A Study of the Self Smear Method as a Screening Device for Uterine Cancer

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The accuracy of Kato's self smear Kit was studied in screening a relatively unselected population group for cervical cancer.

Routine cervicovaginal smears taken periodically would be the ideal method but would be unrealistic in view of the physician's time involved when considered on a large population scale.

Three hundred patients were randomly selected at the Out Patient Clinic of Yonsei Medical Center and 26 cases grossly of cervical cancer were included in this group.

We have here summarized the results briefly as follows.

1. Among 300 women examined in our OPD, 256 (85.3%) were classified as Pap. Class I or II, 9(0.3%) as a 'Deferred' group (Class III, Repeat), 18(6%) as Class III and 17(5.7%) as Class IV or V.

2. Fifteen of the total cases had insufficient material for evaluation (poor quality) and the major causes of the poor smears were vaginal douche within 24 hours, technical problems and cell degeneration.

3. The rate of agreement between the Self Smear Kit and cervicovaginal smear was as follows:
   a. The rate of complete agreement was 93.2% (280/300)
   b. The rate of complete or partial agreement was 96.7% (290/300).

4. The diagnostic accuracy of the Self Smear Kit was as follows:
   a. If we assumed the 'Deferred' group to be detection failures for uterine cancer, the diagnostic accuracy would be 82.4%.
   b. If we assumed the 'Deferred', group to be detection successes, the diagnostic accuracy would be 94.1%.

5. The quality of self smears was superior when taken by an aid nurse rather than by the patient herself.

6. Optimal time for good preservation with the Self Smear Kit prior to pap. stain under the following temperatures was proven experimentally to be as follows;
   a. At 5°C: 3 days after smear
   b. At 15°C: 3 days after smear
   c. At 30°C: 2 days after smear

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Self Smear Method as a Screening Device for Uterine Cancer

Since Papanicolaou (1943) first reported cancer cell detection in human vaginal secretions, this most valuable diagnostic procedure for gynecologic cancer detection has become a technique which is utilized by most gynecologists today. This papanicolaou method may be applied to the lungs, stomach, ureter, and the secretions of other organs of the body. This widely applicable test for cancer detection is in world-wide use as the clinical method of choice.

Routine cervicovaginal smears, taken periodically, would be an ideal method of cancer detection but when they are used in the hospital out-patient clinic, there are several drawbacks to this technique. It requires an appropriately equipped examination room and laboratory, a nurse, equipment, and particularly it is time consuming for both the patient and physician.

Although smears taken by a physician are the most reliable method, it is impossible to provide this kind of medical service to more than a small proportion of the population at high risk for gynecological cancer. In view of this fact, a new self-collection technique was developed.

Draghi (1954) was the first to report on the use of the Tampon method for detection of uterine cervical cancer cells. His work showed that the method had high accuracy and the usefulness of the method was confirmed jointly by Papanicolaou (1954) and also Brunschwig (1954).

Davis (1962) developed a method of self-collection utilizing a vaginal washing technique and in Japan, Yokoyama (1971) developed the Spongecytocylinder method. Also in Japan at the Kobe Public Health Research Institute, Kato (1971) developed the the Kato’s Self Smear kit which is now in wide use in Japan as a method of cervical cancer detection.

According to a report issued in 1968 by the Korean Society of Pathology, cancer of the uterine cervix is the most frequently encountered malignancy in Korea. Lee et al. reported that the incidence rate of cervical cancer of the uterus is approximately 0.6% in Korea.

Women in the 30 to 39 age range are at highest risk, and the total of women in this age group is approximately 2,023, 557 (1970 census figures).

In designing a mass screening program for detection of cervical cancer, the following general requirement must be taken into consideration.

i) The method selected should carefully weigh the amount of time necessary, the cost of the test and if possible, be simple to perform. More important information can be obtained by utilizing a self-collection method, with a slightly lowered sensitivity in which specimens can be collected from a large number of individuals in the population at risk, than can be gathered by an expensive and time-consuming method of high specificity which can be applied to only a small number of patients.

ii) The method selected must have high reproducibility.

iii) The method selected must have high validity.

The objective of this research was to determine whether the methods of Kato, developed at the Kobe Public Health Research Center in Japan, met the above criteria which have been established as the goals of the Korean mass screening program for cervical cancer detection.

MATERIALS AND METHODS

All patients in this study had taken self smears after complete history taking and the
Training course of Self Smear Kit for aid nurses & instruction for patients
by 1. lecture
2. picture

Screening by aid nurse or patient herself

Collection of specimen by aid nurse or others

Cytological evaluation of specimen by pathologist

Class I, II 'Deferred' group
Poor smears

Class II, W, V

Subsequent gynecological examination by gynecologist

Repeat screening
Patient with cancer

→: Gynecologist not involved
→→: Gynecologist involved

Fig. 1. Schema of Cervical Cancer Screening.

Cervicovaginal smears were taken after routine pelvic examination to know whether there were any incidental pelvic diseases.

First each patient was instructed about the use of Kato's Self Smear Kit by an aid nurse with mimeographed directions and pictures (Fig. 1).

The Kato's Self Smear Kit consists of a sliding inner rod, an outer tube, and a small plastic bag containing fixative. All are made of plastic material. The inner rod has a piece of sponge rubber on the top: this sponge rubber can be either exposed or retained in the outer cylinder by either pushing or retained in the outer cylinder by either pushing or pulling. The small plastic bag, which has a tight rubber cap, contains a fixative. The fixative consists of equal parts of either and 95% ethyl alcohol. The instructions for use of Kato's Self Smear Kit are described in Fig. 2.

By inserting the cylinder up to the mark and pushing the inner rod, the sponge tip could reach the cervix and vaginal pooling and so cell specimens can be taken on the sponge. The fixative is dropped onto the sponge for good preservation of the specimen until transport to the pathology laboratory. At the pathology laboratory, by stamping the end of the sponge on a slide and giving a half twist, it was smeared on the slide, and then routine papnicolaou stain is performed.

Of three hundred cases, 180 cases of self smears were taken in the toilet by the patient herself and 120 cases at the consultation table by an aid nurse with a self smear kit.

In follow-up studies on the smears, 94 cases cone knife biopsies and 36 punch biopsies were performed.

We classified the cytologic results of the Self Smear Kit according to Papanicolaou's Classification as follows:

Class I Benign
Class II Atypical benign
Class II Atypical repeat, 'Deferred'
Class II or more Suspicious or positive

In the group of patients who showed abnormal results, ranging in severity from the 'Deferred' group to class II, all were over thirty years of age except one (Table 1).

In three quarters of the cases which were presented at the hospital with various assorted chief complaints, leukorrhea, vaginal bleeding and abdominal or back pain were the most common symptoms.

In the majority of patients with cytological change ranging upwards in severity from those in the 'Deferred' group, the chief complaints or symptoms were either leukorrhea, vaginal bleeding, or a combination of these two symptoms (Table 1).
Self Smear Method as a Screening Device for Uterine Cancer

Fig. 2. a. The Equipment of Self Kato's Smear Kit  
b. Instructions for use of Kato's Self Smear Kit

1. After removing the cylinder cap, insert the cylinder up to the mark on the cylinder neck while in semi-sitting position or other comfortable position—①, ②
2. Push the inner stem into the vagina, rotating it in place for two or three minutes to swab the cervix and vaginal pool—③, ④
3. Pull the inner stem out of the vagina and withdraw the cylinder from the vagina—⑤
4. Drop the fixative onto the sponge and replace the cap—⑥, ⑦

Table 1. Age and Cytologic Results

<table>
<thead>
<tr>
<th>Cytologic Results</th>
<th>Patient</th>
<th>Age</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>20~29</td>
<td>30~39</td>
<td>40~49</td>
</tr>
<tr>
<td>1 or II</td>
<td>256</td>
<td>85.33</td>
<td>23</td>
<td>128</td>
<td>85</td>
</tr>
<tr>
<td>Deferred</td>
<td>9</td>
<td>3.00</td>
<td>—</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>III</td>
<td>18</td>
<td>6.00</td>
<td>—</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>IV or more</td>
<td>17</td>
<td>5.67</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.00</td>
<td>24</td>
<td>138</td>
<td>107</td>
</tr>
</tbody>
</table>

(8.0) (46.0) (35.7) (9.0) (1.3)
Table I. Chief Complaints and Cytologic Results

<table>
<thead>
<tr>
<th>Chief Complaint</th>
<th>Patient</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>85</td>
<td>28.3</td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td>35</td>
<td>11.7</td>
</tr>
<tr>
<td>Leukorrhea</td>
<td>83</td>
<td>27.7</td>
</tr>
<tr>
<td>Bloody leukorrhea</td>
<td>11</td>
<td>3.7</td>
</tr>
<tr>
<td>Postcoital bleeding</td>
<td>24</td>
<td>8.0</td>
</tr>
<tr>
<td>Abdominal or back pain</td>
<td>28</td>
<td>9.3</td>
</tr>
<tr>
<td>Others</td>
<td>34</td>
<td>11.3</td>
</tr>
<tr>
<td>Total cases</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table II. Comparison of Quality of Smear and Elapsed Time from Collection to Smear Preparation

<table>
<thead>
<tr>
<th>Time interval until preparation (hrs)</th>
<th>Patients</th>
<th>Quality of Slide</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>Good</td>
</tr>
<tr>
<td>Less than 12</td>
<td>224</td>
<td>74.7</td>
<td>170</td>
</tr>
<tr>
<td>12~14</td>
<td>46</td>
<td>15.3</td>
<td>39</td>
</tr>
<tr>
<td>24~48</td>
<td>7</td>
<td>2.3</td>
<td>6</td>
</tr>
<tr>
<td>48~72</td>
<td>13</td>
<td>4.3</td>
<td>8</td>
</tr>
<tr>
<td>72~96</td>
<td>10</td>
<td>3.3</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
<td>229(76.3)</td>
</tr>
</tbody>
</table>

* Few cells
** Degeneration

The patients in this study were divided into five groups in order to determine the degree of degeneration of cell specimens according to the elapsed time from collection to smear preparation. On the basis of quantity and quality of cells of the self smear slide, the self smears were divided into good, fair, or poor (Table II).

229 cases of the total patients were reported as good (76.3%), 54(18.3%) as fair and 15 cases (5.0%) as poor smear.

Among fifteen cases of poor smears, in 13 the elapsed time was less than 12 hours. In the remaining two it was more than 48 hours, and they revealed degenerative changes of the cell specimens.

The above thirteen poor smears showed few cell specimens on microscopic examination.

We also analyzed the total fifteen poor smears according to the patient's age, residence, educational level, place of smear and other factors in later description.

The above study was performed under the ordinary room temperatures but we also measured experimentally the optimal length of time for keeping the cells in the Sponge Cytocylinder under the following temperatures, 5°C 15°C and 30°C, and this will be described in a later page.

Of the 300 patients, there was complete
agreement between the self smear and cervico-
vaginal smear in 284 cases (94.6%) (within
the solid line in Table IV). Of the 284 patients,
254 were reported as negative on both types
of smears. In thirty-one instances, Class III or
more was reported on both type of smears.

There was partial agreement in an additional
5 cases: five with 'Deferred' self smears and
class III or more with cervicovaginal smears.
Partial or complete agreement (total agreement
rate) was 96.3% (within the dotted line in
Table IV).

Disagreement of interpretation was noted in
eleven cases. Eight of these patients were as
reported as negative, with cervicovaginal smear
showing 4 as 'Deferred', 3 as Class III and one
as Class IV or V on Self Smear. Three patients
reported as negative on Self Smear were shaw-
t to be Class III in 2 cases and Class II in
one instance.

Table IV. Comparison of Cervicovaginal and
Self Smear Method Reports

<table>
<thead>
<tr>
<th>Self Smear report</th>
<th>Doctor performed cervicovaginal smear report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class I or II</td>
</tr>
<tr>
<td>Class I or II</td>
<td>Class III or IV</td>
</tr>
<tr>
<td>'Deferred'</td>
<td>261(87.6)</td>
</tr>
<tr>
<td>Class III</td>
<td>9</td>
</tr>
<tr>
<td>Class IV or V</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>261(87.6)</td>
</tr>
</tbody>
</table>

Table V. Diagnostic Accuracy of the Self
Smear Kit

<table>
<thead>
<tr>
<th>Cytologic result</th>
<th>No. of patients</th>
<th>Histologic diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I or II</td>
<td>256</td>
<td>2*</td>
</tr>
<tr>
<td>'Deferred'</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Class III or more</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>* Poor smear</td>
<td>300</td>
<td>34</td>
</tr>
</tbody>
</table>

Table VI. Comparison of the Sensitivity and
Specificity of smears prepared by Self-
collection and by Doctor performed Cervicovaginal smears

<table>
<thead>
<tr>
<th>Cytologic result</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>False negative</th>
<th>False positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Smear</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection failure</td>
<td>82.4%</td>
<td>97.4%</td>
<td>17.6%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Detection success</td>
<td>94.1%</td>
<td>95.5%</td>
<td>5.9%</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

* If the 'Deferred' group is considered cancer
detection failure.

In order to analyze the results of the smears,
the 'Deferred' group of patients must be inclu-
ded in the classification of regular patients.
This 'Deferred' group was divided into those
cases in which there was failure to detect
existing cancer and those cases in which there
was successful detection of cancer (Table V).

If one considers the 34 cases of actual cancer
which were detected by histological diagnosis,
it is seen that 28 cases were classified correctly
by smear. In the 'Deferred' group, the histo-
logical diagnosis revealed another four cases
which were actually cancer, bringing the total
number of cases correctly diagnosed or suspect-
ed by self collected smears to 32. The false
negative results, in which self-collected smears
failed to reveal existing cancer, were tests in
which the original smear was of poor quality.

If the 'Deferred' group is considered as
cancer detection failure, the diagnostic accuracy
(sensitivity) would be 82.4 percent and and
the false negative rate would be 17.6 percent,
but if 'Deferred' group is taken as cancer
detection success, the diagnostic accuracy would
be 94.1 percent and the false positive rate
would be 4.5 percent.

The diagnostic accuracy of the doctor per-
formed cervicovaginal smear was 91.2 percent.
Table II. Results of Repeated Screening by Cervicovaginal Smear by Physicians on 24 Cases of ‘Deferred’ and Poor Smears

<table>
<thead>
<tr>
<th>Cytologic results by Self Smear</th>
<th>No. of Patients</th>
<th>Cytologic results of Cervicovaginal smears by physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Deferred’</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Poor smear</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>

* 1 case: Benign on histological diagnosis
* 2 cases: Invasive epidermoid carcinoma of the cervix on histological diagnosis
* 3 cases: Carcinoma in situ on histological diagnosis

Table III. Experimental Study on Cellular Changes according to the Elapsed Time and by Different Temperatures

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp.</td>
<td>15°C</td>
<td>0/7</td>
<td>1/7</td>
<td>2/7</td>
<td>5/7</td>
<td>6/7</td>
<td>6/7</td>
<td>6/7</td>
<td>7/7</td>
<td>7/7</td>
</tr>
<tr>
<td></td>
<td>30°C</td>
<td>0/7</td>
<td>1/7</td>
<td>3/7</td>
<td>4/7</td>
<td>7/7</td>
<td>7/7</td>
<td>7/7</td>
<td>7/7</td>
<td>7/7</td>
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<tr>
<td></td>
<td>5°C</td>
<td>0/7</td>
<td>0/7</td>
<td>1/7</td>
<td>3/7</td>
<td>3/7</td>
<td>4/7</td>
<td>6/7</td>
<td>6/7</td>
<td>7/7</td>
</tr>
</tbody>
</table>

(Table II).

Twenty-four cases of ‘Deferred’ and poor smears were followed up by a physician and cervicovaginal smears with a wooden spatula were performed on the consultation table. Among nine cases of the Deferred’ group, 2 cases were reported a suspicious and 3 cases as positive on subsequent cervicovaginal smear. Four of these 5 suspicious or positive cervicovaginal smears turned out to have carcinoma in situ and three to have invasive epidermoid carcinoma of the cervix of the uterus.

In fifteen patients with poor smears, 13 were reported as normal cervicovaginal smear and two found to have a suspicious or positive cervicovaginal smear, all of which were turned out to be invasive epidermoid carcinoma on subsequent histological diagnosis (Table II).

To know the optimal and acceptable length of time for the cell specimen to remain in the sponge-cytopylinder after collection, we kept self-smear red sponge-cytopylinders at 5°C, 15°C and 30°C for 10 days.

We randomly selected them every day and smeared them on slides. We checked the degree of cellular changes and counted the number of the slides to be discarded (Table III).

We obtained the following results after the experiment:

1. At 5°C: to 3 days after smear
2. At 15°C: to 3 days after
3. At 30°C within the day after smear

To search for underlying factors causing poor smears, we analyzed fifteen cases of poor smear on the basis of age, residential level, douche or not within previous 24 hra., the place of smear, by whom the smear was taken and other factors (Table IV).

In eleven instances, self smears were performed by patient herself and in the toilet. Eight patients had less than primary school level education.

Vaginal douches were taken in most of the relatively high educational levels. Menopause,
Table K. Analysis of Poor Smears according to individual backgrounds

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Residence</th>
<th>Education</th>
<th>Douche</th>
<th>Place of smear</th>
<th>Smearby</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62</td>
<td>rural</td>
<td>none</td>
<td>—</td>
<td>toilet</td>
<td>patient</td>
<td>menopause</td>
</tr>
<tr>
<td>2</td>
<td>68</td>
<td>rural</td>
<td>none</td>
<td>—</td>
<td>toilet</td>
<td>patient</td>
<td>menopause</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>urban</td>
<td>primary</td>
<td>—</td>
<td>toilet</td>
<td>patient</td>
<td>menopause</td>
</tr>
<tr>
<td>4</td>
<td>33</td>
<td>rural</td>
<td>primary</td>
<td>—</td>
<td>toilet</td>
<td>patient</td>
<td>menopause</td>
</tr>
<tr>
<td>5</td>
<td>34</td>
<td>urban</td>
<td>middle</td>
<td>+</td>
<td>toilet</td>
<td>patient</td>
<td>postpartum</td>
</tr>
<tr>
<td>6</td>
<td>41</td>
<td>urban</td>
<td>?</td>
<td>+</td>
<td>toilet</td>
<td>patient</td>
<td>postpartum</td>
</tr>
<tr>
<td>7</td>
<td>46</td>
<td>urban</td>
<td>primary</td>
<td>—</td>
<td>toilet</td>
<td>patient</td>
<td>72 hrs*</td>
</tr>
<tr>
<td>8</td>
<td>61</td>
<td>rural</td>
<td>none</td>
<td>—</td>
<td>toilet</td>
<td>patient</td>
<td>menopause</td>
</tr>
<tr>
<td>9</td>
<td>32</td>
<td>urban</td>
<td>high</td>
<td>+</td>
<td>toilet</td>
<td>patient</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>44</td>
<td>urban</td>
<td>high</td>
<td>+</td>
<td>toilet</td>
<td>patient</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>41</td>
<td>urban</td>
<td>high</td>
<td>+</td>
<td>toilet</td>
<td>patient</td>
<td>96 hrs*</td>
</tr>
<tr>
<td>12</td>
<td>37</td>
<td>urban</td>
<td>high</td>
<td>+</td>
<td>consult. table</td>
<td>aid nurse</td>
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<tr>
<td>13</td>
<td>45</td>
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<td>primary</td>
<td>—</td>
<td>consult. table</td>
<td>aid nurse</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>58</td>
<td>urban</td>
<td>none</td>
<td>+</td>
<td>consult. table</td>
<td>aid nurse</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>52</td>
<td>urban</td>
<td>none</td>
<td>—</td>
<td>consult. table</td>
<td>aid nurse</td>
<td></td>
</tr>
</tbody>
</table>

* Time-interval between self smear until pap. stain.

postpartum state, older age and a long time-interval might be causative underlying factors, although they were of minor importance.

**DISCUSSION**

Following Papanicolau and Traut's classic presentation of "The diagnosis of uterine cancer by the vaginal smear" in 1943, the detection of cervical cancer in its earliest presymptomatic phase has reversed the previous clinical findings of 70 percent invasive cancer with spread beyond the confines of the cervix to the present-day status in which seventy percent of more of cervical disease is detected in situ, or as early invasive lesions.

The original Papanicolau technique (1941) was to aspirate the vaginal secretions with a glass tube and a rubber bulb.

A second technique, popularized by Ayre (1944), is to scrape the cervix with a wooden spatula. It requires a little more equipment and a nurse and doctor to do the scraping, but of course it yields excellent results, with often better than 90 percent accuracy.

Routine cervicovaginal smears taken periodically would be an ideal method but only a limited number actually receive the benefits of periodic check-ups for malignancy. Telinde Matingly (1970) reported that no more than 20 percent of the adult female population receives annual cytological examination in the U.S.A.

Of course in Korea limited population groups have enjoyed periodic cytologic screening. As stated previously the incidence rate of cervical cancer in Korea is 0.6 percent and the number of women between the ages of 30 to 39 is approximately 2,023,557 (1970 Census figure).

Obviously, the task cannot be achieved with our present manpower.

In view of these factors, various self smear methods have been proposed.

A simplified technique for cervical cancer screening at present is utilizing the disposable plastic Kato's Sponge-Cytocylinder.

Now we will discuss its effectiveness and
its shortcomings, referring to the results of our study and to other references.

A. Kato’s Self Smear Kit as a method of mass screening of cervical cancer.

Most cervical cancers, whether preinvasive or invasive, exfoliate significant numbers of abnormal cells which can be identified in a good cytologic laboratory, irrespective of whether the specimen was procured by scraping, sucking, or swabbing the region of the cervix.

The tampon method, vaginal irrigation method and Kayashima’s sponge-cytocylinder method, all have been applied to mass screening by obtaining the specimens from the vaginal pool.

With Kato’s Self-Smear Kit, the specimens could be procured from the vaginal pool as well as from the cervix by rotating the inner rod of the cylinder (Fig. 2) and so it seems to be superior to other smear methods in this regard.

B. Diagnostic accuracy of the Kato’s Self Smear Kit.

We classified the cytologic results of self smears according to Papanicolaou’s classification. The ‘Deferred’ means Class II, repeat or Atypia. The term was reserved for those smear exhibiting atypical changes warranting repeat smears. These borderline cases have been emphasized, especially in mass screening of cervical cancer. Not only positive or suspicious self smears but also the ‘Deferred’ group must be recalled for the further investigation.

In any mass screening the index of suspicion must be high although a certain amount of overreading must be expected.

Brunschwig (1957) reported that 17 percent of total cervical cancers proved to be ‘Deferred’ classification. Yokoyama (1971) stated that 130 cases of 22,323 were reported as Class II with minimal change by utilizing the sponge-cytocylinder.

Among 130 patients, there were two cases of carcinoma of the cervix.

In our series, there were 9 patients of ‘Deferred’ smears and of these 4 cases proved to be carcinoma of the uterine cervix.

If the ‘Deferred’ smear is regarded as a detection success, diagnostic accuracy is 94.1 percent, which is superior to other reports (Table X). If the ‘Deferred’ smear is regarded as a detection failure, diagnostic accuracy is 82.4 percent.

Diagnostic accuracy of other reporters utilizing various self smear methods ranges from 66.6 percent to 83.4 percent when the self smear is performed by patients herself, but when it is taken by a doctor, diagnostic efficiency is improved (Table X). About half of our patients received a self smear by an aid nurse, and so our results are superior to others.

C. About ‘Poor’ smears

One must anticipate that there will be a number with insufficient material whenever mass screening is attempted by utilizing the Self Smear Kit. Because of the patient’s ignorance and inadequate instruction, this should be always born in mind.

Fifteen cases out of 300 were reported as poor smears and the proportion was 5.0 percent of the total patients. In 13 of 15 patients, the elapsed time from collection to cell preparation was less than 12 hours. It suggested that technical problems seemed to have a major role in the etiology of poor smears.

In only two cases, the elapsed time was more than 48 hours.

Among 15 cases of poor smears, 11 patients took the self smear by themselves in the toilet. Eight patients had less than primary school level. Seven patients had a taken vaginal douche within 48 hours prior to self smears, and most of these had a relatively high educational level.
Self Smear Method as a Screening Device for Uterine Cancer

Table X. Comparison of Diagnostic Accuracy with Other Authors' reports

<table>
<thead>
<tr>
<th>a. Author</th>
<th>b. Method</th>
<th>Self smear by patient</th>
<th>Doctor performed cervico-vaginal smear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Invasive carcinoma of cervix: 96%</td>
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<td></td>
<td></td>
<td></td>
<td>3. Endometrial carcinoma: 79%</td>
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<tr>
<td></td>
<td></td>
<td>2. Invasive carcinoma of cervix: 83.4%</td>
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<td>3. Endometrial carcinoma: 79%</td>
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<tr>
<td></td>
<td></td>
<td>2. Invasive carcinoma of cervix: 79%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Carcinoma in situ cervix: 82.8%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Invasive carcinoma of cervix: 90.5%</td>
<td></td>
</tr>
<tr>
<td>a. Bader et al (1957)</td>
<td>b. Detection tampon method</td>
<td>all cervical carcinoma: 66.6%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>all cervical carcinoma: 8.8%</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Present series (1975)</td>
<td>b. Sponge-cytocylinder</td>
<td>all cervical cancer: 82.4%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>all cervical cancer: 94.1%</td>
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</tbody>
</table>

One case of postpartum state and 3 cases of postmenopause were included in this group. All of the factors described above could be etiological factors for poor smears.

Bader (1957) stated that patients between the age of 35 and 50 years appeared to have less difficulty with self smears than those in the younger and older age groups. Bader (1957) noted 143 (5.0%) poor smear among 2834 patients on Tampon study. He also commented that pregnancy, postpartum, atrophic vaginitis and vaginal bleeding might be causes of inadequate smears.

Patients with poor smears must be asked to visit for further investigation. Two cases with poor smears proved to have invasive epidermoid carcinoma of the cervix in our series.

We performed an experimental study to know the optimal and acceptable length of time for cell specimens to be kept in the sponge-cytocylinder at 5°C, 15°C and 30°C.

The Self Smear Kit could be left for three days after collection without remarkable cellular changes under temperatures ranging from 5°C to 15°C. This suggests that the optimal weather would be early spring or late autumn in Korea.

D. Comparison of Self Smear Kit with doctor performed cervicovaginal smear.

Complete agreement of both types of smears was obtained in 94.6% of the patients studied and there was partial agreement in an additional 5 case. So the total agreement was 96.3 percent.
Bader et al (1957) that complete agreement between the Tampon smear and the cervicovaginal smear was obtained in 96.8 percent of the patients studied and partial agreement in 0.2 percent, a combined total of 97 percent.

E. Self Smear Kit as a tool for mass screening of cervical cancer.

On the basis of the present study and other references, it appears that Kato’s Self Smear Kit will prove useful in population screening for cervical cancer.

It should be clear, however, that this rationale applies to systematic population screening and not to individual patients. The self smear is not a substitute for full gynecologic investigation of the symptomatic woman. It is not a substitute for cervical scraping or biopsy among the patients coming to a private gynecologist for periodic examination.

Nonprofessional technical personnel, either technicians or nurses, could be trained for the purpose of using the Self Smear method as a mass population screening program.

The Self Smear Kit is specifically designed for selective screening of asymptomatic women who are not being reached by other more costly methods.

A screening program, utilizing the Self Smear Kit, could be carried out by direct mail among women in specific high-risk age groups, or could be distributed via practitioners for the use of their asymptomatic patients, or by other distribution methods. Mass screening by mail was undertaken by Bader et al (1957), Davis (1962) and Yokoyama (1971). Kato’s self smear method could be performed by direct distribution by practitioners or others.

A major objection to this method is the fear that the patient will obtain a false sense of security concerning the status of the remaining pelvic organs. This can be at least partially overcome by including with the Self Smear Kit, literature telling the woman just what the smear will do and what it will not do.

SUMMARY AND CONCLUSION

A study of 300 female patients were screened for clinical evaluation of Kato’s Self Smear Kit. The results of the self smears compared favorably with those of the cervicovaginal smears. The diagnostic accuracy was superior to those of other reporters. We recommend that the poor smear, the 'Deferred' group as well as suspicious or positive smears must be recalled for further investigation.

High age, bleeding, pregnancy, vaginal douche and inappropriate communication could be the cause of poor smears.

Mass screening could be ideally performed in Korea in early spring or late autumn.

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