

Danish Centre for Evaluation and Health Technology Assessment

The use of liquid based cytology (LBC) and conventional pap smear (CPS) for cervical screening in Denmark

A health technology assessment - summary

Summary

Conclusions

Main conclusions:

- That no scientific basis has been found to suggest any difference in clinical or health economic effect between liquid based cytology (LBC) and conventional Pap smear (CPS).
- If the objective is to improve the clinical or health economic effectiveness, the report demonstrates that an increased coverage rate and an expansion of the age interval included in screening programmes for cancer of the uterine cervix from 59 to 69 years of age would be the more efficient strategy.

The following section provides an outline of primary part conclusions:

- More samples with cellular changes are detected with LBC than with CPS.
- Fewer inadequate cell samples result from LBC than from CPS.
- For the women concerned any detection of cellular changes entails further examination, which in many cases proves to be unnecessary.
- Expenses derived from employing either CPS or LBC are identical. Most CPS expenses are personnel costs whereas the major part of LBC costs are related to utensils.
- The health economic analysis shows that CPS in combination with automatic screening and guided (semiautomatic) screening is the more inexpensive solution.
- There is a need for consistent classification, encoding and follow-up standards for women with abnormal cell samples. Inconsistent practice in Danish counties may be improved through coordinated and concerted regional and national efforts.
- The effectiveness of screening programmes may be increased by minimizing general practitioners' and specialists' use of cell samples with no connection to the screening programmes (opportunistic cell samples).

Background

In Denmark, 400 women are diagnosed with cancer of the uterine cervix every year, and nearly 200 women die from this cancer yearly. In 2000, there were 13 cases for every 100,000 Danish women. This level matches that seen in Norway, but exceeds the incidence observed in Sweden and Finland. The overall 5-year survival rate is approximately 67%, which matches the level seen in the remaining Scandinavian countries.

In 1986, the Danish National Board of Health published the survey Prophylactic surveys for cancer of the uterine cervix (»Forebyggende undersøgelser mod livmoderhalskræft«). The survey recommended screening of all women aged 23-59 at 3-year intervals. Since the mid nineties, Danish counties have introduced systematic screening for cancer of the uterine cervix.

Objective

At Danish pathology departments, two techniques are employed for preparation of cell samples from the uterine cervix in connection with systematic screening for cancer of the uterine cervix:

Conventional Pap smear (CPS)

Liquid based cytology (LBC)

The objective of this HTA is to perform an evidence-based evaluation of CPS compared with LBC and to describe the consequences of using these methods in a Danish context, including consequences related to automatized screening and HPV testing. Furthermore, patient-related, organizational and economic consequences are explored.

CPS is the conventional technique used for preparation of cell samples from the uterine cervix. Increased focus on false negatives, inadequate tests and considerations concerning automatized screening have led to the development of liquid based cytology (LBC), which is a new preparation method used for cell sampling from the uterine cervix.

The two techniques have been debated among Danish specialists for a number of years. International literature in the form of HTA reports and review articles reach different conclusions although they have been based on largely the same primary studies. Different conclusions may occur when scientific results are interpreted in different national contexts.

Method

This analysis of CPS versus LBC rests on a systematic review of published HTA reports, reviews and primary studies. The patient perspective rests on a brief compilation of knowledge and experience from the field. The analysis of organisational and economic aspects is based partly on a literature survey and partly on data and register data gathered during the elaboration of the present report. Furthermore, a questionnaire survey was performed concerning Danish counties' organisation of this field and time studies were carried out at four pathological departments.

Results

Technology

The main conclusion from the survey of HTA reports, review articles and primary articles comparing CPS with LBC for preparation of cell samples from the uterine cervix is:

- There has been an increase in the number of cell samples with abnormal findings for LBC compared with CPS. This, however, yields no information on the clinical effectiveness.
- Currently, there is no scientific basis to support an increase in clinical effectiveness by the introduction of LBC as a substitute for CPS. Consequently, from a scientific point of view, either CPS or LBC may be chosen.
- One article was found in which the study design fulfils the demands for calculation of sensitivity and specificity. The article points to increased clinical effect from CPS compared with LBC.

Patient perspective

- More cell samples display abnormal cellular changes when LBC is used. As increased clinical effectiveness from LBC has not been established, this is a disadvantage to the women, as further examinations need to be performed to confirm or disprove the abnormal findings.
- Use of LBC yields fewer inadequate tests, which is an advantage for the women concerned, as they do not need to undergo renewed testing.

Economy

The overall expenses in connection with cell sampling from the uterine cervix and sample analysis are identical for CPS and LBC.

CPS costs are mainly personnel-related, while a greater part of LBC costs are utensils-related. Any health economic effect from the introduction of LBC would consequently depend on LBC utensil prices. Furthermore, the health economic effect would depend on how much the number of inad-

equate tests may be reduced. Conversely, the health economic effect would point to CPS as the preferred choice if a substantial number of women needs testing following abnormal cell samples.

Danish cervix cancer statistics for 1995-1999 and 1997-2003 compiled by the Danish Cancer Society demonstrate that female cancer incidence peaks above the age of 60. To further increase the effectiveness of screening programmes, it would be an option to include this age group, at least temporarily.

The average coverage rate of Danish cancer of the uterine cervix screening programmes is app. 70%. It has been demonstrated that an increase of even 0.5% would have considerable effect on the health economic effect of the programme.

- The analysis shows that CPS in combination with automatic screening and guided screening is the more inexpensive solution.
- Should it be decided to further develop an efficient screening programme for cancer of the uterine cervix, two courses of action would be advantageous: increasing coverage and expanding the age interval to 69 years of age.

Organisation

Currently, Danish screening programmes for cancer of the uterine cervix are organised by the Danish counties and the present HTA report demonstrates that practice varies considerably across counties.

- If the objective is to employ up-to-date classifications, consistent encoding, quality assessment and follow-up standards for women with abnormal cell samples, it is decisive that screening programme activities be coordinated and concerted nationally as well as regionally.
- A further essential way to increase screening programme effectiveness is to minimize, to the extent possible, the opportunistic screening of women by general practitioners and specialists.
- General practitioners may play a vital part in influencing the barriers keeping women from participating in screening programmes. Currently, only one third of counties send reminders to general practitioners when a woman fails to attend an examination forming part of a screening programme. Counties may consider adapting procedures in this field.
- Introducing a more systematic feedback and dialogue with general practitioners concerning the sampling and correct fixation of cell samples may be instrumental in improving the quality of cell samples.

Research- and development efforts

There is a need for well-designed studies comparing CPS with LBC for preparation of cell samples from the uterine cervix.

Research has shown that the sexually transmitted virus, human papillomavirus (HPV) is a necessary factor conditioning the development of cellular changes and cancer of the uterine cervix. Research efforts have been focused on the production of prophylactic vaccines and it is currently being considered to vaccinate all Danish youths before they become sexually active.