

Healthcare-Acquired Pneumonia & UTIs

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Effects of educational intervention and the semirecumbent position on VAP incidence

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Background:

Staff education, particularly targeting those who manage patients receiving mechanical ventilation is an important effort to reduce the incidence of VAP.

Semirecumbent position (>30°) had been associated with decreased of VAP incidence in entubated patients. Although this is a simple measure the compliance to this recommendation is low than the desirable.

Objective: The aim of this study was to compare the incidence of VAP during two periods before and after an educational intervention based on the addition of a standardized order to use semirecumbent position (>30°).

Methods:

Setting: tertiary care hospital with 945 beds and twelve ICUs with a total of 120 beds categorized in 6 Surgical, Burn and 5 Clinical units. The study was done in three phases, pre-intervention period (observation period), intervention period with classes, semi semirecumbent position order and VAP rates discussion and post-intervention period with two observations (1 month and 4 months after the intervention). The data were collected using the National Nosocomial Infection Surveillance system and analyzed with EpiInfo 6.04 software (CDC).

Results:

A total of 27.771 patients-days and 12.278 ventilator-days were evaluated. 152 patients were observed during the pre-intervention period and 202 in the post-intervention period.

Table 1. Showed the results of adherence to Semirecumbent (>30) and the rates of VAP. Two surgical ICUs had their VAP rates reduced to zero for 3 months in the post-intervention period.

ICU	Pre-intervention Patients observed N:152	Post-intervention 1 month N:112	Post-intervention 4 months N: 90	P
Surgical	Semirecumbent (>30) 23 (30%) VAP/1.000 ventilator-days 14,7	Semirecumbent (>30) 37 (72%)	Semirecumbent (>30) 26 (63%) VAP/1.000 ventilator-days 8,7	<0.001 0.08
Clinical	Semirecumbent (>30) 32 (42%) VAP/1.000 ventilator-days 18.6	Semirecumbent (>30) 49 (81%)	Semirecumbent (>30) 37 (72%) VAP/1.000 ventilator-days 12.7	<0.001 0.09

Conclusions:

Standardizing the care of patient via the addition of an order specifying head-of-bed position significantly increased the number of patients who were placed in the Semirecumbent position and decreased the rates of VAP

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Achromobacter Xylosoxidans Bacteremia Acquired Following Urodynamic Studies (UDS)

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Background:

The prevalence of UTI following UDS ranges from 1-30% and bacteremia up to 7%, with most infections due to *E. coli*. *Achromobacter xylosoxidans* is a multiresistant, gram negative most often associated with nosocomial infections not associated community onset bacteremia or UTI in healthy hosts.

Objectives:

Describe an investigation of *Achromobacter* bacteremia associated with UDS.

Methods:

A 54 yo man underwent a UDS for prostatism on 10/2/2006 at 10:26. Pre-procedure urine was sterile. 72 hours later dysuria and malaise developed followed by rigors. He was hospitalized and started on levofloxacin . Urine culture grew *Achromobacter xylosoxidans* (resistant to Levofloxacin, Cefepime, Meropenem, aminoglycosides), initial blood cultures were negative. 48 hours later, fever persisted and repeat blood cultures grew *Achromobacter xylosoxidans*. A review of the UDS procedure log, observational visit, interview with the UDS staff and PFGE on the isolates was initiated.

Results:

Review of the UDS log indicated the patient preceding our patient, had a urine culture positive for *A. xylosoxidans* on 9/29/06 but negative pre-procedure sample on 10/2/06. His UDS was performed at 9:50 AM using the same system. The procedure was complicated by urine overflow. No additional cases were identified. The organisms from the index case, patient #1's UTI and blood isolates were run on PFGE and found to match. The T-doc system used on 10/2/06 was undergoing evaluation and was discontinued due to poor reliability and difficulty of use. The manufacturer cautioned users to avoid getting the cable connections "wet". We found that this cable connects directly to the patient urethral and rectal catheters and lays on or close to the patient's perineum and is subject to contamination. It is reusable and was previously wiped with alcohol between patients. The connecting ends of the T- doc are irregular surfaces and difficult to effectively disinfect with alcohol wipes. The T-doc catheter equipment with connector diaphragms is difficult to clean with alcohol wipes . This equipment could easily be contaminated with a patient's flora/body fluids and transferred to another patient by hands or gloved hands.

Conclusions:

This case of healthcare acquired *Achromobacter xylosoxidans* bacteremia was likely acquired due to contamination of the UDS monitoring device. We believe the patient was infected by inadequate cleaning of the surface wires and direct contact contamination. Recommendations to prevent further episodes included: cleaning of all surfaces of the equipment and cables from the machine to the patient between procedures. This emphasizes the importance of including reprocessing of equipment when considering equipment trials. For disinfection and cleaning to be effective , friction from wiping and "wetness " with adequate solution must occur.

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An Electronic Method for Rapid and Reproducible Ventilator-associated Pneumonia Surveillance

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Background:

Regulators and quality improvement advocates are increasingly encouraging hospitals to report rates of ventilator-associated pneumonia (VAP). Surveillance for VAP, however, is labour intensive, time consuming, and subject to disagreement between observers.

Objective:

To increase the efficiency and objectivity of VAP surveillance by adapting the CDC National Nosocomial Infection Surveillance (NNIS) definition to permit surveillance solely using electronic data from our hospital's clinical information systems.

Methods:

The NNIS definition was modified by setting quantitative thresholds for purely subjective criteria. Highly non-specific criteria such as delirium, rales, or tachypnea were eliminated. "Change in sputum character" was defined as the presence of moderate to many neutrophils on recent gram stain of pulmonary secretions. "Change in oxygenation" was defined as an increase in ventilator positive-end-expiratory-pressure of ≥ 5 cm H₂O or rise in fraction of inspired oxygen ≥ 15 mm Hg. The establishment of ventilator-change thresholds to diagnose VAP permitted us to rapidly screen large numbers of ventilated patients. Only patients whose ventilator support rose during hospitalization were reviewed for the radiographic changes, temperature, white blood cell count, and sputum purulence needed to render a NNIS diagnosis of VAP. The modified surveillance algorithm was validated by surveying all patients admitted to medical and surgical intensive care units during three-month periods in each unit. During the test periods, intensive care physicians were also surveyed weekly to identify patients with clinically suspected VAP. All patients identified by the surveillance algorithm and by intensivists were reviewed by an infectious disease specialist to assess the accuracy of diagnosis using the original NNIS criteria.

Results:

During the study periods 459 patients were ventilated for a total of 2,540 days. The surveillance algorithm detected 23 episodes of VAP, all of which were confirmed (100%). Intensivists suspected 31 cases of VAP, 17 (55%) of which were confirmed. Of the 17 confirmed cases found by intensivists, 16 were also identified by the algorithm. An additional 7 true cases were found by the algorithm alone.

Confirmed VAP	Identified by		
	Intensivists alone	Both	Algorithm alone
Yes	1 (7%*)	16 (100%)	7 (100%)
No	14	0	0
Total	15	16	7

* Predictive value positive

Conclusions:

Modification of NNIS VAP surveillance criteria by eliminating non-specific criteria and establishment of quantitative thresholds for subjective criteria permitted rapid, accurate VAP surveillance using electronic data from clinical information systems alone.

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Impact of Nurse Driven Multidisciplinary Rounds on Discontinuation of Unnecessary Urinary Catheters: a Possible Strategy to Reduce Infection

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Background:

Urinary tract infections (UTI) represent about 40% of hospital-acquired infections. Urinary catheters (UC) are used in about 20% of patients hospitalized and account for more than 80% of

hospital-acquired UTIs. Unnecessary use of UCs is common.

Objective:

Evaluate the effect of nurse driven multidisciplinary rounds on discontinuation of unnecessary UCs.

Methods:

A nurse trained in the UC use indications participated in daily multidisciplinary rounds on 10 medical-surgical units. The nurse manager, case manager, social worker, and nurses assigned to each patient comprised the rest of the team. During rounds, each patient was assessed for a UC presence and need. If no appropriate indication, the nurse was asked to contact the physician for discontinuation. Data was collected before (5 days), during (10 days) and one month post (5 days) intervention with control units used to evaluate changes in utilization. Similar data was collected from control units not receiving the intervention. UC use ratio, rate of unnecessary UC use, and discontinuation rate of unnecessary UCs were calculated.

Results:

Of 4963 evaluations, 885 had a UC (use ratio 0.18). There was a significant reduction in UC utilization from 203 per thousand patient days preintervention to 162 over the intervention period ($p = 0.002$). Postintervention, the rate increased to 187 per 1000 patient days compared to intervention ($p=0.05$) not significantly different from preintervention ($p=0.3$). The unnecessary use of UCs also decreased from 102 per thousand patient days preintervention to 64 per thousand patient days during intervention ($p < 0.001$), and significantly less than 91 per thousand patient days postintervention ($p=0.01$) (graph). No significant differences were present between pre- and postintervention. There was a significant difference in the use of unnecessary UCs pre-, during, and post-intervention (50.4% vs 39.6% vs 48.7%, $p=0.01$). The discontinuation rate of unnecessary UCs during intervention was 73 of 162 (45%). Seven UCs were reinserted after removal (9.5%). The control units included 1311 UC days and 5380 patient days with no significant differences in UC utilization for the different periods of the study.

Conclusions: A nurse led-multidisciplinary approach to evaluate the need for UCs in the hospital setting is associated with a reduction of unnecessary UC use and potentially a decrease in CAUTI. Efforts to sustain the effect of the intervention should focus on having a trained champion to continue this effort in each team.

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Adopting Infection Control Research into Practice: Indwelling Urinary Catheter Care in Community Nursing Homes

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Background

Nursing home (NH) residents with indwelling urinary catheters are at a high risk of infections & colonization with resistant pathogens. Advances made in the last decade have been translated into recommendations put forward by leading organizations to prevent catheter-associated complications. Whether these recommendations are used by NH is not known. We sought to assess the awareness & practices of urinary catheter care among NH healthcare workers.

Methods:

An anonymous, self-administered survey of healthcare workers in 7 NHs. The 71-item survey included questions about respondent characteristics, knowledge about indications, care & personal hygiene pertaining to urinary catheters as well as attitudes towards measures to prevent infection. We report responses for the full sample & comparisons between nurses and nurses' aides. Logistic Regression using generalized estimating equations (SAS) were used to adjust for clustering by facility & duration of employment.

Results:

A total of 356 of 440 healthcare workers responded (response rate of 81%); 337 were nurses and nurses' aides. Over 80% of healthcare workers identified the usual indications for use of long-term urinary catheters. Nurses were more likely to identify urinary retention untreated by intermittent catheterization (89% nurses vs. 74% aides, $P = .003$) and the presence of large wounds as indications for urinary catheters ($P = .02$). Over 90% of all healthcare workers were aware of practical resident and personal hygiene measures such as cleaning area around the catheter daily or after a bowel movement, glove use & hand hygiene before and after catheter manipulation. Healthcare workers were less aware of the following recommendations: not to disconnect catheter from its collection bag (59% nurses, 30% of aides gave correct responses, $P < .001$); not to routinely irrigate the catheter (50% nurses, 9% of aides gave correct responses, $P < .001$); and hand washing even after casual contact (60% nurses, 69% aides gave correct responses). The differences remained significant on multivariate analysis. In addition, healthcare workers were unaware of current recommendations on the use of alcohol gel.

Conclusion:

The gap between evidence and awareness of various catheter care practices is sizeable. Additionally, there is a wide discrepancy between nurses and aides' knowledge & beliefs regarding recommendations for care of residents with urinary catheters. Further research should focus on strategies to enhance adoption of proven recommendations pertaining to urinary catheters in NHs.

Table 1: Questionnaire Responses

Questions	Recommendation	% Correct		P value
		Nurses	Aides	
Clean area around catheter daily	Yes	95	93	0.6
Clean area around catheter after bowel movement	Yes	97	98	0.8
Catheter should be secured below level of bladder	Yes	91	92	0.8
Catheter should be changed monthly	No	24	12	0.01
Catheter should be changed if resident has a urinary infection	Unclear	85,yes	96,yes	0.001
Catheter should be changed on admission	No	55	14	0.001
Catheter should be irrigated periodically	No	50	9	0.001
Catheter and its drainage bag can be disconnected	No	59	30	0.001
Healthcare workers should perform hand hygiene after casual contact with a patient	Yes	60	69	0.1
Healthcare workers can use alcohol gel if hands are not soiled	Yes	35	40	0.48

Poster Session
 15-27 Infections in Compromised Patients
 10:00 am - 4:00 pm

Grand Ballroom

