

University of Medicine, Pharmacy, Sciences and Technology of Târgu Mureș

Doctoral School

Abstract of the PhD thesis

Minimally invasive treatment of osteo-articular, ligamentous and muscular disorders with PRP

(Platelet-Rich Plasma)

PhD student: Albu Daniel - Emil

Scientific coordinator: Prof. Univ. Dr. Copotiu Sanda - Maria

Background: Regenerative medicine is a rather new and fast-growing field in current orthopedic and sports medicine practice. During recent years, platelet-rich plasma has been shown to contain multiple factors that augment healing, thereby stimulating its use in a vast array of acute and chronic injuries

Objective : As such, the aim of this research was to evaluate clinical outcomes among patients treated with PRP injections as primary therapy for different osteochondral lesions of the knee and traumatic muscle lesions. Furthermore, we evaluated the role of PRP as an adjuvant treatment among patients undergoing recovery after surgical ACL reconstruction

Material and method: Three prospective, interventional studies were carried out to measure and analyze the clinical and structural effects of PRP treatment.

In our first study, entitled ***Minimally invasive treatment of knee osteoarthritis with PRP***, thirty-three patients were included (Group OA) All patients underwent base-line clinical evaluation, using the Tegner Lysholm Knee Scoring Scale. Outcome was then measured at 4 weeks since the beginning of the treatment and 12 weeks afterwards. Ultrasonography was used to quantify inflammatory and structural lesions of the knee. PRP treatment consisted in 3 intra-articular injections.

In the second study, entitled ***Rehabilitation among patients with arthroscopic anterior cruciate ligament reconstruction, using PRP therapy***, two groups of consecutive patients underwent arthroscopic ACL reconstruction, using the SemiT and BPTB techniques. Postoperatively all patients included in this study followed the same standardized rehabilitation protocol. In addition, patients in the first group received three intraarticular PRP injections as auxiliary therapy. Clinical outcomes were measured accordingly.

The third study, entitled ***Treatment of muscle ruptures among professional athletes with PRP injections***, consisted of a short-term follow-up regarding clinical outcomes and rehabilitation progress among professional athletes treated with Eco-Guided PRP injections for confirmed acute muscle ruptures compared to standard rehabilitation protocols (RICE therapy).

Results: We noticed improvements of the overall clinical score among patients from the first study (day 0; mean: 80, SD=8.17 vs 4 weeks; mean:86, SD=6.82 vs 12 weeks; mean:92, SD=5.48/ $p<0.001$), the most significant difference being the pain intensity and swelling of the knee especially between 4 weeks and 3 month's interval (pain: 18, SD=3.22 vs. 20, SD=2.99 / swelling 6, SD=2.64 vs. 8, SD=2,66/ $p<0.001$) but the findings were not correlated with Eco-graphic findings.

The second study population consisted of 39 consecutive patients. In Group A we observed an improvement in the clinical score from baseline examination to 4 weeks (76 vs. 85, $p<0.0001$), from 4 weeks to 12 weeks (85 vs. 95, $p<0.0001$) and from baseline to 12 weeks (76 vs. 95, $p<0.0001$). Improvements from 4 to 12 weeks were also recorded in pain scores (17 vs. 21, $p<0.0001$) and swelling scores (5 vs. 8, $p<0.0001$).

In our third study, Patients treated with PRP injections had a faster healing rate with normal Eco-graphic findings at 22 to 24 days after injury (a mean of 10 days compared to the first group, 34% faster).

Furthermore, none of the patients included in any of the three studies showed signs of post-injection PRP infection, considering that the asepsis and antisepsis norms were respected. We can consider PRP therapy to be superior from this point of view, compared to other similar treatment options.

Conclusions: In the short term, local PRP treatment showed no improvements on structural damage among patients treated for low to mild-degree cartilage defects but it improved the overall status of the patients (less pain, less swelling and improved mobility). The non-development of structural cartilage changes in patients with OA could be regarded as a successful outcome.

Improving these parameters, PRP could be regarded as an additional and integrative therapy to support conventional treatments and recovery protocols among patients undergoing rehabilitation after anterior-cruciate ligament reconstruction and among professional athletes, significantly decreasing time to return to sports by stimulating the healing process in acute muscle ruptures.

Keywords

Platelet-Rich Plasma, cartilage, ligament, muscle, rehabilitation, clinical, outcomes, sports