

CONCURRENCE OF CARTILAGE DEGENERATION, VESSEL FORMATION AND SUBCHONDRAL BONE REMODELLING IN OSTEOARTHRITIC HIP JOINTS

M. Tamaddon, Marysia Lis, C. Liu

Institute of Orthopaedic & Musculoskeletal Science, University College London, Royal National Orthopaedic Hospital, Stanmore HA7 4LP

Osteoarthritis (OA) is a degenerative joint disease that affects both cartilage and subchondral bone (SCB). With progression of OA, as results of changes in the loading pattern and a possible vascular pathology, bone remodelling and resorption occur¹⁻², which affect the physical environment supporting the overlying cartilage. Understanding the co-localisation of these factors can lead to development of possible prognostic factors and can assist us in creating more effective biological treatments. In this study, we report the changes in local distribution of volumetric bone mineral density (vBMD), tidemark morphology and vascular changes with OA to evaluate any concurrence of cartilage degeneration and SCB remodelling.

In this study, human femoral heads (n=4) were collected during total hip replacement operation due to OA. Cartilage was graded using ICRS classification³. To determine the remodelling of the subchondral bone, a peripheral quantitative CT (pQCT) was used to assess the vBMD distribution within the SCB. Histology and immunohistochemistry were used to evaluate vascular changes.

The examination of retrieved tissues revealed cartilage in different stages of degeneration, from normal to severely abnormal. Subchondral vBMD decreased with cartilage ICRS grade confirming bone remodeling in all samples. CD31 positive cells were identified in different regions of the femoral head confirming the concurrence of changes in blood vessels, cartilage degeneration and SCB remodelling.

¹ D Bhatia et al., *Journal of Pharmacy & Bioallied Sciences* **5** (1), 30 (2013).

² DM Findlay, *Rheumatology* **46** (12), 1763 (2007).

³ RW Wright, *J Bone Joint Surg Am* **96** (14), 1145 (2014).