Cervical Cancer Prevention Program in Zambia

CIDRZ/UAB

Groesbeck Parham, MD

Disclosures

Groesbeck P. Parham, MD

No Relevant Financial Relationships with Commercial Interests

Center for Infectious Disease Research in Zambia

- Zambian NGO: MOH/UAB
- Health service delivery and support
- Research
- Programmatic focus
  - HIV prevention, care, and treatment
  - TB prevention and treatment
  - Reproductive health and family planning
  - Prevention of maternal and neonatal mortality
  - Cervical cancer prevention

Cervical cancer in Zambia

- Age adjusted incidence and mortality rates
  - 6th highest in the world, 2nd highest in Africa
- Most common cancer in Zambia (30%)
- Most common cancer in women (30%)
- Most common cause of cancer-related death in women (30%)
- Cervical cancer screening coverage <5%

Globocan, 2002, IARC
HIV in Zambia

- HIV infection prevalence (age 15-49)
  - 16% nationally, 23% Lusaka
  - 60% HIV infected are women WHO, 2006

Cervical cancer precursors in HIV infected women

- Prevalence – higher
- Spontaneous regression rates -lower
- Recurrence rates following treatment -higher

Cytological screening of HIV-infected women in Lusaka
(n = 150)

Parham GP et al *Gynecol Oncol* 2006
2006 conclusion

- Cervical cancer screening, especially of HIV-infected women, was urgent
- Roll out of the HPV vaccine was paramount

Selection of prevention modality

Asset mapping

- No certified cytologist
- One pathologist with experience in reading cervical histology at the University
- Shortage of gynecologists - 9 in Lusaka, 15 in the nation
- Target population low income, undereducated, informal settlements

Choice of prevention modality

Single visit VIA and cryotherapy

- Nurse-led
- Affordable and cost effective
- Documented acceptability
- Documented efficacy: Reduces incidence and prevalence of CIN and cervical cancer mortality rates
- Endorsed by Zambian MOH

Selection of prevention modality

Digital photography for primary screening

- Enhanced visual examination (magnification)
- Distance-consultation for expert medical opinion
- Monitoring and evaluation of nurses
- Patient education
- Medical records documentation
- Easy to learn
- Mobile
- Battery operated
Infrastructure and resources

- Integrated services into government-operated public health clinics
- Linked services to HIV care and treatment program and university hospital
- Resources (PEPFAR, MOH, UTH, UAB, private donors)

Operationalization

- Targeted HIV-infected women
- To avoid stigmatization, we did not turn away HIV negatives or unknown status
- Created community outreach unit to raise awareness

Acetowhite lesion
Cryotherapy equipment
Cryoprobes

Source: Reprinted from Sellors and Sankaranarayanan, with permission.
Excisional biopsy

Suspicious for cancer
CIDRZ Cervical Cancer Prevention Program

Overall Outcomes (Jan 2006 –April 2010)

- 21 nurses, 4 physicians (Zambia)
- 18 clinic sites
- >41,000 screened (1/3 HIV infected)
- Services integrated into public health clinics
- Trained 51 health professionals from 8 countries:
  - Peoples Republic of China,
  - Botswana,
  - SA,
  - Tanzania,
  - Uganda,
  - Kenya,
  - Zimbabwe,
  - Cameroon,
  - India,
  - Nigeria,
  - Ghana

Programmatic Outcomes

Cohort

- HIV-infected women
- Analyzed data from women enrolled Jan 2006 –Dec 2008

Outcome measures

- Description of major programmatic outcomes
Patient enrollment (Jan 2006 – Dec 2008)
n = 21,010,720
Programmatic outcomes

- 6,572 HIV(+)
  - 3,049 VIA-negative
  - 3,523 VIA-positive
    - 1,461 referred for excisional biopsy
    - 2,062 eligible for cryotherapy
      - 459 declined
      - 1,603 underwent cryotherapy
        - 1,079 immediate
        - 524 delayed
Major programmatic outcomes

1,461 referred for excisional biopsy

715 with histology results

746 ‘no show’, no histology results

151 benign histology

449 pre-cancers
  • 214 CIN I
  • 235 CIN II/III

115 invasive cancers
  • 79 early stage
  • 36 late stage

Measuring program effectiveness

Conditional probability model
  ▪ Progression and cure rates
    o from published literature
  ▪ Observed counts
    o from programmatic data
  ▪ Modelled estimation of cancer deaths prevented
### Indicators of program effectiveness

<table>
<thead>
<tr>
<th>Pathology result Progression rates</th>
<th>Treatment modality</th>
<th>Cure rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIA positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.06</td>
<td>Cryotherapy</td>
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<tr>
<td>Pre-cancer</td>
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<td></td>
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<tr>
<td>CIN I</td>
<td>0.06</td>
<td>Local excision</td>
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<tr>
<td>CIN II/III</td>
<td>0.3</td>
<td>Local excision</td>
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<tr>
<td>Early stage</td>
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<td></td>
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<tr>
<td>Stage Ia</td>
<td>1</td>
<td>Surgery/XRT</td>
</tr>
<tr>
<td>Stage Ib</td>
<td>1</td>
<td>Surgery/XRT</td>
</tr>
<tr>
<td>Stage IIa</td>
<td>1</td>
<td>Surgery/XRT</td>
</tr>
<tr>
<td>Late stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage IIb</td>
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<td>XRT</td>
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<tr>
<td>Stage IIIa</td>
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<td>XRT</td>
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<td>XRT</td>
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### Indicators of program effectiveness

<table>
<thead>
<tr>
<th>Pathology result Progression rates</th>
<th>Estimated # of cancers</th>
<th>Cancer deaths prevented</th>
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<tbody>
<tr>
<td>VIA positive</td>
<td>1,603</td>
<td>96</td>
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<tr>
<td>Pre-cancer</td>
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<tr>
<td>CIN I</td>
<td>214</td>
<td>13</td>
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<tr>
<td>CIN II/III</td>
<td>235</td>
<td>71</td>
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<tr>
<td>Early stage</td>
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<tr>
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<tr>
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### Sensitivity analysis

<table>
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<tr>
<th>Sensitivity analysis</th>
<th>Estimated # of cancers</th>
<th>Cancer deaths prevented</th>
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<tbody>
<tr>
<td>Std progression/Std cure*</td>
<td>295</td>
<td>223</td>
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<tr>
<td>Low progression/Low cure</td>
<td>264</td>
<td>183</td>
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<tr>
<td>Low progression/High cure</td>
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<td>224</td>
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<tr>
<td>High progression/Low cure</td>
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<tr>
<td>Std progression/Low cure</td>
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<tr>
<td>Std progression/High cure</td>
<td>295</td>
<td>253</td>
</tr>
<tr>
<td>Low progression/Std cure</td>
<td>264</td>
<td>196</td>
</tr>
<tr>
<td>High progression/Std cure</td>
<td>351</td>
<td>268</td>
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</tbody>
</table>

Cancer deaths prevented 183-302 out of 6,572 HIV (+) screened
- For every 22 -35 women screened we prevent 1 cancer death

233 cancer deaths prevented out of 6,572 HIV (+) screened
- For every 29 women screened we prevent 1 cancer death
Limitations

Limitations due to programmatic factors

- Healthcare infrastructure under-capacitated
- Substantial loss to follow-up

Limitations in data analyses

- Differential missing data
- Projections regarding cancers prevented were developed assuming optimal conditions
- Cost data not analyzed yet

Conclusions

- VIA + cryotherapy based 'screen and treat' program in a low-income African nation can prevent deaths from cervical cancer in HIV (+) women
- Adherence to follow-up visits is a challenge and requires significant investment

The future

- HPV vaccination
- HPV DNA-based screening

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“Every woman has the right to live life free from cervical cancer”