통증 및 근골격재활

게시일시 및 장소 : 10 월 18 일(금) 08:30-12:20 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 10:32-10:36 Room G(3F)

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A preliminary study of importance of bone micro-architecture for diagnosis of knee osteoarthritis.

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Introduction

The diagnosis of Osteoarthritis (OA) of the knee is typically based on assessing joint space width, achieved by X-ray. However, it is difficult to early detection and prediction of prognosis of OA using only this method. Changes in the microarchitecture of the trabecular bone are associated with the development and progression of OA, and parameter based on bony textures, bone structural value (BSV), can distinguish healthy individuals from patients with OA. BSV is an important parameter for the evaluation and analysis of bone microarchitecture, which delivers information about bone status by means of texture analysis. The present study was designed to use plain X-ray image to measure BSV and to show BSV has clinical value for diagnosis and prognosis of OA.

Materials and Methods

From an available pool of 39 patients, we classified 8 patients with no signs of OA (Kellgren-Lawrence (KL) grade = 0), 31 patients with signs of OA (KL grade ≥ 1), and 5 patients with clear signs of OA (KL grade = 2). These patients were graded on the KL scale and texture BSV using the analyzing software, KOALA (ImageBiopsy Lab GmbH, Vienna, Austria). The texture BSV mean values (BSV:M) from the medial compartment of the tibial plateau were calculated from the radiographs of these patients. An average BSV value was calculated for each patient. Mann-Whitney's U-test used to analyze BSV among the three groups.

Results

We found the BSV:M for all patients resulting in an average BSV:M of 0.38 for the clear sign of OA, 0.50 for the sign of OA, and 0.57 for the no sign of OA group. There was highly significant difference in the BSV:M between the clear sign of OA and the no sign of OA ($p<0.01$). These result suggest that the BSV:M can discriminate between these two groups. But there was no significant difference between the sign of OA versus no sign of OA groups. These results show that the population can be classified in roughly 3 categories based on the BSV:M : an osteoarthritic region, for low values of BSV:M (below 0.38), a healthy region, for high values of BSV:M (above 0.57), and an "at risk" category in between these two thresholds.

Conclusion

Our results show that bone texture carries enough information to distinguish between healthy individuals and patients with OA. Furthermore, microarchitecture of the trabecular bone, which is associated with the development and progression of OA, can be used for the early diagnosis and prediction of progression of OA from conventional radiographs, not requiring expensive imaging study. And ultimately, our results suggest standards of BSV which can be predictable value for OA. Although our findings have practical implications, our study design has some limitations. There was a small sample size, and patients were only Koreans. Thus, further studies are required to investigate more population and various races.