Category: Knee - Other

Intra-Articular Vancomycin-Concentrations In Synovial Fluid Do Not Reach Chondrotoxic Thresholds Following Vancomycin-Soaking Of Autologous Soft Tissue Grafts For Anterior-Cruciate Ligament Reconstruction

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All Authors:
Thomas R. Pfeiffer Prof. GERMANY
Arne Althoff cand. med. GERMANY
Sophia Krombholz MSc GERMANY
Max Dautert BSc GERMANY
Jan-Hendrik Naendrup BS, MD GERMANY
Daniel Guenther MD, PD GERMANY
Arsach Wafaísade PD GERMANY
Thevis Mario Prof. GERMANY

Summary:
This study describes the short term postoperative intraarticular vancomycin concentration in synovial fluid following ACL Reconstruction with Hamstring and Quadriceps tendon autografts. No chondrotoxic thresholds were reached in the synovial fluid on average 15 minutes after implantation of the graft.

Data:
Background: Studies revealed that vancomycin-soaking of hamstring autograft could drastically reduce the incidence of postoperative infections following ACL Reconstruction. However, it remains unclear whether chondrotoxic thresholds of Vancomycin in the synovial fluid are reached. Several studies investigated the chondrotoxic concentration of Vancomycin in in-vitro experiments and described 1000 μg/ml as a critical threshold. The purpose of this study was to measure the Vancomycin-concentration in the synovial fluid following Anterior Cruciate Ligament (ACL)-Reconstruction with vancomycin-soaked autografts. It was hypothesized that intra-articular Vancomycin-concentrations in synovial fluid do not reach a chondrotoxic threshold of 1000 μg/ml following Vancomycin-Soaking of autologous Semitendinosus and soft tissue quadriceps grafts for ACL Reconstruction. Methods: This study included 10 patients undergoing an ACL-Reconstruction using four-strand semitendinosus tendon autografts and 10 patients undergoing an ACL-Reconstruction using soft tissue quadriceps tendon autografts. Each graft was intraoperatively wrapped in 5 mg/ml vancomycin-soaked gauze swabs prior to implantation. Following wound closure, an aspiration of 5 ml synovial fluid was taken from each patient. Time was measured from soaking to implantation and from implantation to aspiration. In addition, the graft size was noted, and remnant ACL tissue was preserved. The aspirations were analyzed using high-performance liquid chromatography and mass spectrometry (HPLC/MS) regarding the vancomycin concentration. Spearman-Rho correlation coefficients were used to identify relations between the parameters and t-test to test for differences between the grafts. A p-value of < 0.05 was considered statistically significant. Results: 20 patients (15 women; 5 men, 29.35 ± 11.3 years) were included in the study. The mean concentration of Vancomycin measured in the synovial fluid was 23.229 ± 21.68 μg/ml with a minimal concentration of 2.324 μg/ml and a maximal concentration of 71.56 μg/ml. There was no significant difference between the two grafts (p = 0.911). A significant positive correlation (r = 0.644 p < 0.05) was observed between the concentration of Vancomycin and the duration from implantation to fluid aspiration (r = 0.73 p = 0.841) as well as the concentration of Vancomycin and the graft diameter (median 8.5mm Range 6.0-10.0mm r = 0.026 p = 0.914) for both grafts. Conclusion: Chondrotoxic concentrations of equal to or greater than 1000μg/ml were not reached in any aspiration of synovial fluid following ACL-Reconstruction using soft tissue autografts that were intraoperatively soaked in a 5mg/ml vancomycin solution. Against the backdrop of multiple studies showing significantly reduced infection rates after ACLR when using vancomycin-soaking of the graft, this study distinctly attenuates the counter-argument of the chondrotoxic side effects of this method.

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Predictors of Radiographic Osteoarthritis Following Anterior Cruciate Ligament Reconstruction at 5 Years Post-Operatively

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All Authors:
Nick Mohrani MD, MSc, FRCS, Dip. Sport Med; Clinical Professor CANADA
Denise S. Chan MBT, MSc CANADA

Summary:
This study evaluated predictive factors of post-traumatic radiographic osteoarthritis (OA) in the medial, lateral, and patellofemoral compartments, within a large randomized clinical trial at 5-years post-ACL reconstruction. Varus alignment and medial meniscectomy increase risk of medial OA. PT graft, lateral meniscectomy, meniscus repair, and chondral damage increase the risk of lateral OA.

Data:
Purpose To evaluate predictive factors of post-traumatic radiographic osteoarthritis (OA) in the medial, lateral, and patellofemoral compartments, within a randomized clinical trial at 5-years post-ACL reconstruction. Methods Three-hundred-and-thirty patients (14–50 years) were randomized intra-operatively to ACL reconstruction (ACLR) with patellar tendon (PT), single-bundle semitendinosus/gracilis tendon (HT), or double-bundle semitendinosus/gracilis tendon (DB) autografts. Clinical and quality-of-life-outcomes were previously published. Baseline, 2- and 5-year standardized radiographs (bilateral P-A knee weightbearing, 45 degrees flexion; lateral 40-45 degrees, and bilateral skyline patella views) were assessed for radiographic OA in the medial, lateral, and patellofemoral compartments, using the International Knee Documentation Committee (IKDC) scale. Presence of radiographic OA was defined by IKDC Abnormal or Severely Abnormal grades. An independent fellowship-trained orthopaedic surgeon blinded to all outcomes assessed the radiographs. Primary outcomes included radiographic OA and Anterior Cruciate Ligament Quality-of-Life (ACL-QOL) scores. Five-year medial, lateral, and patellofemoral radiographic OA were the respective dependent outcome variables in three multi-variable logistic regressions. Independent predictor variables included: age, sex, knee alignment, clinical stability (Lachman, pivot shift tests), meniscal treatment, chondral condition at surgery, graft type, graft failure, re-injury, and secondary surgery. Bivariate logistic regressions were performed for each predictor; individual predictor variables with p<0.1 were added into the multi-variable model. Odds ratios and 95% Confidence Intervals (95%CI) were reported. An ANCOVA investigated the association of radiographic OA in each compartment and ACL-QOL scores at 5-years. Results Five-year IKDC grades for radiographic OA were available for 302 patients (91.5%). Thirty-five patients (10.6%) had radiographic OA in the medial compartment. Varus alignment, meniscectomy, chondral damage, age>35, and male sex were identified as individual predictors. Only median meniscectomy and varus knee alignment were statistically significant predictors of medial OA in the multi-variable model, with odds ratios of 5.8 (95% CI 2.7–12.6, p<0.01) and 2.4 (95% CI 1.1–5.1; p=0.03), respectively. Sixty-seven patients (20.3%) had radiographic OA in the lateral compartment. Graft type, pivot shift, valgus alignment, meniscectomy, meniscal repair, and chondral damage were identified as individual predictors. Only PT graft, lateral meniscectomy, lateral meniscal repair, and lateral chondral damage were statistically significant predictors of lateral OA in the multi-variable model, with odds ratios of 2.4 (95%CI 1.2–4.8, p=0.02), 2.6 (95%CI 1.3–5.2, p=0.01), 3.3 (95%CI 1.5–7.4, p=0.01), and 2.0 (95%CI 1.0–3.9, p=0.04), respectively. Only 9 patients (2.7%) had patellofemoral OA; insufficient to progress to a multi-variable model. Bivariate analyses showed patellofemoral chondral damage as the only significant predictor of OA at 5-years (odds ratio of 5.7; 95%CI 1.5–21.8, p=0.01). Graft failure, traumatic re-injury, and secondary surgery did not predict radiographic OA at 5-years in any compartment. No significant associations were shown between 5-year ACL-QOL scores and presence of medial, lateral, or patellofemoral OA. Conclusions Varus alignment and medial meniscectomy at ACLR significantly increase the risk of developing medial OA. PT graft, and meniscectomy, meniscus repair, and presence of chondral damage in the lateral compartment significantly increase the risk of developing lateral OA. Higher proportions of OA cases would increase the confidence in these associations.

Category: Knee - Other

Bilateral ACL Surgery - A Comprehensive Study on Risk Factors, Functional and Subjective Outcome

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All Authors:
Anders Stallman MD, PhD, associate professor SWEDEN
Firthan Koca MD SWEDEN
Magnus Forsblad MD, PhD SWEDEN
Riccardo Cristiani MD, PhD SWEDEN

Summary:
This study evaluated predictive factors of post-traumatic radiographic osteoarthritis (OA) in the medial, lateral, and patellofemoral compartments, within a large randomized clinical trial at 5-years post-ACL reconstruction. Varus alignment and medial meniscectomy increase risk of medial OA. PT graft, lateral meniscectomy, meniscus repair, and chondral damage increase the risk of lateral OA.