Do intravaginal support devices mitigate urine leakage while running among females who experience exercise-induced urinary incontinence?

Collins, G[1], Rodrigues, MP[1], Vesting, S[1], **McLean, L[1]**
[1]University of Ottawa, School of Rehabilitation Sciences, Ottawa, Canada
Email: lmclea2@uottawa.ca

Summary

We evaluated the immediate effectiveness of a pessary and a menstrual tampon to mitigate urine leakage among females who experience running-induced urinary incontinence (RI-UI). The pessary led to greater improvement in UI symptoms and satisfaction compared to the tampon. Neither intervention prevented pelvic floor strain during running. Pessaries seem to provide symptom relief, but do not appear to prevent tissue strain.

Introduction

Approximately 30% of females report urine leakage during exercise [1]. A recent systematic review found that pessaries and tampons may help with exercise induced UI, yet high-quality evidence is lacking [3]. Intravaginal devices may support the pelvic structures and thus reduce the connective tissue strain that has been observed after running [2]. We aimed to investigate whether a pessary or tampon used during running (1) reduces RI-UI symptoms and (2) reduces strain in the connective tissues of the pelvic floor.

Methods

Approval was obtained from the institutional research ethics board and all participants provided written informed consent. Adult females with RI-UI attended three laboratory visits, each involving a standardized 37-minute treadmill run. Bladder volume was confirmed to be 100-200mL using transabdominal ultrasound prior to beginning the run. Participants ran with no intervention (baseline) at the first visit, then with a pessary or tampon *in situ*, assigned in random order, at two subsequent visits.

Urine leakage was assessed through self-report every five minutes during the run, rated by occurrence (yes/no) and perceived volume (drop(s)=1, squirt=2, or gush=3). The leakage severity index was determined as a product of the proportion of 5-minute blocks where leakage was reported and the median amount of leakage per block. After the run, participants rated their satisfaction (0-100%) and perceived improvement (0–100%) with each intervention.

3D-transperineal ultrasound (Voluson S6, GE Healthcare) was used to measure levator plate length (LPL), bladder neck height (BNH), and levator hiatus area (LHA) before and after running, measured off-line using GE 4D View Software, and the change (before-after) was computed.

Friedman's test with post-hoc Wilcoxon signed-rank tests were used to compare leakage severity among interventions. Pelvic morphology was compared among interventions using repeated-measures GLMs (α=0.05), with pre-run values as covariates. The proportion of the sample that reported >75% improvement with each intervention was compared using McNemar's (paired) test. While the target sample size is n=30, this abstract presents preliminary findings.

Results and Discussion

Fourteen runners have participated to date (Table 1). Data from two runners were excluded from the leakage severity analysis due to no leakage at baseline. Leakage severity was significantly lower than baseline and tampon (Table 2). Leakage severity with the tampon was not significantly different from baseline. The pessary led to greater improvement ($z=-2.00$, $p=0.046$) and satisfaction ($z=2.64$, $p=0.008$) than the tampon. Under all conditions, after running, the LHA and LPL were larger relative to before the run while the BNH remained unchanged. Neither intervention impacted the extent of change in LHA ($F(2,23)=0.41$, $p=0.67$), LPL($F(2,23)=0.48$, $p=0.92$) or BNH ($F(2,23)=2.59$, $p=0.09$) observed after the run, however there was a tendency for the bladder neck to descend less when participants used the tampon.

Conclusions

The pessary appears to be associated with greater improvements in leakage severity, higher satisfaction and greater perceived improvement than the tampon, but does not appear to mitigate passive tissue strain.

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Table 1. Demographic data (n=14).

Age (years), mean (SD)	43 (11.43)
Body Mass Index (kg/m^2), mean (SD)	23 (2.96)
Parous (n, %)	10 (71.4)
Postmenopausal (n, %)	11 (78.6)

Table 2. Leakage severity index [mean (SD)] (n=12).

None	Tampon	Pessary	p
0.88 (0.45)[a]	0.69 (0.59)[a]	0.26 (0.28)[b]	**0.002**

References

[1] Brennand E. et al. (2018). *Int Urogynecol J.* ***29***:497-503
[2] Bérubé, MÈ. et al. (2024) *Int Urogynecol J* ***35****:* 127-138
[3] Petter Rodrigues M. et al. (2024). *BJU Int,* ***134***:906-91