

# HPV Typization in Vaccinated Women with Cervical Lesions

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## Abstract

**Background and objective:** 24 patients, all of them vaccinated in postpubertal period, on their own decision, all of them had abnormal PAP tests. In all of them an expert colposcopy was performed, in all of them a low and high grade cervical lesion was detected. HPV genotyping, punch biopsy of the lesion followed by histology and immunohistochemical staining of p16 INK4a were performed.

**Study design:** Our study concerns 24 patients suffering of cervical lesions. The age of these patients was 20-34 years. 20 of them were vaccinated by Silgard and 4 of them by Cervarix.

**Results:** Two patients were hrHPV negative, in 21 patients the cervical lesions were infected with different HPV combinations, only in one woman single hrHPV type 52 was present. The frequent hrHPV types occurrence was: 52/11x/, 39/11x/, 31/9x/, 45/6x/, 51/6x/.

**Conclusions:** Different high risk HPV combinations were present in 21 of 24 examined patients. The p16INK 4a positivity was detected in all lesions in all women examined.

**Keywords:** HPV vaccination; Cervical lesions; Cytology; Colposcopy; p16ink 4a; HPV genotyping

## Introduction

University Gynaecology Department cooperation with the cytology laboratory of the Centre for Gynaecological Oncological Prevention in Prague 4, Hrusická 2538, has inspired us by supply of significant material for assessment of inoculation results in the postpubertal period. That laboratory processes and evaluates screening PAP smears taken and performed by 28 district gynaecologists, who secure the gynaecological care at the area about 560,000 inhabitants, i.e. 200,000 women approximately. The dispatch notes attached to the fixed cervical smears have shown the type of HPV vaccine used in 24 women having significant cervical cytological abnormalities of PAP smears and cervical lesions. The HPV vaccination time and data were given us by the district gynaecologists from the women health record. The aim of our study was to choose the optimal way for the proper care of the affected women. It was necessary to carry out complementary examinations to know the more precise background of the cervical lesions in 24 women inoculated on their own decisions in postpubertal period of their life

## Case Report

The group of 24 patients with cervical cytological abnormalities of PAP smears were 20-24 years old. All of them were examined by expert colposcopists at the University Department. The colposcopy results were stated according to the "Barcelona 2" terminology which corresponds to the Bethesda system 2001 cytology nomenclature. Cytology results are conveyed in Bethesda system classification, i.e. ASC-US is atypia squamous cells of undetermined significance, ASC-H atypia squamous cells high grade lesion cannot be excluded, LSIL-low grade intraepithelial lesion corresponds with CIN 1 histology, HSIL cytological lesion corresponds to the CIN 2-CIN 3 on histology. In all enrolled women in our study, the Genotyping test according to the "LINEAR ARRAY" HPV Genotyping Test. The punch biopsies of the women lesions were histologically verified and classified. After punch biopsies the tissue was stained in paraffin sections/H-E/haematoxylin eosin procedure. The

p16 ink4a visualised the abnormal and pathological tissue parts, using the GINtec p16ink 4a DAKO.

## Results

The results are summarised in the Tables 1 and 2. Typical methods for examination of cervical lesions are demonstrated in colour pictures of two patients in Figure 1. Several methods have to be used to elucidate uncertain cases and make the exact diagnosis.

The p16 positive lesions were classified histologically as CIN 1/22 patients/and CIN2/2 patients/condyloma planum 3x, condyloma inversum 2x, condyloma accuminatum 1x, acanthotic condyloma 1x.

Regarding HPV, monotypic viral infection/hrHPV type 52/ was present in a single patient. In all remaining there were HPV combinations. Infection with two types of hrHPV was found in 10 women. Tritypic combination of HPV was present in 7 cases. Tetritypic combination was present in 2 patients. The viruses of the low risk category, 66, CP6108 were found in 3 women together with the high risk types. HPV negative were the cervical lesion in 2 cases.

## Discussion

Regarding cytology, ASCUS is the most common atypia, affecting

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	Age	Vaccine	Cytology	Colposcopy
1	1982	Silgard	LSIL	LG
2	1990	Silgard	ASC-H	LG
3	1984	Silgard	ASC-H	LG
4	1990	Silgard	LSIL	LG
5	1979	Silgard	LSIL	LG
6	1982	Silgard	ASC-US	LG
7	1988	Cervarix	LSIL	LG + (inflam)
8	1986	Silgard	LSIL	LG
9	1991	Silgard	ASC-US	LG
10	1993	Silgard	LSIL	LG
11	1989	Silgard	ASC-US	LG
12	1978	Silgard	ASC-H	LG
13	1988	Silgard	ASC-H	LG
14	1984	Silgard	ASC-H	LG + (PUS)
15	1979	Cervarix	HSIL	HG(CIN2)
16	1985	Silgard	ASC-H	LG
17	1983	Silgard	ASC-H	LG
18	1976	Cervarix	ASC-H	LG
19	1983	Cervarix	LSIL	LG
20	1980	Silgard	LSIL	LG
21	1984	Silgard	HSIL	HG(CIN2)
22	1980	Silgard	LSIL	LG
23	1988	Silgard	ASC-H	LG
24	1990	Silgard	LSIL	LG

**Cervical Lesions and HPV Genotyping in Vaccinated Patients**

**Table 1:** Vaccination and cervical lesions.

about 6% of the screened population in our country. ASCH a serious cytologic abnormality comprising 0.2-0.6% in screened population [1,2]. In our country the ASCH diagnosis is checked to 1% patients. In the CR the cytology result of ASCH is advised to undergo to colposcopy and biopsy in the same study [1]. The cells showing metaplastic features, irregular nuclear borders, a mildly uneven chromatin distributio and/ or hyperchromazia [2] were evaluated as follows:

56.5% of papillary lesions of the cervix were histologically classified as mature, 26% as immature, 17.3 as mixed. Corresponding smears were cytologically diagnosed as LSIL (6.2%), ASCUS (7.3%) and negative (10.4%). Cylogy was not effective in detection of cervical condyloma accuminatum. Cytologic changes such as koilocytosis binucleation and dyskeratosis do not occur commonly and vaginal cytology appeared to underestimate. Condylomatous metaplastic lesions of the cervix changes are often associated, mature lesions with a lack of significant cytologic abnormalities and therefore with the diagnosis of ASCUS, or as negative missed.70% of cytology negative cases and 37% cases diagnosed as ASCUS were proven to be mature condyloma on histology [1].

The overall prevalence of HPV infection has increased over past 20 years [2]. But relative prevalence of HPV enotypes has remained stabile over time, despite certain geographical differences. HPV testing is frequently performed in conjunction with PAP test in atypical and abnormal smears. HPV testing in primary screening has a lower predictive value [3]. New episodes of disease re either recurrence or asynchronic multifocal lesion. This may account for the rare of viral genomic intergration of the infected cells. Integration of the DNA with the Genomic DNA is the most important stage in development of the HPV related cervical carcinoma [3]. There is no doubt that in cervical epiteliu the p16ink 4a expression is linked with HPV infection to

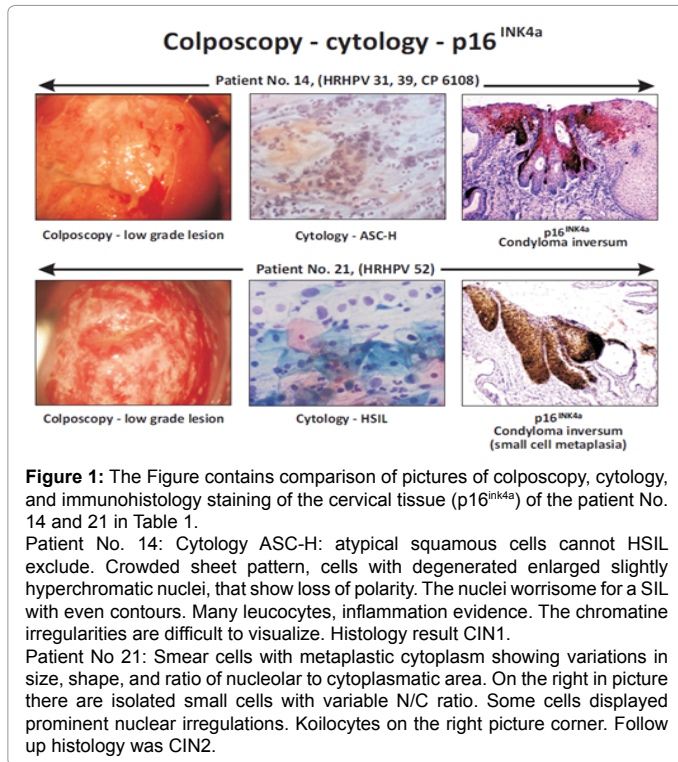
preparative changes. Our experience is the same as the presence of p16ink4a has significant clinical importance as a biomarker of cervical epiteliu proliferation detecting viral presence. The detection of expression could identify clinically important cases of HPV infection with a risk of progression toward dysplasia and carcinoma [4].

Two cases in our group of patients were hrHPV genotyping negative. The commonly recognized cancerogennic hrHPV, types of HPV 16 and 18, were present in 4 our cases in combination with hrHPV 39, 51, 52. These patients were 33-34 years old therefore it is supposed that these patients were vaccinated to late. At the time of vaccination they were already infected by the cancerogenic HPV. In the other remaining group/of 18 cases/, only one patient was infected with a single high risk HPV/HPV type 52/. In other 17 cases we found a combination of two types/9 cases/. High risk RHPV types in combination with a low risk HPV was present in 3 cases. The most frequent HPV types in the different combinations were hrHPV 52/11 cases/, hrHPV 39/10 cases/,

Genotyping	Biopsy	p16 <sup>ink-4a</sup>	
31,45	CIN 1	+	
33,52	CIN 1	+	
Neg.	CIN 1	+	Condyloma Inversum
31,39	CIN 1	+	
16,39,51,52	CIN 1	+	
Neg.	Immature met.	+	Condyloma akantothicum
31,39,52	CIN 1	+	Condyloma planum
33,45	CIN 1	+	Condyloma planum
31,39,52	CIN 1	+	
52,66	CIN 1	+	
18,39	CIN 1	+	
31,39,51	CIN 1	+	
33,45	CIN 1	+	Condyloma planum
39,31,CP6108	CIN 1	+	Condyloma accuminatum
18,52, CP6108	CIN 2	+	
31,45,52	CIN 1	+	
52,66	CIN 1	+	
31,45,51	CIN 1	+	
33,39,45	CIN 1-2	+	
39,45,51	CIN 1	+	
52	CIN 2	+	Condyloma Inversum
16,39,51,52	CIN 1	+	
31,51	CIN 1	+	
39,52	CIN 1	+	

Vaccine	Cytology	Genotyping	P. biopsy	Remarks
Cervarix 4x	ASC-US 3x	16 2x	CIN1 20x	<i>C. planum</i> 3
Silgard 20x	ASC-H 9x	18 2x	CIN2 2x	<i>C. inversum</i> 2
	LSIL 10x	52 11x	CIN1-2 1x	<i>C. akantothicum</i> 1
	HLSIL 2x	39 10x		<i>C. accuminatum</i> 1
		31 9x		
		45 7x		
		51 6x		
		66 2x		
		CP6108 2x		

**Table 2:** Vaccination and cervical lesions.



hrHPV 31/9 cases/, hrHPV 45/6 cases/, hrHPV 51/6 cases/. The p16 INK4a positivity in cervical lesions of all followed women was found.

In two HPV negative patients the cervical lesions were classified histologically as condyloma inversum and acanthotic condyloma. There was a good correlation of the p16ink4a positivity and metaplastic changes classification. We suppose that the p16ink4a positivity coincides with a onset of viral infection. We suppose that the p16 ink4a positivity HPV might start in superficial located exhausted cylindrical glandular cells,

saving them from apoptosis. These infected cells escaping apoptosis may be consequently reintroduced into the regenerating epithelium spreading the infection to the parabasal and basal regenerating cells of the metaplastic areas.

Regarding to use of vaccines, they are specifically focused and well working, providing a good protection regarding the cancerogenic hrHPV 16 and 18. Regarding the other HPV types, low risk HPV types such as 66, and CP 6108 it seems, that such infected lesions are of a short duration and that they heal spontaneously. Regarding lesions infected with all viral combinations with high risk HPV we do not know anything about their perspective for how long will they persist, how long and how will they change? Therefore, we conclude, that all cervical lesions infected with hrHPV viruses deserve long time clinical surveillance. The precise HPV genotyping and correlations with the behaviour in all cervical lesions is badly needed.

We found regarding the validity of our result we have to consider, that the population in our Republic is still almost white complexion. All our patients were Czech. Therefore, the frequency and viral combinations may be highly endemic. We would like to stimulate and initiate imillar studies in other countries. We do neither verestimate he validity of our results nor the small umber of ur patients.

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