Platelet-rich plasma in sports medicine

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Platelet-rich plasma (PRP) is a kind of autologous blood with concentrations of platelets above normal level (PRP was defined as having at least four times the normal platelet concentration). Platelets play a role in normal healing response via local secretion of growth factors and recruitment of reparative cells. PRP was first utilization on maxillofacial and plastic surgery to improve bone healing in 1990. Later , there are growing evidence support the use of PRP injections for the treatment of muscle, tendon injuries and degeneration. Recent development of PRP preparation devices in outpatient and surgical settings has led to an increased use in sports medicine , orthopaedic , rheumatology , and rehabilitation medicine.

PRP is prepared by taking autologous, anticoagulated blood and using a centrifuge or filter to separate red blood cells from leukocytes and platelets. With further concentration, plasma is divided into platelet-poor and platelet-rich plasma. After isolation, PRP can be administered with or without an activating agent. Its combination with calcium chloride and/or thrombin immediately before injection initiates platelet activation, clot formation, and growth factor release at the injection site.

Cell culture studies have provided evidence that PRP can stimulate processes of tendon healing. Several investigators have found increased collagen gene expression and increased production of vascular endothelial growth factor and hepatocyte growth factor in human tenocytes treated with PRP. In addition, recently reported that PRP stimulates the mobilization of circulation-derived cells to the area of injection and stimulates type I collagen production.

In skeletal muscle, growth factors in PRP have been shown in laboratory studies to regulate the inflammatory phase and improve healing. In a mouse model, insulin-like growth factor-1 (IGF-1) and basic fibroblast growth factor were found to improve muscle healing and increase fast-twitch strength.

There are increasing number of clinical use of PRP. Mishra and Pavelko prospectively evaluated 20 patients who failed nonsurgical treatment of lateral or medial epicondylitis. The study was non blinded, and 10 of the 20 patients were randomized to their treatment. At 8 weeks follow-up, those with PRP injection noted a statistically significant improvement in both visual analog scale (VAS) (60% versus 16%) and Mayo Elbow Performance (52% versus 14%) scores compared with control subjects. Preliminary results have been released of an ongoing double-blind, randomized, controlled trial evaluating PRP and cortisone injections for chronic lateral epicondylitis. Of 100 patients, those receiving PRP have demonstrated greater improvements in VAS and Disabilities questionnaire scores at a minimum 6-month follow-up. Recently, there is emerging literature on the beneficial effects of PRP for chronic non-healing tendon injuries including Achillis tendinitis , plantar fasciitis ,and patella tendinitis.

At Vichaiyut hospital , PRP has been used early this year. Two cases studies of chronic supraspinatus tendinitis injected with PRP have shown good result of pain and functional scores within 3 months and one case of chronic medial epicondylitis reported fair to good result of pain score within 6 months.

In summary, PRP has been used safely in a variety of conditions such as acute and chronic muscle and tendon injuries.
Most studies to date are involve in small sample sizes. Anyway, we are seeing increased clinical use of PRP especially in sports medicine, rheumatology , orthopaedic , and rehabilitation medicine.However more clinical trials are certainly needed.