

Cytological Detection of Sexually Transmitted Diseases (STDs) During Routine Outpatient Screening

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Summary

Cytological detection of 4 different types of sexually transmitted diseases namely *Trichomonas vaginalis*, Condyloma, Herpes simplex and *Candida albicans* was carried out during routine Outpatient Screening to find out their prevalence rate and correlation with cervical carcinogenesis. The study comprised of 20,953 women attending Gynaecology OPD of Queen Mary's Hospital, Lucknow, India (April 1971 to May 1999). *Trichomonas vaginalis* was found to be most prevalent STD (3.1%) followed by *Candida* (1.1%) and Condyloma (0.8%). The prevalence rate of *T. vaginalis* and *Candida* was seen maximum in younger women upto 20 years, Condyloma between 21-30 years and Herpes between 21-40 years of age. All these STDs were mostly associated with different kinds of vaginal discharge and contact bleeding and cervix which bled on touch.

Cervical dysplasia was found associated with 27.7% of Herpes, 25.3% of Condyloma, 11.5% of *Trichomonas* and 8.1% of *Candida* infested cases. Frank cancer was seen only with viral STDs-33.3% in Herpes cases and 1.7% of Condyloma. The findings reveal some relation between infections of viral STDs and cervical cytopathologies. Hence periodical cytological monitoring is necessary in viral infested women after adequate treatment.

Introduction

Sexually transmitted diseases (STDs) have become a major health concern among women especially in developing countries where majority of these pathogens go undetected and untreated because of non-availability of the diagnostic facilities. The aggravation of the infestation may lead to gynaecological complication such as pelvic inflammatory diseases (PID), infertility and cervical cancer. It is also feared that if adequate preventive measures are not taken especially in case of trichomonal infection, this may assume epidemic proportions.

Routine cytology carried out for early detection of cervical cancer permits a definitive diagnosis of many STDs such as *Trichomonas vaginalis*, *Candida albicans*, Condylomata accuminata (Human Papilloma Virus) and Herpes simplex. While non-viral STDs (*T. vaginalis*

and *Candida*) are diagnosed on the individual presence of the organism, the viral STDs (Condyloma and Herpes) produce specific cytomorphological changes in the cell component of the cervical epithelium-koilocytosis in condylomatous lesions and multinucleation and "ground glass" appearance of nuclei with Herpes infection. In the present study cytological detection of these 4 STDs have been made during routine outpatient screening in last 28 years (April 1971-May 1999) in 20,953 women to find out their prevalence rate and correlation with cervical carcinogenesis. In addition, the prevalence rate of the 4 STDs has also been investigated in relation to different parameters such as clinical lesions in the lower female genital tract, gynaecological symptoms and age.

Materials and Methods

Routine cervical smear examination has been

carried out for early detection of carcinoma cervix in 20,953 women attending gynaec O.P.D. of Queen Mary's Hospital, Lucknow, India between April 1971 to October 1998. The age of women ranged from 17 to 60 years and their parities from 0 to 12. In each case, prior to bimanual examination, a scrape smear was taken from the squamocolumnar junction of cervix. The smears were fixed immediately in Absolute Alcohol and later stained according to the Papanicolaou's technique. The cytopathological grading of cervical smears has been made in accordance with classification recommended by WHO Study Group (1973). The diagnosis of the 4 STDs forming the study group was made in the smears on the basis of criteria stated above. The diagnosis of condyloma was initiated at this centre from March 1989 and hence its prevalence rate etc. has been calculated in 14,907 women enrolled between March 1989 to May 1999.

Results

The prevalence rate of the 4 STDs detected in the routine cervical smears of 20,953 women was found to be as follows

Trichomonas vaginalis	-	634 (3.1%)
Candida albicans	-	245 (1.1%)
Herpes simplex	-	90 (0.4%)
Condyloma	-	113/14,907 (0.8%)

Trichomonal infection was found to be the most prevalent STD in the segment of the population screened (3.1%). Among the viral STDs, Condyloma was seen in 0.8% while Herpes was detected in 0.4% of cases.

Table I
Relation of 4 STDs with Cervical Dysplasia and Carcinoma Cervix

STD	Dysplasia			Carcinoma Cervix
	Mild	Moderate	Total	
T. Vaginalis (634)	76 (11.9%)	8 (1.2%)	84 (11.5%)	1 (0.1%)
Candida albicans (245)	18 (7.3%)	3 (1.1%)	21 (8.1%)	-
Condyloma (113)	24 (4.1%)	5 (4.1%)	29 (25.6%)	2 (1.7%)
Herpes (90)	20 (22.2%)	5 (5.5%)	25 (27.7%)	30 (33.3%)

Table II
Prevalence rate of 4 STDs in Three Categories of Women

Category	No. of cases	T. vaginalis	Candida	Condyloma	Herpes
I Symptomatic women	2215	232 (10.4%)	120 (5.1%)	35/1610 (2.1%)	41 (1.8%)
II women with clinical lesions in the lower female genital tract	7344	365 (5.1%)	101 (1.3%)	71/5339 (0.8%)	49 (0.6%)
III Asymptomatic women with healthy cervix	11,394	37 (0.3%)	24 (0.2%)	7/7148 (0.09%)	-

Concomittant occurrence of cervical dysplasia and Carcinoma cervix was also investigated in the smears diagnosed harbouring STD infection (Table I). The dysplasia rate was found to be higher with trichomonal infection (11.5%) and Candida (8.1%). Though majority of these dysplasias were of mild nature, but a high percentage of dysplasia with these non-viral STDs warrant need for careful study of smears with their association with any premalignancy and subsequent adequate treatment. This exercise becomes more essential in view of a finding of a malignant smear associated with T.V. infection.

Association of dysplasia was many fold higher with viral STDs - 25.6% with condyloma and 27.7% with Herpes. The percentage of moderate dysplasia was also higher with these 2 STDs. Carcinoma cervix was seen in 2 cases of condyloma (1.7%) and in 33.3% of Herpes infested smears.

The prevalence rates of the 4 STDs were analysed in relation to different parameters such as clinical lesions in the lower female genital tract, gynaecological symptoms and age. This was considered essential to identify the catchment areas of these STDs. Consequently, the total 20,953 women of the study were classified into three categories depending upon the presence of clinical lesions or symptoms. The prevalence rate of the 4 STDs in these three groups are shown in Table II. The symptomatic women harboured maximum number of STDs followed by those showing clinical lesions. As expected, the prevalence rate of the 4 STDs was lowest in asymptomatic women with healthy cervix.

As all STDs were in majority of cases associated with gynaecological symptoms or clinical lesions, we thought it interesting to investigate their prevalence with different types of symptoms and clinical lesions in the lower female genital tract.

Clinical Lesions in the Lower Female Genital Tract

Five types of clinical lesions – Erosion cervix, hypertrophied cervix, cervix bleeds on touch, unhealthy cervix suspicious of cervical carcinoma and vaginitis were included in this group and the prevalence rate of the 4 STDs in these 5 lesions has been shown in Table III. *T. vaginalis*, Condyloma and Herpes were seen maximum in women whose cervix bled on touch and particularly the rate was exceedingly higher with trichomonal infection (19.1%). Since premalignant manifestations in the cervix were also found common with the same clinical lesions during current screening, such women require special attention for cytological evaluation and repeat cytology, if any, pathogen is detected and regimen of the treatment is completed.

Candida infection was optimally seen with vaginitis (2.3%) *T.V.* infection was found associated with 5.1% of vaginitis cases. Eroded cervix harboured 5.9% of

T.vaginalis cases, 1.1% of Candida and 1.6% of Condyloma cases.

Gynaecological Symptoms

The prevalence rate of the 4 STDs in 2215 symptomatic women have been analysed in detail in relation to different symptoms in Table IV. The trichomonal infection, Condyloma and Herpes was mostly associated with contact bleeding and different kinds of vaginal discharge while Candida was common only in vaginal discharge cases. It should be emphasized here that women complaining of contact bleeding were found to harbour maximum number of dysplasia cases and hence cytological evaluation of postcoital bleeding cases appears to be mandatory.

Interestingly, Herpes simplex was also found commonly associated with bleeding disorders such as menorrhagia and postmenopausal bleeding.

Age

Distribution of the STDs detected in different specific age category of women is shown in Table V. The maximum prevalence rate of trichomonal infection and

Table III
Relationship of the 4 STDs with Clinical Lesions in the Lower Female Genital Tract

Clinical lesions	No. of Cases	<i>T. vaginalis</i>	Candida	Condyloma	Herpes
Erosion cervix	2593	155 (5.9%)	30 (1.1%)	27/1923 (1.6%)	17 (0.7%)
Hypertrophied cervix	1824	72 (3.9%)	19 (1.7%)	20/1408 (1.2%)	15 (0.8%)
Suspicious cervix	1541	31 (1.8%)	8 (0.5%)	7/682 (1.1%)	19 (1.1%)
Cervix bleeding on touch	185	35 (19.1%)	-	6/134 (4.5%)	9 (4.9%)
vaginitis	1201	62 (5.1%)	21 (2.3%)	4/683 (0.6%)	-

Table IV
Relation of the 4 STDs with Gynaecological Symptoms

Symptoms	No. of cases	<i>T. vaginalis</i>	Candida	Condyloma	Herpes
Contact bleeding	143	24 (16.7%)	-	6/112 (5.8%)	8 (6.7%)
All kinds of vaginal discharge	1258	206 (16.4%)	105 (8.5%)	29 (3.4%)	14 (1.1%)
Menorrhagia	653	2 (0.3%)	15 (2.4%)	-	15 (2.4%)
Postmenopausal bleeding	201	-	-	-	4 (1.9%)

Table V
Relation of 4 STDs with Age

Age group	No. of cases	<i>T. vaginalis</i>	Candida	Condyloma	Herpes
Upto 20 yrs.	314	35 (11.1%)	18 (5.7%)	2/236 (0.8%)	-
21 to 30 yrs	5379	312 (5.4%)	80 (1.3%)	51/2958 (1.3%)	22 (0.4%)
31-40 yrs	6635	193 (2.8%)	71 (1.1%)	36/474 (0.8%)	31 (0.4%)
Above 40 yrs.	8625	95 (1.1%)	76 (0.9%)	24/5974 (0.4%)	37 (0.4%)

Candida was seen in younger women below 20 years of age while Condyloma was observed maximum in 21-30 years age group. The prevalence rate of Herpes simplex was almost identical in women between 21-60 years of age.

Discussion

Sexually transmitted diseases pose a major health problem to women as morbidity associated with their prolonged infection is rising at an alarming rate. In Indian women, it is reported that 5% of the total population suffer from one or other form of STDs Wasseheit and Holmes (1992). This has prompted the health managers to pay major attention to STD detection and treatment in Reproductive Health Programme of different countries. Since cytology permits quick detection of many of these STDs, we included detection of *T. vaginalis*, *Candida albicans*, Condyloma and Herpes simplex in our cytological screening programme for cervical cancer. This facilitated in determining the prevalence rate of these 4 STDs in women screened, thus providing an idea regarding the magnitude of the infection in the urban population adjacent to our hospital who have been frequently visiting us for gynaecological treatment.

As expected, trichomonal infection was found to be the most common STD in 20,953 women screened (3.1%). A study carried out in Delhi and surrounding areas by Sadana et al (1994) have revealed slightly higher incidence of the infection (4.1%). Among viral STDs, Condyloma was more common than Herpes (0.8% as against 0.4%). All the 4 STDs were commonly seen in the symptomatic women which needs greater attention for investigation for these pathogens.

Cervical dysplasia was concomitantly found with all 4 STDs but the incidence was higher with viral pathogens – 25.6% with Condyloma and 27.7% with Herpes simplex. Frank cancer was also seen only with viral STDs – 33.3% with Herpes and 1.7% with Condyloma. These findings clearly indicate association between infection of viral – STDs and cervical carcinogenesis and the affinity appears to be more pronounced with Herpes infection.

The incidence of cervical dysplasia in *T.V.* infested cases was found to be 11.5% and 8.1% with Candidal infection. This emphasizes need for adequate treatment of non-viral STDs and repeat cytological checkup to rule out any advent of premalignancy. Since both these STDs have also been detected in asymptomatic women with healthy cervix (though their prevalences rate ranged from 0.1% to 0.3%), their detection without

any symptom or clinical lesion suggests that the infection may be latent in the initial phase but could be easily picked by cytology.

Prevalence rate of *T.vaginalis* and *Candida* was found to be higher in the young women upto 20 years. This may be due to early active sexual life in Indian girls which are married between 16-20 years especially in rural areas. In western countries also, there are reports of trichomoniasis occurring as early as 20 years with peak incidence of the age 16-33 (Charles 1980).

Among viral STDs, the human papilloma virus was seen maximum between 21-30 years of age. Miesels and Morish (1981) have also reported similar age prevalence of HPV in Canada. Herpes was also found after 20 years of age and its prevalence rate was identical in all age groups even after 40 years.

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References

1. Charles D. sexually transmitted diseases. Infections in obstetrics and gynaecology. Edited by D. Charles, Philadelphia W.B. Saunders, 39-43, 1980.
2. Miesels A and Morin C. Gynaecol. Oncol. 12: 111-123, 1981.
3. Sadana S, Sodhani P and Agrawal S.S. Acta Cytol. 38 (5), 695-697, 1994.
4. Wasserheit J.N. and Holmes K.K., Reproductive tract infections: Challenges for international health policy, programs and research. In reproductive tract infections: Global impact and priorities in women reproductive Health. Edited by A. Germain, K.K., Holmes, P. Plot, J.N. Wasserheit, New York. Plenum Press, 7-30, 1992.
5. WHO; Cytology of female genital tract. WHO monograph series 3, 1973.