93±0.35	0.021
P. value		0.030			0.044	

IV. CONCLUSION

Ghrelin serum levels were increased in patients with osteoarthritis in the knee. Patients with osteoarthritis in their knees exhibited elevated erythrocyte sedimentation rate and C-reactive protein levels. The concentration of C-reactive protein may rise in the early stages of osteoarthritis in the knee.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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