HPV Subtype VS HPV Virus Load

Population-Based Study on the Prognostic Value of High-Risk Human Papillomavirus Subtype and Virus Load Tests for Cervical Intraepithelial Neoplasia

Ling Li, Longyu Li
Ling LI, Longyu LI

Jiangxi Maternity and Child Hygiene Hospital
Cervical cancer affects nearly 500,000 women around the world every year and kills more than 270,000 women, and 80% of them live in the developing countries.
Globe Cancer Statistics (1,000人/year)

<table>
<thead>
<tr>
<th></th>
<th>Developed</th>
<th></th>
<th></th>
<th>Developing</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>692</td>
<td>338</td>
<td>77</td>
<td>232</td>
<td>691</td>
<td></td>
</tr>
<tr>
<td>Colon</td>
<td>242</td>
<td>102</td>
<td>142</td>
<td>272</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cervical</td>
<td></td>
<td></td>
<td></td>
<td>453</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td>142</td>
<td>40</td>
<td></td>
<td>247</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stomach</td>
<td>100</td>
<td></td>
<td></td>
<td>145</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine</td>
<td>74</td>
<td></td>
<td></td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live overy</td>
<td></td>
<td></td>
<td></td>
<td>186</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid</td>
<td></td>
<td></td>
<td></td>
<td>125</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IARC, Globocan 2011
2013--2014 Cancer Epidemiology of Jiangxi in China

Urban or Rural areas

Cervical cancer is ranked first in the female Reproductive Tract Cancers!
Two-cancers screening   Nationwide Program
(cervical cancer and breast cancer)

About 10,000,000 women were screened every year.
From 2014, the **HPV** test was used as the primary screening for cervical cancer in China.

**HPV load or subtypes**

**What kind of HPV Screening is the cost-benefit population-based screening?**

**Triage of the positive cases after the primary HPV screening is a potential solution**
Natural History of HPV Infections


Wright and Schiffman (2003) NEJM
Introduction:
Overview of Cervical Cancer Prevention

Human Papillomavirus (HPV) causes virtually all cervical cancers.

Cervical cancer is nearly 100% preventable, and this epidemic needs to end!
Two triages of HPV screening in “Two Cancers” screening project
Value of high-risk human papillomavirus viral load test and subtypes test in predicting cervical intraepithelial neoplasia based a prospective cohort study

Ling Li, Longyu Li

(2013---2015)
Supported by China Anti-Cancer Association (CACA) 
Cervical Cancer Prevention Research Project in Jiangxi Province

- 3 years, 3 rural areas (Jing'an County, Xingguo County and Suichuan County)
- 2257 women (35–64 years old) (2013--2015)

**RLU/Cutoff value**
- High load: $\geq 10.0$
- Low load: $\geq 1.0$ and $<9.99$
- Negative: $-(-)$
The results of the baseline screening and the distribution of cervical lesions

Table 1: Relationship of cervical lesions and HPV virus load in baseline of 2257 women

<table>
<thead>
<tr>
<th>HPV status</th>
<th>Pathological diagnosis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NIL/M (n=2114)</td>
<td>CIN1 (n=97)</td>
</tr>
<tr>
<td>Negative</td>
<td>1918 (90.73)</td>
<td>40 (41.24)</td>
</tr>
<tr>
<td>Low load</td>
<td>110 (5.20)</td>
<td>26 (26.80)</td>
</tr>
<tr>
<td>High load</td>
<td>86 (4.07)</td>
<td>31 (31.96)</td>
</tr>
</tbody>
</table>

*CIN3+: CIN grade 3 or worse; (%)
The results of the baseline screening and the distribution of cervical lesions

Table 2: Relationship of cervical lesions and type-specific HPV in baseline of 2257 women

<table>
<thead>
<tr>
<th>Type-specific HPV</th>
<th>Pathological diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NIL/M (n=2114)</td>
</tr>
<tr>
<td>Negative</td>
<td>1878 (88.84)</td>
</tr>
<tr>
<td>Any other 13 pos.</td>
<td>132 (6.24)</td>
</tr>
<tr>
<td>HPV16 or 18</td>
<td>104 (4.92)</td>
</tr>
</tbody>
</table>

*CIN3+: CIN grade 3 or worse;  ( % )

The difference in the HPV16/18 infection rate between the CIN2+ group and the lesion-free group was statistically significant  \( P<0.01 \)
Based on the pathology, 2 years follow up
2257 women were screened in 3 population-based studies

HC-2 (n=2257)
HybriMax genotypes

Screen positive (n=361)
HC-2 or HybriMax positive

Colposcopy (n=550)
Biopsies were taken for pathological diagnosis

CIN2+ (n=46)
Appropriate

Normal or CIN1 (n=504)

Screen negative (n=1896)

Randomly selected (n=189)

575 were excluded

Follow up 24m (n=1636)
Table Association of progression to CIN2+ based on the pathological diagnosis normal or CIN1 women baseline at different viral load groups and type-specific HPV groups after 24 month follow up

<table>
<thead>
<tr>
<th>Baseline of HPV status or Subtype</th>
<th>No. of Participants</th>
<th>No. of CIN2+</th>
<th>RR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HC-2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>1394</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Low load</td>
<td>110</td>
<td>1</td>
<td>12.67 (0.79~201.2)</td>
</tr>
<tr>
<td>High load</td>
<td>132</td>
<td>5</td>
<td>52.80 (4.76~375.2)</td>
</tr>
<tr>
<td><strong>HybriMax</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>1314</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Any other 13 positive</td>
<td>163</td>
<td>2</td>
<td>16.12 (2.50~231.1)</td>
</tr>
<tr>
<td>HPV16 or 18</td>
<td>159</td>
<td>4</td>
<td>33.06 (3.72~293.9)</td>
</tr>
</tbody>
</table>
Association of CIN2+ progression with HPV subtype infections and HPV loads in 24-month follow up (%)

2年后CIN2+累计发生率（%）

- HC2 (一)
- HC2 载量<10
- HC2 载量>10
- HybriMax（一）
- HPV其他13型(+)
- HPV16,18(+)

HPV baseline
The achievements in the rural area of China

The WHO Health System Framework

Leadership Government

Screening Tech

Health education Health System Framework
The achievements in the preventive treatment of cervical cancer in the rural area of Jiangxi province
Ministry of Health of the People’s Republic of China had launched “screening-for-two-cancers program” (Cervical Cancer and Breast Cancer).

- **2009**: 10 million women in about 200 counties joined in the cervical cancer screening program.
- **2009-2011**: Free Cervical Cancer Screening Program for 50 million women in rural area launched, and 10 million women had accepted the screening.
- **2012**: 10 million women in about 200 counties joined in the cervical cancer screening program.
- **2012-2015**: Complete the Free Cervical Cancer Screening Program for 50 million women.
Thank you!

worldcancercongress.org