Comparison Of Direct Visual Inspection (DVI) With Pap Smear In Diagnosis Of Precancerous Lesion Of Cervix

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Abstract: The aim of this study was to compare direct visual inspection (DVI) with Pap smear in diagnosis of precancerous lesion of cervix. A total of 1500 women were screened cytologically as well as clinically with direct visual inspection of cervix after application of acetic acid (DVI). A total of 1500 women were screened cytologically as well as clinically with direct visual inspection of cervix after application of acetic acid (DVI). Women with abnormal findings in either Pap smear or DVI were investigated with colposcopy and biopsies were obtained from colposcopically assessed abnormal lesions. Seven women had abnormal Pap smear (6 ASCUS, 1 CIN_1) with colposcopy and biopsies. 3 of 7 were actually positive. All of 3 positive tests were positive in DVI but one of the 4 false- positive tests was positive in DVI. Nine women had abnormal DVI which colposcopy and biopsies confirmed 8 of them as premalignant or malignant lesions of cervix. Two of them were invasive cancer (negative Pap smears), 3 CIN_1 (one of them negative in Pap smear, one CIN_1, one ASCUS), 2 CIN_2 (one of them negative in Pap smear, one ASCUS) and 1 CIN_3 (negative Pap smear). Test efficiency parameters particularly sensitivity, specificity, and positive predictive values of DVI were 88.8%, 99.9% and 88.8%, respectively; those of Pap smear were 37.5%, 99.06%, 42.85%, respectively. Direct visual inspection (DVI) is feasible and easy to perform with superior sensitivity and specificity to Pap smear in detecting cervical premalignant and malignant lesions. Direct visual inspection can be used as an efficient primary screening tool with a satisfactory low biopsy rate in low resources settings.

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1. Introduction

Cervix cancer is one of the most important female genitalia cancers. Not only the most common gynecological malignancy in the world, but also is the 3d prevalent cancer in female after breast and colorectal cancers. This disease is more prevalent in under developing countries and 78% of its cases happen in these areas; and the reason is, lack of effective screening programs[1-3].

In the East Azerbaijan of Iran the incidence of cervix cancer in 2003-2004 was reported as 5.11 in 100000, and incidence of high grade pre-malignant lesions of cervix was 11.9 in 100000 and with low grade pre-malignant lesions the incidence was 3.68 in 100000 [4].

The main oncogenic factor that transmits via sexual contact to the cervix is human papilloma virus (HPV), which has a role in inducing pre-malignant lesions or intraepithelial neoplasias of cervix (CIN). HPV genome has been detected in all neoplasias of cervix. HPV infection usually does not stay stable and in most women, infection resolves in 9 to 15 months. Minority of women exposed to HPV develop a persistent infection and progress to CIN [5].

There is a usually long period of pre-malignancy before formation of invasive cancer of cervix, which is microscopically, has a different range of progressive events from cellular atypia to varying degrees of dysplasia or CIN [5].

Using screening methods and specially Pap smear in the United States has reduced the prevalence of cervix cancer up to 79% and its mortality up to 70% since 1950 [5].

A single Pap smear has a sensitivity of about 50%to 60% which means having a single Pap smear in most of the women, will not show the cervix lesions[1]. About 30% of new cases of cervix cancer, every year, are the women who had Pap smear but due to errors in sampling, fixation or interpretation have been reported incorrectly normal [5]. Against the effectiveness of cytological programs of cervix, the Pap smear has lots of limitations [3].

Direct visual inspection (DVI) is the other method for screening cervical pre-malignant lesion with high sensitivity (90%) and specificity (94.6%). DVI has high positive predictive value[6].

In this study, we assumed that the direct visual inspection is equal or more capable to detect abnormal lesions of cervix in comparison to Pap smear, and its

usage is easer and affordable in different regions of our country. General purpose of this survey is comparing the direct visual inspection of cervix with Pap smear in diagnosing pre-malignant lesions of cervix.

2. Material and Methods

This was a cross sectional study on 1500women, voluntaries or referred by doctors or health care centers, visited the Alzahra and Taleghani hospitals for screening cervix cancer and its pre malignant lesions. Pregnant and women who had a history of pre malignant or malignant lesions of cervix were excluded from the study.

Everyone who included in the study went on the gynecology bed and in lithotomic position, her cervix exposed with one time usable spatula and the Pap smear taken with spatula from exocervix cellules, also from endocervix by brushing, then they expanded on a lamella and fixed with 95% alcohol. Then cotton impregnated with 5% acetic acid placed on the cervix for a minute, and after removing the cotton, the cervix observed under the adequate light.

The findings of direct visual inspection of cervix were registered as bellow:

1. Abnormal findings in cervix same as invasive cancer, polyps, leukoplakia, condyloma cervisitis.
2. Presence or absence of acetowhite region in the cervix.
3. The expansion of acetowhite region if it exists.

When there was no acetowhite lesion, DVI was reported negative.

The DVI was reported positive when opache acetowhite lesions with sharp borders near to SCJ were seen. Some times after using acetic acid TZ had a very light discoloration which was lucent and had no sharp borders, these cases considered negative. If the DVI was positive the colposcopy done in the same visit and if it was necessary biopsy as the gold standard of cervix assessment taken.

The Pap results were reported after a week via pathologic centers of hospitals, and if they were positive an appointment for colposcopy was made.

Cytology considered positive in bellow situations:

Invasive cancer, ASC-US, ASC-H, LSIL, HSIL

Statistic analysis:

Continuous data with normal distribution are given as mean ± standard deviation, otherwise as median, student t test for testing the significance of mean for independent continuous scale data, Chi-square or Fisher exact test for testing the significance of percentages. A *p* value of 0.05 or less was considered significant.

3. Results

1500 women ,voluntaries or referred by doctors or health care centers, who had come to the Pap smear centers of Alzahra and Taleghani hospitals ,went under the Pap smear and direct visual inspection (DVI) of cervix after using acetic acid .

The mean age of cases was 36.63±9.7 (18-80).Half of the patients had less than 36 years of age.

No one was single or pregnant, 81.2%of women had husband and 18.8% was divorced or was widowers and there for had no sexual intercourse. 1187 (79.1%) women were educated and 313 (20.9%) were illiterate.

The mean age of women in their first intercourse was 17.92±2.42. 901 of the study group (60.1%) had no problem and just wanted to have Pap smear and 39.9% had came due to a problem in their genitalia or they just declared their problem in history taking before screening.

Through these objections backache with 38.7% had the highest rate. The other objections were :lower abdominal pain(28.7%), bleeding between the menses (14.5%), painful intercourses(11.9%), lesions in the external ano-genitalia(8.9%), menorrhagia(8%), pruritus in external ano-genitalia (6.9%) and post coital bleeding (3%).

The results reported from evaluating the Pap smears of studied cases were as follow:

1251 cases (83.4%) were normal and had no finding, 48 cases (3.2%) had atrophy, 57 cases (3.8%) had benign changes, 25cases (1.7%) had edema,59 cases (3.9%)had fungus ,49 women (3.3%) had bacteria,3 person (0.2%)had bacteria plus benign reactive changes,1 case (.1%)had atrophy plus mild edema,6 person(0.4%)had ASCUS and 1 woman (0.1%) had CIN_1.

Table 1: problem in history taking before screening

Problems	percentage
backache	38.7%
Lower abdominal pain	28.7%
Bleeding between the menses	14.5%
Painful intercourses	11.9%
lesions in the external ano-genitalia	8.9%
menorrhagia	8%
pruritus in external ano-genitalia	6.9%
post coital bleeding	3%

Table 2: The results reported from evaluating the Pap smears

Pap smear result	Percentage
No finding	83.4%
atrophy	3.2%
benign changes	3.8%
edema	1.7%
fungus	3.9%
bacteria	3.3%
bacteria plus benign reactive changes	0.2%
atrophy plus mild edema	1%
ASCUS	0.4%
CIN_1	0.1%

From the mentioned cases due to the aim of our study 1493 (99.5%) cases were healthy and 7 cases that had ASCUS or CIN_1 considered positive and checked with colposcopy and biopsy taken from them.

Of these 7 cases only 3 get proofed as a premalignant lesion, with colposcopy and biopsy. And 4 cases had some changes in their cervix due to acute or chronic cervisitis which the Pap smear had reported them as ASCUS. The 3 cases which were diagnosed as ASCUS or CIN_1, through Pap smear and also biopsy had proofed their pre malignancy, were positive with DVI too.

But from 4 false positive cases of Pap smear only 1 had a positive DVI.

Of the 1500 cases only 9 cases had positive DVI whom went under the colposcopy and biopsy.

Of the 9 positive DVI cases, biopsy and colposcopy proofed 8 cases as pre- malignant or malignant lesions, so that 2 cases were invasive cancer (with negative Pap), 3cases CIN_1 (1 was reported negative in Pap and 1case as CIN and the other one was reported as ASCUS) and 2 cases were CIN_2 (one had a negative Pap and one was reported as ASCUS) and one case was CIN_3 which had negative pap smear.

Of the 8 cases which the pre-malignant or malignant lesions have been proofed by colposcopy and biopsy, 3 had no objection about their genital system (CIN_3-CIN_2-CIN_1),2 women complained of excessive vaginal bleeding during menstruation period (CIN_2-CIN_1),and 3 had post coitious bleeding (2cases of invasive cancer and 1 case of CIN_1).

Test efficiency parameters particularly sensitivity, specificity, and positive predictive values of DVI were 88.8%, 99.9% and 88.8%, respectively; those of Pap smear were 37.5%, 99.06%, 42.85%, respectively.

Discussion:

One of the important health problems in many developing countries is cervical cancer [7] which is the second most common cancer among women worldwide [8,9] so that approximately 450,000 new cases of cervical neoplasm are diagnosed each year in the world [10].

The cervical cancer incidence is higher in countries where screening programs are poorly [11,12]. One of the major causes of cervical cancer remains the most common cause of cancer deaths among women in developing countries is failure of screening programs in these countries [13].

Many cases of cervical cancer are preventable by screening programs. Some studies in deveioped countries demonstrate can be reduced by screening [14-18].

There are several methods to screen for cervical cancer. One of these methods is direct visual inspection of the cervix after the application of 5% acetic acid (DVI).

Because of its ability to in detecting cervical cancer is nearly equivalent to cervical cytology some studies have recommended this method [19-23]. This method is cost effective and justified for screening [24]. Another successful method for cervical cancer screening is Pap smear [9].

The current study was designed to compare the DVI and Pap smear in diagnosis of precancerous lesions of cervix.

Recent studies have shown direct visual inspection (DVI) has high sensitivity for detecting the premalignant cervix lesions [6,13,25] for example, in Denny et al survey, 2754 women were screened by DVI that can be diagnosed 70% of cases of high-grade SILs (CIN Grade 2, 3) in this study [13].

Another study with equivalent design has done in Egypt; DVI had a sensitivity of 85% for pre-malignant lesions compared with 16.9% for cervical cytology [25]. However, sensitivity of DVI was reported from 75% to 100% in several studies [6,13,25-27]. Our results confirm these finding because in our study, sensitivity of DVI was 88.8%.

Sensitivity of the Pap smear in detecting pre-malignant lesions has been reported between 16 to 85 percent [6, 25, 27-29]. In this study, sensitivity of Pap smear was 37.5%.

The specificity of the Pap smear is more than DVI, although its sensitivity is less than DVI [6, 25]. In De Vuyst et al survey, specificity of Pap smear (94.6%) was higher compared to that of DVI (80%) [30]. In our study, specificity of Pap smear and DVI were 99.06% and 99.9%, respectively.

In several studies, positive predictive value of Pap smear has been reported lower than direct visual inspection (DVI) [25, 29]. Our results confirm these finding because in our study and PPV of DVI is better than Pap smear (PPV of Pap smear and DVI were 42.85% and 88.8%, respectively).

Sensitivity and specificity of DVI is higher than Pap smear and its cost effective [13, 25 26]. In our study, these results obtained, so we suggest direct visual inspection can be used as a primary screening tool with a satisfactory low biopsy rate in developing countries.

Conclusion:

Current survey shows that we can use a simple and inexpensive method to find malignant and pre-malignant lesions of cervix. Especially in the societies which there are not all the conditions resulting in effectiveness of screening methods such as Pap smear, in reducing the prevalence and mortality of cervix cancer, using a simple diagnostic method like DVI for all cases and referring the suspected ones to get final diagnose and be treated is critical. Direct visual

inspection (DVI) is feasible and easy to perform with superior sensitivity and specificity to Pap smear in detecting cervical premalignant and malignant lesions.

It seems that the important and basically problems which if be solved can reduce the cervix cancer are unconsciousness of most society people ,with any socioeconomically levels ,about the importance of screening and its method also the risk factors of this cancer such as smoking and unsafe sexual relations.

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