EARLY INTERVENTIONS: A ROLE FOR PLATELET-RICH PLASMA IN THE TREATMENT OF EARLY KNEE OSTEOARTHRITIS?

EVIDENCE GROWS IN FAVOR OF PRP AS COST-EFFECTIVE, MINIMALLY INVASIVE TREATMENT FOR KNEE OA

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In the past, abundant anecdotal reports showing the benefits of platelet-rich plasma (PRP) in the treatment of knee osteoarthritis (OA) amassed faster than we could produce empirical data. Now, as the desire increases to use minimally invasive, cost-effective treatments prior to surgical intervention, published data are gaining ground. PRP has emerged in the literature as a cost-effective, minimally invasive way to reduce OA-associated pain and morbidity in the active aging population.

At Cleveland Clinic Florida, our patients with mild-to-moderate knee OA have shown favorable clinical outcomes with ultrasound-guided intra-articular PRP injections. In total we perform approximately 10 to 15 PRP injections per month. We have about an 80 percent success rate with an average length of pain relief of 9 to 12 months.

PRP mechanism of action

Platelets are activated by exogenous substances (calcium chloride or thrombin), endogenous thrombin and/or intra-articular cartilage. Upon platelet activation, α-granules are degranulated and secrete growth factors and anti-inflammatory cytokines, including insulin-like growth factor (IGF), platelet-derived growth factor (PDGF) and interleukin receptor antagonists. Current literature indicates these mediators inhibit cartilage degradation by regulating and promoting gene expression of tissue inhibitors of metalloproteinases (TIMP-1). This reduction in cartilage degradation makes PRP particularly useful in the treatment of osteoarthritis.

Preparation impacts injectate efficacy

PRP is prepared by centrifuging autologous whole blood. The initial centrifugation separates the patient's blood into three layers based on specific gravity: plasma, platelets and white blood cells, and red blood cells. Some PRP systems include a second centrifugation to further concentrate the platelets and separate the platelet-rich plasma from platelet-poor plasma. Differences in container size, spin time and spin rate among PRP systems produce PRP with varying amounts of leukocytes, RBCs and platelet concentrations. These differences can alter the efficacy of the injectate.

Comparing hyaluronic acid and PRP

In the past five years, at least 13 independent studies looked specifically at PRP and knee OA, while several recent studies have looked at the role of PRP in the he of musculoskeletal conditions in general. Of the studies OA, 11 directly compared intra-articular PRP with intra articular hyaluronic acid (HA). Nine studies showed be symptom scores and clinical outcomes six to 12 months post-treatment in the PRP groups. In the two that showe significant difference between PRP and HA, one study only leukocyte-rich PRP. The remaining two studies com undefined PRP to saline, and leukocyte-poor PRP to sali and both showed better outcomes in the PRP groups.

> OUR PATIENTS WITH MILD-TO-MODERATE KNEE OA HAVE SHOWN FAVORABLE CLINICAL OUTCOMES WITH ULTRASOUND-GUIDED INTRA-ARTICULAR PRP INJECTIONS.

PRP offers clinical improvements

A review of the current literature suggests that patients with knee OA have a positive response to PRP treatme Younger, more active patients with mild OA tend to hav better clinical improvements with PRP when compared older patients with more severe OA.

PRP is a minimally invasive, cost-effective procedure with a low complication rate and a rapid recovery time. Usually, patients are able to bear weight immediately post-procedure and can return to normal activities following completion of treatment.

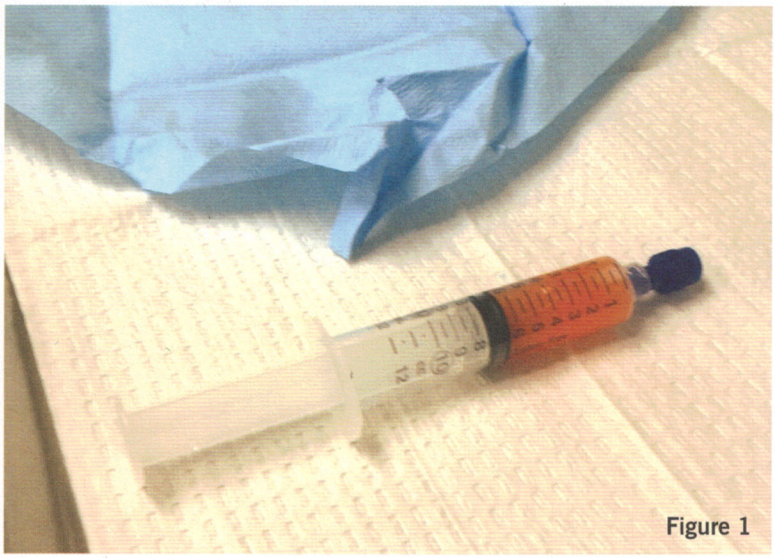

Figure 1

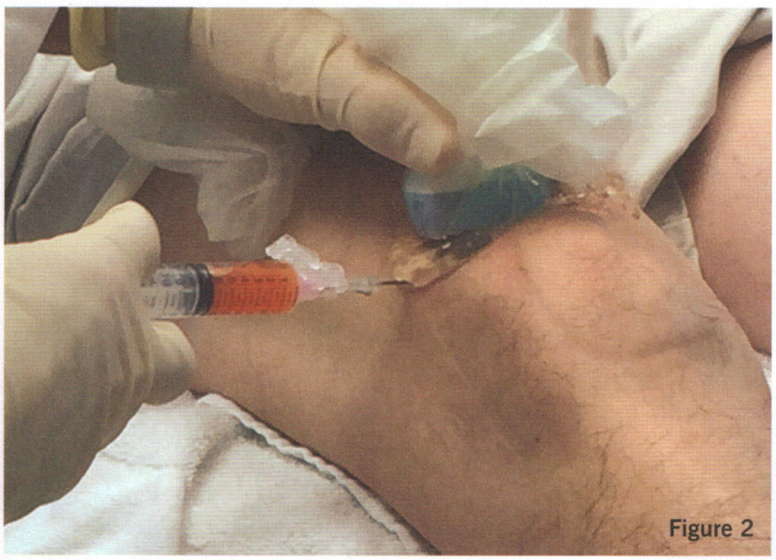

Figure 2

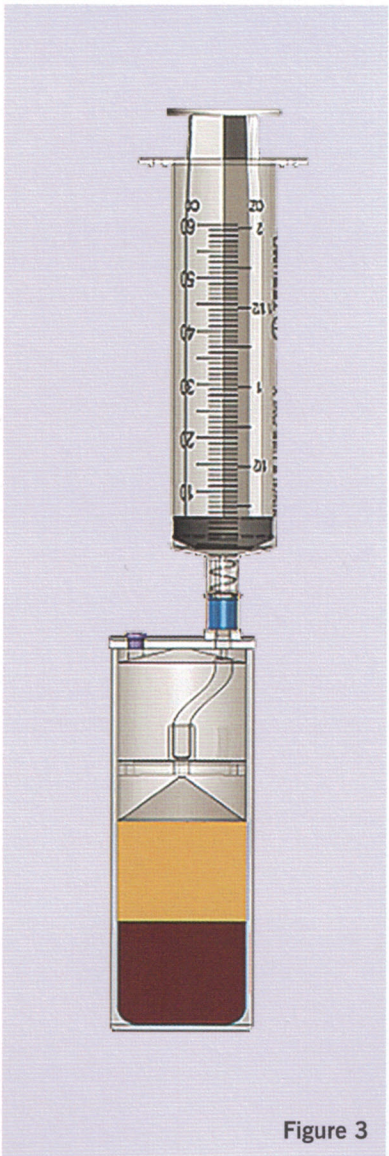

Figure 3

Figure 1. PRP post-centrifugation.

Figure 2. Injection of PRP into the knee using ultrasound guidance.

Figure 3. Separation of plasma from red blood cells.

Ideas for the future

Future studies should focus on comparing leukocyte-rich versus leukocyte-poor PRP in the treatment of OA, as different preparations of PRP yield different results.

Double-blind randomized controlled trials looking at PRP treatment in grade II and III knee OA would be useful as well. Additionally, protocols for injection technique, post-injection rehabilitation and longer follow-up times will give better information on treatment outcomes.

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References

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