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Effects of platelet-rich plasma in carpal tunnel syndrome: A systematic review

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ADMINISTRATIVE INFORMATION

Support - NA.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 September 2024 and was last updated on 11 September 2024.

INTRODUCTION

Review question / Objective Does platelet rich-plasma local injection therapy improve the clinical outcomes of patients with carpal tunnel syndrome?

Rationale Carpal tunnel syndrome (CTS) is the most common compressive neuropathy of the upper extremity, with progressive ischemia caused by high pressure on the median nerve (MN) within the carpal tunnel being one of the forms involved in the pathophysiology of the disease.
Treatment options for CTS include a variety of conservative treatments. Although surgical intervention is more effective than conservative treatment, conventional therapies are still used for mild to moderate forms of CTS, with failure and/or recurrence rates ranging from 7% to 75%.
Since 2014, platelet-rich plasma (PRP) has been gradually developed and used in the treatment of neuropathies with acceptable success rates. More recently, benefits related to nerve fiber regeneration have also been demonstrated in animal studies.

Condition being studied Carpal tunnel syndrome (CTS) is the most common upper extremity compression neuropathy which prevalence varies from 1% to 5%. It is believed that progressive ischemia caused by high pressure on the median nerve (MN) inside the carpal tunnel is one of the forms involved in the pathophysiology of the disease. The most common symptoms observed in patients with CTS include paresthesia, pain and decreased hand strength.
Treatment options for CTS comprise conservative management with medications, nocturnal wrist splinting, physical therapy and local injections with anesthetic, 5% dextrose, corticosteroid or platelet rich plasma (PRP) to surgical decompression of the median nerve (MN). Although the surgical intervention is more effective than conservative treatment, conventional therapies are still used for

mild to moderate forms of CTS. Patients with severe compression or those in whom conservative treatment was ineffective, surgery is recommended, however, the failure and/or recurrence of this method varies from 7% to 75% . Since 2014 the platelet-rich plasma (PRP) has been gradually developed and used in the treatment of neuropathies with acceptable success rates. PRP is an autologous blood product collected and centrifuged from a patient's blood that contains a high concentration of platelets. It is assumed the high concentration of varie growth factor realizes a vital role in tissue regeneration and healing. In this way, when PRP is injected into a patient, its components promote wound healing, angiogenesis and improve axonal regeneration in areas of entrapment. Most recently, benefits related to nerve fiber regeneration have also been demonstrated in animal studies.

METHODS

Search strategy For this review, the PUBMED, COCHRANE and EMBASE database were consulted. The sustaining principles were based on the PRISMA model (Preferred Reporting Items for a Systematic Review and Meta-Analysis).

Participant or population The research includes quantitative studies that evaluated the effect of platelet-rich plasma treatment in men and women with mild to severe CTS, aged 20 to 80 years.

Intervention Different methods and quantities of PRP administration by the local infiltration on the compression location, in the carpal tunnel.

Comparator A splint, one in slight extension and in neutral position, saline solutions, considered placebo, 5% dextrose, corticosteroids and shock waves were used as comparison.

Study designs to be included Randomized clinical trials controlled or not by placebo (double blind or not), retrospective case-controlled studies and prospective cross sectional studies.

Eligibility criteria The research included quantitative studies that evaluated the effect of treatment with platelet rich-plasma in patients with CTS from mild to severe.
Every article that associated the descriptors "Carpal tunnel syndrome AND Platelet rich plasma OR Autologous OR Platelet rich OR PRP" published in the last 10 years (from January 2014 to June 2024), in the English language, were included, except cross-sectional studies, experimental models, reviews, communication letters, case reports and articles that were not in English.

Information sources For this review, the PUBMED, COCHRANE and EMBASE database were consulted. The sustaining principles were based on the PRISMA model (Preferred Reporting Items for a Systematic Review and Meta-Analysis).

Main outcome(s) The studies evaluated a total of 387 patients who underwent PRP injection and had a mean age between 20 and 80 years. The size of the trials ranged from 26 to 98 patients. The RCTs used PRP doses between 1 and 3.5 ml, administered as a single dose, with local injection at the compression site. The time to evaluate the results ranged from 1, 3, 6 and 12 months. Most of the studies included mild to moderate carpal tunnel syndrome, one of them included only patients with moderate CTS and one article included moderate to severe carpal tunnel syndrome. Regarding the measurement of the efficacy outcome used, the visual analogue scale for pain (VAS) was used in four studies, while the BCTQ was the primary outcome in three studies. None of these seven studies reported adverse events before PRP injection.

Quality assessment / Risk of bias analysis The quality assessment/risk of bias analysis was performed using the ROBIS tool, using a descriptive table of the included randomized clinical trials.

Strategy of data synthesis Data extraction, based on the exclusion and inclusion criteria, was performed independently by two judges, with the opinion of a third judge being used in case of disagreement. Data extraction from eligible articles was analyzed following the PICO system (Population, Intervention, Comparison and Outcomes) and included characteristics of the population evaluated, intervention performed, comparison of groups and outcomes evaluated, as well as date, author, study design and sample size. After confirming all data, the judges assessed the quality of the evidence and wrote up the results.

Subgroup analysis The population samples were divided into intervention - infiltration with PRP and comparison - slight extension and in neutral position, saline solutions, considered placebo, 5% dextrose, corticosteroids and shock waves.

Sensitivity analysis Sensitivity analysis considered results with significant differences to be those with p-value <0.05.

Language restriction English.

Country(ies) involved BRAZIL.

Keywords Carpal Tunnel Syndrome; Platelet-Rich Plasma; Median Nerve; Compression;Treatment.

Contributions of each author

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