ORIGINAL ARTICLE

Comparison of CRP levels and Radiological Grading in OA knee

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ABSTRACT

Aim: To determine CRP levels in osteoarthritis knee patients with different radiological grades.
Methods: We analyzed one hundred and sixty outdoor patients with osteoarthritis knee. Patient's historytaken regarding daily activities, severity of pain based on Visual Analogue Scale and trauma detailsin few patients were noted. In physical examination swelling, deformity and range of movements were noted. Patient's height, weight and BMI were noted. X-rayexamination especially AP standing and lateral views were performedand graded according to Kellgren and Lawrence. CRP level was done by ELIZA method and compared with clinical and radiological severity.
Results: Patients age varied from 32 years to 75 years with an average 49.8 years and 71 males and 89 females. Two third of the patients had pain severity from 3 to 6 on Visual Analogue Scale. Most of the patients were idiopathic. Swelling and decrease in range of movements were homogenous with increasing severity. Kellgren Lawrence grade I to IV had increasing average CRP levels.
Conclusion: Elevated CRP at one occasion in OPD patients indicates inflammatory changes in synovium and progression of osteoarthritis of knee.
Keywords: CRP level, Eliza, radiological grades

INTRODUCTION

Arthritis is the second most frequent[1] cause of outpatient complaints among patients with chronic diseases. As much as 10-15% of the population of is disabled by arthritis by the age 55 years. Most common is osteoarthritis characterized by deterioration of joint surface cartilage and progressive loss of joint function. One of the most difficult problems that patients with arthritis and their families face is accepting that the disease is chronic. Patients with osteoarthritis must live with their disease, because they will not die of it. There is growing financial burden and negative impact on quality of life[2,3]. Thisresults in developing more measures to identifying osteoarthritis early in the disease. It is characterized by pain, and loss of motion resulting in restricted activity and loss of independence during activities of daily living. Different treatment modalities for OA include drug therapy, exercise, physiotherapy, weight control. In advance cases surgical intervention includes total knee arthroplasty. It has been focus of research to identify relevance of biomarkers of inflammation including high-sensitivity C-reactive protein[4,5,6] (CRP) in relation to disease activity and bone quality.CRP is produced in response to inflammation, infection, injury and with complications related to conditions such as hypertension, cardiovascular disease, and diabetes. Elevatedlevel of CRP is related with synovial fluid infiltration[7, 8]as well as symptoms of pain, stiffness and progression. CRP also produced by extra articular sites in acute myocardial infarction and severe ketoacidosis[9,10,11]. The nature of the painin osteoarthritis of the knee may be mechanical orinflammatory. Mechanical painoccurs when the joint is used like walking, climbing stairs and on rest there is less pain.Inflammatory[12,13,14,15] pains typically presents at night, specifically, the second part of the night. Bone scan performed in the patients with OA knee show increased uptake in the subchondral bone indicate inflammation process in synovium and is predictive of progression.

Stevens-Lapsley J. and Timpson N. presented role of body mass index[16,17] in the functional outcome of total knee replacement and its role in progression in non operative OA cases.Biochemical receptors have been identified in the joint cartilage[18].Radiological severity graded by Kellgren and Lawrence is not specific for progression compared to inflammatory response. Inflammation in the synovium is a phasic and may occur in OA knee patients with any grade of radiological severity. Raised CRP indicates local severity of osteoarthritis and it precedes radiological progression[19.] Takahashi M has presented increasing biochemical markers with higher radiological grades of OA knee.In this study we performed x-ray and CRP levels in the outpatients with osteoathrits of knee and compared radiological severity with CRP levels.

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MATERIAL AND METHODS

In this study we included 160 patients presented in the outpatient department with osteoarthritis of the knee. The study was approved by an Institutional Review Board and all patients were consented before enrollment.Patients were enrolled based on the diagnosis of OA and was confirmed preoperatively with radiographs and review of past medical conditions.Patients with signs and symptoms of rheumatoid arthritis or having previous history of the disease were also excluded. Patients on oral hormone replacement therapy, immunosuppressant, insulin, oral hypoglycemic agent,thyroid disease, malignancy, drug abuse and chronic inflammatory condition not related to bone were also excluded. Detailed history was taken from the patients regarding pain severity, duration, swelling, physical activities, associated diseases and detail of accident in traumatic cases. On physical examination joint effusion, alignment of the joint, instability, range of movements, gait and findings of other associated diseases were noted. AP x-rays in standing position were assessed according to the Kellgren and Lawrence grade for each patient. Distance between midpoint of medial compartment of femur and tibia in millimeters at the midpoint observed. Subchondral sclerosis, cysts, severity of varus deformity and features related to fracture in traumatic cases were noted.CRP of the patients performed using ELISA method. Levels of CRP at different clinical and radiological grades were analyzed.

RESULTS

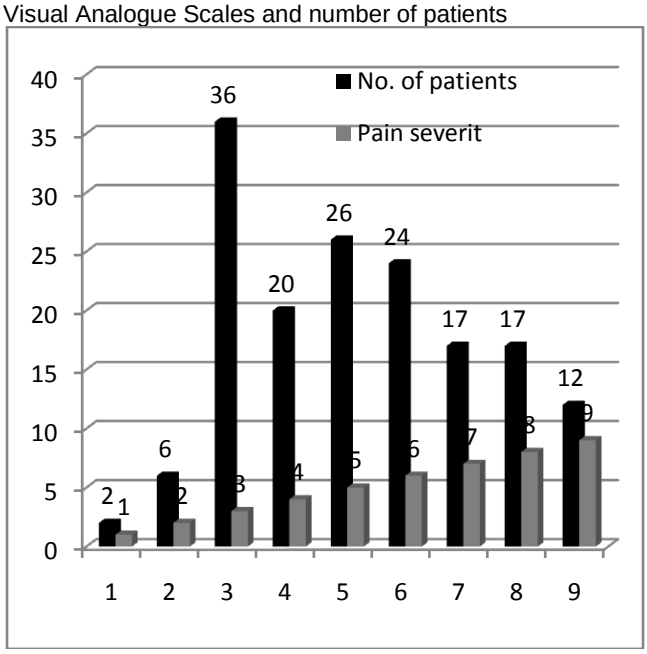
Age of the patients varied from 32 to 75 years with an average of 49.8 years. Male were 71 and females were 89. Only 5 patients had post traumatic osteoarthritis and all others were idiopathic. Pain severity was assessed on Visual Analogue Scale from 1-10. More patients had pain from 3 to 6 grades. Mild swelling in 124, moderate in 27 and 9 patients had no selling. One third of patients had limitation of flexion from 10 to 20 degree and limitation of activities of daily livings. BMI varied from23 to 54 with an average of 36. According to Kellgren and Lawrence grade I were 34, II were 62, III were 35 and IV were 29 patients. Most of the grade III and IV patients were obese. Average CRP levels increased homogenously with increasing radiological grades.

Knee swelling and CRP levels

Knee swelling	n	Average CRP
Nil	9	1.8
Mild	124	2.63
Moderate	27	4.08

Kellgren and Lawrence grade I to IV

Visual Analogue Scales and number of patients



Radiological severity (Kellgren and Lawrence) and CRP levels.

Kellgren & Lawrence grades	n	CRP min.	CRP max.	CRP - average.
Grade-I	34	1.2	3.3	1.74
Grade-II	62	1.2	4.3	2.51
Grade-III	35	2.1	4.8	3.4
Grade-IV	29	2.3	5.3	4.1

In this study average CRP levels consistently increased with clinical and radiological severity of knee osteoarthritis. This increasing severity clinical, radiological and CRP levels require joint replacement surgery.

DISCUSSION

Inflammation has been implicated in the pathogenesis of OA, yet the specific correlations between biomarkers of inflammation are still being undefined. The primary goal of the present study was to evaluate potential correlations between CRP and radiological severity.There is association of cytokines in the pathogenesis of OA and suggests that they play an important role in the progression of OA.CRP also produced by other tissues like liver, heart and adipose tissue.Measurementof CRP at one occasion is related to radiographicprogression over a distant period. A raisedserum CRP reflects events that precede a subsequentperiod of cartilage loss. HighCRP levels predict the progression of osteoarthritis of the knee. It indicates phased inflammatory episode in the synovium. Multiple levels at three months intervals are preferred than single to determine the progression of the disease. Sharif M noted that CRP level at start of five year follow up was less significant compare to -3 year level in disease progression cases[20]. Takahashi M had presented negative correlation between CRP and all other biomarkers with increasing radiological severity[21]. Obesity influence the CRP levels and levels differ in <30 and >30 BMI. With increased radiographic severity CRP levels does not necessarily increase but with inflammatory phase it always rise. However longer follow up is required to asses predictive significance of CRP in OA knee progression.

CONCLUSION

ElevatedCRP at one occasion in OPD patients indicates inflammatory changes in synovium and progression of osteoarthritis of knee.

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