Relations of ankle alignment and MRI findings of ankle osteoarthritis.

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Introduction/Purpose: MRI is gaining attention as a tool for examining the severity of osteoarthritis (OA) over X-ray findings. However, there are few reports on the relationship between MRI and X-ray findings in ankle joints. We assessed the combination of ankle joint alignment and MRI to find the factor to predict MRI findings from X-ray findings in OA.

Methods: Of the 341 patients who had a diagnosis of ankle OA in our hospital from May 2009 to August 2015, we assessed 46 feet of 45 patients who underwent MRI. We determined ankle joint alignment by measuring tibial anterior surface (TAS) angle, and tibial lateral surface (TLS) angle on X-ray, and determined the areas of Bone Marrow Edema (BME) appearing on STIR, by partitioning 22 areas for talocrural, tarocalcaneal, Chopart joint. In the statistics analysis, we divided into two groups with and without BME, and we compared TAS angle and TLS angle. Moreover, for predicting the occurrence of BME, we divided the disease group into 2 groups, training set and validation set. We then verified the validity of the results by measuring cut-off value of TAS angle and TLS angle from ROC curve, an area which had statistically significant difference.

Results: TAS angles or TLS angles were significantly lower in the group which showed BME at the anterior medial part of the tibia canopy and medial malleolus joint surface.

From the ROC curve of the training set, the cut-off value (TAS angle of 82 degrees or less and TLS angle of 76 degrees or less) was obtained. Applying the obtained cut-off value to the validation set, it was possible to predict the occurrence of BME on the medial malleolus joint surface (sensitivity 71%, specificity 67%).

Conclusion: Association with BME and clinical symptoms as well as disease prognosis has been reported in the OA area, so predicting the appearance of BME can be a useful index for prescribing a treatment plan. It was suggested that the appearance of BME could be predicted from X-ray findings because it was related to ankle alignment and MRI. It is possible that these findings could be used as a new diagnostic tool to estimate disease severity in the future.

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