Washington State Health Care Authority
Health Technology Assessment

FINAL Key Questions and Background

Autologous Blood or Platelet-Rich Plasma Injections

Background

Platelet-rich plasma (PRP) and whole blood injections are treatments that have been utilized for a variety of healing applications in sports medicine and orthopedic medicine. Conditions where PRP or whole blood injections are commonly utilized include refractory acute or chronic ligament injuries, muscle strain injuries, cartilage injuries, osteoarthritis, and tendinopathies. In particular, the use of PRP and blood injections in sports medicine have seen a recent increase in public exposure, as many professional athletes have elected to receive these treatments, especially PRP, for sports-related injuries.

The rationale behind PRP and autologous blood injections (ABI) is to increase the concentration of growth-factor rich platelets around the injured area. These growth factors include platelet-derived growth factor (PDGF), insulin-like growth factors (IGF-I and IGF-II), and vascular endothelial growth factor (VEGF). This influx of platelets is thought to promote the healing process by enhancing regeneration and increasing angiogenesis. In particular, PRP preparations contain a concentration of platelets that is at least four-fold higher than that in blood to approximately one million platelets per microliter, a concentration that is thought to be clinically active. These therapies are outpatient procedures and utilize the patient's own blood to obtain the PRP or whole blood used in the injection. PRP is prepared by centrifugation of autologous blood to separate out the platelet-carrying buffy coat layer from platelet-poor plasma, red blood cells and white blood cells; the buffy coat layer and some of the plasma are then isolated and re-centrifuged to obtain the PRP to be used in the injection. Platelet-activating factors like thrombin may be added to PRP to stimulate platelets to release growth factors and increase recruitment of tissue repair factors. No such additional processing occurs for whole blood injections after venipuncture. It is common to add local anesthetic to PRP and whole blood samples to reduce pain at the injection site. Injection is usually performed under ultrasound guidance, and can be repeated if needed.

Despite the increased use of PRP and whole blood injections for healing applications, the efficacy and safety for PRP and whole blood injection treatments are not well established. In particular, there are additional issues regarding PRP: while the technology to obtain PRP is FDA-approved, PRP itself is currently not indicated for direct injection. Additionally, the number of PRP-preparation systems and lack of standardization for the platelet concentration of PRP also make establishing true efficacy difficult.

Policy Context

Platelet-rich plasma (PRP) and whole blood injections are proposed for a variety of healing applications. Concerns are considered medium for safety, medium/high for efficacy and medium for cost-effectiveness.

Scope of This HTA

To systematically review, critically appraise, analyze and synthesize research evidence evaluating the comparative efficacy, effectiveness, and safety of PRP in adults for treating musculoskeletal soft tissue injuries, tendinopathies, osteoarthritis, or low back pain. The differential effectiveness and safety of PRP for subpopulations will be evaluated, as will the cost effectiveness.

Population: Patients with musculoskeletal soft tissue injuries, tendinopathies, osteoarthritis, or low back pain.

Interventions: Autologous PRP or whole blood injections (that used in conjunction with other procedures such as surgery will be excluded)

Comparators: Alternative treatment(s), placebo, or no treatment

Outcomes: Function (primary), pain (primary), time to recovery, return to normal activities (sports, work, or activity level), quality of life, patient satisfaction, recurrence, medication use, secondary procedures (e.g., surgery), adverse events (primary), cost-effectiveness (e.g., cost per improved outcome), cost-utility (e.g., cost per quality adjusted life year (QALY), incremental cost effectiveness ratio (ICER) outcomes

Key Questions

In patients with musculoskeletal soft tissue injuries, tendinopathies, osteoarthritis, or low back pain:

1. What is the evidence of the short- and long-term efficacy and effectiveness of autologous PRP or whole blood injections compared with alternative treatment options or no treatment/placebo?

2. What is the evidence regarding short- and long-term harms and complications of autologous PRP or whole blood injections compared with alternative treatment options or no treatment/placebo?

3. Is there evidence of differential efficacy, effectiveness, or safety of autologous PRP or whole blood injections compared with alternative treatment options no treatment/placebo? Include consideration of age, sex, race, ethnicity, socioeconomic status, payer, and worker's compensation?

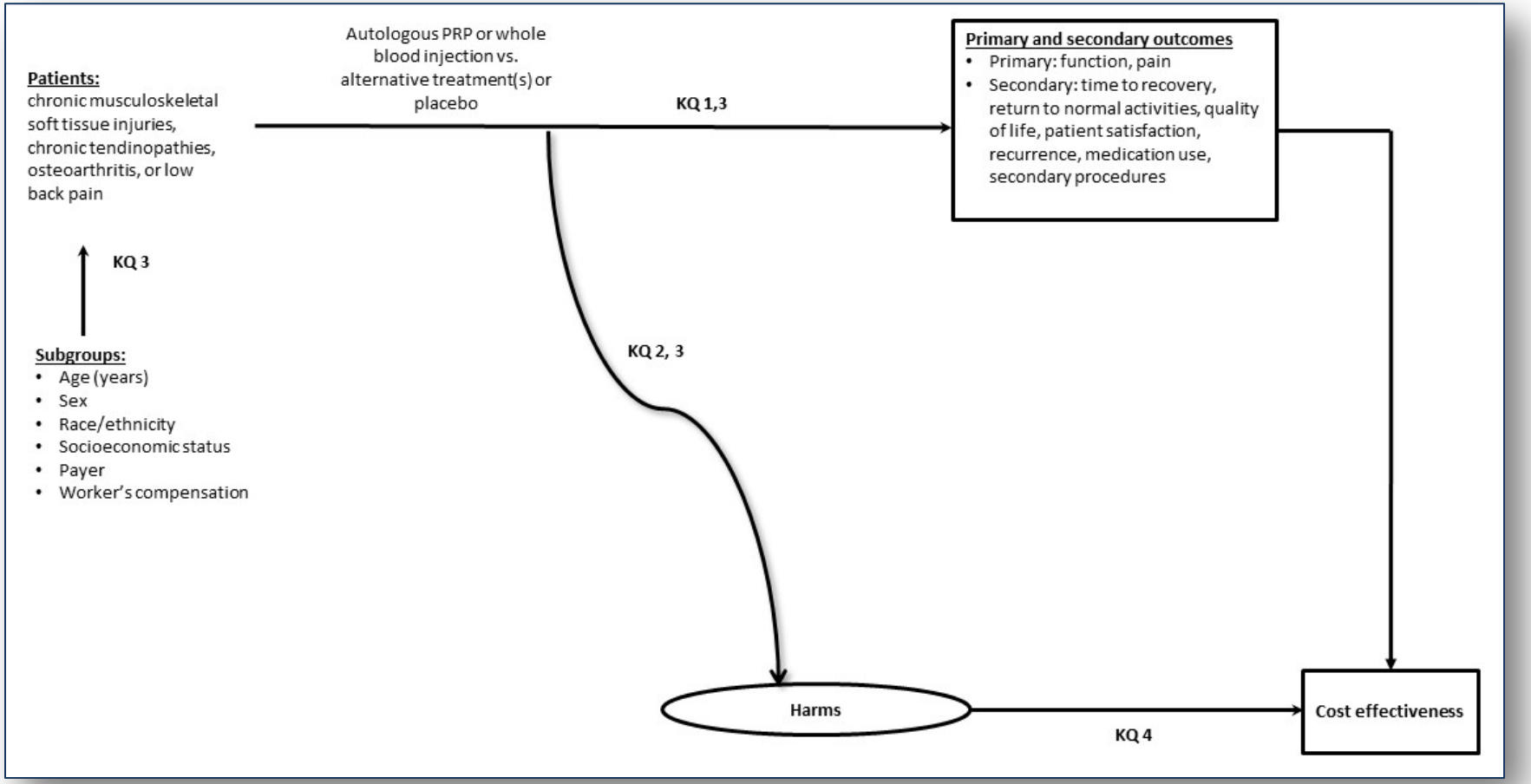
4. What is the evidence of cost-effectiveness of autologous PRP or whole blood injections compared with alternative treatment options?

Summary of Inclusion And Exclusion Criteria

Study Component	Inclusion	Exclusion
Population	Patients with any of the following conditions: • musculoskeletal soft tissue injuries • tendinopathies • osteoarthritis, or • low back pain:	• Cutaneous wounds • Bone fractures • Neurosurgery • Ophthalmological conditions • Cosmetic conditions • Maxillofacial surgery • Urological conditions • Cardiothoracic conditions • Dental conditions
Intervention	Autologous PRP or whole blood injections*	• PRP or whole blood injections used in conjunction with other procedures (i.e., surgery) • Other biologics (growth factor injections, etc.) • Whole blood injections for OA*
Comparator	• Alternative treatment(s) • Placebo	
Outcomes	• Function (primary) • Pain (primary) • Time to recovery • Return to normal activities (sports, work, or activity level) • Quality of life • Patient satisfaction • Recurrence • Medication use • Secondary procedures (e.g., surgery) • Adverse events (primary)	• Non-clinical outcomes
Study Design	Focus will be on studies with the least potential for bias. **Key Questions 1-2:** • High quality systematic reviews will be considered if available. • Randomized controlled trials (RCTs) • High quality non-randomized comparative studies **Key Question 2:** • KQ2: High-quality non-comparative studies (case series) designed specifically to evaluate harms/adverse events. **Key Question 3:** • RCTs which present results for both intervention and comparator such that they are stratified on patient or other characteristics of interest. **Key Question 4:** • Only full, formal economic studies (i.e., cost-effectiveness, cost-utility, cost-minimization, and	• Indirect comparisons • Noncomparative studies (case series) (except as described to evaluate harms) • Incomplete economic evaluations such as costing studies • Studies with fewer than 10 patients per treatment group • Case reports • Studies in which <80% of patients have a condition of interest

Study Component	Inclusion	Exclusion
	cost-benefit studies) will be considered.	
Publication	• Studies published in English in peer reviewed journals or publically available FDA reports	• Abstracts, editorials, letters • Duplicate publications of the same study which do not report on different outcomes • Single reports from multicenter trials • White papers • Narrative reviews • Articles identified as preliminary reports when results are published in later versions

Analytic Framework



Public Comment & Response

No comments were received.