Accuracy of urinary human papillomavirus testing for presence of cervical HPV

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RHL summary

Key findings

- Compared to testing for cervical HPV DNA, urinary HPV detection has a sensitivity of 87% and specificity of 94% overall
  - Testing for detection of high-risk HPV has a sensitivity of 77% and specificity of 88%
  - Testing for detection of HPV 16 or 18 has a sensitivity of 73% and specificity of 98%
- Sensitivity of testing was increased with first-void urine samples, as opposed to mid-stream or random samples.

Evidence included in this review

Twenty-three articles on 21 studies (total of 2277 women) were included in the review. Seven studies were excluded due to insufficient data (3), no patients with disease (1), case-control study (2), and patients with cervical cancer (1). Fourteen studies with a total of 1535 women (1443 women analysed) were included in the meta-analysis. Studies were included from Canada, Spain, the United Kingdom, Greece, Italy, Sweden, India, The Netherlands, Colombia, France, Korea, Zimbabwe and the USA.

Quality assessment

Overall, the risk of bias in the included studies was low. Six of the 14 studies included in the meta-analysis had a high risk of patient selection bias due to restrictive selection criteria. No other high-risk sources of bias were identified for any studies.

There was significant heterogeneity in the accuracy reported in individual studies. This was partly explained by different techniques in urine sampling.

Clinical implications

At present there is insufficient evidence to support the introduction of urinary HPV testing in clinical practice. However, with further validation and methodological standardization, it may offer an accurate and non-invasive method of screening in the future.

Further research

Standardization of sample collection and analysis are required to ensure testing is consistent and
reproducible. Variation in techniques between studies may partly account for the heterogeneity observed in this review, and addressing this may produce more robust evidence for urinary HPV testing.

Further trials are therefore required to evaluate the role of urinary testing in predicting Cervical intraepithelial neoplasia (CIN) or cervical cancer.

Research article

Citation: Pathak N, Dodds J, Zamora J, Khan K. Accuracy of urinary human papillomavirus testing for presence of cervical HPV: systematic review and meta-analysis. BMJ 2014;349:g5264 DOI: 10.1136/bmj.g5264

Abstract

To determine the accuracy of testing for human papillomavirus (HPV) DNA in urine in detecting cervical HPV in sexually active women.

Systematic review and meta-analysis.

Test accuracy studies in sexually active women that compared detection of urine HPV DNA with detection of cervical HPV DNA.

Data relating to patient characteristics, study context, risk of bias, and test accuracy. 2×2 tables were constructed and synthesised by bivariate mixed effects meta-analysis.

16 articles reporting on 14 studies (1443 women) were eligible for meta-analysis. Most used commercial polymerase chain reaction methods on first void urine samples. Urine detection of any HPV had a pooled sensitivity of 87% (95% confidence interval 78% to 92%) and specificity of 94% (95% confidence interval 82% to 98%). Urine detection of high risk HPV had a pooled sensitivity of 77% (68% to 84%) and specificity of 88% (58% to 97%). Urine detection of HPV 16 and 18 had a pooled sensitivity of 73% (56% to 86%) and specificity of 98% (91% to 100%). Metaregression revealed an increase in sensitivity when urine samples were collected as first void compared with random or midstream (P=0.004).

The major limitations of this review are the lack of a strictly uniform method for the detection of HPV in urine and the variation in accuracy between individual studies.

Testing urine for HPV seems to have good accuracy for the detection of cervical HPV, and testing first void urine samples is more accurate than random or midstream sampling. When cervical HPV detection is considered difficult in particular subgroups, urine testing should be regarded as an acceptable alternative.

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