

Colposcopy, colpocytology and the vaginal ecosystem

Oncological, bacteriological and hormonal evaluation in a series of 400 women

A. TORRISI - G. L. ONNIS - D. MINUCCI

Summary: The Authors retrospectively considered colpocytological and colposcopic findings in a series of 400 women, aged 16 to 83 years, presenting for the first time at the Oncological Gynaecology Unit of the Institute of Gynaecology and Obstetrics of Padua University between 1991 and 1992. In addition to oncological evaluation, the bacteriological profile and hormone status of cytological samples were formulated in all cases.

The most common oncological finding was a cell morphology within normal limits (67%), followed by reactive and reparative changes (19%) and low-grade squamous intraepithelial lesions (SIL, 12%). Histological findings correlated well with the cytological diagnosis, though low-grade SIL was over-estimated. As for the bacteriological profile, a mixed flora was most frequent (56.7%) followed, especially in fertile age, by Döderlein's bacillus (20%) and vaginosis (15.5%).

Colposcopy most frequently revealed ectopia and/or a normal transformation zone (50.7%) and dystrophic mucosa (21%). An abnormal transformation zone was more common among women with a moderate-to-abundant flora. Fifteen male partners were also checked: cellular changes typical of human papilloma virus infection were found in 40% and colposcopic findings compatible with said virus were observed in 26.6% of cases.

These results confirm that colpocytology provides a complete and simultaneous evaluation not only of cell morphology, but also of the bacterial population and hormones in the vaginal ecosystem. It is therefore the method of choice in screening for cervical and vaginal neoplasms and an effective means for simultaneously evaluating vaginal flora and hormone status.

Key words: Colpocytology; Colposcopy; Vaginal ecosystem.

INTRODUCTION

Research on the prevention and early diagnosis of gynaecological genital neoplasms has achieved considerable results in recent years. A study of their natural

Institute of Gynaecology and Obstetrics,
Oncological Gynaecology Unit,
University of Padua, Italy

All rights reserved — No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, nor any information storage and retrieval system without written permission from the copyright owner.

history has confirmed that neoplastic lesions develop from a multi-stage process which can last for many years. Their onset is characterized by loss of differentiation and cell growth control (^{1,2}), with various factors having a potential role in this process. Prevention and early diagnosis are therefore important, particularly for cervical cancer, which continues to have a high incidence and has therefore been given high priority in cancer control programs (^{1,3-6}).

Maintaining the health and hygiene of the vaginal ecosystem is an important factor in the prevention of cervical cancer. It is common knowledge that the ecological balance in the vagina depends on the interaction of a number of physiological and para-physiological variables, such as age, menstruation, sexual activity, pregnancy, eating habits, personal hygiene, and so on. The presence of flora in the vagina is influenced by various factors affecting vaginal condition. Lactobacilli (which have a marked polymorphism) are predominant in fertile age, but staphylococcus, streptococcus, diphtheroid and Gram-negative bacteria are also found. These micro-organisms generally behave as neighbours, but in the event of altered immune defences or in the presence of "triggering factors", one bacillus may develop an opportunist role, becoming pathogenic if it outnumbers the others⁽⁸⁻¹⁰⁾.

On the pathogenic agents in the vagina, the most common are 3 categories of germs: bacteria, mycetes and trichomonas vaginalis. Some genuinely pathogenic micro-organisms are occasionally isolated even in symptom-free women in physiological conditions⁽⁹⁾.

In addition, chlamydia, mycoplasmas and viral agents such as human papilloma virus (HPV), herpes simplex virus (HSV) and cytomegalovirus are also known to have a role in male and female genital pathology. In the event of changes in immune defences and the vaginal environment, these viruses find a more favourable habitat and can contribute to further disrupting the vaginal ecosystem, possibly also playing a part in carcinogenesis^(1, 9, 11).

This study involved our application of colposcopy and colpocytology for oncological screening, bacteriological and hormonal evaluation purposes in 400 women.

MATERIALS AND METHODS

This retrospective study considered the outcome of colposcopy and cervical-vaginal cytology in a group of 400 women, aged between

16 and 83 years, randomly selected from those presenting for the first time for screening at our Unit. Clinical data collected on the women included age, symptoms, use of contraceptives and number of children.

For cytological examination, material was collected from the cervix using absorbent cotton and from the portio and vagina (fundus and walls) using an Ayre's spatula. The 3 samples were separately smeared onto a single slide, fixed and stained using the Papanicolaou method. The Bethesda system⁽¹²⁾ was used for cytological evaluation. Vaginal flora was quantified as scanty, moderate abundant. The karyopyknotic index (which measures the proportion of cells with a pyknotic nucleus) was used for hormonal evaluation. A complete oncological, bacteriological and hormonal diagnosis were formulate.

The Italian colposcopic classification^(13, 14) was used to evaluate colposcopic findings. Biopsies were taken in any cases diagnosed as high-grade squamous intraepithelial lesions (SIL) and also in the event of low-grade SIL being found in association with an abnormal transformation zone (ANTZ) grade 1 or grade 2. Fifteen male partners of women presenting the features of HPV infection (i.e. those who agreed to undergo the test procedure) were also evaluated by means of urinary cytology for 3 consecutive days, urethral meatus cytology and balano-preputial sulcus and colposcopy⁽¹¹⁾.

RESULTS

Of the 400 women examined, 156 were between 45 and 83 years old (mean age 63) and were in menopause; 244 were between 16 and 55 years old (mean age 36) and were not in menopause.

Table 1 and Figure 1 summarize the outcome of the cytological investigations on the 400 women, while Table 2 shows the results of histological evaluation of the biopsies taken from 27 women.

Cytological tests on the 15 male partners of women with features suggestive of HPV infection revealed HPV-related cellular changes in 6 cases (40%) and colposcopic findings compatible with UPV in 4 cases (26.6%).

Table 3 and Figure 2 illustrate the bacteriological profiles and Table 4 relates the bacteriological profile to the patients' age. Table 5 shows the hormone status

Table 1. — Colpocytology in 400 women: oncological evaluation.

Colpocytology	No. of cases	%
Within normal limits	268	67
Reactive and reparative changes	76	19
Low-grade squamous intraepithelial lesions (SIL)	48	12
High-grade squamous intraepithelial lesions (SIL)	8	2
Atypical squamous cells of undetermined significance	—	—
Squamous cell carcinoma	—	—
Adenocarcinoma	—	—
Total	400	100

Table 2. — Correlation between colpocytology and histology in 27 women.

Histology	Colpocytology				Total	
	low grade SIL No.	low grade SIL %	high grade SIL No.	high grade SIL %	No.	%
Minor alt.	4	21	0	0	4	14.8
CIN I	14	73.7	2	25	16	59.2
CIN II	1	5.2	6	75	7	25.9
CIN III	0	0	0	0	0	0
Total	19	100	8	100	27	100

CIN = Cervical Intraepithelial Neoplasia; SIL = Squamous Intraepithelial Lesions.

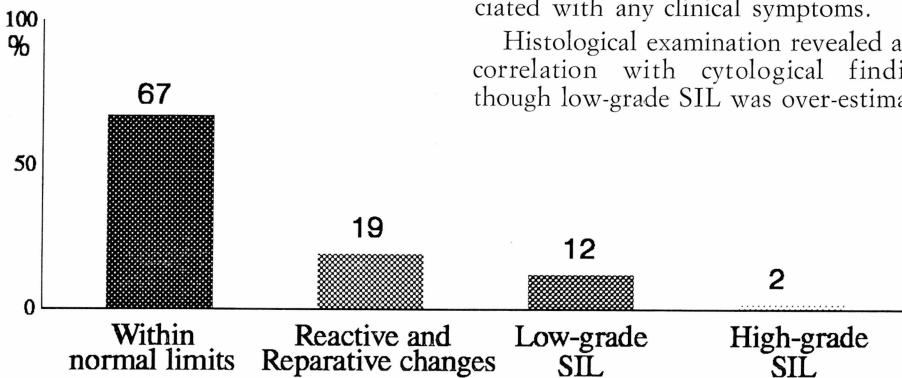


Fig. 1. — Colpocytology in 400 women: oncological evaluation.

resulting from colpocytology in the 400 women.

Colposcopic findings are given in Table 6, in relation to the quantity of flora. The total percentage of cases of ANTZ amounted to 10.6% among women with scanty flora and 20.4% among those with moderate-abundant flora. The different incidence of ANTZ proved highly significant with the chi-squared test ($p < 0.001$).

Table 7 summarises the clinical signs and symptoms found in the 400 women, again divided according to the bacteriological situation observed, while Table 8 indicates the contraceptive measures adopted, if any, and Table 9 gives the number of children.

DISCUSSION

In the 400 women considered, the most common condition emerging from cancer screening is that of a colpocytology within normal limits.

Mixed bacterial flora were the most common finding in the bacteriological profile and there was a greater presence and variety of bacteria in women in fertile age. The presence of Döderlein's bacillus was confirmed, again particularly in fertile age. It was also found that the presence of moderate-abundant flora diagnosed by colpocytology was not necessarily associated with any clinical symptoms.

Histological examination revealed a fair correlation with cytological findings, though low-grade SIL was over-estimated.

Table 3. — Colpocytology in 400 women: bacteriological evaluation.

	Scanty flora		Moderate-Abundant flora		Total	
	No.	%	No.	%	No.	%
Bacteria	66	55.9	161	57	227	56.7
Doederlein	25	21.2	55	19.5	80	20.0
Vaginosis	29	24.6	33	11.7	62	15.5
Mycosis	5	4.2	21	7.4	26	6.5
Trichomonas	3	2.5	12	4.2	15	3.7
Chlamydia related changes . .	2	1.7	—	0	2	0.5
Leptothrix	2	1.7	—	0	2	0.5
Total	118	29.5	282	70.5	400	100

Table 4. — Colpocytology in 400 women: bacteriological evaluation in relation to age.

Flora	AGE (Years)												Total	
	< 20		21-30		31-40		41-50		51-60		> 60			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Scanty	6	30	14	18.6	21	30	19	21.8	20	30.7	38	45.7	118	29.5
Moderate	6	30	33	44	37	55.8	46	52.8	24	36.9	27	32.5	173	43.2
Abundant	8	40	28	37.3	12	17.1	22	25.3	21	32.3	18	21.6	109	27.3
Total	20	100	75	100	70	100	87	100	65	100	83	100	400	100

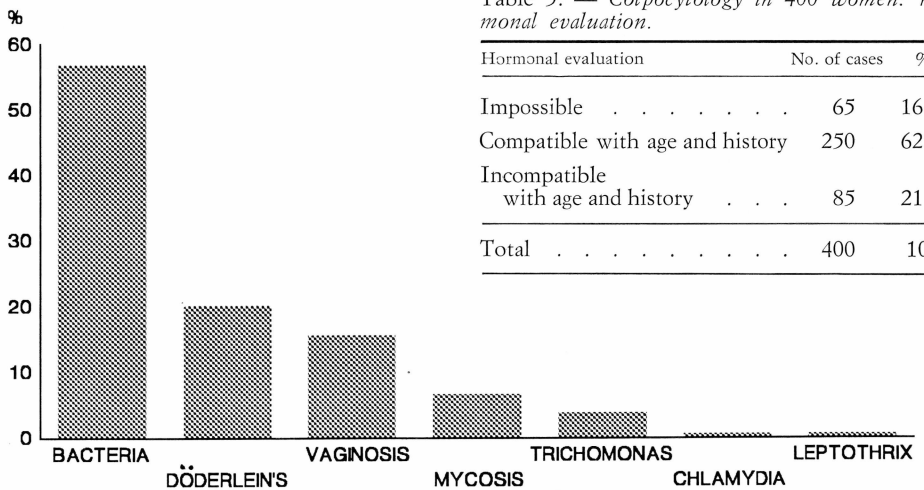


Table 5. — Colpocytology in 400 women: hormonal evaluation.

Hormonal evaluation	No. of cases	%
Impossible	65	16.2
Compatible with age and history	250	62.5
Incompatible with age and history	85	21.2
Total	400	100

Fig. 2. — Colpocytology in 400 women: bacteriological evaluation.

Table 6. — Colposcopic findings in 400 women.

Colposcopy	Colpocytology (bacteriological evaluation)					
	Scanty flora		Moderate-Abundant flora		Total	
	No. cases	%	No. cases	%	No. cases	%
Jodopositive mucosa	15	5.0	4	3.7	19	4.7
Dystrophic mucosa	68	23.2	16	10.3	84	21.0
Ectopia and/or NTZ *	150	51.2	54	50.4	203	50.7
ANTZ G0 **	16	5.5	14	13.0	30	7.5
ANTZ G1 **	14	4.8	7	6.5	21	5.2
ANTZ G2 **	1	0.3	1	0.9	2	0.5
Associate findings	29	9.9	11	10.3	40	10.0
Total	293	73.2	107	26.7	400	100
Associated colpitis	21	7.2	76	71.0	97	24.2

* Normal Transformation Zone

** Abnormal Transformation Zone Grade 0, 1, 2.

As for the male partners involved in the study, there was a 40% incidence of cellular alterations related to HPV infection and 26.6% of the colposcopic findings were compatible with the said viral infection.

Colposcopy most frequently revealed ectopia and/or a normal transformation zone. The finding of an abnormal transformation zone and colpitis was more common in women with a moderate-to-abundant flora.

Examination of the male partners revealed a fairly frequent incidence of HPV-induced cellular changes.

Colpocytology proved capable of providing a complete and simultaneous evaluation of cell morphology and of the bacterial population in the smear, giving rise to a reliable oncological, bacteriological and hormonal diagnosis. As concerns the site of the flora and lesions, the severity of inflammation and of altered cells can vary in the smears obtained from

Table 7. — Symptoms in 400 women.

Clinical signs and symptoms	Colpocytology					
	Scanty flora		Moderate-Abundant flora		Total	
	No. cases	%	No. cases	%	No. cases	%
Asymptomatic	165	56.3	13	12.1	178	44.5
Leukorrhea	40	13.6	29	27.1	69	17.2
Itching or burning	6	2.0	32	29.9	38	9.5
Spotting	10	3.4	5	4.7	15	3.7
Metrorrhagia	0	0	2	1.9	2	0.5
Pelvic pain	22	7.5	6	5.6	28	7.0
Not specified	50	17.0	20	18.7	70	17.5
Total	293	100	107	100	400	100

Table 8. — *Contraceptive methods in 400 women.*

Contraceptive methods	No. of cases	%
Oral contraceptives	76	19.0
IUD	45	11.2
Barrier methods	59	14.7
"Natural" methods	40	10.0
No methods	130	32.5
Not specified	50	12.5
Total	400	100

Table 9. — *Evaluation of the number of children in 400 women.*

No. of children	No. of cases	%
0	75	18.7
1	80	20.0
2	94	23.5
3	65	16.2
> 3	77	19.2
Not specified	9	2.2
Total	400	100

different sites (cervix, portio, vagina), thus offering useful indications for more accurately locating any disorders. It is common knowledge that cervico-vaginal inflammatory processes often cause changes in flat and cylindrical epithelial cells.

The hormone status emerging from the smear is useful both for cancer screening purposes and for preventing the effects of any imbalance in the vaginal ecosystem, especially during menopause, when vaginal conditions may follow an unpredictable evolution in the presence of factors altering the preexisting balance. Evaluating and, if necessary, restoring vaginal mucosa trophism is important because it recreates the ideal substrate, repairing the biological chain characteristic of the female prior to menopause. In addition, the finding of a hormone status incompatible with a patient's age and clinical history, especially

during menopause, will be an indication for a thorough examination of the endometrium.

Colposcopy can clearly play an important part in identifying lesions "at risk", in guiding the taking of biopsies and in revealing the presence of any epithelium requiring local treatment.

In conclusion, our findings further confirm that colposcopy is the method of choice for cervical and vaginal cancer screening and a valid technique for simultaneously verifying vaginal flora and hormone status. In view of the fundamental role of the "oikos", it enables an overall evaluation of the vaginal ecosystem, with important implications in diagnosis, therapy and follow-up.

REFERENCES

- 1) Koss L.G.: "The Papanicolaou test for cervical cancer detection. A triumph and a tragedy". *JAMA*, 1989, 261, 737-43.
- 2) Parkin D.M., Laara E., Muir C.S.: "Estimates of worldwide frequency of sixteen major cancers in 1980". *International Journal of Cancer*, 1988, 41, 184-197.
- 3) Hakama M.: "Efficacy of screening for cervical cancer". Bauburg Report 21. Cold Spring Laboratory, 1986, 45.
- 4) Miller A.B.: "Cervical Cancer Screening Programmes: managerial guidelines". 1992, WHO Geneva, England.
- 5) Yu S.Z., Miller A.B., Sherman G.J.: "Optimising the age, number of tests, and test interval for cervical cancer screening in Canada". *Journal of Epidemiology and Community Health*, 1982, 36, 1-10.
- 6) WHO: "Cytological screening in the control of cervical cancer: technical guidelines". 1988, Geneva, World Health Organization, England.
- 7) Soost H.J., Lange H.J., Lehmacher W., Ruffing-Kullmann B.: "The validation of cervical cytology - Sensitivity, specificity and predictive values". *Acta Cytologica*, 1991, 35, 8-14.
- 8) Amsel R., Totten P.A., Spiegel C.A., Chen K.C., Eschenbach D., Holmes K.K.: "Non-specific Vaginitis. Diagnostic criteria and microbial and epidemiologic associations". *Am. J. Med.*, 1983, 74, 14.
- 9) Bibbo M., Wied G.L.: "Microbiology and inflammation of the female genital tract.

- Compendium on Diagnostic Cytology". 'Tutorials of Cytology'. Chicago, 1988, 54.
- 10) Richart R.M.: "The patient with an abnormal Pap-smear: screening techniques and management". *New England Journal of Medicine*, 1980, 41, 184-197.
 - 11) Torrisi A., Reveane A., Minucci D.: "Infezioni genitali virali: aspetti epidemiologici e approccio diagnostico in 190 coppie". *Giornale Italiano di Ostetricia e Ginecologia*, 1990, 6, 435-490.
 - 12) National Cancer Institute Workshop: "The 1988 Bethesda System for reporting cervical/vaginal cytological diagnosis". *Journal of the American Medical Association*, 1989, 262, 931-934.
 - 13) Mossetti C., De Palo G., Remotti G., Marchionni M., Montanari G., De Virgiliis G., Gilardi E.M., Stefanon B.: "Proposta di una classificazione colposcopica unificata italiana". *Minerva Ginecologica*, marzo 1987, 39.
 - 14) De Palo G.: "Manuale di Colposcopia e Patologia del Tratto Genitale Inferiore". 1990, Masson, Milano.

Address reprint requests to:
ANGELA TORRISI
Istituto di Ostetricia e Ginecologia
Via Giustiniani, 3 - 35128 Padova (Italy)
Fax +39 49 8750860