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THE ENDOCERVICAL CELL: ITS SIGNIFICANCE IN CERVICAL CYTOLOGY

H. Senanayake[1] P. Kumarasinghe[2]
and R. Fernando[3]

Summary: The reliability of a cervical smear depends on adequate sampling of the 'transformation zone'. The presence of endocervical cells has been accepted as evidence that this area has been sampled. In 601 smears analyzed this evidence was found only in 295 (49%). The rate was higher in the smears presented on one slide (57.1%) than on two (40.7%). The difference was statistically significant ($p < 0.001$)

The smears with endocervical representation comprised 30% of the 'normal' smears. In contrast, 54.8% of the 'abnormal' smears which included those showing inflammation, atypical changes and cervical intraepithelial neoplasia showed endocervical cells. The probability of a smear with endocervical cells falling into one of these 'abnormal' categories was significantly higher than that of ones without ($p < 0.001$). The smears that were presented on a single slide but with 'endocervical representation' had the highest abnormality rate (7.5%).

Taking a smear accurately, i e., with good representation of endocervical cells, is an efficient way of detecting cervical precancer. The low rates of endocervical representation seen in our study signifies poor technique used in taking smears.

Key Words: Endocervical cell, transformation zone, squamocolumnar junction, cervical precancer, screening, immature metaplastic cell, cervical intraepithelial neoplasia, cellular atypia.

INTRODUCTION

The cervical smear has been the mainstay of the most successful cancer control programmes worldwide. In many countries the incidence and mortality rates of carcinoma of the uterine cervix have been significantly reduced since the introduction of these techniques (1).

Where these progammes are in operation, it has been revealed that the majority of the women who develop invasive carcinoma of the cervix have never been tested with a cervical smear (2,3). With wider coverage, there is increasing concern, however regarding development of invasive disease after a recent, negative smear (3,4,5). A smear that provides adequate material for the accurate prediction of disease, for example, one that shows an abnormality, could be considered adequate (6). One that is negative cannot be similarly characterized, due to the possibility of bad sampling or due to 'screener' errors.

1. Senior Lecturer, Department of Obstetrics & Gynaecology, North Colombo Medical College, Ragama.
2. Senior Lecturer, Department of Pathology, University of Colombo.
3. Consultant Pathologist, General Hospital, Colombo.

Cervical cancer is believed to originate in the squamocolumnar junction of the cervix, alternatively referred to has the 'transformation zone' (7,8). A cervical smear must therefore contain cells representing this area.. This area consists of immature metaplastic cells. More cephalad to this are the columnar cells of the endocervical canal. Where a cervical sampler has traversed this zone, these immature metaplastic cells or endocervical cells could be expected to be present. The presence of endocervical cells ('endocervical representation') has been accepted as evidence that the transformation zone has been adequately sampled (5,6,9). The problem of the poor quality of smears presented for assessment is well recognized (10).

This study was undertaken to evaluate the endocervical representation in smears performed routinely, and to determine the effect such sampling would have on the result.

MATERIALS AND METHODS

This study was conducted at a private laboratory over a period of one year on 601 cervical smear samples. The smears were assessed by two pathologists and the criteria used were based on the Cervical Intraepithelial Neoplasia Classification (CIN) with modifications(11).

The smears were stained using the standard Papanicolaou method and studied in respect of the adequacy of cellularity, presence or absence of endocervical or immature cells, cellular atypia, dyskaryosis, and the presence of neutrophils. The clinical details of the subject were not usually available. It was also not possible to ascertain as to how many 'scrapes' of the cervix were done in obtaining individual smears.

RESULTS

Of the 601 specimens, 297 cases were smeared on two slides and 301 on one. Two were smeared on three slides while there was one case presented on four slides. The overall endocervical representation was 49.0% An analysis of the smears presented as single and paired samples is given in Table 1. The difference in the endocervical representation between the single and paired samples was statistically significant ($p < 0.001$).

Table 1. Endocervical representation by number of slides

SLIDES	N	ENDO +
1	301	172 (57 . 1%)
2	297	121 (40 . 7%)

(ENDO + = presence of endocervical cells)

Table 2. Analysis of smear result according to the presence or absence of endocervical cells.

RESULT	TOTAL	ENDO+(%)	ENDO+(%)
Normal	120 (19.9)	36 (30.0)	84 (70.0)
Inflammatory	398	217	181
Atypical	50	26	24
CIN I	18	10	8
CIN II	13	5	8
CIN III	2	2	0
CIN (I+II+III)	33	17	16
'Abnormal'	481 (80.0)	260 (54.0)	221 (45.1)

ENDO+ = Endocervical cells present
ENDO— = Endocervical cells absent
CIN = Cervical Intraepithelial Neoplasia
'Abnormal' smears = Inflammatory + Atypical + CIN smears

Table 3. Analysis of abnormal smears by the numbers of slides prasented. (A presentation on 3 slides which contaiaed endocervical cells and had atypical changes has not been included.)

	Slides	CIN 1	CIN II	CIN III	Total	Atypia
E+	1	9	3	1	13 (7.5%)	15 (8.7%)
	2	1	2	1	4 (3.3%)	10 (8.2%)
E-	1	2	4	0	6 (4.6%)	15 (6.9%)
	2	6	4	0	10 (5.6%)	15 (8.5%)

E+ = Endocervical cells present
E— = Endocervical cells absent
CIN = Cervical Intraepithelial Neoplasia

Table 2 analyzes the results by the presence or absence of endocervical representation. These results are further analyzed according to the number of slides and presented in Table 3.

The probability of a smear with endocervical representation being categorized as 'abnormal' (either CIN or atypical or inflammatory) was significantly higher than in those without such representation ($p < 0.001$).

DISCUSSION

Proper collection of the sample is an important aspect of cervical cytology. The cervix must be visualized, and the sampler rotated through the entire transformation zone. In the younger woman this is relatively easy, since the transformation zone is often on the ectocervix. In the older woman however, it is relatively inaccessible, being situated higher in the endocervical canal.

In some studies the presence of endocervical cells has been used as the sole criterion to determine the adequacy of a smear (5.9). Some authorities, however, consider only those smears with representation of abnormal cells to be adequate (6). This may be an extreme view based on the possibility that a smear that does not yield abnormal cells does not necessarily exclude cervical intraepithelial neoplasia due to sampling or 'screener' error.

The low endocervical representation in paired samples in our survey can only be explained by the level of skill of the smear taker. The current trend in countries where cervical smear campaigns are in operation is to take only one sample, although paired samples has been suggested as a way of improving the detection rate (12). Paired smears however would put an unacceptable burden on such programmes, which are often limited.

The commonly used Ayre spatula has been the sampling equipment in some of the most successful smear campaigns worldwide. More recently the advantages of using a spatula with a longer hook end as in the Aylesbury spatula has been highlighted (13). The cytobrush is useful in sampling the transformation zone situated in the cervical canal.

It must be stressed that the results of this survey in no way represents the incidence of cervical precancer in Sri Lanka. The population studied was not representative of the general population. It was a presenting sample that had a consultation for a gynaecological complaint or had a routine "well-woman" screening.

'An inflammatory smear' does not necessarily mean infection. In the premenstrual and menstrual phases the degenerating endometrium is usually heavily infiltrated with leucocytes. Some of the inflammatory smears of this survey would fall into this category and therefore may not be pathological.

The number of smears reported as CIN and 'atypical' smears did not differ between those with and without endocervical representation. Those samples with endocervical representation presented on one slide were far more efficient in detecting abnormalites. 7.5% of these samples showed CIN changes, reflecting superior sampling technique. On the contrary, those without endocervical representation detected CIN only 4.6% of the time. Woodman et al (5) surveyed women who developed cervical cancer after recent negative smears which were deemed 'inadequate'. They found that these smears were less likely to contain endocervical cells than the positive smears which were later obtained from the same woman. In our series, the probability of a smear containing endocervical cells being labelled 'abnormal' was higher than in those without these cells ($p < 0.001$).

If the detection of abnormalities is the final arbiter of effective screening, it could be argued that a properly taken smear presented as a single sample would be an efficient way of screening for cervical cancer.

The public are becoming increasingly aware of the value of the cervical smear in secondary prevention, and the rate of endocervical representation seen in the samples reviewed in this survey is low. This highlights a poor performance on the part of the smear takers, The taking of a cervical smear must at least be demonstrated as a part of the medical curriculum, since the 'hand that wields the spatula' determines the quality of the smear(9).

Another fact that must be highlighted is the high incidence of 'normal' smears in the samples without endocervical representaion. A high proportion of false negative smears fall into this category (14). A 'normal' smear that results from poor sampling technique is a wasted opportunity, and may create a false sense of security that is dangerous.

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