AUTOLOGOUS CONDITIONED PLASMA FOR ACHILLES TENDINITIS

HEALTH TECHNOLOGY ASSESSMENT SECTION

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EXECUTIVE SUMMARY

Introduction

Achilles tendinitis is tendinitis of the Achilles tendon, generally precipitated by overuse of the affected limb and is more common among athletes training under less than ideal conditions.
Currently Achilles tendinitis can be managed conservatively with rest, medication and physiotherapy. However, these techniques may offer little beyond the body's own healing processes. The use of novel treatment techniques that utilize the body's own growth factors promises to provide a further therapeutic option to improve the quality and speed of recovery from injury. ACP can potentially enhance healing by the delivery of various growth factors and cytokines from the α-granules contained in platelets.

Autologous conditioned plasma (ACP) is also known as platelet-rich plasma (PRP) which is a product derived from fresh whole blood that contains a high concentration of platelets.

This review was requested by Deputy Director of Health Technology Assessment Section, Ministry of Health Malaysia.

Aims/objectives

To determine the safety, efficacy and cost implications of autologous conditioned plasma for the treatment of achilles tendinitis.

Results and conclusion

A randomised controlled trial showed that a PRP injection compared with a saline injection did not result in greater improvement in pain and activity. There was no microbial growth found in the collected PRP samples and no complication was reported after the treatments.

Methods

Literature were searched through electronic databases which included Ovid Medline, PubMed, Ovid's Evidence Based Medicine Review Collection, and general databases such as Google and Yahoo.

AUTOLOGOUS CONDITIONED PLASMA FOR ACHILLES TENDINITIS

1. INTRODUCTION

Achilles tendinitis is tendinitis of the Achilles tendon, generally precipitated by overuse of the affected limb and is more common among athletes training under less than ideal conditions. Tendinitis may develops insidiously after sudden changes in activity or training level, use of inappropriate footwear, or training on poor running surfaces especially if high-risk factors are present such as age, cavus feet, tibia vara, heel and forefoot varus deformities.

The true incidence of Achilles tendinitis is unknown, although there is a reported incidence of 6.5 to 18% in runners.[1] In Malaysia, a study among badminton players showed that the prevalence of Achilles tendinopathy was 33.3%.[2]

Currently Achilles tendinitis can be managed conservatively with rest, medication and physiotherapy. However, these techniques may offer little beyond the body's own healing processes. The use of novel treatment techniques that utilize the body's own growth factors promises to provide a further therapeutic option to improve the quality and speed of recovery from injury.[3]

This review was requested by the Deputy Director of Health Technology Assessment Section, Ministry of Health Malaysia.

2. OBJECTIVES

To determine the safety, efficacy and cost implications of autologous conditioned plasma for the treatment of Achilles tendinitis.

3. TECHNICAL FEATURES

Autologous conditioned plasma (ACP) is also known as platelet-rich plasma (PRP) which is a product derived from fresh whole blood that contains a high concentration of platelets.[4] The platelet concentration of at least 1,000,000 platelets/μL in 5 mL of plasma is associated with enhancement of healing. ACP contains 3 to 5 fold increase in growth factor concentrations. Greater platelet concentrations have not been shown to further improve healing.[5]

ACP can potentially enhance healing by the delivery of various growth factors and cytokines from the α-granules contained in platelets. The basic cytokines identified in platelets include transforming growth factor-β (TGF-β), platelet-derived growth factor

(PDGF), insulin-like growth factor (IGF-I, IGF-II), fibroblast growth factor (FGF), epidermal growth factor, vascular endothelial growth factor (VEGF) and endothelial cell growth factor.[3,5]

Figure 1. Preparation of blood for PRP injection

ACP or PRP can only be made from anticoagulated blood. It cannot be made from clotted whole blood because platelets become part of the clot. It cannot be made from serum because serum is the clear liquid part of the blood that remains after blood cells and clotting proteins have been removed; the serum contains very few platelets.[5]

Preparation of ACP begins by addition of citrate to whole blood to bind ionized calcium and inhibit the clotting cascade. This is followed by one or two centrifugation steps. The first step is to separates the red and white blood cells from plasma and platelets. The second centrifugation is to concentrate the platelets.[5]

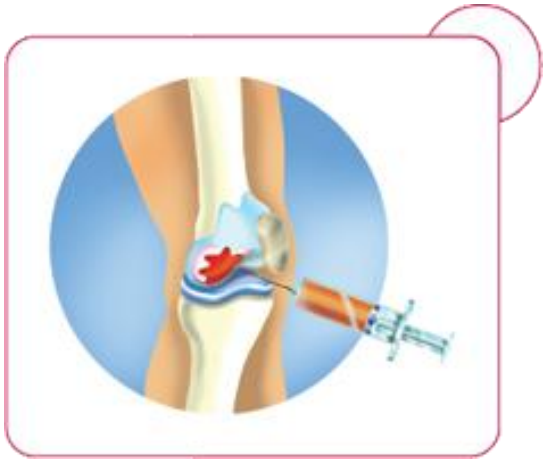

Figure 2. PRP injection to the affected joint

ACP extract is injected directly into the damaged tissue. The aim is to enhance the wound healing through delivery of growth factors and theoretical optimization of the healing environment. Because it is an autologous sample, the risk of allergy or the introduction of exogenous infection is considered negligible.[3] Some clinicians utilize dynamic musculoskeletal ultrasound to better identify the area to be injected.[5] Once delivered, the platelets begin active secretion of growth factor within 10 minutes and more than 95% of the presynthesised growth factors are released within an hour. Platelets are viable for 7 days and will continue to release growth factor into the tissue during this time.[3] The use of local anaesthetic before injection or with the injection of ACP may be controversial. The anaesthetic may change the pH of the tissue and decrease the effectiveness of the injection.[3]

4. METHODOLOGY

4.1 SEARCH METHODS

Literature were searched through electronic databases which included Ovid Medline, PubMed, Ovid's Evidence Based Medicine Review Collection (EBMR) which include ACP Journal Club (ACP), NHS Economic Evaluation Database (CLHTA), Cochrane Database of Systematic Review (CDSR). National Health Service Economic Evaluation Database (CLEED), Database of Abstracts of Review of Effectiveness (DARE), Cochrane Central Register of Controlled Trials (CCTR), and general databases such as Google and Yahoo.

The search strategy used the terms, which were either used singly or in various combinations: "autologous conditioned plasma" OR "autologous plasma rich in platelets" OR "platelet rich plasma" OR "plasma rich in platelets", and "achilles tendinitis" OR "achilles tendinopathy" OR "achilles tendon pain"

The search was limited to articles on human.

4.2 SELECTION OF STUDIES INCLUDED /EXCLUDED

Systematic reviews, meta-analysis and all primary studies pertaining to safety, effectiveness and cost effectiveness of autologous conditioned plasma to treat achilles tendinitis were included in this review.

A critical appraisal of all the relevant literature was performed using Critical Appraisal Checklist Project (CASP) checklists and the evidence was graded according to the US/Canadian Preventive Services Task Force Level of Evidence (2001).

5. RESULTS AND DISCUSSION

There was only one study retrieved.

5.1 EFFICACY

A randomised controlled trial conducted by de Vos *et al.* in which 54 patients with chronic tendinopathy aged between 18 and 70 years old were treated with eccentric exercise. The study showed that a PRP injection compared with a saline injection did not result in greater improvement in pain and activity. The mean score using Victorian Institute of Sports Assessment-Achilles (VISA-A) improved significantly after 24 weeks within the PRP group by 21.7 points (95% CI, 13.0 to 30.5) and within the placebo group by 20.5 points (95% CI, 11.6 to 29.4). However, after adjustment for baseline, the VISA-A score and duration of symptoms, there was no significant difference in the improvement on the VISA-A score at 6, 12 and 24 weeks follow up between these two groups. The between group differences were

2.5 (95% CI, -6.9 to 11.9), -1.6 (95% CI, -11.9 to 8.7) and -0.9 (95% CI, -12.4 to 10.6) respectively.[6] Level 1

There was no significant difference in the secondary outcome measures. Subjective patient satisfaction after 24 weeks was -4.1% (95% CI, -25.8% to 17.7%) and the number of patients returning to their desired sport after 24 weeks was 1.4% (95% CI, -17.0% to 19.8%).[6] Level 1

5.2 SAFETY

PRP or ACP injections are considered therapies and therefore are not regulated by the FDA. The preparation system such as Osteokin system, GPS II platelet concentration kit and AutoloGel have been approved by FDA.[7,8]

There was no microbial growth found in the collected PRP samples and no complication were reported after the treatments on patients with Achilles tendinitis in the de Vos *et al.* study.[6] Level 1

5.3 COST IMPLICATIONS

There was no retrieval of evidence on cost-effectiveness study on ACP for achilles tendinitis treatment retrieved. However, the cost of the procedure is about [redacted]

6. CONCLUSION

Based on the review, the efficacy and safety of autologous conditioned plasma or platelet-rich plasma is inconclusive. The only study retrieved showed that autologous conditioned plasma or platelet-rich plasma is a fairly safe procedure but did not show greater efficacy when compared to placebo.

7. REFERENCES

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