

Extended Abstract

Laboratory Quantification of Bone Marrow Concentrate Components in Unilateral Versus Bilateral Posterior Superior Iliac Spine Aspiration

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Mean total CFU-fs were 1.9 times higher in the bilateral group (n=13) versus the unilateral group (n=13); 42,912 versus 23,038, respectively (p=0.17). The median number of CFU-fs cultured from 1 ml of BMC in the bilateral cohort was 33% higher than the unilateral group (2477 versus 1860 CFU-fs/ml, respectively (p=0.23). Despite the difference in CFU-fs, the TNC counts were similar between the two groups. This descriptive study suggests a lower volume; multisite draw-technique for BMA increases the absolute number of CFU-fs, and therefore the correlated MSC count. Due to the limited statistical power, these data will need to be further evaluated with a larger patient dataset and correlated with patient outcomes data to determine clinical significance. Keywords: Bone marrow aspiration technique; Bone marrow concentrate; Quantitative analysis; Mesenchymal stem cell.

Mesenchymal Stem Cells (MSCs) from Bone Marrow Concentrate (BMC) have emerged as a promising treatment for degenerative musculoskeletal pathologies, such as Osteoarthritis (OA). Many aspiration techniques have been described in the literature with little consensus on optimal methodology. This study aimed to compare MSC quantity in unilateral versus bilateral Posterior Superior Iliac Spine (PSIS) bone marrow aspirate concentrations. Patients with unilateral knee OA seeking treatment with intraarticular BMC were recruited and randomized to a unilateral PSIS Bone Marrow Aspiration (BMA) or a bilateral PSIS BMA of equal total volumes. BMA and BMC samples underwent laboratory analysis of Colony Forming Unit-Fibroblasts (CFU-fs) as a marker for MSCs, for quantification of Total Nucleated Cell (TNC) count, and CD-34 positivity, in addition to other metrics. Data from 26 patients were analyzed.