Subchondral and intra-articular injections of bone marrow concentrate are a safe and effective treatment for knee osteoarthritis: a prospective, multi-center pilot study

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Abstract

Purpose: Subchondral bone is becoming a treatment target for knee OA patients, with promising early findings on the use of bone marrow aspirate concentrate (BMAC). The aim of this prospective, multi-centric pilot study was to evaluate safety as well as clinical and MRI outcomes of a combined approach of intra-articular and subchondral BMAC injections.

Methods: Thirty patients (19 men, 11 women, 56.4 ± 8.1 years) with symptomatic knee OA were treated with a combination of an intra-articular and two subchondral BMAC injections (femoral condyle and tibial plateau). Patients were evaluated at baseline and at 1-3-6-12 months of follow-up with the IKDC subjective, VAS, KOOS, and EQ-VAS scores. The MRI evaluation was performed with the WORMS score.

Results: No major complications were reported and only two patients were considered treatment failures, requiring a new injective or surgical treatment. The IKDC subjective score improved significantly from 40.5 ± 12.5 to 59.9 ± 16.1 at 3 months, 59.1 ± 12.2 at 6 months, and 62.6 ± 19.4 at 12 months

($p < 0.0005$). A similar improvement was reported for VAS pain and all KOOS subscales at all follow-ups, while EQ-VAS did not show any significant improvement. The MRI analysis showed a significant bone marrow edema reduction ($p = 0.003$), while the remaining WORMS parameters did not show any significant changes.
Conclusion: The pilot evaluation of this combined BMAC injective treatment showed safety and positive outcome up to 12 months of follow-up in patients with symptomatic knee OA associated with subchondral bone alterations. These findings suggest that targeting both subchondral bone and joint environment can provide promising results, and that BMAC can be a valid option for this combined approach to treat knee OA.
Keywords: BMAC; Bone marrow; Injective; Intra-articular; Knee; Osteoarthritis; Subchondral.

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