

Plasma Rich in Growth Factors to Treat Adductor Longus Tear

Dear Editor,

Acute tears of the adductor tendons are a rarely reported injury, and the best treatment for this injury is unknown. Options include conservative treatment with rest, analgesia and physiotherapy, or surgical repair.¹ However, non-surgical therapy such as physiotherapy, anti-inflammatory medications and acupuncture, may represent significant downtime in athletes with high demands. The increasing use of platelet-rich plasma in orthopaedics thus presents both significant opportunities and questions about the most appropriate use of this therapy in acute muscle tears.

Clinical uses of growth factors have been reported in the treatment of chronic elbow tendinosis, closure following total knee arthroplasty, augmentation of dental bone grafts, healing of anterior cruciate ligaments grafts and ruptured Achilles tendons. Sanchez et al² reported a case of platelet-derived growth factor (PRGF) used to treat articular cartilage avulsion. However, little has been published on the use of growth factors in acute muscle tears.

To our knowledge, there remains a paucity in the literature of the clinical use of PRGF in the treatment of musculoskeletal conditions in our Asian population and thus a lack of consensus on the indications of PRGF injections. We report a case study of PRGF injection of a patient with an acute adductor tear in our centre.

Case Report

The patient was a 35-year-old Chinese male and was working as a professional bodybuilder. He presented with acute onset of right groin pain and swelling after lower limb weight training. Clinical examination revealed a well built young man, tenderness at right groin and limited right hip joint motion due to pain. Bedside ultrasound revealed a right adductor longus rupture with haematoma (Fig. 1a).

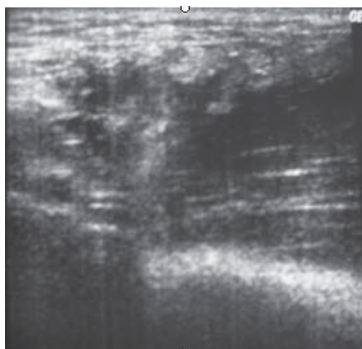


Fig. 1. Bedside ultrasound showed disruption of muscle fibres consistent with acute adductor tear based on patient's history and clinical examination.

He was counselled and treated with rest, analgesia and physiotherapy and was offered the option of growth factor injection, which he opted for as he needed to resume training as soon as possible.

Blood was collected on four 5 mL tubes containing 3.8% trisodium citrate, then centrifuged at 1800 rpm for 8 minutes (PRGF System II, BTI, Vitoria-Gasteiz, Spain). The 1 mL fractions located immediately above the erythrocytes were collected from each tube and transferred to sterile tubes. Care was taken to avoid collection from the buffy coat.

Calcium was added to the plasma enriched in platelets, triggering the formation of a fibrin matrix containing embedded platelets. Upon activation, the preparation was injected under aseptic technique.

He underwent 1 injection of PRGF weekly for 3 weeks. A repeat ultrasound done revealed muscle healing and organised haematoma (Fig. 1b) and the patient reported good pain relief and was able to get back to competitive training within 1 week of completion of the PRGF injections. No side-effects such as infection or anaphylaxis were reported.

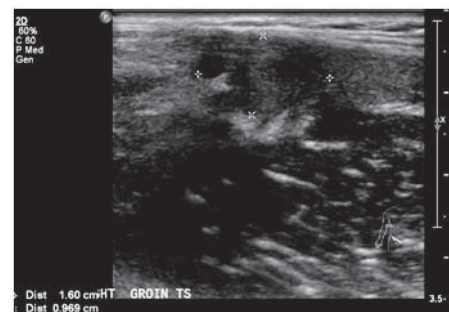


Fig. 2. A repeat ultrasound showed a 1.6 x 1.0 cm organised haematoma.

Discussion

Platelet rich plasma was initially developed in the 1970s and Antoniades identified 2 types of growth factors from platelets in 1981, which he named PDGR I and PDGR II.

Upon activation, platelets aggregate producing a clot, and secrete a variety of cytokines, including adhesive proteins and growth factors such as PDGF, transforming growth factor beta (TGF- β), vascular endothelial growth factor (VEGF), basic fibroblast growth factor (bFGF), insulin-like growth factor I (IGF-I), and epidermal growth factor (EGF). These growth factors are small proteins that stimulate cell proliferation, migration, differentiation, and matrix synthesis and can affect chondrocyte metabolism, chondrogenesis, and improve tendon healing in vivo. Animal

studies reported that in vivo tendon and cartilage healing may be enhanced by these growth factors.

Anitua³ focused his research in the field of bone graft optimisation in the mid-1990s with the aim of improving osseointegration in oral surgery. He described a method of preparing platelet rich plasma which is easy to implement and to handle. This method is known as Plasma Rich in Growth Factors. The advantage is that the risk of disease transmission or an antigenic reaction is non-existent because autologous blood is not mixed with any other component of animal or human origin. The resultant preparation allowed a slow release of biologically active proteins that initiate and modulate wound healing in soft and hard tissues.⁴

However, growth factor levels may be influenced by age, gender and platelet levels and different collection systems may yield different levels of platelets and leukocytes. Weinbrich et al⁵ compared 2 systems (PCCS vs PRGF) and reported a higher level of platelet and leukocytes in the PCCS kit. It remains debatable whether there is any clinically different biologic effect as proponents of PRGF stated that reduced leukocytes lead to reduced inflammation, pain and unwanted side-effects, with no need of bovine thrombin and minimal volume of blood needed.

We hope to use our case study to illustrate that PRGF may be a useful adjunct used to accelerate muscle and tendon healing and that it is safe and efficacious if the clinical setting is appropriate. We cannot extrapolate that PRGF can be used to treat all cases of muscle tears or tendon injuries. The benefits of PRGF in acute muscle tears need confirmation in a large cohort study. However, we believe that our case study provides useful information about the safety of this procedure and allows sports physicians and surgeons to offer their patients another mode of therapy in a field where acceleration of healing is paramount.

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Wee Lim Loo,¹MBBS, MRCS (Edin), MMed (Ortho),

Dave YH Lee,¹MBBS, MRCS (Edin), MMed Ortho),

Michael YH Soon,¹MBBS, MMed (Ortho), FRCS (Edin)

¹ Department of Orthopaedics, Alexandra Hospital, Singapore
Address for Correspondence: Dr Wee Lim Loo, Blk 2 St George's Rd,
#12-51 Singapore 320002.
Email: looweelim@yahoo.com