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ORIGINAL RESEARCH ARTICLE

Evaluation of cervicovaginal smear results at postmenopausal period

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***Abstract*:** This study evaluates the statistical analysis of cervicovaginal smear results at postmenopausal period accompanied by literature. Cervicovaginal smear results of 894 postmenopausal women were evaluated retrospectively according to the 2001 Bethesda system (BS) in Adana Numune Training and Research Hospital of Obstetrics and Gynecology Clinic from 2007–2010. The study found, normal results on 287 patients (32.1%), benign findings on 556 patients (62.2%), abnormal epithelial cell changes on 48 patients (5.36%) and malignant changes on 3 patients (0.33%). The abnormal epithelial changes were observed to be atypical cells of undetermined significance (ASC-US) for 22 patients (2.46%), low-grade squamous intraepithelial lesion (LSIL) for 11 patients (1.23%), high-grade squamous intraepithelial lesion (HSIL) for 7 patients (0.78%), findings that cannot exclude a high-grade squamous intraepithelial lesion (ASC-H) for 6 patients (0.55%) and atypical glandular cells-not otherwise specified (AGC-NOS) for 2 patients (0.22%). Malignant results were 2 squamous cell carcinomas (SCC) (0.22%) and 1 adenocarcinoma (ACC) (0.11%). Cervical cancer screening programs should be expanded and Pap smear screening should be applied to all postmenopausal women. The longer time span involved from premalignant lesions to cancer improves our chance for the diagnosis and treatment. As the incidence of invasive cancer increases in menopausal period, gynecological smear examination and regular check-up are crucial. A high rate of abnormalities of epithelial cells was detected in this study.

***Keywords*:** pap smear; cytology; bethesda system; epithelial cell abnormalities

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Introduction

Cervical cancer ranks second among malignancies in women after breast cancer. 437,000 new patients are diagnosed every year[1,2]. The high incidence of cervical cancer is a major problem, particularly in developing countries[3]. Cytological examination has an important role in the early diagnosis and treatment of invasive cervical cancer precursors[2]. Cervical cancer incidence and mortality rates decreased significantly with the use of the Papanicolaou (Pap) test in many European countries since the early 1940s[4]. Although the false negative rate varies between 6% and 50%, this test is still considered as the most effective method to detect precancerous lesions[5,6].

Bethesda system (BS) was used since the year 1988 to ensure a more uniform and detailed information on the interpretation of cytologic terminology. Subsequently, this classification was revised in 1991 and 2001[6]. Despite the significant improvement in cervical cancer death rates, there are still conflicting opinions on appropriate cancer screening protocols throughout the life span[7]. Regular Pap smear screening is usually recommended until the age of 65–70. Thus, the rate of cervical

cancer has successfully decreased. If there is no previous screening, screening may be useful after the age of 65–70[8]. In this article, we evaluated the cervicovaginal smear results in postmenapausal women.

Materials and methods

In this study, cervicovaginal smear results of 894 postmenopausal women were evaluated retrospectively atypical glandular cells-not otherwise specified according to the 2001 Bethesda system (BS) classification in Adana Numune Training and Research Hospital of Obstetrics and Gynecology Clinic between 2007 and 2010 (*Table 1*)[9]. The study protocol was approved by the local Research Ethics Committee. Patients were *Table 1* the criteria with an exclusion of vaginal bleeding, sexual intercourse within 72 hours, vaginal therapy and, vaginal douching. All cervicovaginal smears were taken by gynecology physicians using a sterile disposable plastic speculum and cervical smear brush that is rotated 360° clockwise in the external cervical os (including endocervix). During propagation, one side of the brush first, followed by the other side was smeared to the slide. While maintaining longitudinal axis of the brush to the long axis of the slide, the smear is detected by spraying with fixative. Smears are described as cellular abnormalities and competence/incompetence according to the criteria of BS and the results were collected. Cervicovaginal smear results are analyzed according to age, gravity, parity, cytological profiles and inability causes of smear. NCSS Statistical Software 2007 & Power Analysis and Sample Size (PASS) 2008 (Utah, USA) program is used for statistical analysis of the results.

Table 1 2001 Bethesda system for cervical cytology

Types	Diagnostic categories
Specimen adequacy	1. Satisfactory for evaluation
	2. Unsatisfactory for evaluation (hemorrhage, severe inflammation)
General categorization	1. Negative for intraepithelial lesion or malignancy
	2. Epithelial cell abnormality
	3. Other
Non-neoplastic results, organisms	1. Trichomonas vaginalis
	2. Fungal organisms morphologically consistent with Candida species
	3. Shift in flora suggestive of bacterial vaginosis
	4. Bacteria morphologically consistent with Actinomyces species
	5. Cellular changes consistent with herpes simplex virus
Other non-neoplastic findings	1. Reactive cellular changes due to infection
	2. Reactive cellular changes due to radiation
	3. Reactive cellular changes due to intrauterine device
	4. Benign glandular cells after hysterectomy
	5. Atrophy
Epithelial cell abnormalities	I. Squamous cell abnormalities
	1. Atypical squamous cells
	a. of undetermined significance (ASC-US)
	b. cannot exclude HSIL (ASC-H)
	2. Low-grade squamous intraepithelial lesion (LSIL)
	3. High-grade squamous intraepithelial lesion (HSIL)
	4. Squamous cell carcinoma
	II. Glandular cell abnormalities
	1. Atypical glandular cells (AGC) (specify endocervical, endometrial, or not otherwise specified)
	2. Atypical glandular cells, favor neoplastic (specify endocervical or not otherwise specified)
	3. Endocervical adenocarcinoma in situ (AIS)
	4.Adenocarcinoma (endocervical/endometrial/extrauterine or not otherwise specified)

Ethics statement

The study was approved by the local Research Ethics Committee.

Results

Age range of patients was from 38–76 years and the mean age was 52.2 ± 7.4 years. A total of 614 patients were admitted for routine control with 126 patients for vaginal discharge, 112 patients for pelvic pain and 42 patients for vaginal bleeding. Menopause age of patients ranged from 29–64 years and the mean of menopause age was 41.5 ± 5.3 years. Duration of menopause time was from 1–33 years with mean of 8 ± 6.4 years. The gravida ranged from 0–17 with the mean of 5.3 ± 2.8. Meanwhile, the parity ranged from 0–13 and the mean was 3.8 ± 2.2. The distribution of demographic characteristics of the patients is summarized in *Table 2*. It was found that 97.3% of cervicovaginal smears were adequate for examination while the remaining, 2.7% was inadequate.

A total of 287 patients (32.1%) showed normal results, 556 patients (62.2%) have benign, 48 patients (5.37%) showed abnormal epithelial changes and 3 patients (0.33%) showed malignant changes (*Figure 1*). Infection was detected for 28.3% of benign findings (154 patients). Benign epithelial changes were detected on 185 patients (33.8%) followed by atrophic vaginitis on 207 patients (37.9%). The abnormal cervicovaginal smear results for the epithelial cell abnormalities are 22 patients (2.46%) with atypical squamous cells of undetermined significance (ASC-US), 6 patients (0.67%) with cannot exclude HSIL (ASC-H), 11 patients (1.23%) with low-grade squamous intraepithelial lesion (LSIL), 7 patients (0.78%)

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with high-grade squamous intraepithelial lesion (HSIL), 2 patients (0.22%) with atypical glandular cells (AGC-NOS), 2patients (0.22%) with squamous cell carcinoma (SCC) and 1 patient (0.11%) with adenocarcinoma (ADC) (*Figure 2*). The inadequate smear was due to fixation disorder (47.3%), poor spreading of cells (33.3%), severe inflammation (17.1%) and severe hemorrhage (2.3%).

Table 2 Demographic features distribution

	Minimum	Maximum	Mean ± SD
Age (year)	38	76	52.2 ± 7.4
Gravida	0	17	5.3 ± 2.8
Parity	0	13	3.8 ± 2.2
Menopause time (year)	1	33	7.8 ± 6.4
Menopause age (year)	29	64	41.5 ± 5.3

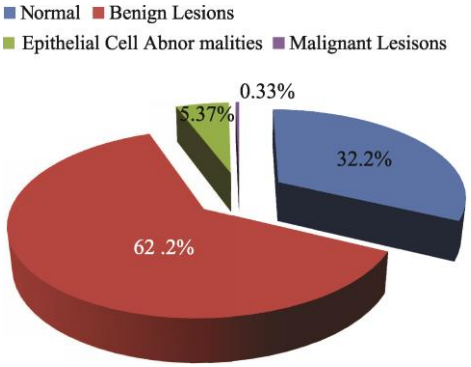

Figure 1 The distribution of the cervicovaginal smear results

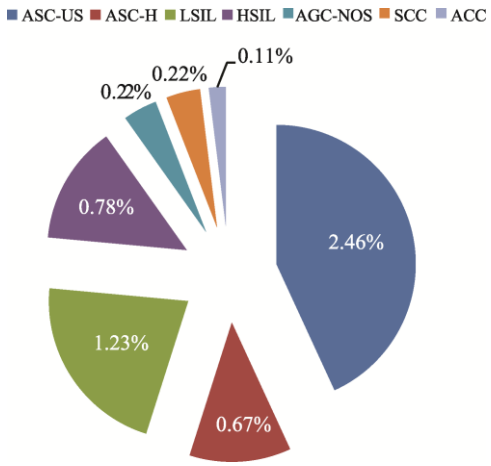

Figure 2 The distribution of abnormal cervicovaginal smear results. ASC-US: atypical squamous cells of undetermined significance; ASC-H: high-grade squamous intraepithelial lesion; LSIL: low-grade squamous intraepithelial lesion; HSIL: high-grade squamous intraepithelial lesion; AGC-NOS: atypical glandular cells; SCC: squamous cell carcinoma; ACC: adenocarcinoma

Discussion

As cervical cancer is prevalent all over the world, cervical cancer screening and early diagnosis of the disease is vital. The widespread use of Pap smear testing and BS significantly reduced the mortality of cervical cancer in the world[6,10]. Although, failures in procedure, fixation failure, presence of erythrocyte, specimen painting errors and inaccurate assessment of pathologist may cause false positive and negative test results, it is still the most effective screening method for cervical cancer screening. Inadequate specimen results are reported as 0.5%–7.2% in different studies[11-14]. Ersoz et al. reported inadequate specimens as 6.7% in their study[2]. In the present study, the inadequate smear specimens were 2.7%. Fixation error is the most important factor for inadequate results and the error seems to be related to the physician in charge or fixation materials. In our study, we detected fixation error as the most common cause of inadequate material (47.3%). Postmenopausal hormonal changes such as hypoestrogenism may increase the likelihood of atrophic changes and cause inadequate findings on cervical cytology with atrophic changes of the genital tract[15]. In the present study, we detected atrophic vaginitis on 207 patients (37.9%).

Cervical preinvasive lesions have a crucial role for development of cervical cancer. Cervical cancer has a long preinvasive phase and cervical screening thus, relevant management of the lesions can reduce the rate of cervical cancer with population based screening. The prevalence of cervical cytologic abnormalities varies from 1.5%–6% in the developing countries[16]. In a large cytological screening performed in Belgium, the prevalence of abnormal smears was reported to be 3.7% in total, of which 2.2% of them were ASCUS, 1.1% was LSIL, 0.4% was HSIL and 0.1% was AGC-NOS[17]. The frequency of epithelial abnormalities in another study conducted in the United States was reported to be 5.5%, of which 3.3% was AS-CUS, 1.2% was LSIL, 0.3% was HSIL and 0.2% was AGC-NOS[12]. In a study conducted in China, the overall prevalence was 3.12%, on which 2.3% was AS-CUS, 0.41% was LSIL, 0.28% was HSIL, 0.06% was AGC-NOS and SCC was 0.02%[18]. In our study, we detected abnormal smear results to be 5.69%, in which 2.46% was ASC-US, 0.55% was ASC-H, 1.23% was LSIL, 0.78% was HSIL and 0.22% was AGC-NOS. It can be seen that the rate was higher than the rate found in previous studies. The higher rate may be due to the postmenopausal study population and the fact that screening programs were less performed, previously, in this present study population. In a report, 25% of cervical cancer incidence and 41% of deaths due to cervical can-

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cer were recorded in a group with individuals over 65 years old[19]. Therefore, previous researchers suggested continual, lifetime screening. Pap smear screening should be performed for women with no previous screening even though they are over 65 years of age[19].

According to the American Cancer Society (ACS), women at 70 years of age or older might choose to discontinue the Pap smear screening if they had three or more normal Pap smear results in a row or no abnormal Pap smear results in the last 10 years[20]. The 2009 American Congress of Obstetricians and Gynecologists (ACOG) guidelines recommends to stop screening at the age of 65–70 in patients with three consecutive normal Pap smears and no abnormal tests in the last 10 years[21]. In our study, women were between the ages from 38–76. Postmenopausal patients with cervical lesions are seen with *in situ* and invasive carcinoma[22]. In our study, two cases of squamous invasive carcinoma and a single case of adenocarcinoma were detected.

Conclusion

Cervicovaginal smear is one of the most successful screening tests and cancer screening methods developed in recent years. This is because, via this method, it is possible to get an adequate amount of brush cytology specimens and reach the cervical tissue with ease. The longer time span involved in premalignant lesions developing into cancer improves our chances for diagnosis and treatment. As the incidence of invasive cancer increases in the menopausal period, gynecological smear examination and regular check-ups are crucial.

Conflict of interest

The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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