UROFAIR VIRTUAL 2021

E-Poster: C-130

Systematic Review and Meta-Analysis of Intravesical Glycosaminoglycan Layer Replenishment for Bladder Pain Syndrome: Hyaluronic Acid/Chondroitin Sulfate Relative to Dimethyl Sulfoxide and Vehicle Control

M. R. Setiawan[1]

[1] *Faculty of Medicine, Universitas Brawijaya, Malang, East Java, Indonesia*

BACKGROUND & OBJECTIVES

Defect in the glycosaminoglycan layer of urothelium is thought to be a keyrole in the biomechanism of Bladder Pain Syndrome (BPS). GAG layer replenishment, performed with instillation of either hyaluronic acid or chondroitin sulfate has showed significant values in recent trials. Supplementary analysis is imminent to address uncontrolled intervention and scarcity of enrolled patients. This study evaluates the comparative efficacy of intravesical HA and CS respectively, with subsequent addition of dimethyl sulfoxide and neutral solution as control arms.

Patient	Bladder Pain Syndrome (BPS)
Intervention	Hyaluronic Acid+Chondroitin Sulfate
Comparison	1) Dimethyl Sulfoxide (DMSO) 2) Vehicle Control 3) HA, CS
Outcome	1) ICSI/ICPI 2) VAS 3) Daily voiding

Table 1. Study Characterisctics

MATERIALS & METHODS

Studies regarding BPS and GAG layer replenishment were collected from PubMed and ScienceDirect in accordance to PRISMA specification. The review generates 7 RCTs and 3 prospective clinical trials comprising multiple treatment arms comparing the instillation of hyaluronic acid/chondroitin sulfate for BPS patients. Primary outcomes were O'Leary Sant symptoms (ICSI) and problem (ICPI) scores and visual analogue scale (VAS). The number of voiding frequency, nocturia, and mean voiding volume were recorded as the secondary measures. Assessment for the risk of bias was arranged with Cochrane tools. All changes from baseline were estimated in Mean Difference (MD) of study parameters.

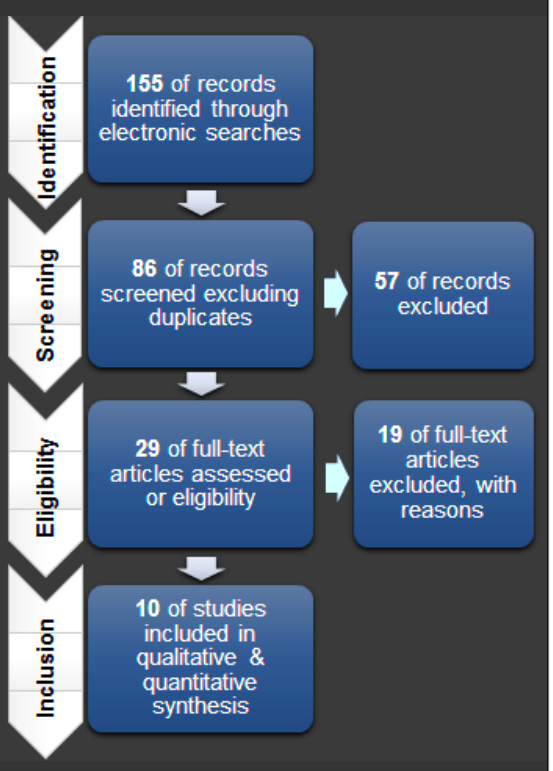

Diagram 1. Prisma Flow Diagram

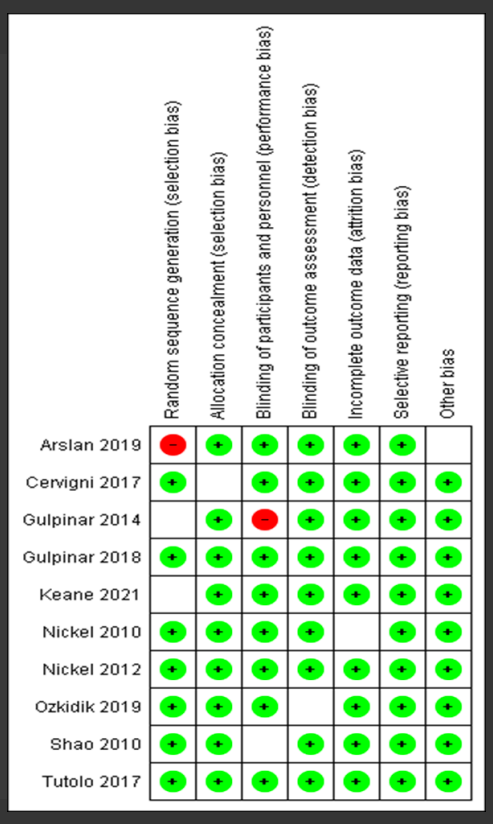

Figure 1. Risk of Blas

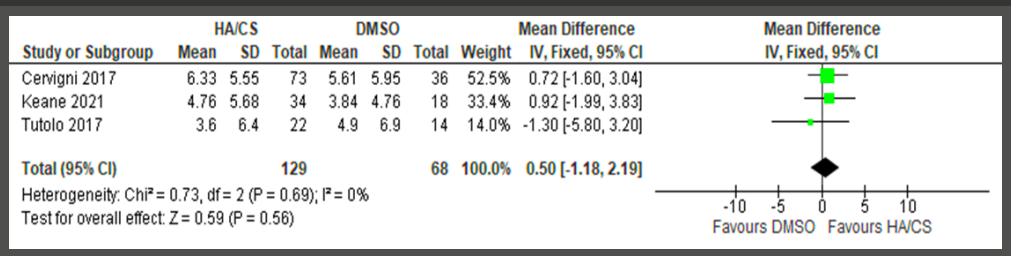

Figure 2. Forest plot of HA/CS vs DMSO on of ICSI score total reduction

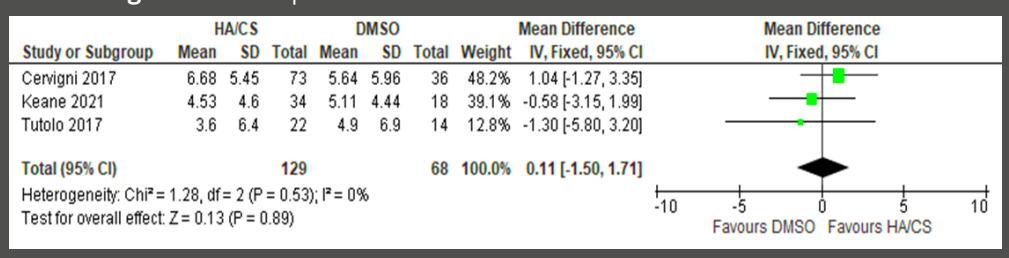

Figure 3. Forest plot of HA/CS vs DMSO on of ICPI score total reduction

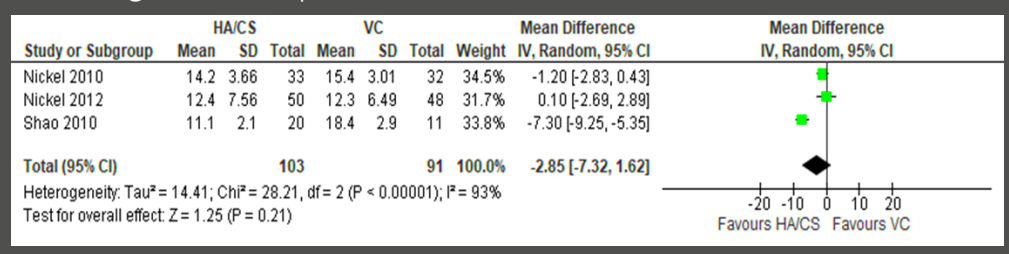

Figure 4. Forest plot of HA/CS vs vehicle on frequency of voiding

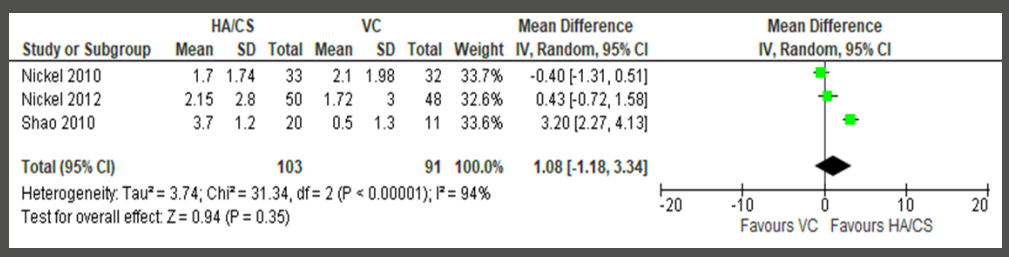

Figure 5. Forest plot of HA/CS vs vehicle on VAS score reduction

RESULTS

Study endpoint analyses showed a greater change of ICSI scores not significantly in favour of intravesical HA/CS (MD: 0.50 ; 95% CI; -1.18-2.19; P=0,56), while ICPI was virtually similar compared to DMSO. Daily frequency of voiding (MD: -2.85 ; 95% CI; -7.32-1.62; P=0,21) and VAS (MD: 3.20 ; 95% CI; 2.27-4.13; P=0,35) also showed numerical improvement compared to vehicle control. Most parameters including ICSI, ICPI, and VAS scores were improved and statistically significant, in the group of HA/CS compared to mono-solution, particularly when compared to CS group. Number of voiding/day, nocturia, and mean voiding volume are balanced between these groups. Overall, instillation of HA/CS provided slightly better outcome compared to DMSO and vehicle control

KEYWORDS Bladder Pain Syndrome, GAG layer replenishment

CONCLUSION

This study indicates that GAG layer replenishment could be equally valuable compared to predecessor intravesical treatments, i.e. DMSO or bladder hydrodistention. Hyaluronic acid solution without chondroitin sulfate is more similar in its efficacy with both solutions combined.

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