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Treatment of articular cartilage lesion of the knee: Biopolymer hydrogel and microfracture versus microfracture only technique

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Introduction & Aim: Articular cartilage injuries of the knee are a common finding in patients with knee pain. In recent years, thermo-gelling biopolymer systems have elicited interest for biomedical applications, such as filler matrix for treatment of osteoarthritis and post-traumatic cartilage lesion. The purpose of this study was to evaluate and compare outcomes in two groups of patients, one treated with Microfractures (MF) and one treated with microfracture and a thermo-sensitive bio-adhesive hydrogel made of polyglucosamine/glucosamine carbonate (JR).

Methods: Sixty-nine (69) patients with symptomatic articular cartilage lesions in the knee, grade III-IV (outerbridge), treated from January 2015 to April 2015 were prospectively divided into two groups. All patients were treated with standard knee arthroscopy procedure, also associated with other treatment such as meniscal repair. The 46 patients included in JR group were treated with microfractures, plus a thermo-sensitive bio-adhesive hydrogel made of polyglucosamine/glucosamine carbonate that was applied directly on the site after marrow stimulation. In MF group, 23 patients were treated with arthroscopic microfractures as traditionally described by Steadman. All patients were allowed to full weight bearing 3 hours after surgery. The patients were evaluated clinically using WOMAC scores preoperatively, at 6 month, 1 year and 2 years follow up and VAS scores, preoperatively at 48 hours, 1 month and 6 months, 1 year and 2 years follow up. MRI and T2 mapping were performed before surgery and after 6 months to control the quality of the regenerated cartilage.

Results: The demographics and comorbid conditions known to affect outcome of cartilage repair techniques were similar between the two groups. No adverse event or complications related to surgery were observed or reported by patients. At 48 hours from surgery VAS score decreased of 41% (JR group) and of 32% (MF group), at 1 month, the decrease were 72% (JR) and 53% (MF), at 6 months there was no pain in the JR group and a decrease of 89% in the MF group, no pain was registered in both group afterwards. Before surgery WOMAC score was 56.5 in the JR group and 58.9 in the MR group, at 6 months follow up was 7.4 in JR and 28.4 in MR and at the last follow up 4.4 in JR group and 41.9 in MR group. Results from T2 mapping in JR group were compared with results from native cartilage. Biopsy was performed in 2 patients of the JR group who needed new surgical procedure due to trauma; both biopsies contained hyaline-like cartilage.

Conclusion: Patients treated with biopolymer hydrogel and microfracture technique obtained better clinical results than patients treated with only microfracture. This new technique resulted to be safe and allowed significant improvements in function and pain.

Biography

Raffaele Borghi is working as an Orthopedic Consultant in Rizzoli Orthopaedic Institute, Bologna, Italy and he is also working as Surgeon in Villa Regina Hospital located in Bologna at Italy.

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