Dry and Wet Self-collected Flocked Vaginal Swabs

A.Lytwyn[1,2], M. Howard[3], L. Elit[4], K. Onuma[1], D. Jang[1], A. Ecobichon-Morris[4], M. Chernesky.
1Pathology and Molecular Medicine, 2Clinical Epidemiology and Biostatistics, 3Family Medicine, 4Division of Gynecological Oncology, McMaster

Background

Self-collected vaginal samples for high risk human papillomavirus (hrHPV) DNA testing is a promising alternative cervical cancer screening method for women who are reluctant to undergo pelvic examination for the purpose of Papanicolaou (Pap) smear testing.

Some women have expressed concern about placing samples into liquid transport medium because of the perceived potential for spillage and self-harm. Dry transport would address this concern and has the advantage of ease of handling. The effect of dry transport on HPV-DNA detection needs to be determined.

Objective

- To compare hrHPV-DNA detection in self collected vaginal samples transported dry to those placed in liquid medium
- To compare vaginal self samples to physician-obtained cervical samples tested for hrHPV-DNA and E6/E7 messenger RNA (mRNA)

Methods

Population

Women with abnormal Pap test referred to the Henderson Hospital colposcopy clinic, with intact cervix and no history of cervical biopsy or treatment for cervical intraepithelial neoplasia (CIN).

Sample collection

Women collected a vaginal sample using dual flocked swabs (Copan Italia) (Figure): 1 swab was put into a dry tube and the other into a tube containing specimen transport medium. The colposcopist obtained a cervical sample for liquid Pap smear (Hologic ThinPrep), and biopsies if indicated.

Figure 1: Dual flocked swab (Copan Italia).

High risk HPV testing

hrHPV-DNA: wet and dry vaginal swabs, and L-Paps were tested with Qiagen Hybrid Capture 2 (HC2) for 13 high risk HPV types (RLU/CO). Values between 1.0 to 2.0 were repeated.
E6/E7 mRNA: L-Paps were tested by Gen-Probe APTIMA HPV (S/CO) for E6/E7 mRNA from the same 13 HR HPV types, plus one additional HR HPV (type 66). Values between 1.0 to 2.0 were repeated.

Results

50 women, 17 to 63 years old (median age 28 years), collected paired vaginal samples.

Test concordance in wet and dry vaginal swabs

48 (96%) paired samples were concordant for HC2 (kappa=0.92, 95%CI 0.81-1.00) (Figure 2). In discordant pairs, dry swabs were hrHPV-DNA negative, and wet swabs were borderline positive (1.00 and 1.17, 1.16 and 1.61, for the first and repeated rounds of testing, respectively). In both patients, cervical biopsies were normal.

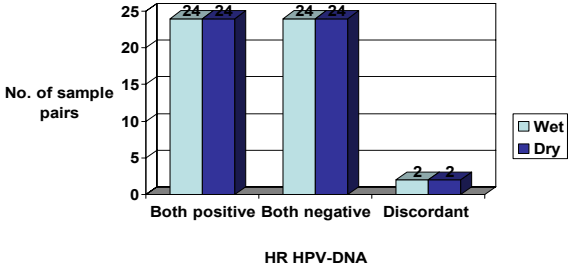

Figure 2: Self collected vaginal samples assayed for HR HPV-DNA

Signal strength in concordant hrHPV-DNA test positive paired vaginal samples

Dry swab signal values ranged from 2.3-1146.3 RLU/CO, and those of wet swabs from 1.2-1110.8 RLU/CO; values within swab pairs were positively correlated, Pearson correlation coefficient 0.89, p<0.001 (Figure 3).

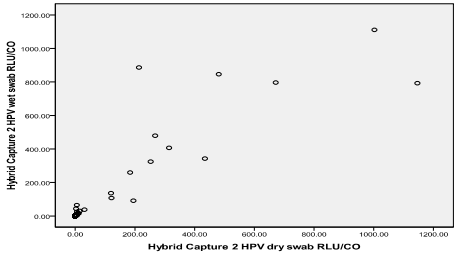

Figure 3: HR HPV-DNA load in paired self collected dry and wet vaginal swabs.

Dry swab test result and time to testing

Vaginal swabs were tested 3-10 days after self-collection. Test results showed no association with length of time to testing (p=0.91) (Figure 4), and time to testing did not affect the signal values of positive tests (p=0.66).

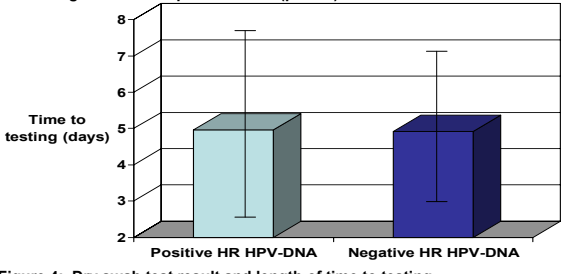

Figure 4: Dry swab test result and length of time to testing

Cervical L-Pap testing

30/50 L-Paps were HC2 test positive and 31 were positive for hrHPV mRNA. 5 L-Paps showed discordant results: 3 were hrHPV-DNA positive but negative for mRNA, and 2 contained mRNA but were hrHPV-DNA negative.

High grade CIN detection

12 women had biopsy-confirmed high grade cervical dysplasia (CIN2+).

	Dry vaginal swab HR HPV-DNA	Wet vaginal swab HR HPV-DNA	Cervical HR HPV DNA	Cervical HR HPV mRNA
Sensitivity	0.58	0.58	0.91	0.91
Specificity	0.55	0.55	0.46	0.47

Table: Sensitivity and specificity of vaginal and cervical testing for detection of biopsy-proven CIN 2+

Conclusions

- Self collected flocked vaginal samples transported dry appear to show similar hrHPV-DNA test results as vaginal samples placed into liquid medium.
- Sensitivity of self collected vaginal samples for CIN 2+ detection is lower than that of provider obtained cervical liquid Pap smears, but provides an opportunity for cervical cancer prevention among women who may otherwise decline Pap smear testing.

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