Accuracy of visual inspection with acetic acid for cervical cancer screening

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CRD summary
This review concluded that screening for precancerous cervical lesions using visual inspection with acetic acid was a simple, low cost and efficient alternative to cytologic testing in low-resource areas. These conclusions are based on extremely heterogeneous data from studies of unknown quality and the analysis had limitations. The conclusions are unlikely to be reliable.

Authors' objectives
To provide an updated estimate of the accuracy of visual inspection with acetic acid (VIA) in detecting cervical cancer.

Searching
PubMed was searched to April 2010. There were no language restrictions. Search terms were reported. Reference lists of retrieved studies were screened. Experts in the field were contacted.

Study selection
Studies that assessed the accuracy of VIA or VIA with magnification (VIAM) for the detection of histologically confirmed CIN2 or more advanced cervical lesions against the reference standard of histology or colposcopy followed by biopsy were eligible for inclusion. Studies were excluded if they had missing data or imprecise disease definition or if the authors were unable to provide data to construct a 2x2 table of test performance.

All studies defined a positive VIA result as the presence of acetowhite lesions in the transformation zone near the squamocolumnar junction or the os one minute after the direct application of a 3% to 5% diluted solution of acetic acid. All studies were from low and middle income countries. Screeners consisted of clinicians, health workers, colposcopists, cytotechnicians, nurses and midwives. Age of the women screened ranged from 14 to 74 years. Screening was conducted in hospitals, primary health centers, field clinics and rural or urban centers.

Two reviewers independently selected studies for inclusion.

Assessment of study quality
Study quality was not assessed formally.

Data extraction
Two reviewers independently extracted data to populate 2x2 tables of test performance. These data were used to calculate sensitivity, specificity, positive and negative predictive values and diagnostic odds ratios. Disagreements were resolved through discussion.

Methods of synthesis
Summary sensitivity, specificity and positive predictive values together with 95% CI were calculated. Studies were grouped according to whether asymptomatic or symptomatic women were assessed, which women received the reference standard, the target condition (CIN-2 or CIN-3) and whether VIA or VIAM testing was employed. Methods used to pool data were not reported. Heterogeneity was assessed statistically using the $I^2$ statistic and visually using forest plots. Subgroup analysis was conducted by use of meta-regression analysis to estimate the relative diagnostic odds ratio for subgroups based on the region of study, screener capacity, place of screening, study period and sample size.

Results of the review
Fifty-seven studies were included (number of participants unclear). Some studies reported multiple data sets for different disease thresholds (CIN 2 or CIN3), different person administering VIA and different countries.

Asymptomatic women, all received reference standard, threshold CIN-2 (26 studies): Sensitivity ranged from 41% to 92% with a pooled estimate of 80% (95% CI 78% to 81%). Specificity ranged from 49% to 98% with a summary
estimate of 92% (95% CI 92% to 92%). There was substantial heterogeneity ($I^2$ estimates of 90% and 97.7%).

Data were reported for other categories, but fewer studies contributed to these analyses. There was substantial heterogeneity for all analyses ($I^2$ estimates ranged from 64% to 99.7%). None of the variables investigated in the regression analyses showed a significant association with the diagnostic odds ratio.

**Authors’ conclusions**

Screening for precancerous cervical lesions using VIA was a simple, low-cost and efficient alternative to cytologic testing in low-resource areas.

**CRD commentary**

The review addressed a clear question. Inclusion criteria were defined. The literature search was restricted to one electronic database, so there was a possibility that studies were missed. No language restrictions were applied. Appropriate steps were taken to minimise bias and errors when selecting studies and extracting data. Study quality was not formally assessed and so the risk of bias in the included studies is unclear. However, the analysis was stratified according to the risk of verification bias. Methods used to pool data were not reported but (based on Stata commands that the authors used) did not appear to be based on statistically robust models for diagnostic data. It was inappropriate to pool positive predictive values from studies with different prevalences (pre-test probability) of disease. Steps were taken to investigate heterogeneity, but no reasons were found for the substantial differences between studies.

The authors’ conclusions are based on extremely heterogeneous data from studies of unknown quality. The analysis had limitations. The authors' conclusions are unlikely to be reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that screening for precancerous cervical lesions using VIA was a simple, low cost and efficient alternative to cytologic testing in low-resource areas. These recommendations should be followed with caution as they are not supported by the results of the review.

**Research:** The authors did not state any implications for further research.

**Funding**

Not stated.

**Bibliographic details**


**PubMedID**

21257169

**DOI**

10.1016/j.ijgo.2010.10.012

**Original Paper URL**


**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Acetic Acid; Biopsy /methods; Colposcopy /methods; Female; Humans; Indicators and Reagents; Mass Screening /methods; Predictive Value of Tests; Sensitivity and Specificity; Uterine Cervical Dysplasia /diagnosis; Uterine Cervical
Neoplasms /diagnosis

**AccessionNumber**
12011002465

**Date bibliographic record published**
08/06/2011

**Date abstract record published**
14/12/2011

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.