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Intraarticular application of autologous conditioned serum (ACS) reduces bone tunnel widening after ACL reconstructive surgery in a randomized controlled trial

Nikica Darabos *, Miroslav Haspl †, Carsten Moser ‡, Anela Darabos §, Dubravka Bartolek *, Dietrich Groenemeyer ‡

* University Clinic for Traumatology, Medical School, University of Zagreb, Zagreb, Croatia

† Special Hospital for Orthopaedics and Traumatology Akromion, Krapinske Toplice, Croatia

‡ Groenemeyer Institute for Microtherapy, University Witten-Herdecke, Bochum, Germany

§ Scientific Unit, General Hospital Varazdin, Varazdin, Croatia

Purpose: Pro-inflammatory cytokines play a pivotal role in osteoarthritis, as well as in bone tunnel widening after ACL reconstructive surgery. A new treatment option is to administer autologous conditioned serum (ACS) containing endogenous anti-inflammatory cytokines including IL-1Ra and growth factors (IGF-1, PDGF, and TGF- β 1, among others) in the liquid blood phase. The purpose of this trial was to establish whether the postoperative outcome could be affected by intraarticular application of ACS.

Methods: In a prospective, randomized, double-blinded, placebo-controlled trial with two parallel groups, 62 patients were treated. Bone tunnel width was measured by CT scans, while clinical efficacy was assessed by patient administered outcome instruments (WOMAC, IKDC 2000) up to 1 year following the ACL reconstruction in patients receiving either ACS (Group A) or placebo (Group B). We compared the levels and dynamics of IL-1 β concentrations in the synovial liquid and examined the correlation between the levels of IL-1 β at three different postoperative points.

Results: Bone tunnel enlargement was significantly less (6 months: 8%, 12 months: 13%) in Group A than in Group B (6 months: 31%, 12 months: 38%). Clinical outcomes (WOMAC, IKDC 2000) were consistently better in patients treated with ACS at all data points and for all outcome parameters, and there were statistically significant differences in the WOMAC stiffness subscale after 1 year. The decrease in IL-1 β synovial fluid concentration was more pronounced in the ACS group, and values were lower, to a statistically significant degree, in the ACS group at day 10.

Conclusion: The intraarticular administration/injection of ACS results in decreased bone tunnel widening after ACL reconstructive surgery.

Level of evidence: Therapeutic study, Randomized controlled trial (significant differences and narrow confidence intervals), Level I.

Keywords: ACL reconstruction, Autologous conditioned serum, ACS, Osteoarthritis, Interleukin-1 receptor antagonist (IL-1Ra), Growth factors.