

Diagnostic value of matrix metalloproteinases-1, -3 and -13 in patients with primary knee osteoarthritis: relation to radiological severity

Background: Knee osteoarthritis (KOA) is an important cause of disability in elderly. Aim of the work: to study the expression of matrix metalloproteinases (MMP-1, MMP-3 and MMP-13) in serum of patients with KOA and relation to radiological findings. Patients and methods: One hundred patients with KOA and 80 matching control were studied. The Kellgren Lawrence (KL) scale was assessed. The mRNA and protein expressions of MMP-1, MMP-3 and MMP-13 were assessed by "quantitative real-time polymerase chain reaction (qRT-PCR)" and western blotting, respectively. Results: There was a significant increase in the mRNA expression of MMP-1, MMP-3 and MMP-13 in patients (18.5 ± 3.4 , 3 ± 0.5 and 2 ± 0.2 , respectively) compared to controls (2.6 ± 0.4 , 0.7 ± 0.3 and 0.3 ± 0.06 , respectively) (all $p < 0.001$) and in the protein expression of MMP-1, MMP-3 and MMP-13 in patients (2.89 ± 0.01 , 2.37 ± 0.07 , 2.56 ± 0.02 , respectively) relative to controls (1.15 ± 0.04 , 0.79 ± 0.01 , 1.02 ± 0.08 respectively) (all $p < 0.001$). A significant correlation was found between the age of patients and mRNA expression of MMP-1 ($r=0.19$, $p=0.01$) and MMP-3 ($r=0.17$, $p=0.019$) and between the BMI and mRNA expression of MMP-1 ($r=0.16$, $p=0.028$). No significant correlation was found between mRNA expression of MMP-1, MMP-3 and MMP-13 and grade of KOA. At cut off values 5.5, 1.7 and 0.8, MMP-1, MMP-3 and MMP-13 could diagnose KOA at a sensitivity of 98%, 100% and 100% respectively with 100% specificity for all. Conclusion: The expression of MMP-1, MMP-3 and MMP-13 could be a valuable non-invasive marker for early diagnosis of primary KOA with no relation to radiological finding.