Stuck in the "Spin" Zone: Assessing Spin Bias in Systematic Reviews and Meta-Analyses on Intra-Articular Platelet-Rich Plasma Injections for Knee Osteoarthritis

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INTRODUCTION: Intra-articular (IA) platelet-rich-plasma (PRP) injections for the management of knee osteoarthritis (KOA) is an area of rapidly growing research in orthopaedics. With increasing data on PRP treatment of KOA, systematic reviews and meta analyses summarizing the current literature have become important drivers of clinical decision-making and practice guidelines. Given this role, which may directly impact patient care, these studies must be critically evaluated to ensure high-quality evidence drives medical decision making. The purpose of this study is to assess the prevalence and associated variables of spin bias in the abstracts of systematic reviews and meta-analyses of KOA treatment with IA PRP.

METHODS:

PubMed and Embase were queried for peer reviewed English-accessible systematic reviews with or without meta-analysis reporting on non-surgical treatment outcomes of IA PRP for KOA in human subjects. Two authors independently analyzed the abstracts for the 15 most common types of spin and appraised methodological quality using the AMSTAR 2 score. Interobserver agreeability was calculated prior to resolution consensus. Descriptive statistics were used for spin and AMSTAR 2 scores. Logistic regression and categorical association tests (Fisher's and Chi-square) were used to assess for the effect of study characteristics on the presence of spin.

RESULTS: One or more forms of spin were found in 92% (45/49) of study abstracts. Misleading reporting was found in 84% (41/49) of studies, followed by misleading interpretation in 39% (19/49), and inappropriate extrapolation in 35% (17/49). The most common form of spin identified was type 11, "conclusion focuses selectively on statistically significant efficacy outcome" which was found to occur in 63% (31/49) of studies. AMSTAR 2 confidence ratings were high for 10% (5/49) of studies, moderate in 8% (4/49), low in 6% (3/49), and critically low in 76% (37/49). Decreasing level of evidence was associated with inappropriate extrapolation spin type (OR = 2.528, 95% CI 1.037-6.161, p =.041).

DISCUSSION AND CONCLUSION:

Spin bias is highly prevalent in the abstracts of systematic reviews and meta-analyses analyzing IA PRP for the treatment of KOA. Decreasing level of evidence is associated with a higher likelihood of spin.

Table 2 | Assessment of Spin in the Reviewed Studies[a]

Misleading Interpretation		19
1	Conclusion contains recommendations for clinical practice not supported by the findings.	3
2	Title claims or suggests a beneficial effect of the experimental intervention not supported by the findings.	0
4	Conclusion claims safety based on non–statistically significant results with a wide confidence interval.	0
9	Conclusion claims the beneficial effect of the experimental treatment despite reporting bias.	14
12	Conclusion claims equivalence or comparable effectiveness for non–statistically significant results with a wide confidence interval.	3
Misleading Reporting		41
3	Selective reporting of or overemphasis on efficacy outcomes or analysis favoring the beneficial effect of the experimental intervention.	27
5	Selective reporting of the beneficial effect of the experimental treatment despite high risk of bias in primary studies.	30
6	Selective reporting of or overemphasis on harm outcomes or analysis favoring the safety of the experimental intervention.	0
10	Authors hide or do not present any conflict of interest.	1
11	Conclusion focuses selectively on statistically significant efficacy outcome.	31
13	Failure to specify the direction of the effect when it favors the control intervention.	2
14	Failure to report a wide confidence interval of estimates.	1
Inappropriate Extrapolation		17
7	Conclusion extrapolates the review's findings to a different intervention (ie, claiming efficacy of 1 specific intervention although the review covers a class of several interventions).	2
8	Conclusion extrapolates the review's findings from a surrogate marker or a specific outcome to the global improvement of the disease.	13
15	Conclusion extrapolates the review's findings to a different population or setting.	4

[a]Numbers on the left correspond to the type of spin. Numbers on the right are the number of studies with the specific type of spin.

Table 3 | AMSTAR 2 Evaluation of the Reviewed Studies[a]

AMSTAR 2 Criteria		Yes	No
1	Did the research questions and inclusion criteria for the review include the elements of PICO?	49	0
2	Did the report of the review contain an explicit statement that the review methods were established before the conduct of the review, and did the report justify any significant deviations from the protocol?	35	14
3	Did the review authors explain their selection of the study designs for inclusion in the review?	49	0
4	Did the review authors use a comprehensive literature search strategy?	49	0
5	Did the review authors perform study selection in duplicate?	39	10
6	Did the review authors perform data extraction in duplicate?	37	12
7	Did the review authors provide a list of excluded studies and justify the exclusions?	34	15
8	Did the review authors describe the included studies in adequate detail?	45	4
9	Did the review authors use a satisfactory technique for assessing the RoB in individual studies that were included in the review?	42	7
10	Did the review authors report on the sources of funding for the studies included in the review?	2	47
11	If meta-analysis was performed, did the review authors use appropriate methods for statistical combination of results?	39	1
12	If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	28	12
13	Did the review authors account for RoB in primary studies when interpreting/discussing the results of the review?	26	23
14	Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	37	12
15	If they performed quantitative synthesis, did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	24	19
16	Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	48	1

[a]AMSTAR 2, A Measurement Tool to Assess Systematic Reviews, Version 2; PICO, patient/population, intervention, comparison, and outcomes; RoB, risk of bias.

Variable to Spin Comparison vs. Odds Ratio