A Program to Reduce Nosocomial Urinary Tract Infections at a General Acute Care Hospital

Alan F. Rothfeld, M. D.
Avelyne Sitckley, R.N., CCRN
Hollywood Presbyterian Medical Center
Los Angeles, CA
Hollywood Presbyterian Medical Center

- 434 bed general acute care facility
- 80 bed subacute facility
  - 50 long term ventilators
DOU (Progressive Care Unit)
Telemetry Unit

- 60 beds
- Average occupancy 83%
- RN to patient ratio 1:3
- No CNAs
Recent History

- Worst physician-rated units in the Hospital 2006 (of 11 Nursing Units)
- Major turnover 2007
  - New manager
  - Higher salaries
  - Residency Program (Versant)
- Average age of day shift RNs 2008: 27
- Average tenure of day shift RNs 2008: 3 years
Background
The Subacute and SNF Example

- Most Foleys removed on admission
- No major problems noted
SuperDiapers

• Superadsorbent products
  • 1961 Pampers – fluff pulp with polyethylene and rayon liners
  • 1986 – hydrogel - superadsorbent gelling material (dilute 3 dimensional crosslinked polymer)
SuperDiapers in Acute Medical Care

- Eliminates Foleys
- I/O may be more accurate than urinary catheter bags
  - Weighing more accurate
  - Adsorbs sweat, feces, exudate
- Keeps skin/wounds dry
SuperDiapers in Acute Medical Care
Advantages of removing Foleys

- May reduce UTIs
  - Reduced cost (nonreimbursable)
  - Reduced LOS
  - Patient satisfaction
  - Mortality
SuperDiapers in Acute Medical Care
Other Advantages of removing Foleys

- Reduces urethral trauma
- Reduces need for sedation
- Reduces need for restraints
- Enables easier mobilization
  - Reduced pneumonias
When do You Need a Foley?

- Obstruction
- Hourly I/O ordered
- Stage 3 or 4 skin ulcer with active UTI
  - Culture plus pyuria
- Urologist’s order
Urinary Catheters are RN Driven

- Physicians (except urologists) have no vested interest in urinary catheters
- Most Foleys are placed in the ER or the OR and never removed
  - Routine
  - No criteria
- RN culture favors Foleys
  - Hygiene
  - Ease
Motivating RNs to Remove Foleys

**Motivation**

- Intensive education about CAUTIs
- “You can protect your patient”
- Higher level of nursing performance
- Current concern about nosocomia
- Patient comfort and dignity
- Competition
- Excitement
Motivating RNs to Remove Foley's

● Removing barriers
  • Demonstration of SuperDiapers
    » Dryness
    » Up to 2 liter capacity
    » Change only twice a day + BMs
  • Weighing for accurate I/O
    » Easy to use scales
  • Hygiene
    » Absorbs all fluids
Motivating Administration to Buy SuperDiapers

- Foley Catheter kit: $14
- Two superadsorbent under pads, each holding up to 1500 cc of urine while maintaining dry contact surfaces, is $1.78 per day ($0.89 per pad).
- Diapers, for use when patients are being moved or transported, cost $1.18 per day ($0.59 per diaper).
- The cost of the pads and diapers is less than the cost of the silver coated catheters until eleventh hospital day.
The Program
Design

- 3 month baseline period
- 1 month education
- Institution
- 3 month measurement period
Criteria Applied to All Patients

1. Urinary obstruction
2. Order for hourly I/O
3. Stage 3 or 4 decubitus with active UTI
   - Pyuria plus $>10^5$ organisms on culture
4. Urologist order
1. Foley catheter indication

Does the patient have a Foley catheter?

- YES
- NO

- ordered by urologist
- urinary obstruction
- order for hourly I/O
- stage 3 or 4 decubitus PLUS UTI

If no boxes checked ask MD for DC order
MD response: ______________________
Date/time: ______________________

Finished
HPMC ICU SERVICE
Today’s Criteria for ICU:

Date Admitted to ICU: __________________
Name of Night Nurse: __________________
Name of Day Nurse (confirming): ______________

1. DVT Prophylaxis

Criteria for High Risk (check)
- CHF
- Vent
- Sepsis
- Trauma
- Cancer
- Age >70
- non-ambulatory

One or more checked

Follow admitting orders for SCD

None checked

Patient on:
- Lovenox
- Heparin
- Coumadin

Contraindication:
- Bleeding
- Other: __________________

None of the above:
- contact MD for an order:
- MD response: ________________
- Date/Time

Submit this form to Charge Nurse by 12:00pm each day

2. Foley catheter indication

Does the patient have a Foley catheter?

High Risk Patient
requires pharmacological prophylaxis, unless contraindicated

High Risk Patient
requires pharmacological prophylaxis, unless contraindicated
Institution of the Program

- Criteria applied to all patients by 7 am
- Physician asked if catheter can be removed for all patients not meeting criteria
- If no physician visit by 4 pm, called and asked for order
- Catheter count at 5 pm
Physician Reaction

- Pleased in general
  - Impressed with nursing initiative
  - Unit rating improved dramatically
    » Rated last of 11 units in June, 2006
    » Rated first in November, 2008
- Only one physician refused
  - Oncologist with terminal patients (2)
Foley Catheters per Day

Program Start

Date

# at 5 pm

0 5 10 15 20 25
Catheter Days

Control Period

- Catheter days: 1564
- PT days: 4692

Intervention Period

- Catheter days: 819
- PT days: 4416

Legend:
- Catheter days
- PT days
Effect of Project on Catheter Days

National median for medicine services = 520
Effect of Project on UTIs per Catheter

Nosocomial UTIs per 1000 Catheter Days

- Control Period: 3.2
- Intervention Period: 2.4

(p < .10)
Overall Effect of Project on UTIs

Nosocomial UTIs per 1000 Patient Days

- **Control Period**: 1.06
- **Intervention Period**: 0.45

(p<.05)
## Results

<table>
<thead>
<tr>
<th></th>
<th>Catheter days per 1000 patient days</th>
<th>Nosocomial UTIs per 1000 catheter days</th>
<th>Nosocomial UTIs per 1000 patient days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control period</td>
<td>330</td>
<td>3.2</td>
<td>1.06</td>
</tr>
<tr>
<td>Intervention period</td>
<td>190 (p&lt; .01)</td>
<td>2.4 (p&lt; .10)</td>
<td>0.45 (p&lt; .05)</td>
</tr>
</tbody>
</table>
Nursing Satisfaction With the No Foley Project at 3 Months

- Difficulty of your job:
  - More Difficult
  - Easier
  - No Effect

- Job Satisfaction:
  - Less Satisfied
  - Greater Satisfaction
  - No Effect

- Patients’ Feedback:
  - No feedback or No Change
  - Improved Comfort

- Physicians’ Feedback:
  - No feedback or No Change
  - Acceptance

- Resistance
Problems
Diapers

- Failure to change BID
- Fecal problems
- ? Stage 2 decubiti
Change to Pads

- Same material
- Does not “hide” problems and compliance with changing improved
- Allows more contact of urine with skin
- Reduces fecal contact
Modification of Pads

- Placed under patients and brought up between legs to contact inner thighs and urethral area
- Not fastened or brought up to waist
Urinary Incontinence Related Dermatitis
UIRD

- Difficult to separate effect of fecal and urinary irritation
  - Especially with diarrhea and c. diff
- Poor use of barrier creams and cleaning
- Wound care RN suggested continuing program but intensified skin care
- Criticaid clear adhesive BID
- Periwash
A Fifth Indication for Foleys?

- Failure of UIRD to improve in 48 hours with optimal skin care
Difficulty of Introduction to Other Units

- ICU very resistant
  - Incidence of UIRD seems higher
- Med/Surg floors resistant
  - Related to staffing?
- Was this a unique unit?
Motivating Factors

• Rewards to successful units
  • Constructive jealousy
  • Positive physician feedback

• Recognition of success as excellence

• Education regarding CAUTIs and costs

• Professional pride
Suggestions

- May not be applicable to ICUs
- Requires nursing excitement and motivation
  - Cannot succeed by fiat
- Morale building required
- Must be seen as better care, not more work
Future Projects
No Central Lines

● Criteria review:
  • Hypotension
  • Pressor use
  • Sclerosing agents
    » Parenteral nutrition
    » Chemotherapy
  • Order for CVP measurements
  • Vascular surgeon order
No Central Lines

- Requires alternative vascular access
  - Ultrasound device
  - Transilluminator
  - PIC (NOT PICC) lines
  - Expert IV RN
  - Nursing pride

- Start peripheral line, *then* ask for order to DC Central Line
## Hormone Response to Severe Illness

<table>
<thead>
<tr>
<th>Response to Illness</th>
<th>Function</th>
<th>Disease State</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓ erythropoietin</td>
<td>antiapoptotic</td>
<td>Anemia of chronic disease</td>
</tr>
<tr>
<td>↓ thyroid</td>
<td>metabolic rate</td>
<td>Sick euthyroid syndrome</td>
</tr>
<tr>
<td>↓ cortisol</td>
<td>general</td>
<td>Adrenal insufficiency</td>
</tr>
<tr>
<td>↓ growth hormone</td>
<td>general</td>
<td>↓ muscle, ↓ bone, ↑ sleep</td>
</tr>
<tr>
<td>↓ prolactin</td>
<td>reproductive</td>
<td>↓ fertility, immunosuppression</td>
</tr>
<tr>
<td>↑ ADH</td>
<td>intravascular</td>
<td>Syndrome of inappropriate ADH</td>
</tr>
<tr>
<td>↓ leptin</td>
<td>hibernation</td>
<td>↓ metabolism, depression</td>
</tr>
<tr>
<td>↑ δ Opioid Peptide (HIT)</td>
<td>hibernation</td>
<td>↓ activity, depression</td>
</tr>
</tbody>
</table>
Class 1 Cytokine Receptor Family

- *Erythropoietin*
- *Growth hormone*
- *Prolactin*
- *Leptin*
- *Thrombopoietin*
- *Ciliary Neurotrophic Factor*
- *Granulocyte colony stimulating factor*
- *Granulocyte/macrophage stimulating factor*
- *Interleukins 6, 11, 12*
- *Interleukins 2, 4, 7, 9, 15*
- *Leukocyte inhibitory factor*

Ibelgaufts, Cytokines Online Pathfinder Encyclopedia 2003; http://www.copewithcytokines.de
Class 1 Cytokine Receptor Homologies

- Growth Hormone & receptor
  - W.G Grimes
  - U. Arizona

- Erythropoietin & receptor
  - Stroud Lab
  - UCSF

- Prolactin & receptor
  - Rowland Inst.
  - Harvard U.

- Interleukin 6 & receptor
  - M Revel
  - Weizman Inst
Effect of Hypothyroidism on Mortality in Pneumonia

Biological systems require mechanisms to deal with resource limitation
Resource Limitation

- Environmental
  - Food shortage
  - Physical stresses
- Infection
- Injury
- Pregnancy
Consequences of the 2\textsuperscript{nd} Law: 2
Survival requires tolerance of scarcity

- **nonmetabolic systems**
  - Viruses
  - Spores

- **metabolic downregulation**
  - *Situational signals*
    - *inflammatory downregulation of receptors*
    - Type 2 diabetes
  - *Timed signals*
    - Torpor
    - Hibernation
    - Depression
    - Sleep?
The Big Picture

- SIRS
- CARS
- Thyroid
- GH
- EPO
- insulin

Volume Control

INFLAMMATION GRADIENT

Hibernation

Repair, Recovery

Sepsis syndromes

Delayed or inadequate response

Bacteria
Trauma
Mediator spill

Coagulo-inflammation
Questions