
Abstract Publication (Poster Presentation)


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Original Research Article

Status of soluble vascular cell adhesion molecule-1 in knee osteoarthritis among type 2-diabetic postmenopausal women

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Abstract

Background: Knee osteoarthritis is the most common form of joint disorder and a leading cause of pain and functional disability among elderly female population. Type 2-diabetes is frequently reported comorbidity in elderly female patients with knee osteoarthritis. VCAM-1 is emerging as a strong and independent predictor for severe osteoarthritis. VCAM-1 is an inducible cell surface sialo glycoprotein and mediates heterotypic cellular aggregation. Therefore, the aim of this study is to assess the role of soluble vascular cell adhesion molecule-1 at the onset of knee osteoarthritis among type 2 diabetic postmenopausal women.

Methods: The present study includes 100 type 2-diabetic female subjects of age above 50 years as cases and 100 normal healthy female age matched individuals as controls. Osteoarthritis of knee was ascertained using the American college of rheumatology classification criteria. Serum soluble VCAM-1 concentration was measured by ELISA method in all 200 subjects. Biochemical parameters—Fasting blood sugar and lipid profile were measured using Mind ray BS-400 and HbA1c was measured by turbidimetric immunoassay method. Statistical analysis was made by student independent sample t-test. Correlation was determined by using spearman’s rank correlation coefficient.

Results: Serum level of soluble VCAM-1 was found statistically highly significant (p<0.001) in type 2 diabetic postmenopausal women having early stage of knee osteoarthritis as compared to control healthy subjects. The mean levels of fasting blood sugar, HbA1c, total cholesterol, TG, LDL-C and VLDL-C were also found significantly increased while HDL-C was found significantly decreased in cases as compared to controls.

Conclusions: The increased level of soluble VCAM-1 in type 2 diabetic subjects shows active inflammation or cartilage damage. Therefore, it can be used as an early biomarker for osteoarthritis among type 2 diabetic postmenopausal women.

Keywords: Knee osteoarthritis, Type 2 diabetes Mellitus, VCAM-1

Introduction

Knee pain is one of the most common musculoskeletal complaints that bring people to their physician and the most common cause of knee pain is osteoarthritis.1 Especially in females, knee osteoarthritis is the major cause of mobility impairment.2,3 Nearly, 45% of women over the age of 65 years have symptomatic findings of knee osteoarthritis while radiological evidence is found in 70% of those over 65 years.2,4 In India, average menopausal age in women is 46.3 years as compared to 54 years in western countries.5,6 This predisposes Indian women at higher risk of developing osteoarthritis in earlier age as compared to their western counterparts. It could be due to loss of estrogen especially close to menopausal years at this time.7,8

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Diabetes mellitus is a multi-system disease characterized by persistent hyperglycemia that has both acute and chronic biochemical and anatomical sequel which may cause irreversible damage to many organs and organ systems. This disease affects connective tissues in many ways and causes different alterations in periarticular and musculoskeletal system. Type 2 diabetes is frequently reported co-occurring disease in elderly patient with knee osteoarthritis. Singh et al reported that there was around 55% of knee osteoarthritis patients of over 65 years old having hypertension and 13% of them showing Type 2 Diabetes Mellitus. Many studies have reported a correlation of osteoarthritis with duration of diabetes mellitus and poor glycaemic control. However, the link between diabetes mellitus and osteoarthritis is not well defined, but it may be due to deleterious role of excess of glucose through the accumulation of advanced glycation end products, oxidative stress and promotion of systemic inflammation. So, there is a need of biomarker that identifies type 2 diabetic individuals who are at higher risk of developing osteoarthritis.

Vascular cell adhesion molecule-1 emerged as a strong and independent predictor for severe osteoarthritis. Previous studies have reported that hyperglycemia, hyperinsulinemia or insulin resistance are responsible for elevation of this adhesion molecule. VCAM-1 is an inducible cell surface sialo glycoprotein expressed on chondrocytes and synovial fibroblasts. VCAM-1 mediates the adhesion of lymphocytes, monocytes, eosinophils, and basophils to vascular endothelium and plays a role in the development of inflammation. VCAM-1 mediates the interaction of chondrocytes with immune cells and could thus by itself contribute to immune-mediated cartilage damage. Therefore, the present study is aimed to assess the serum level of sVCAM-1 in type 2-diabetic postmenopausal women having early stage of knee osteoarthritis.

METHODS

The present study has been carried out in the Department of Biochemistry and Department of Orthopaedics, G.R Medical College and J.A. Group of Hospitals, Gwalior. Total 200 human subjects were taken in the study. Out of which 100 type 2-diabetic postmenopausal women of age 50 years or above having clinical symptoms of knee osteoarthritis were considered as cases and 100 normal healthy individuals of same age as control.

Inclusion criteria

Postmenopausal women suffering from type 2 diabetes mellitus with complain of knee pain lasting longer than 1 month in addition to at least 3 of the following 6 criteria according to ACR guideline: age>50 years, morning stiffness more than 30 minutes, crepitus, bony enlargement, bony tenderness and absence of palpable warmth.

Exclusion criteria

Patients taking any hormone replacement therapy (HRT), non-steroidal anti-inflammatory drugs (NSAIDs), having metabolic bone disease, rheumatoid arthritis, serious systemic diseases, history of knee trauma or knee injury, cardiac heart diseases. Before starting analysis, the written consent was taken from all subjects. The study has been approved by institutional ethical committee and was carried out by keeping all norms in mind. The clinical manifestations of disease, personal history of patients was recorded in study proforma.

8ml of fasting blood sample was taken from all subjects under all aseptic precautions and dispensed into three tubes i.e. fluoride, EDTA and plain tubes. Serum and plasma from plain and fluoride tubes were separated after centrifugation for 5-10 minutes at 3000 rpm and analysed for routine biochemical parameters and serum was stored at -20°C in aliquots for ELISA analysis of sVCAM-1. Levels of Fasting blood sugar, total cholesterol, triglycerides, HDL-C were measured by standard biochemical kits (Erba) using BS 400 fully automated analyser (Mindray). EDTA tube was used for estimation of HbA1c (estimated by turbidimetric immunoassay). LDL and VLDL were calculated by using Friedewald formula. Serum levels of sVCAM-1 was measured by enzyme-linked immunosorbent assay kit (Diaclone Elisa Kit).

Statistical analysis

The results were expressed as Mean ± Standard Deviation. The statistical differences between cases and control were determined by student independent t-test. Data analyses were performed with the Statistical Package for the Social Sciences, version 21.0 (SPSS, Chicago, Illinois, USA). In order to determine correlation, statistical analysis was carried out by using spearman’s rank correlation coefficient. The p value less than 0.05 were considered as significant.

RESULTS

The descriptive statistics of glycemic status, lipid profile and sVCAM-1 are shown in (Table 1). The mean value of FBS, HbA1c and lipid profile such as TG, TC, LDL-C and VLDL-C were highly significantly increased while HDL-C was significantly decreased (p<0.001) in cases as compared to control. The serum level of sVCAM-1 was highly found statistically highly significantly increased (p<0.001) in Type 2-diabetic subject suffering from knee osteoarthritis as compared to control. Correlation analysis among the investigated serum parameters revealed a significant positive correlation of VCAM-1 with FBS, HbA1c, Total Cholesterol, and a significant negative correlation of VCAM-1 with HDL-C (Table 2).
Table 1: The changes of blood sugar, lipid profile and sVCAM-1 in control group and diabetic postmenopausal women cases.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (100)</th>
<th>Cases (100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS (mg/dl)</td>
<td>95.8±10.86</td>
<td>167.41±40.94**</td>
</tr>
<tr>
<td>HbA1c</td>
<td>4.92±0.38</td>
<td>7.5±1.44**</td>
</tr>
<tr>
<td>Triglyceride (mg/dl)</td>
<td>134.58±24.36</td>
<td>172.64±39.63**</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>190.30±15.02</td>
<td>257.21±36.39**</td>
</tr>
<tr>
<td>HDL-C (mg/dl)</td>
<td>45.41±4.43</td>
<td>32.76±7.42**</td>
</tr>
<tr>
<td>LDL-C (mg/dl)</td>
<td>117.61±16.93</td>
<td>190.68±38.88**</td>
</tr>
<tr>
<td>VLDL-C (mg/dl)</td>
<td>26.92±4.87</td>
<td>34.52±7.92**</td>
</tr>
<tr>
<td>sVCAM-1 (ng/ml)</td>
<td>464.31±28.54</td>
<td>784.47±115.97**</td>
</tr>
</tbody>
</table>

**Significant at p<0.001.

Table 2: Showing correlations between sVCAM-1 and biochemical parameters in diabetic postmenopausal women.

<table>
<thead>
<tr>
<th>Variables</th>
<th>VCAM-1</th>
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<tr>
<td>FBS</td>
<td>0.297**</td>
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<tr>
<td>HbA1c</td>
<td>0.244**</td>
</tr>
<tr>
<td>TC</td>
<td>0.283**</td>
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<tr>
<td>TG</td>
<td>0.013NS</td>
</tr>
<tr>
<td>HDL-C</td>
<td>-0.207*</td>
</tr>
<tr>
<td>VLDL-C</td>
<td>0.013NS</td>
</tr>
<tr>
<td>LDL-C</td>
<td>0.186NS</td>
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</tbody>
</table>

Results are presented in r value. *Significant at p<0.05. **Significant at p<0.001. NS: Non-Significant.

DISCUSSION

Knee osteoarthritis is a major public health problem especially in postmenopausal women. Type 2 diabetic postmenopausal women are at higher risk of incidence, severity and earlier onset of knee osteoarthritis than nondiabetic postmenopausal women. In diabetes hyperglycemia plays a role for joint degradation and may be induces osteoarthritis. In this study, we found highly significant increased levels of HbA1c and FBS (p<0.001) in diabetic postmenopausal women with knee osteoarthritis compared to controls. Which is same as Cimmino et al who reported that mean fasting plasma glucose was significantly higher in women with osteoarthritis as compared to controls and out of which 5.5 percent women had type 2 diabetes. Rouen et al reported that in postmenopausal women having type 2 diabetes glucose control is associated with the severity of those symptoms commonly attributed to menopause such as joint pain. Hart et al also reported that in women of age 45-64 years blood glucose was associated with unilateral and bilateral knee osteoarthritis. The possible explanation of link between hyperglycemia and osteoarthritis that hyperglycemia can induce an inflammatory state, and that an inflammatory state might predispose cartilage damage to leads to osteoarthritis. The level of TG, TC, LDL-C, VLDL-C were also found significantly increased while HDL-C was found significantly decreased in diabetic postmenopausal women with knee osteoarthritis as compared to controls. The alteration of lipid profile i.e. dyslipidemia, observed in our study may be due to deposition of lipids, particularly in chondrocytes, which aggravates lipid metabolism disorders in degenerative articular cells and promotes the development of osteoarthritis which is consistent with the study of Hart et al. Some epidemiological studies have also shown that raised serum cholesterol and reduced HDL level to be risk factor for osteoarthritis development and progression.

Along with raised FBS and dyslipidemia, in this study the serum level of sVCAM-1 was found statistically highly significantly increased (p<0.001) in diabetic postmenopausal having clinical symptoms of knee osteoarthritis as compared to controls. Hoeven et al also reported the increased level of VCAM-1 in elderly women having knee osteoarthritis than those without knee osteoarthritis. The increased levels of sVCAM-1 in our study shows inflammation or cartilage damage. In this study, a positive correlation of hyperglycemia with VCAM-1 is present which is consistent with the hypothesis that high intracellular glucose concentration in diabetes promotes the formation of advanced glycation end products. AGE compounds interact with membrane receptors called RAGE present on chondrocytes and give rise to a cascade of events that promote release of pro-inflammatory factors such as TNF-α, and activate transcription factors such as NF-kB, which in turn induces VCAM-1 and promotes inflammation and cartilage degradation. Therefore, in our study hyperglycemia, dyslipidemia with VCAM-1 increase is suggestive of onset of inflammation or cartilage damage in knees.

CONCLUSION

This study concluded that hyperglycemia, dyslipidemia with VCAM-1 increase in diabetic postmenopausal women is suggestive of onset of osteoarthritis.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES


Role of Soluble Vascular Cell Adhesion Molecule-1 in Knee Osteoarthritis among Postmenopausal Women

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Abstract
Objective: Knee osteoarthritis is the most common form of joint disorder and a leading cause of pain and functional disability among elderly female population or in postmenopausal phase of females. Osteoarthritis is now considered as a low grade inflammatory condition. VCAM-1 is an inducible cell surface glycoprotein and mediates heterotypic cellular aggregation. Therefore, the aim of this study is to assess the role of soluble VCAM-1 in knee osteoarthritis among postmenopausal women.

Materials and Methods: The present study includes 100 postmenopausal women of age 50 years or above with clinical symptoms of knee osteoarthritis as cases and 100 normal healthy female age matched individuals as controls. CRP was assayed in serum by using latex-enhanced turbidimetric immunoassay method. Soluble VCAM-1 and estrogen were estimated by ELISA method in all 200 subjects. Statistical analysis was made by student independent sample t-test. Correlation was determined by using spearman’s rank correlation coefficient.

Result: The serum level of soluble VCAM-1 was found statistically highly significantly increased (p<0.001) while estrogen was found highly significantly decreased (p<0.001) in postmenopausal women with symptoms of knee osteoarthritis as compared to control healthy subjects. CRP was also found significantly increased in postmenopausal women with symptoms of knee osteoarthritis as compared to control healthy subjects. A correlative study showed significant negative correlation between VCAM-1 and estrogen hormone while positive correlation between VCAM-1 and CRP in postmenopausal women with symptoms of knee osteoarthritis.

Conclusion: The increased levels of soluble VCAM-1 showed an active inflammation or cartilage damage. Thus, it can be used as a biomarker for the assessment of onset of osteoarthritis.

Keywords: VCAM-1, Knee osteoarthritis, Postmenopausal women, Estrogen.

Introduction
Osteoarthritis is the most common joint disorder and one of the leading causes of pain, functional disability and reduced health-related quality of life. It is characterized by slow progressive degeneration of articular cartilage, subchondral bone sclerosis, synovial inflammation and marked osteophyte formation, with the involvement of whole joint. Epidemiological observations showed that after the age of 50, osteoarthritis,
particularly of the knee, is more common in women than in men and suggesting that estrogen deficiency may play an important role in the onset or progression of osteoarthritis. Clinically, this condition is characterized by joint pain, tenderness, limitation of movement, crepitus, occasional effusion, and variable degrees of local inflammation. For a long time osteoarthritis was considered as non-inflammatory condition, but now it become evident that low grade of inflammation mainly associated with synovitis has been reported in osteoarthritis. Synovitis is commonly seen in early and advanced phase of osteoarthritis and has been associated with knee pain and cartilage degeneration. C-reactive protein (CRP) serving as a marker for systemic inflammation, several studies showing a relationship between serum CRP levels and osteoarthritis of the knee. Although, CRP is not taken as an optimal marker for inflammation in osteoarthritis; other putative markers have been associated with some osteoarthritis phenotypes. These include proinflammatory cytokines, cell adhesion molecules and adiponectin. The inflammatory changes occur in the synovium include synovial hypertrophy and hyperplasia with infiltration of the underlying tissue by various inflammatory cells. Adhesion molecules play an important role during inflammatory process because they enable inflammatory cells to migrate to inflamed compartment. Vascular cell adhesion molecule-1 is an inducible cell surface sialoglycoprotein expressed on chondrocytes and synovial fibroblasts. VCAM-1 mediates the adhesion of lymphocytes, monocytes, eosinophils, and basophils to vascular endothelium and plays a role in the development of inflammation. Therefore, the aim of this study is to assess the role of soluble VCAM-1 in postmenopausal women to detect early stage of knee osteoarthritis.

Materials and Methods
The present study has been carried out in the Department of Biochemistry and Department of Orthopaedics, G.R Medical College & J.A. Group of Hospitals, Gwalior. Total 200 human subjects were taken in the study. Out of which 100 postmenopausal women with symptoms of knee osteoarthritis were taken as cases and 100 normal healthy individuals of same age as control.

Inclusion criteria: Postmenopausal women having no menstruation for more than 12 months with complain of knee pain lasting longer than 1 month in addition to atleast 3 of the following 6 criteria according to American College of Rheumatology Criteria for knee osteoarthritis: age>50 years, morning stiffness more than 30 minutes, crepitus, bony enlargement, bony tenderness and absence of palpable warmth.
Exclusion criteria: Patients taking any hormone replacement therapy (HRT), non steroidal anti inflammatory drugs (NSAID), having any metabolic bone disease, rheumatoid arthritis, serious systemic diseases, history of knee trauma or knee injury, cardiac heart diseases, diabetes.

Before starting analysis, the written consent was taken from all subjects. The study has been approved by institutional ethical committee and was carried out by keeping all norms in mind. The clinical manifestations of disease, personal history of patients were recorded in study proforma. 7 ml of blood sample was taken from all subjects under all aseptic precautions. Blood sample was collected in plain vial and incubated at 37°C for 30 minutes. After incubation, clot was removed and remaining sample was taken in centrifuge test tube. Samples were centrifuged at 3000rpm for 10 to 20 minutes. Supernatant was collected in clean and dry serum test tube and stored at -20°C for further estimation of C- reactive protein, estrogen hormone and soluble vascular cell adhesion molecule-1(sVCAM-1). CRP was assayed in serum by latex-enhanced turbidimetric immunoassay. The serum level of soluble VCAM-1 level and estrogen hormone were estimated by ELISA technique. The results were expressed as Mean ± Standard Deviation .The statistical differences between cases and control were determined by student independent t-test. Correlation was determined by using spearman’s
rank correlation coefficient. Data analyses were performed with the Statistical Package for the Social Sciences, version 21.0 (SPSS, Chicago, Illinois, USA). The p value less than 0.05 were considered as significant.

**Results**

Table No 1: showing the status of CRP, estrogen hormone and soluble VCAM-1 level in control and postmenopausal women with symptoms of knee osteoarthritis (cases). The mean level of CRP was found significantly increased (p<0.01) while the serum levels of soluble VCAM-1 was found statistically highly significantly increased (p<0.001) and estrogen hormone was found highly significantly decreased (p<0.001) in postmenopausal women with symptoms of knee osteoarthritis as compared to control. Table No 2: showing the inverse correlation between soluble VCAM-1 and estrogen hormone while positive correlation between soluble VCAM-1 and CRP in postmenopausal women with symptoms of knee osteoarthritis.

**Table No 1**: Showing the level of sVCAM-1, estrogen and CRP in control and postmenopausal women with clinical symptoms of knee osteoarthritis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (100)</th>
<th>OA Subjects (100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen (pg/ml)</td>
<td>36.19± 15.80</td>
<td>27.31±17.29**</td>
</tr>
<tr>
<td>CRP(mg/l)</td>
<td>4.6 ± 1.67</td>
<td>6.6± 5.78</td>
</tr>
<tr>
<td>sVCAM-1 (ng/ml)</td>
<td>464.31± 28.54</td>
<td>562.87±63.78</td>
</tr>
</tbody>
</table>

*Significant at p<0.01, **HighlySignificant at p<0.001

**Table No 2**: Showing correlation between sVCAM-1 and other investigated parameters in postmenopausal women with symptoms of knee osteoarthritis:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>VCAM-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CRP</td>
<td>0.329*</td>
</tr>
<tr>
<td>2.</td>
<td>Estrogen</td>
<td>-0.281*</td>
</tr>
</tbody>
</table>

Results are presented in r value
*Significant at p<0.01

**Discussion**

Osteoarthritis is now considered as a whole joint disease in which bone, synovia and other joint structures are affected and adhesion molecules in the circulation contribute to the pathogenesis of osteoarthritis through cell-cell or cell-matrix interactions. In our study, the mean level of serum soluble VCAM-1 was found statistically highly significant (p<0.001) in postmenopausal women with symptoms of knee osteoarthritis as compared to control (Table No 1). This is consistent with the study of Hoeven et al who reported the increased level of VCAM-1 in elderly women having knee osteoarthritis than those without knee osteoarthritis.[21] Other studies also reported the elevated level of soluble VCAM-1 in serum of patients with osteoarthritis.[22-24] In joints, VCAM-1 is expressed by microvascular endothelial cells, synovial fibroblasts, and chondrocytes. [25] It is not appreciably expressed on resting vascular endothelium but is rapidly induced in response to a number of inflammatory stimuli, such as TNF-α, IL-1β. [26] During cartilage damage, chondrocytes can produce or respond to a large number of cytokines such as tumor necrosis factor-α and interleukin-1β. [27] These proinflammatory cytokine activation alters the phenotype of quiescent endothelial cells, which in turn increases the synthesis of VCAM-1. [28] The increased level of soluble VCAM-1 in our study shows active cartilage damage or an inflammatory component in osteoarthritis. The cartilage is the prime site of osteoarthritis disease and is very sensitive to change in sex hormone level. Our study showed significant decreased levels of estrogen hormone (p<0.001) in postmenopausal female subjects with symptoms of knee osteoarthritis as compared to control postmenopausal women. This is in agreement with the studies of Sheikh et al [29]. The correlative study between VCAM-1 and estrogen hormone showed an inverse relationship between them. It may be due to depletion of estrogen hormone during menopause, which induces VCAM-1 production. The mechanism through which estrogen decreases cytokine induced
VCAM-1 production by inhibition of NF-κβ, AP-1 and GATA transcription factors.\cite{30} In this study the serum level of CRP was also found significantly high in postmenopausal women with symptoms of knee osteoarthritis as compared to control which is in consistent with the study of Spector et al who reported modestly but significant increase of CRP level in women with early stage of knee osteoarthritis \cite{14}. CRP is an acute phase protein, which reflects a measure of the acute-phase response. Elevated level of CRP in serum may reflect subclinical inflammation in affected joints, mediated by cytokines. Furthermore we also found a positive correlation between CRP and VCAM-1 in this study. Thus, these findings support that inflammation is a component of the early events leading to clinical osteoarthritis.

**Conclusion**

It is therefore concluded from the study that in postmenopausal women lack of estrogen hormone induces soluble VCAM-1 production. VCAM-1 mediates the interaction of chondrocytes with immune cells and could thus by itself contribute to immune-mediated cartilage damage. Hence, serum level of soluble VCAM-1 could be used as an early biomarker for inflammatory response and cartilage damage in osteoarthritis. If in postmenopausal women the periodic check up for estrogen and VCAM-1 is carried out the occurrence and severity of osteoarthritis could be prevented.

**References**


27. Goldring MB, Otero M, Tsuchimochi K, Ijiri K, Li Y. Defining the roles of


CERTIFICATE

Author/Coauthor By
Reetika Shrivastava

Title
"Role of Soluble Vascular Cell Adhesion Molecule-1 in Knee Osteoarthritis among Postmenopausal Women"

Published in Volume 05 Issue 08 August 2017
In
Journal of Medical Science and Clinical Research

The Mentioned Research paper is measured up to the required standard
RESULTS: When compared with gentamicin induced nephrotoxicity, rats those who received extract of Bael leaves showed significant (p<.001) reduction in nephrotoxicity. Conclusion: It can be concluded from this study that leaves of Aegle marmelos possess nephroprotective activity.

STUDY OF SOLUBLE VASCULAR CELL ADHESION MOLECULE-1 IN KNEE OSTEOARTHRITIC FEMALE PATIENTS

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BACKGROUND: Knee osteoarthritis is one of the leading causes of pain and functional disability among elderly population. Angiogenesis is a critical event in inflammatory processes which is frequently observed in osteoarthritis. Vascular cell adhesion molecule-1 (VCAM-1) is emerging as a strong and independent predictor for severe osteoarthritis. VCAM-1 is a cell surface glycoprotein and mediates heterotypic cellular aggregation.

OBJECTIVE: To estimate the serum level of soluble vascular cell adhesion molecule-1 in postmenopausal women suffering from knee osteoarthritis.

MATERIALS AND METHODS: The present study includes 50 postmenopausal women of age above 50 years suffering from knee osteoarthritis and 50 normal healthy individuals of same age as controls. In all the cases and controls, serum VCAM-1 concentrations were measured by sandwich ELISA method.

RESULTS: The mean level of VCAM-1 was significantly increased in cases as compared to controls.

CONCLUSION: The increased level of soluble VCAM-1 in knee osteoarthritis subjects shows active inflammation indices of knee damage. Therefore, it is used as a biomarker for diagnosis of knee osteoarthritis.
and cytotoxicity against different cancer cell lines.

**Results:** The lectin has no specificity against human ABO erythrocytes and activity depends on Ca<sup>2+</sup> and it is stable at wide range of pH and temperature. The lectin showed effective dose dependent cytotoxicity specifically more in MCF-7 cells that evidenced by DNA ladder assay and PARP cleavage in a dose dependent manner. Further it increased the cell cycle inhibitor p21 level with corresponding decrease in cyclin D in response to lectin treatment in MCF-7 cells.

**Conclusion:** We report a novel lectin from the prawn hemolymph with high specificity for L-fucose that has antiproliferative activity towards human cancer cells. However, further establishment of the modus operandi of this lectin is required to enable its biotechnological applications as anti-tumor therapeutics.

**Key Words:** Lectins, Anticancer, Apoptosis, *Fenneropenaeus indicus*

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<table>
<thead>
<tr>
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<td><strong>Title</strong></td>
<td>Role of miR 21 and miR23a During Induction of Endothelial Mesenchymal Transition</td>
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<tr>
<td><strong>Name of Authors</strong></td>
<td>Lincy Edatt, V.B. Sameer Kumar</td>
</tr>
<tr>
<td><strong>Affiliation</strong></td>
<td>Department of Biochemistry and Molecular Biology, School of Biological Sciences, Central University of Kerala, Padannakkad, Kasaragod, Kerala</td>
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<tr>
<td><strong>Abstract</strong></td>
<td><strong>Background:</strong> Endothelial to mesenchymal transition (EndoMT) is a type of cellular transdifferentiation during angiogenesis in which endothelial cells lose their endothelial characters and acquire a mesenchymal phenotype, giving them invasive and migratory properties. Taking into consideration that miRNAs play important gene regulatory role, the present study was designed to identify the miRNAs associated with EndoMT. <strong>Material and Method:</strong> In the present study, HUVECs were treated with recombinant VEGF165 to induce angiogenesis. Microscopic observation and gene expression profiles were carried out to identify the time point of induction of EndoMT and the expression pattern of miRNAs were carried out at that time point. The role of two of the important miRNAs was further validated in the process of mesenchymal transition. <strong>Results:</strong> Both the microscopic observation and gene expression profiles showed a significant surge in the expression of mesenchymal specific genes by 2-4 hours of VEGF treatment. Profiling the expression of 1088 microRNAs during this time point showed significant changes in the expression of 10 microRNAs. Overexpression of miR21 and miR23a in cells showed that these microRNAs regulate the expression of many genes like MMPs, associated with mesenchymal transition. <strong>Conclusion:</strong> The results presented here suggest an important role of miR21 and miR23a in the process of Endothelial/Epithelial- mesenchymal transition implying modulation of the levels of these miRNAs can open up a new therapeutic strategy to control EndoMT and thereby angiogenesis.</td>
</tr>
<tr>
<td><strong>Key Words</strong></td>
<td>Angiogenesis, Endothelial mesenchymal transition, Micro-RNAs</td>
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<td>Role Of Soluble Vascular Cell Adhesion Molecule-1 In Type 2 Diabetic Postmenopausal Women Suffering From Knee Osteoarthritis</td>
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<tr>
<td><strong>Name of Authors</strong></td>
<td>Srivastava Reetika1, Singh Neelima2, Dhakad RK5 3</td>
</tr>
<tr>
<td><strong>Affiliation</strong></td>
<td>1, 2. Department of Biochemistry, 3. Department of Orthopaedic, Gajra Raja Medical College, Gwalior</td>
</tr>
</tbody>
</table>
| **Abstract** | **Background:** Type 2 Diabetes is frequently reported comorbidity in elderly patients with knee osteoarthritis. Vascular Cell Adhesion Molecule-1 (VCAM-1) is emerging as a strong and independent predictor for severe osteoarthritis. VCAM-1 is an inducible cell surface
Correlative Study of Soluble Vascular Cell Adhesion Molecule-1 And Estrogen In Knee Osteoarthritis Among Postmenopausal Women

Shrivastava Reetika, Singh Neelima, Dhakad RKS

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INTRODUCTION: Knee osteoarthritis is a leading cause of pain and functional disability among elderly female population. The high incidence of osteoarthritis in women just after menopause has suggested that estrogen deficiency plays an important in the onset and progression of disease. Osteoarthritis is associated with a local inflammatory process. VCAM-1 is an inducible cell surface glycoprotein and mediates heterotypic cellular aggregation. Therefore, the aim of this study is to assess the role of soluble VCAM-1 and its relation with estrogen in postmenopausal women having clinical symptoms of knee osteoarthritis.

MATERIALS AND METHODS: The present study includes 80 postmenopausal women of age 50 years or above with clinical symptoms of knee osteoarthritis as cases and 80 normal healthy female age matched individuals as controls. In all the cases and controls, serum VCAM-1 concentrations and estrogen were estimated by ELISA method. Statistical analysis was made by student independent sample t-test. Correlation was determined by using spearman's rank correlation coefficient.

RESULT: Serum level of soluble VCAM-1 was found statistically highly significantly increased and estrogen was found highly significantly decreased (p<0.001) in postmenopausal women with symptoms of knee osteoarthritis as compared to control healthy subjects. A significant negative correlation was observed between VCAM-1 and estrogen.

CONCLUSION: These findings show that in postmenopausal women lack of estrogen hormone induces soluble VCAM-1 production. VCAM-1 mediates the interaction of chondrocytes with immune cells and contributes to immune-mediated cartilage damage. Hence, serum level of soluble VCAM-1 could be used as an early biomarker for inflammatory response and cartilage damage in osteoarthritis.

KEYWORDS: Vascular cell adhesion molecule-1 (VCAM-1), Knee osteoarthritis, Estrogen

Evaluation of Serum Vitamin B12 Level In Primary Hypothyroidism

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OBJECTIVE: The objective of my study is to evaluate the level of serum vitamin B12 in patient of primary hypothyroidism. The vitamin B12 level was determined in patients of primary hypothyroidism and compared with normal subjects.

MATERIAL AND METHOD: Fifty five patients of known hypothyroidism and fifty normal subjects were taken for study. Serum sample were collected and level of vitamin B12 was measured by Backmen Coulter Access 2.

RESULT: The result showed serum vitamin B12 level of primary hypothyroid patients were significantly lower as compared to normal subjects (145.5±65.71 vs 396.4±197.6) p<0.0001.

CONCLUSION: There is very high prevalence of vitamin B12 deficiency in hypothyroid patients. So screening of serum vitamin B12 level should be undertaken in all hypothyroid patients in early course of disease when it is in potentially reversible condition and we will prevent vitamin B12 related complication in hypothyroid patients.

KEY WORDS- vitamin B12, hypothyroidism.
INSTITUTIONAL ETHICAL COMMITTEE
GAJRA RAJA MEDICAL COLLEGE, GWALIOR (M.P.)

D.NO. 251 /Bio /MC /Ethical

To,
Reetika Shrivastava,
Deptt. Of Biochemistry,
G.R. Medical College,
Gwalior, M.P.

Gwalior, Date- 10/12/2016

Dear, Reetika Shrivastava, Deptt. of Biochemistry,

The Institutional Ethical Committee, Gajra Raja Medical College, Gwalior has reviewed and discussed your Synopsis for MD/MS/Ph.D/Project entitled: "ROLE OF SOLUBLE VASCULAR CELL ADHESION MOLECULE -1 IN KNEE OSTEOARTHRITIS AMONG POSTMENOPAUSAL WOMEN SUFFERING FROM TYPE II DIABETES MELLITUS."

Following documents were reviewed:
1. IEC form of MPMSU.
2. Introduction.
3. Aim & Objectives
5. Expected outcome of Study.
7. Performa.

Following Members were present:
1. Dr.(Mrs.) Shaila Sapro - Chairman (Ex-Dean)
2. Dr. Sudhakar Dwivedi - Member (MPMSU Jabalpur)
3. Dr.(Mrs.) Neelima Singh - Member Secretary (Bio-chemistry Dept)
4. Dr. Saroj Kothari - Member (Pharmacology Dept.)
5. Dr. Ashok Mishra - Member (PSM Dept)
6. Dr. Ajay Gaur - Member (Pediatrics Dept)
7. Dr. Sanjay Saxen - Member (CHRI)
8. Mrs. Nidhi Patankar - Member (Legal Advisor)
9. Mr. J.P. Sharma - Member (Social worker)
10. Dr. P. Bisen - Member (Philosopher)
11. Mr. Anil Sarode - Member (Eminent lay person)

We approve the above mentioned study in the present form to be conducted by

Principal Investigator - Reetika Shrivastava, Deptt. of Biochemistry.
Guide Name - Dr. (MRS.) Neelima Singh Professor & Head dept of Biochemistry G.R. Medical college, Gwalior.
Co-Guide Name - Dr. R.K.S. Dhakad, Professor, Dept of Orthopedic G.R. Medical college, Gwalior.

Dr. (MRS.) Neelima Singh
Member Secretary, Ethical Committee
G.R. Medical College, Gwalior