Category: Knee - Osteoarthritis

Biological Therapies for Knee Osteoarthritis. Intraosseous Injections of Platelet Rich Plasma Improve Pain, Function and Quality of Life as Compared to Intraarticular Injections: A Controlled, Double-Blind, Randomised Clinical Trial. Preliminary Results

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Summary:
Intraosseous injections of platelet rich plasma improve pain, function and quality of life as compared to intraarticular injections, and constitute a safe alternative for the treatment of advance knee osteoarthritis

Data:
INTRODUCTION. The increasing prevalence of knee osteoarthritis (KOA), as well as the lack of effective treatments in moderate-severe stages, have made the target of new biological therapies such as platelet rich plasma (PRP) and mesenchymal stem cell (MSC) research. Studies emphasise the importance of addressing the osteochondral functional unit (OFU) as a whole, as biochemical synergy and communication between the tissues is key in the pathogenesis of OA. The anti-inflammatory and immuno-modulatory effects of PRP make it a useful alternative to classic symptomatic treatments, yet intra-articular (IA) PRP injections alone appear ineffective in the later stages of KOA, as they do not target the subchondral bone. OBJECTIVE. The purpose of this study is to assess the effectiveness of intraosseous (IO) PRP injections in patients with KOA as compared to IA at 0, 3 and 6 months. Materials and methods. A controlled, double-blind, randomised clinical trial including patients with over 6 months of symptomatic KOA, Kellgren-Lawrence stages III and IV, who did not respond to NSAIDs, corticoid injections and viscosupplementation. Subjects received three IA PRP injections 1-2 weeks apart. Alongside the first infiltration, our study group was injected with IO PRP according to the PRGF-Endoret® technique while our control group was given the placebo (sodium chloride solution 0.9%). Joint pain and function were assessed via the Western Ontario and McMaster Universities Scores (WOMAC) and Knee Injury and Osteoarthritis Outcome Score (KOOS) scales at 0, 3 and 6 months after procedure. RESULTS. 84 patients were included in the study with an average age of 59.77 ± 7.54 years. 46.4% were female. 40.6% were diagnosed with bilateral KOA, 23.2% left and 36.2% right side KOA. No statistically significant differences in patient characteristics were found between the two groups. Initial average WOMAC score for our study group was 55.03 ± 24.96 versus 53.38 ± 21.09 for our control group. Baseline mean overall KOOS score for either group was 109.11 ± 45.37 and 107.68 ± 39.19, respectively. Preliminary results show a significant improvement in pain reduction and quality of life (Qol) within both groups individually during follow-up. Patients who received IO PRP as opposed to placebo showed greater improvement on both WOMAC and KOOS scales, yet said difference was only found to be statistically significant (p 0.007) at the 6-month but not at the 3-month follow up (p 0.143). DISCUSSION. Due to the growing prevalence of OA, it is crucial we learn more about the underlying physiopathology so we may prevent, stall or alter the course of this illness. Research has shown the importance of treating the OFU as a whole, thereby pushing biological therapies such as PRP technology to the forefront. PRP is an effective and safe alternative to classic symptomatic treatments for KOA. Our study shows that, while the benefits of IA PRP injections alone cannot be denied, their synergic action with IO PRP was key in improving pain, joint function and QoL. Administration of IO PRP should therefore be considered as a viable alternative when devising new treatment protocols for KOA.

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Decreased Skeletal Muscle Mass as Indicated By the Sarcopenia Index Correlates With Decreased ADL In Patients With Advanced Knee Osteoarthritis

Abstract ID# 21939
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Summary:
In advanced knee osteoarthritis patients, decreased skeletal muscle mass assessed by the sarcopenia index (serum creatinine/cystatin C ratio) was significantly associated with ADL decline.

Data:
[Objective] In Japan, a super-aging society, the number of patients with knee osteoarthritis (KOA) is expected to increase in the future. The elderly may be complicated by Sarcopenia, an age-related loss of muscle mass, but its measurement is not simplified. Recently, it has been reported that the serum creatinine/cystatin C ratio (sarcopenia index: SI) correlates with skeletal muscle mass, and SI divided by body weight (SI/BW) is considered more accurate. In this study, we used SI/BW to examine the characteristics of skeletal muscle mass loss in patients with advanced KOA. [Methods] Retrospective, single center study was conducted. A total of 68 consecutive advanced KOA patients who underwent total/unicompartmental knee arthroplasty from April 2020 to June 2021 were recruited. To avoid the influence of renal function or other conditions that cause muscle atrophy, exclusion criteria included estimated glomerular filtration rate < 30, inflammatory disease, and general anesthesia surgery for other disease within a year. After application of exclusion criteria, 45 patients, 45 knees were included. Age, gender, Body Mass Index, Visual Analogue Scale, joint range of motion, SI/BW and patient-reported outcome scores (PROs) such as Knee Society Score (KSS), Knee Injury and Osteoarthritis Outcome Score (KOOS) and Oxford Knee Score (OKS). Cut-off values of SI/BW were defined as 0.0145 (men) and 0.009 (women) respectively according to the previous report, and we defined patients’ group with SI/BW less than the cut-off value as SI+ and the others as SI- . We evaluated the percentage and characteristics of SI+ . We also evaluated the association between SI/BW and PROs. [Results] The overall percentage of SI+ was 20.0% , while SI+ was significantly higher in males (57.1%) compared to females (32.2%) (p < 0.001). There was no significant difference in pain background other than sex between SI+ and SI-. The association between SI/BW and each PROs were statistically analyzed using multiple regression analysis. There was no multicollinearity in the independent variables with variance inflation factor of 1.14 (age), 1.43 (BMI), 1.02 (sex), 1.38 (SI/BW) respectively. Among each PRO subscales, KSS functional activity score (ß: 0.34, 95%CI: 0.024 to 0.65, p-value 0.036), KOOS ADL (ß: 0.57, 95%CI: 0.28 to 0.86, p-value 0.00032), and OKS (ß: 0.45, 95%CI: 0.13 to 0.77, p-value 0.0075) were significantly associated with SI/BW. [Discussion] This study revealed that 20% of patients with advanced-stage KOA have decreased skeletal muscle mass, and the percentage was higher in males. Decreased skeletal muscle mass was significantly correlated with lower activity-related scores such as KSS Functional activity, KOOS ADL and OKS. Rehabilitation interventions have been reported to improve clinical outcomes for KOA patients, and selective intervention for patients with reduced SI/BW can be aimed at improving efficiency. In addition, preoperative evaluation is important because TKA in patients with Sarcopenia is reported to...
have a high risk of complications. SI/BW is useful for preoperative risk assessment of patients. In conclusion, SI/BW, which can be evaluated only by blood sampling, is simple and useful, and the results can be used for patient evaluation, efficient intervention, and risk management.

Category: Knee - Osteoarthritis

An Examination of the Frequency of Central Sensitization in Patients with Knee Osteoarthritis with Chronic Pain and its Association with Patient-Reported Outcome Measures

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Summary:
Examination of correlation between Central Sensitization and PROMs

Data:
Objective Chronic pain associated with knee osteoarthritis (KOA) has been shown to involve not only nociceptive pain but also peripheral and central nerve sensitization. However, there are few reports comparing central sensitization (CS) to the severity of deformity, versus patient-reported outcome measures (PROMs) and we aim to investigate these relationships. Methods: 78 KOA patients (male/female=30/48, mean 63.6±11.8 years, KL2/3/4=29/28/21) who first visited our hospital between June and July 2022 with chronic pain refractory to conservative treatment were included in the study, and PROMs and CS were assessed by a self-administered questionnaire (Central Sensitization Inventory [CSI]). The severity levels were divided into the following point categories: subclinical (0-29 points), mild (30-39 points), moderate (40-49 points), severe (50-59 points), and extreme (≥60-100 points). A CSI score of 30 or higher was defined as having CS. The correlation between CSI score and KL classification, tibiofemoral angle (FTA), % mechanical axis (% MA), Visual Analogue Scale (VAS), Knee injury and Osteoarthritis Outcome Score (KOOS), Knee Osteoarthritis Measure (KOM) was examined. Statistical analysis was performed using SPSS ver.28 with Spearman's rank correlation coefficient. Comparison among the three groups was performed by one-way ANOVA, followed by post-hoc test using the Tukey-Kramer method. The significance level was set at 5%. Results: The mean CSI score was 20.1±10.4. CS occurred in 16.7% of patients (CSI score=30), the quantity of subclinical/mild/moderate patients was 11/11/1 respectively. KL2, KL3 and KL4 patients had CS in 3 (10.3%), 5 (17.8%), and 5 (23.8%) patients. There were no significant differences between the groups (p=0.45). FTA and %MA showed no correlation with the CSI score (p=0.74/0.68). VAS, KOOS-ADL, KOOS-QOL, KOOS-pain, KROM and CSI scores were significantly correlated (r=0.24, p=0.03/r=0.48/p=0.01/r=0.26/p=0.02/r=0.31/p=0.007/r=0.41/p<0.01). Only KOOS-symptom did not correlate with the CSI score (p=0.05). Summary and Discussion: Our findings indicate that there was a correlation between CSI and PROMs, but not with KOA severity or lower limb alignment. 16.7% of KOA patients had CS, but it has been reported that KOA patients with CS often have persisting residual pain after operations such as joint replacement surgery. In conclusion, it is necessary to evaluate not only PROMs but also CSI in patients with chronic pain to determine a correct treatment plan.

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Successful Isolation Of Viable Stem Cells From Cryopreserved Microfragmented Human Abdominal Adipose Tissue from Patients With Knee Osteoarthritis

Abstract ID# 22421
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Summary:
Viable stem cells can be successfully isolated and expanded from cryopreserved microfragmented adipose tissue using both tissue explant culture and enzymatic digestion

Data:
Background: Microfragmentation is a new non-enzymatic, mechanical one-step procedure to process stem cells from adipose tissue (AT) for use directly in the operation theatre. Treatment of knee osteoarthritis with autologous stem cells from microfragmented AT has shown promising results. Cryopreservation and biobanking of stem cells are becoming increasingly important for research purposes, treatment of aged patients, and for repetitive treatments to improve long-term outcomes without the need for additional liposuctions. Isolation of viable stem cells from cryopreserved whole liposapirates have been described, but not from cryopreserved microfragmented AT. Aim: To investigate if viable stem cells could be isolated and expanded from cryopreserved microfragmented AT harvested from knee osteoarthritis patients by two different isolation methods; (1) tissue explant culture (TEC), and (2) enzymatic digestion (ED). Materials and Methods: Microfragmented subcutaneous abdominal AT from knee osteoarthritis patients was cryopreserved in cryomedium containing 10% dimethyl sulfoxide (DMSO) cryoprotectant at -80 degrees Celsius. The samples were thawed and rinsed for stem cell isolation by TEC (non-enzymatic) and ED (with 1 mg/mL collagenase type 1), respectively. Viability, population doublings, and doubling time was assessed by trypan blue staining. Cell type and senescence-associated β-galactosidase activity were measured by flow cytometry. Osteogenic and adipogenic differentiation was assessed quantitatively by Alizarin Red S and Oil-Red-O staining, respectively. Statistical analysis was performed using paired t-tests. Normality of data was confirmed using Shapiro-Wilk tests and QQ-plots. p-values < 0.05 were considered statistically significant. Results: Microfragmented AT from 7 patients (5 females and 2 males, age 41 to 63 years) was cryopreserved for a period of 46-150 days (mean SD) 115.9 days (44.3 days). Viable stem cells were successfully recovered and expanded from all patients using both isolation methods with no significant difference in viable population doublings or doubling time from passage 1 to 3 (p>0.05). Low levels of senescence-associated β-galactosidase activity was detected for both methods. Stemness was verified by stem cell surface markers and osteogenic and adipogenic differentiation performance. Adenovital stem cells (CD31+/CD34+/CD45-/CD90+/CD146+), pericytes (CD31-/CD34-/CD45-/CD90+ + CD166+), transitional pericytes (CD31-/CD34+/CD45-/CD90 + CD146+), mesenchymal stem cells (CD34-/CD45-/CD90+), and CD271+ stem cells (CD34-/CD45+/CD90+/CD271+) were identified using both methods. More pericytes were present when using TEC (25% (24%)) compared to ED (2% (2%)) at passage 4 (p<0.04). Conclusion: Viable stem cells can be isolated and expanded from cryopreserved microfragmented AT using both TEC and ED. The TEC isolation method provides more clinically relevant pericytes than ED. For research purposes, the TEC method is believed to be more representative of treatment with microfragmented AT as no enzymes have been applied.

Category: Knee - Osteoarthritis

Availability and Price Variation in Platelet-Rich Plasma Injections at Top Ranked Orthopedic Centers in the U.S

Abstract ID# 22499
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Summary:
This is a prospective study investigating geographic variation in availability and pricing of platelet-rich plasma injections for knee osteoarthritis. Data: Background: Demand for costly cash-pay platelet-rich plasma (PRP) injections for knee osteoarthritis (OA) has dramatically increased in recent years despite a lack of consensus on its efficacy. This off-label use is not covered by insurance and patients often pay ~$700 per PRP injection, generally administered in a series of 3. Given increasing demand for PRP, hypothized price

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