The Application of Evidence Based Bundle Approach to Reduce Surgical Site Infection in Geriatric Hip Fracture Patients – A Single Centre Experience

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Geriatric Hip Fracture Hemiarthroplasty

- Common Orthopaedic Procedure
- At least 1 Surgeon + At least 1 Assistant
- Done by Trainee or Specialist
Background

- The Surgical Site Improvement Program and Audit for Orthopedic surgeries has been developed in 2009 in AHNH

- **10.3%** Surgical Site Infection (SSI) in Geriatric Hip Hemiarthroplasties in 2010

- **8%** SSI in Geriatric Hip Hemiarthroplasties in 2012
Surgical Site Infection (SSI) = Dreadful Complication


↑ Morbidities  ↓ Quality of Life

↑ Hospital length of stay by 7 - 14 days

↑ Likelihood of ICU admission by 60%

↑ Median total direct Costs by 300%

× 2 Risks of Rehospitalization & Death
What to Do?

ALICE HO MIU LING NETHERSOLE HOSPITAL, NTEC

BUNDLE Approach since 2012

- Pre-operative Preparation
- Intra-operative Preparation
- Post-operative Preparation

What to Do?
Multidisciplinary Teamwork

Orthopaedic Surgeons + Nurses

Operation Theatre Infection Control Team

Microbiologist

Infection Control Nurse (ICN)
Methodology

• Objective:
  ◦ To reduce surgical site infection (SSI) in hemiarthroplasty operation in geriatric hip fracture patient

• Target group:
  ◦ > 65 years old
  ◦ Fracture neck of femur
  ◦ Hemiarthroplasty operation
A. Pre-operative Preparation

• MRSA screening
  ◦ Performed for all potential hemiarthroplasty cases for Hip fractures
  ◦ For positive cases:
    ◦ Vancomycin is used as prophylactic antibiotics.
    ◦ Decolonization is carried out
Preoperative Skin Preparation by Chlorhexidine Bathing

1 day before operation / on operation day
B. Intra-operative Preparation

**Strict Observation of Hand Washing Guideline**

**Limitation of Traffic**
Step I.  
Povidine iodine disinfection before draping

Step II.  
Double-sponge disinfection with povidine iodine upon water-tight draping
Step III.
Coverage of the knee to distal region with a sterile plastic sheet wrapped by crepe bandage

Step IV.
ChloraPrep with tint (Chlorhexidine gluconate and isopropyl alcohol) with time allowed for alcohol evaporation
Step V.
Circumferential iodophor impregnated plastic adhesive drape ('Ioban') covering the hip and thigh region
VI. Surgical wound dressed with Aquacel Adhesive tape after wound closure
C. Post-operative Care

• **Dressing care:**
  - Change dressing immediately after soaked or contaminated

• **Wound Inspection Precautions:**
  - Surgical wound should NOT be left unattended for inspection.
  - Unnecessary wound inspection in early post-operative period should be avoided.
Total of 496 Hemiarthroplasties (2008-2017Q3)

Chi-square test
p=0.082
Operative Statistics

- **No. of Days between Admission to OT**
- **Acute LOS (Days)**
- **OT time (min)**

<table>
<thead>
<tr>
<th></th>
<th>2008-17Q3</th>
<th>2008-2012</th>
<th>2013-17 Q3</th>
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<tbody>
<tr>
<td>No. of Days</td>
<td>7.64</td>
<td>7.47</td>
<td>7.91</td>
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<tr>
<td>Acute LOS</td>
<td>19.82</td>
<td>19.53</td>
<td>20.27</td>
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<tr>
<td>OT time</td>
<td>81.11</td>
<td>86.94</td>
<td>72.09</td>
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Medical Comorbidities 2008-2017

No. of comorbidities / patient 2008-17Q3 2008-2012 2013-17 Q3
1 2 1 1
2 12 7 5
3 2 2 0
4 7 5 2
5 3 1 2
6 2 1 1

No. of comorbidities / patients 2008-2017

- One: 7%
- Two: 43%
- Three: 7%
- Four: 25%
- Five: 7%
- Six: 11%
Average Yearly Infection Rate (%)

- Superficial Infection
- Deep Infection
- Overall Infection rate

2008-2012:
- Superficial Infection: 3.31%
- Deep Infection: 3.95%
- Overall Infection rate: 7.25%

2013-17 Q3:
- Superficial Infection: 1.95%
- Deep Infection: 1.6%
- Overall Infection rate: 3.55%
AHNH Surgical Site Infection Surveillance (AMA & Unipolar Hip Arthroplasty)
2008 - 2017 Q3

AHNH overall mean = 5.24
HA overall mean for HPRO 2016

Infection rate of AMA/Unipolar hip arthroplasty (%)
AHNH Overall mean of AMA & UHA
HA overall mean for HPRO 2016

0 2 4 6 8 10 12 14 16


SSI rate (%)
Yearly SSI for Hip fracture Hemiarthroplasty/ AMA

![Graph showing Yearly SSI for Hip fracture Hemiarthroplasty/ AMA](image-url)
Treatment of Superficial Wound Infections

- 79% Antibiotic Alone
- 21% Surgical Debridement

Treatment of Deep Wound Infections

- 100% Removal of Implant and Surgical Debridements
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<tr>
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<tr>
<td>Enterococcus species</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>Klebsiella species</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Pseudomonas Species</strong></td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
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<tr>
<td>MRSA</td>
<td><strong>6</strong></td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
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<tr>
<td>Staphylococcus CNS</td>
<td><strong>4</strong></td>
<td><strong>4</strong></td>
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**Bacteriology of AMA / Unipolar Hip Arthroplasty**
Discussion

• The Bundle Approach cannot 100% eliminate SSI, **BUT**....

• *Decreasing* trend of **Overall SSI**

• *Decreasing* trend in *Deep wound infection* in *consecutive 2 years* since 2015
Conclusions

• The bundle approach has shown to achieve an effective and sustained decrease in SSIs in Hemiarthroplasty operations for geriatric hip fracture patients

• The result needs shared efforts, mutual communications, support and understandings of multidisciplinary teams

Reference:


