Feasibility of Patient-Collected Tampon Samples for Longitudinal Monitoring of the Vaginal Microbiome

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Background

The bacterial composition of the vaginal microbiome is highly dynamic with compositional changes related to menses, intercourse, hygiene and hormone levels. Imbalances in vaginal bacterial communities can lead to an increased risk of infertility, miscarriages, preterm birth sexually transmitted infections, yeast infections, urinary tract infections and bacterial vaginosis.

Advances in sequencing technology have greatly increased the granularity of vaginal microbiome data in recent years, however, significant inter- and intra-individual variation has made defining normal difficult. The expense and inconvenience to the patient of next-generation sequencing on a clinician-collected sample has obstructed high frequency and longitudinal vaginal microbiome monitoring with healthy patients.

Objectives

Determine if the tampon is a superior vaginal microbiome sample collection method than the clinician collected high vaginal swabs.

Methods

Self-collected tampons and clinician collected high vaginal swabs from 11 volunteers were analysed using targeted qPCR for 16 common vaginal microorganisms with results compared.

Results

Tampon samples demonstrated a high (91%) level of agreement with clinician-collected samples for measures of Total Bacteria Mass, *Lactobacillus spp.* and Lactobacilli Ratio. Tampon samples were superior for detecting potential pathogenic microbes 6.29 ± 0.67 participants (mean ± SEM) compared to 5.29 ± 0.65 participants for clinician-collected samples. *Mycoplasma genitalum* was detected via the tampon and not the clinician collected sample in one participant..

Discussion

These results indicate that tampon-collected sampling and targeted qPCR assays could represent a feasible and low-cost tool for high-frequency longitudinal monitoring of key indexes of the vaginal microbiome (e.g. Lactobacilli dominance or presence of key pathogens) and represent a scalable research tool for large cohort studies of numerous obstetric and gynaecology outcomes with the aim of improving health care for women.