STAR Project:
Strategic Targets Aim to Reduce
*haemodialysis catheter-related bloodstream infections*

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Presented by Ho Lai Fan
For Renal Unit
Risk of Haemodialysis catheter

- Haemodialysis patients are at high risk of CRBSIs
- 3.5 events per 1000 catheter days
- Risk of bacteremia is 7.64-fold higher in haemodialysis patients with catheters as compared to arteriovenous fistula

Catheter related blood stream infections

- Attributable mortality:
  4-20%

- Attributable cost:
  US$37,00 to US$29,000

- Prolongation of hospitalization: mean 7 days

www.rhqn.org/resources, 2008
Background

In 2007

- HD patients contributed to one-fifth of overall CRBSIs in PMH
- MRSA accounted for 90% of all CRBSIs in HD patients.
Aims of STAR Project

- To reduce CRBSIs among haemodialysis patients by implementing evidence-based practice interventions.
Seven-E Approach to prevent CRBSIs

- Establish care pathways
- Educate home HD catheter care
- Evaluate infection control measures
- Enhance hand hygiene & HD procedure compliance
- Exercise MRSA screening & timely decolonization
- Employ CHG bathing
- Ensure HD Catheter bundle
- Evaluate infection control measures

Preventing CRBSIs in haemodialysis patients
Enhanced MRSA surveillance

- Identify MRSA carriers for early implementation of infection control measures to prevent cross transmission

### MRSA Screening Pathway for Haemocatheter Insertion

1. **Take nasal swab + any skin swabs before insertion**
   - *(Refer to Care flow for patient with Central Venous Catheter insertion)*

2. **Positive Result**
   - Record on MRSA Checklist & affix MRSA sticker on the HD Reminder
   - Immediately commence decolonization Rx
   - Patient to receive:
     - 5-day course of decolonization Rx
     - Decolonization leaflet
     - Patient is isolated & barrier nursed
   - F/U screening (2DAYS + QIW for 2 WEEKS)
   - Any one of results
     - Positive Result
       - Decolonization Rx
       - F/U screening (2DAYS + QIW for 2 WEEKS)
     - Negative Result
6. **All negative**
   - Continue Chronic HD Pathway
   - Change to Permanent vascular access
   - Not on HD
   - Decolonization treatment
   - Close case

5. **Close case**
   - F/U screening (2DAYS + QIW for 2 WEEKS)
   - All negative
   - All negative

6. **Positive result**
   - Off isolation / Continue isolation for intermittent carrier
   - Inform ICN for successful decolonization by MRSA group nurses
   - Continue F/U screening after 3 months & 12 months
   - Positive result
     - Decolonization treatment
     - Classify as intermittent carrier
     - Close case
   - Negative result
     - All negative
     - Adjust care regimen
     - F/U screening (2DAYS + QIW for 2 WEEKS)

Remarks:

1. If free of HD catheter and not on HD, case closed & F/U re-screening is NOT required.
2. “Persistent carrier” is defined as positively by culture at the same body site despite TWO consecutive decolonization courses.
   (Within Decolonization Loop) or resistant to Mupirocin.
3. Patients with intermittent positive cultures, decolonization treatments, continue isolation and F/U re-screening are still required. These cases would be referred to nephrologists for review by MRSA group nurses.
# HD catheter bundle

- **Hand Hygiene**
- **Maximal Barrier precautions**
- **Chlorhexidine skin antisepsis**
- **Catheter site insertion- avoid using femoral vein**
- **Remove unnecessary lines**

**Source:** [http://www.IHI.org](http://www.IHI.org)

## Photo Guide for Central Line Insertion Procedure – Department of M&G

### Before procedure

1. **Prepare patient**
   - Mark/ Assess site
   - Position patient correctly for procedure before drape
   - Assist to put on surgical mask

2. **Adopt standard precautions**
   - Cap
   - Face shield
   - Surgical mask (doctor & nurse)

### Procedure steps

3. **Antiseptic hand wash** (scrubbing in)
   - Wash hands with water and hibiscrub for at least 15 seconds.

4. **Wear maximum aseptic barriers**
   - Sterile gown
   - Sterile gloves

5. **Skin Preparation**
   - Prepare skin with 2% Chlorhexidine in 70% Alcohol
   - Use back and forth friction scrub for at least 30 seconds (Do not wipe or blot)
   - Allow antiseptic solution to dry completely before puncturing the site at least 2 minutes

6. **Designate sterile field**
   - Use 4 pieces of cotton sterile towels for designate the puncture site
   - Then use large sterile disposable drape to cover patient
   - Cut a key hole for puncture procedure with sterile scissors

### After procedure

7. **Site dressing**
   - Wipe off residual blood from the site and tubing and dry completely
   - Use sterile gauze dressing to cover puncture site
   - Secure dressing and catheter

8. **De-gown in a proper way**
   - After procedure, follow photo guide to degown
   - Degown according to the infection control guideline
Designated areas & equipment for HD Catheter insertion

Designated procedure trolley for catheter insertion

Procedure Room
To minimize skin shedding of bacterial load

Care flow for Patient With Central Venous Haemocatheter:

- ARF patients who plan for acute HD
- PD or RT patients who need HD support
- HD patients with failed AVF/AVG (P2)

Patient who plan for Central Venous HD catheter insertion

Take nasal swab x MRSA surveillance

If +ve → Perform decolonization before insertion if possible

Can patient take bath by self?

Yes

Instruct patient to take bath and hair washing with 2% CHG skin cleanser before catheter insertion

HD catheter inserted

Post insertion care and observation
(e.g. CXR, observe bleeding...)

Continue daily bathing with 2% CHG skin cleanser / wipe with 2% CHG solution x 4 consecutive days

Provide education on HD catheter care (in P2 or P3)

Educate patient to follow catheter care as instructed and maintain good personal hygiene.

"At Risks" for CRBSI:
1. Recent MRSA infection
2. Poor skin condition
3. Poor personal hygiene
4. Immuno-compromised patients

Reinforce on catheter care: (Special Notes to Patient with Central Venous HD Catheter)
1. Bathe with 2% CHG skin cleanser / wipe with 2% CHG solution on the night before HD
2. Keep ES dressing clean and dry
3. Maintain clean home environment
4. Refer CNS for ES and home care if necessary

*At Risks* for CRBSI:
1. Recent MRSA infection
2. Poor skin condition
3. Poor personal hygiene
4. Immuno-compromised patients
Specific infection Control measures instituted

- Use prophylactic antimicrobial lock solution for HD patients with limited vascular access or history of multiple CRBSIs.

- Use antimicrobial ointment for high risk HD patients (eg. poor skin condition) after haemocatheter insertion until their insertion sites have healed.

- Conducting home visit to solitary patients with poor personal hygiene by Community Nursing Service.
WHAT WE ACHIEVED.......
MRSA Prevalence Screen in HD Patients (2008-2012)

- **409** HD patients with catheters
  - **51 (14.4%)** +ve screening
    - **38 (64.4%)** MRSA decolonization completed
    - **29** -ve screening post 3-month & post 12-month
    - **9** Re-colonization
  - **358 (85.6%)** -ve screening
    - **21 (35.6%)** Died or HD catheter removed

76% effective clearance rate
Decreased MRSA CRBSIs

<table>
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<th>Year</th>
<th>No of MRSA CRBSI cases</th>
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Overall Decreased CRBSI Rate

CRBSI rate / 1000 catheter days in PMH Renal Unit

CRBSI rate / 1000 patient days

Year

Rate / 1000 patient days

2007 2008 2009 2010 2011 2012

0.13 0.94 0.52 0.67 0.56 0.21

2007 2008 2009 2010 2011 2012

CRBSI rate / 1000 catheter days

0.2
Hand Hygiene & Procedure
Adherence Increased

Achieved 100% compliance to CVC insertion with key components & HD procedures.
Increasing catheter days in Renal Unit

No of Catheter days

Year

2007 2008 2009 2010 2011 2012

7745 9536 11641 13539 14374 14289

↑ 85% Catheter days from 2007 to 2012

No of Catheter days
Conclusion

- A comprehensive evidence-based interventions program through collaborative and multidisciplinary approach can substantially decrease CRBSIs, which implies a reduction in mortality, hospital cost, hospitalization and improved patient’s outcomes.

- Structural patient education & unified care pathway are crucial to assure the strategic approach sustainable, cost-effective and efficient.

- Culture of safety has been embedded through periodic audit and review of clinical practice.
Our next steps:

- Decrease no of HD catheters by early Tenckhoff catheter insertion / creation of AV fistula or AV graft.
- Assign vascular access coordinator to provide education and early permanent dialysis access plan for renal patients.
- Sustain implementation of evidence based practice and collaboration with multidisciplinary team.
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