Surgical Site Infection after Cesarean Delivery in a District Hospital in Central Region, Ghana

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GE/NMF International Scholars Program
Ghana 2013
Millennium Development Goals

Photo: Millennium Development Goals, 2013

IMPROVE MATERNAL HEALTH
Millennium Development Goals

• Target 5.A: Reduce by three quarters the maternal mortality ratio

• Target 5.B: Achieve universal access to reproductive health
Target 5.A: Reduce by three quarters the maternal mortality ratio

- Unsafe abortion
- Elevated blood pressure
- Hemorrhage
- Infection
St. Luke Catholic Hospital

- District Hospital in Central Region
- 3 Medical Officers
- Serve 27,734 patients
<table>
<thead>
<tr>
<th>Service</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC Registrants</td>
<td>3,124</td>
<td>2,935</td>
<td>2,570</td>
<td>2,566</td>
</tr>
<tr>
<td>ANC Total</td>
<td>12,420</td>
<td>12,605</td>
<td>10,251</td>
<td>6,078</td>
</tr>
<tr>
<td>Post Natal</td>
<td>838</td>
<td>1,077</td>
<td>1,344</td>
<td>1,456</td>
</tr>
<tr>
<td>Deliveries</td>
<td>1,684</td>
<td>1,699</td>
<td>1,897</td>
<td>1,930</td>
</tr>
<tr>
<td>Supervised Deliveries</td>
<td>1,410</td>
<td>1,402</td>
<td>1,461</td>
<td>1,930</td>
</tr>
<tr>
<td>Maternal Deaths</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Caesarean Section</td>
<td>339</td>
<td>380</td>
<td>436</td>
<td>526</td>
</tr>
<tr>
<td>Still Births</td>
<td>60</td>
<td>54</td>
<td>61</td>
<td>44</td>
</tr>
<tr>
<td>Fresh Still Births</td>
<td>21</td>
<td>26</td>
<td>30</td>
<td>23</td>
</tr>
</tbody>
</table>
St. Luke Catholic Hospital

Figure: St. Lukes Catholic Hospital

Major Surgeries

- LUSC: 526
- Hernia: 144
- Excision: 64
- BTL: 51
- Thyroidectomy: 41
- TAH: 36
Cesarean Delivery

- Life saving surgery
- WHO Goal of 10-15% of all deliveries
- Indication for safe motherhood

Photo: WHO, 1991
Common Surgical Complications

• Hemorrhage
• Infection
• Mortality

Photo: Google Images
Common Surgical Complications

- Hemorrhage
- Infection
- Mortality

Photo: Google Images
Surgical Site Infection

- The single most important risk factor for postpartum infection is cesarean method of delivery.
- Surgical site infection rates are significantly higher for cesarean section than other major surgeries.
- Target population may be at even higher risk by the time of cesarean section as the majority of cases are emergent versus elective.
What is the rate of surgical site infections?

What can be done to reduce surgical site infection rate?
Methods

• Retrospective review of medical records
• January 1, 2013- March 31, 2013
• Inclusion criteria
  - C/S within 42 days prior to admission for “infected wound”
  - readmission to maternity ward for infected wound
Outcomes

• **Primary**
  Number of surgical site infections after cesarean delivery

• **Secondary**
  Identify factors which may influence risk of surgical site infection
  Identify measures to reduce surgical site infection
Results

Cesarean Delivery January-March 2013

- Elective: N=25 (19%)
- Emergent: N=126 (81%)

Total N=131
Results

Admission record review

• 10 cases of admission for infection after CS
• Reason for admission included
  - infected wound
  - infection
• Infection rate of 7.6%

Photo: Sudhi Trye, 2012
Results

Admission Diagnosis of Infection - Maternity Ward

10 cases

7 charts located

5 charts contained adequate documentation
## Results

### Demographics

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>22</td>
<td>20 - 40</td>
</tr>
<tr>
<td>Gravida</td>
<td>2</td>
<td>1-7</td>
</tr>
<tr>
<td>Parity</td>
<td>1</td>
<td>0-5</td>
</tr>
</tbody>
</table>
Results Pre-Operative

• 100% of cases received surgery within 24 hours of admission
• 100% of cases were categorized as emergent
• None of the patients received antibiotics therapy prior to skin incision
Results Pre-Operative

• Clinical indications for cesarean section include:
  - Malpresentation
  - Retained second twin (n=2)
  - Fetal distress
  - Prolonged labor
Results Intra-Operative

Delivery Outcome

- Live Birth: 80%
- Stillborn: 20%
Results Intra-Operative

Intra-operative Complications:

- Complications: Post-Partum Hemorrhage

- No: 60%
- Yes: 40%
Results Post-Operative

• 100% of cases included prophylactic antibiotics in post-operative period
  - Ceftriaxone & metronidazole IV x 3 days
  - Amoxicillin & metronidazole po x 7 days
  - Antibiotics all started within 24 hrs of operation

• Average length of initial hospital stay for delivery-3 days (n=3)
Results Post-Operative

Disposition

5 cases of infection after C/S

3 patients

Discharged in stable condition then readmitted with infection

1 patient

Unable to find discharge date after delivery but was later readmitted with infection

1 patient

Developed infection during hospitalization
## Results Post-Operative

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<thead>
<tr>
<th></th>
<th>Average</th>
<th>Range (Days)</th>
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<tr>
<td>Surgery to readmission</td>
<td>7 days</td>
<td>7-9</td>
</tr>
<tr>
<td>Discharge to readmission</td>
<td>4 days</td>
<td>3-6</td>
</tr>
<tr>
<td>Length of hospitalization for infection*</td>
<td>20 days</td>
<td>7-37</td>
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</table>

*50% (n=2) cases required hospitalization for 1 month (28 days) or more for post-operative infection*
Results Readmission

- Antibiotics regimens during readmission
  - Ceftriaxone & metronidazole IV
  - Amoxicillin & metronidazole po
- One patient also had ciprofloxacin + gentamicin added
- All patients required surgical debridement of the wound in the operating theater
Limitations & Discussion

• Not Institutional Review Board approved
• Retrospective
• Small sample size
• Short period of time
• Confounding variable of patient wound care after discharge

What can we do as health professionals to prevent post-operative complications including SSI?
WHO Safe Surgery Initiative

• The Safe Surgery Saves Lives initiative aims to improve surgical outcomes around the world by raising the standards that patients anywhere can expect.

• WHO aims to define a core set of safety standards that can be applied in all WHO Member States.
# WHO Safe Surgery Initiative

## Box 5: Ten essential objectives for safe surgery

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<th>Objective</th>
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<td>1.</td>
<td>The team will operate on the correct patient at the correct site.</td>
</tr>
<tr>
<td>2.</td>
<td>The team will use methods known to prevent harm from anaesthetic administration, while protecting the patient from pain.</td>
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<tr>
<td>3.</td>
<td>The team will recognize and effectively prepare for life-threatening loss of airway or respiratory function.</td>
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<tr>
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<td>The team will effectively communicate and exchange critical patient information for the safe conduct of the operation.</td>
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<td>10.</td>
<td>Hospitals and public health systems will establish routine surveillance of surgical capacity, volume and results.</td>
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Objective 6. The team will consistently use methods known to minimize risk of surgical site infection.

- Use of prophylactic antibiotics in surgery
Evidence Based Medicine

• A 2002 Cochrane review of 86 research studies with more than 13,000 participants
• Randomized clinical trials to evaluate the effect of prophylactic antibiotics in both emergent and non-emergent cesarean deliveries.
Evidence Based Medicine

• Significant reductions in:
  - Overall febrile morbidity
  - Wound complications
  - Endometritis

• The risk of endometritis after elective cesarean delivery, for example, was reduced by 76%.

• All risk reductions remained significant regardless of the type of cesarean delivery (emergent or elective).
Evidence Based Medicine

• Timing
  - Administer up to 1 hour before skin incision

• Choice of antibiotic
  - G+, G-, anaerobic coverage
  - Ampicillin, cefazolin
  - Single dose therapy pre-operatively is more cost effective and effective than multiple post-partum doses or hospital readmission for infection
Use of Prophylactic Antibiotics

The use of antibiotics for prophylaxis during the peripartum period is intended to decrease the risk of maternal infection. This practice bulletin outlines the different situations in which prophylactic antibiotics may be indicated.
Use of Prophylactic Antibiotics

Clinical Considerations and Recommendations
• Is antibiotic prophylaxis appropriate for patients undergoing cesarean delivery?

The single most important risk factor for infection in the postpartum period is cesarean delivery, with rates of postoperative infection significantly higher than would be predicted compared with rates from other surgical procedures (31–33). As with other elective, noninfected surgical cases, antimicrobial prophylaxis is recommended for all cesarean deliveries unless the patient is already receiving an antibiotic regimen with appropriate coverage (eg, for chorioamnionitis), and such prophylaxis should be administered within 60 minutes before the start of the cesarean delivery (34). When this is not possible (eg, need for emergent delivery), prophylaxis should be administered as soon as possible after the incision is made.

• As with all other elective, non-infected surgical cases, antimicrobial prophylaxis is recommended
• Should be administered up to but not longer than 60 minutes before skin incision.
• In emergent cases, start the antibiotic as soon as possible at or after time of skin incision.
WHO Safe Surgery Initiative

System-wide approach to improved surgical safety

Institution

- Administration
- Medical Officers
- Midwives
- MA/PA
- Pharmacy, Lab
- Nurses

System-wide approach to improved surgical safety
Institution

Objective 6. The team will consistently use methods known to minimize risk of surgical site infection.

- Hospital policy and protocols
- Continuous training of staff
- Sterile technique
- Wound care
- Hand hygiene
- Antibiotic management
Administrative

Objective 10. Hospitals and public health systems will establish routine surveillance of surgical capacity, volume and results.

Routine surveillance for surgical capacity, resources, and surgical outcomes.

Monitoring use of equipment, supplies, sterilization techniques.
Healthcare Providers

Objective 6. The team will consistently use methods known to minimize risk of surgical site infection.

- New pilot project- Wound care at home
  - Patients to receive education on how to clean their wound while inpatient
  - Then discharged with surgical spirit and sterile gauze
  - These patients will be tracked for readmission due to wound infections
In-Service Training for Nurses

• Presentation on SSI reduction
• Discussed a number of methods including:
  – Patient education
  – Staff education
  – Hand hygiene
  – Provision of wound care supplies
  – Surgical checklist
  – Use and timing of prophylactic antibiotics
Beneficial to Clinical Staff?

- Strongly Agree: 11
- Somewhat Agree: 0
- Neutral: 0
- Somewhat Disagree: 0
- Strongly Disagree: 0
Clinician Survey

Do you think the following infection reducing protocols will be implemented at St. Luke’s Catholic Hospital?

- Staff In-Service Training on peri-operative care (sterile technique, wound care, hand hygiene, antibiotic management)
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely

- Routine surveillance for surgical capacity, resources and outcomes
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely

- Surgical Safety Checklist “Time-Out”
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely

- Use of prophylactic antibiotics in surgery
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely

- Hand hygiene at every patient point of care (with hand washing or alcohol based rubs)
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely

- Patient education about wound care
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely

- Patient provision of wound care supplies (spirits, sterile gauze)
  - Very Likely
  - Somewhat likely
  - Neutral
  - Somewhat unlikely
  - Strongly unlikely
Most Important

- In-Service: 4
- Surveillance: 1
- Hand Hygiene: 1
- Education: 4
- Supplies: 1
- Checklist: 1
- Antibiotics: 1
Most Likely to Implement

- In-Service: 4
- Surveillance: 1
- Hand Hygiene: 3
- Education: 2
- Supplies: -
- Checklist: -
- Antibiotics: -
Reasons

- Cost: 3
- Administrative: 2
- Clinical: 3
- Specific: 4
- Practical: 8
Summary & Conclusion

• Surgery, particularly CS, is a very important health service to the community.

• Every precaution should be made to reduce surgery related morbidity including SSI.

• Risk reduction is multifactorial and must involve all members of the healthcare team.

• Use of known, evidence-based methods will improve surgical outcomes and reduce SSI

• Surveillance, data collection and periodic review are necessary to monitor trends and improve care
MEDASE!

• GE/NMF
• Dr. Ebenezer Amekah
• Matron Reverend Sister Mary Magdalene