Colorectal cancer screening in West Africa

T. Peter Kingham MD, FACS
Asst. Attending Memorial Sloan Kettering Cancer Center
Isaac Alatise, MD WACS
Obafemi Awolowo University Teaching Hospital
Ile-Ife, Nigeria
CRC screening

- Why is it important?
- How is it used in the US?
- Can it be applied to low resource settings?
- Where do we go from here?
Why CRC screening is important: Estimated new cases 2015

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prostate</strong></td>
<td>220,800</td>
<td>231,840</td>
</tr>
<tr>
<td><strong>Lung &amp; bronchus</strong></td>
<td>115,610</td>
<td>105,590</td>
</tr>
<tr>
<td><strong>Colon &amp; rectum</strong></td>
<td>69,090</td>
<td>63,610</td>
</tr>
<tr>
<td><strong>Urinary bladder</strong></td>
<td>56,320</td>
<td>54,870</td>
</tr>
<tr>
<td><strong>Melanoma of the skin</strong></td>
<td>42,670</td>
<td>47,230</td>
</tr>
<tr>
<td><strong>Non-Hodgkin lymphoma</strong></td>
<td>39,850</td>
<td>32,000</td>
</tr>
<tr>
<td><strong>Kidney &amp; renal pelvis</strong></td>
<td>38,270</td>
<td>31,200</td>
</tr>
<tr>
<td><strong>Oral cavity &amp; pharynx</strong></td>
<td>32,670</td>
<td>24,120</td>
</tr>
<tr>
<td><strong>Leukemia</strong></td>
<td>30,900</td>
<td>23,370</td>
</tr>
<tr>
<td><strong>Liver &amp; intrahepatic bile duct</strong></td>
<td>25,510</td>
<td>23,290</td>
</tr>
<tr>
<td><strong>All Sites</strong></td>
<td><strong>848,200</strong></td>
<td><strong>810,170</strong></td>
</tr>
</tbody>
</table>

Cancer Statistics, 2015

Rebecca L. Siegel, MPH; Kimberly D. Miller, MPH; Ahmedin Jemal, DVM, PhD

Memorial Sloan Kettering Cancer Center
Why CRC screening is important: Estimated deaths 2015

Cancer Statistics, 2015

Rebecca L. Siegel, MPH; Kimberly D. Miller, MPH; Ahmedin Jemal, DVM, PhD

Memorial Sloan Kettering Cancer Center
Removal of polyps reduces the incidence of cancer

- Removal of adenomatous polyps reduces the incidence of cancer, and the diagnosis of CRCs at earlier stages reduces mortality. (1, 2)

- Prospective studies have proven that screening for colorectal polyps and cancer using a variety of methods reduces CRC mortality, even long-term after screening. (3-5)

- Screening for CRC is cost effective in term of the quality-adjusted life-years gained compared to non-screening.

CRC screening

• Why is it important?

• How is it used in the US?

• Can it be applied to low resource settings?

• Where do we go from here?
US screening recommendations

• Screening for CRC is recommended for men and women over age 50
  – Compliance remains suboptimal since more than one third of Americans report not having participated in a screening program.
Figure 10. Cumulative incidence of CRC in relatives of probands with CRC. Age at diagnosis of CRC for case subjects: □, < 45 years; ▲, 45–54 years; ●, 55+ years. Controls: ○, all ages. (Reprinted with permission.)
Barriers to screening?

- Inconvenience
- Bowel preparation
- Discomfort
- Lack of information
- Lack of access
CRC screening in the African American community

- African American patients, especially males, often decline colonoscopy screening
  - Despite high incidence of colorectal cancer
  - “doctor didn’t spend enough time discussing screening”
  - Pts report little knowledge of CRC and fear of the health care system
Successfully overcoming barriers: Bronx, NY

• Utilized:
  – Patient navigators
  – Streamlined referral network
  – Guidelines for referrals
  – Fact sheet

• Results: missed appointment rate decreased from 67% to 5% for colonoscopy
  – 25.9% had an abnormal finding
    • 2% had CRC

Kanna, Journal of General Internal Medicine, 22(6), 835-240. 2007
CRC screening

• Why is it important?

• How is it used in the US?

• Can it be applied to low resource settings?

• Where do we go from here?
Global cancer statistics 2012

Estimated New Cases

Male
- Lung, bronchus, & trachea: 1,241,600
- Prostate: 1,111,700
- Colon & rectum: 746,300
- Stomach: 631,300
- Liver: 554,400
- Urinary bladder: 330,400
- Esophageus: 323,000
- Non-Hodgkin lymphoma: 217,600
- Kidney: 213,900
- Leukemia: 200,700
- All sites*: 7,427,100

Female
- Breast: 1,676,800
- Colon & rectum: 614,300
- Lung, bronchus, & trachea: 583,100
- Cervix uteri: 527,600
- Stomach: 320,300
- Corpus uteri: 319,600
- Ovary: 238,700
- Thyroid: 229,900
- Liver: 228,100
- Non-Hodgkin lymphoma: 168,100
- All sites*: 6,663,000

Estimated Deaths

Male
- Lung, bronchus, & trachea: 1,098,700
- Liver: 521,000
- Stomach: 489,100
- Colon & rectum: 373,600
- Prostate: 307,500
- Esophagus: 281,200
- Ovary: 173,800
- Pancreas: 151,300
- Leukemia: 115,400
- Non-Hodgkin lymphoma: 114,200
- All sites*: 3,548,200

Female
- Breast: 521,900
- Lung, bronchus, & trachea: 491,700
- Colon & rectum: 320,300
- Cervix uteri: 265,700
- Stomach: 254,100
- Liver: 224,500
- Pancreas: 156,600
- Ovary: 151,900
- Esophagus: 119,000
- Leukemia: 114,200
- Non-Hodgkin lymphoma: 68,100
- All sites*: 3,548,200

Global Cancer Statistics, 2012

Lindsey A. Torre, MSPhD; Freddie Bray, PhDr; Rebecca L. Siegel, MPH; Jacques Ferlay, ME; Joanne Lortet-Tieulent, MSc; Ahmedin Jemal, DVM, PhD

Memorial Sloan Kettering Cancer Center
African Research Group for Oncology (ARGO)

- Originally a consortium of MSKCC and OAU in Nigeria to study colorectal cancer

- Goal: improve training, research, and treatment to improve the outcomes of patients with cancer in Nigeria
ARGO

Research

1. Who gets CRC?
   - NCI Pilot grant:
     • prospective database
     • tissue bank

2. What are outcomes of pts with CRC?

3. Can pts with breast cancer be identified earlier?

4. How can care for breast cancer be standardized?

Training

1. Post graduate courses

2. Masters in Clinical Research

3. Soudavar Fellowships

4. ARGO Pilot Grants

5. K Award

6. Pathology

Treatment

1. Can pts with CRC be identified at early stages?

2. Developing ARGO SOPs

3. CRC therapeutic trial

4. Early discharge after breast surgery
Post Graduate Courses
Disease Management Team
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>55.43 (17.07-100.2)</td>
</tr>
<tr>
<td>Male</td>
<td>83 (56.8)</td>
</tr>
<tr>
<td>Blood in stool</td>
<td>78 (66.7)</td>
</tr>
<tr>
<td>&gt;6 months bleeding</td>
<td>23%</td>
</tr>
<tr>
<td>Weight loss</td>
<td>88%</td>
</tr>
<tr>
<td>Rectal primary</td>
<td>53%</td>
</tr>
<tr>
<td>Metastatic disease</td>
<td>64%</td>
</tr>
</tbody>
</table>
Survival with CRC in Nigeria is poor

- 6 month survival (95% confidence interval) was 62.6% (53.6-72.1)
- 12 month survival was 48.4% (38.9-60.1)
How do we decrease this mortality rate?

• Prevention
  – Lifestyle changes

• Screening
  – Prevent CRC
  – Diagnose CRC at earlier stage

• Improve treatment options for CRC
How do we identify patients with early stage disease?

• Retrospective colonoscopy data 2007-2011
  – 139 patients with LGI bleeding
  – 12 patients (8.6%) were diagnosed with CRC
  – 20 patients (14.4%) were diagnosed with polyps

• Utilization of stool based screening strategies
  – cost effective in setting like Nigeria
  – high prevalence of benign rectal bleeding
  – culturally challenging
Prospective colonoscopy study

• Prospective cross sectional study involving consecutive patients with rectal bleeding who underwent colonoscopy

• Eligibility criteria
  – Inclusion criteria was all 45 year old subjects with rectal bleeding lasting up to one week
  – Exclusion criteria
    • inflammatory bowel disease,
    • colorectal polyps, colorectal adenoma or CRC,
    • family history of polyposis
    • contraindication to colonoscopy
## Results

<table>
<thead>
<tr>
<th>Patients</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>58 (58.0%)</td>
</tr>
<tr>
<td>Age (years, median)</td>
<td>58.5 (45-95)</td>
</tr>
<tr>
<td>Duration of rectal bleeding (months, median)</td>
<td>6 (0.25-360)</td>
</tr>
<tr>
<td>Saw MD for bleeding</td>
<td>84 (84.0%)</td>
</tr>
</tbody>
</table>
## Result of colonoscopy

<table>
<thead>
<tr>
<th>Colonoscopy findings</th>
<th>N=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhoids</td>
<td>71 (71.0%)</td>
</tr>
<tr>
<td>Diverticulum present</td>
<td>30 (30.0%)</td>
</tr>
<tr>
<td>Polyps present</td>
<td>21 (21.0%)</td>
</tr>
<tr>
<td>CRC present</td>
<td>20 (20%)</td>
</tr>
</tbody>
</table>
Step one: Determine probability of colorectal cancer

1. Points
   0 10 20 30 40 50 60 70 80 90 100

2. Lost weight
   None
   Yes

3. Change in stool
   Constipation
   None
   Pellet like stool
   Diarrhea

4. Total Points
   0 20 40 60 80 100 120 140 160

5. Probability of CRC
   0.001 0.01 0.1 0.4 0.7

Memorial Sloan Kettering Cancer Center
Step 2: determine the probability of polyps, given no colorectal cancer

- Points
- Lost weight: Yes, None
- Change in stool: Diarrhea, None, Pellet like stool, Constipation
- Total Points
- Probability of polyps: 0.001, 0.01, 0.1, 0.4, 0.7

Memorial Sloan Kettering Cancer Center
Modeling

• A useless (random) model will have a c-index of 0.5.
• The c-index of our model for cancer is 0.895 which is quite good. The same idea can be applied to the probability of polyps (without cancer). The c-index of our model for polyps is 0.710.
CRC screening

• Why is it important?

• How is it used in the US?

• Can it be applied to low resource settings?

• Where do we go from here?
Future plans

• Overcoming barriers
  – Financial
  – Access to care
  – Training
  – Education/cultural acceptance

• Developing screening tests that work in low resource environments
Thank you