

## Post-Meeting Abstracts Addendum

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### Abstract Updates

- The following abstracts were omitted from the *Final Program*. These abstracts were accepted for presentation at the 18<sup>th</sup> Annual Scientific Meeting and displayed as posters onsite.

#### **The Epidemiology of Hematogenous Vertebral Osteomyelitis: A Cohort Study in a Tertiary Care Hospital**

Kavita P. Bhavan, MD MPH, Jonas Marschall, MD, Margaret A. Olsen, PhD, Victoria J. Fraser, MD, Neill M. Wright, MD, David K. Warren, MD, MPH

Disclosure Block: J. Marschall, None

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**Background:** Vertebral osteomyelitis is one of the most common manifestations of osteomyelitis in adults and is associated with considerable morbidity. Few studies describe the epidemiology of hematogenous vertebral osteomyelitis and its management.

**Objective:** To study the epidemiology, diagnosis, and treatment of hematogenous vertebral osteomyelitis in a tertiary care center.

**Methods:** We retrospectively reviewed medical records of adult inpatients who presented or were diagnosed with hematogenous vertebral osteomyelitis at a tertiary care hospital in St. Louis, Missouri, between 1/1/2004 - 12/31/2005. Post-surgical ( $\leq 1$  year) and trauma-related infections were excluded. Results: Seventy patients with hematogenous vertebral osteomyelitis were identified; the mean age was 59.7 years ( $\pm 15.0$ ) and 38 (54%) were male. The median body-mass index was 27.2 (range 13.4-80.6). Comorbidities were common, including diabetes (30 pts;

43%) and renal insufficiency (17; 24%). In the 30 days prior to admission, 13 (19%) had a documented bacteremia, 12 (17%) had a skin/soft tissue infection, and 21 (30%) had an indwelling catheter. Back pain was present in 61 (87%) pts, weakness in 39 (56%), fever in 32 (46%), and 9 (13%) pts reported stool and/or urine incontinence. A neurological exam was documented in 66 (94%) pts, among whom 46 (70%) had decreased deep tendon reflexes, 40 (60%) had impaired motor strength, and 29 (44%) had sensory deficits. 10/33 (30%) pts who had a rectal exam performed were found to have decreased rectal tone. Twenty-nine (41%) pts had diagnostic needle biopsy and 12/29 (41%) had a positive culture; 15 (21%) pts had open biopsy with 12 (80%) resulting in positive culture ( $p=0.02$ ). The median time from admission to bone biopsy was 2.5 days (range 0-69). Twenty-five (57%) of 44 pts who had bone biopsies received antibiotics prior to biopsy. Pathogen recovery from biopsy samples did not differ whether pts had been started on empiric antibiotics or not [15/25 (60%) vs. 9/19 (47%);  $p=0.4$ ]. Forty-six (66%) pts had a positive bone or blood culture: Methicillin-susceptible *S. aureus* (MSSA) was recovered in 15/46 (33%) cases, followed by MRSA (10, 22%), coagulase-negative staphylococci (7, 15%), *Streptococcus* spp. (4, 9%), *E. coli* (3, 7%), *P. aeruginosa* (2, 4%), & *E. faecalis* (2, 4%). 3/46 (7%) infections were polymicrobial. Sixteen (23%) pts had a surgical procedure performed during admission, including laminectomy/discectomy in 10 (14%) pts, and laminectomy/vertebral fusion in 5 (7%) pts.

**Conclusions:** This is one of the largest series of hematogenous vertebral osteomyelitis. In 1/3 of cases bone biopsy culture results guided treatment. Open biopsies had a higher yield than needle biopsies. Antibiotic exposure before the biopsy did not negatively impact pathogen recovery.

#### **Is the Prolonged Use of Minocycline/Rifampin-Coated Catheters (M/R-CVC) Associated with Increased Resistance: A Seven Year Experience in a Tertiary Cancer Center**

Elizabeth R. Ramos, MD, Ying Jiang, MS, Ray Hachem, MD, Cheryl Perego, MPH, Jeffrey Tarrand, MD

Disclosure Block: E.R. Ramos, None

MD Anderson Cancer Center, Houston, TX

**Background:** Since its introduction in 1999 at MD Anderson Cancer Center (MDACC), M/R-CVC has shown decreased catheter-related bloodstream infection (CRBSI) rates in different patient populations. However, there is limited data

and a major concern regarding the possible increased resistance to the antibiotics used in coating these devices.

**Objective:** In order to identify the impact of M/R-CVC on the resistance to tetracycline and rifampin (RIF) we evaluated antibiograms in two periods: 1999 and 2006.

**Methods:** Antibiotic susceptibilities to RIF and tetracycline from all *Staphylococcus aureus* (SA) and coagulase-negative *Staphylococci* (CNS) strains isolated between 1999 and 2006 from cancer patients were obtained from the clinical microbiology laboratory at a university affiliated tertiary cancer center. CRBSI Incidence density per 1000 days was calculated from the database of the infection control surveillance in intensive care units (ICU).

**Results:** Between 1999 and 2006, MDACC utilized 9200 M/R - CVCs with mean dwell time of 55.6 days and total of 511520 catheter days. During this period there were a total of 11183 SA and 8254 CNS clinical isolates tested. Surprisingly, from 1999 to 2006 the resistance trend among SA and CNS isolates to tetracycline and RIF either improved ( $p < 0.001$ ) or did not change (Table). However, CRBSI incidence density per 1000 days in ICU significantly and gradually decreased from 8.5 in 1998 to 1.3 in 2006 ( $p < 0.001$ ).

Antibiotic	Organism	1999		2006		P
		No.	Resistance (%)	No.	Resistance (%)	
Tetracycline	SA	1228	10	1497	5	<0.001
	CNS	1223	25	784	14	<0.001
RIF	SA	1228	4	1497	3	0.16
	CNS	1223	11	784	5	<0.001

**Conclusion:** M/R CVC use is not associated with long term increased staphylococcal resistance to tetracyclines and rifampin however it represents a crucial strategy to significantly decrease CRBSI in critically ill cancer patients.

**A Local Hand Hygiene Campaign to Improve Compliance among HCWs in a 1500-Bed Tertiary Care University Hospital**



Wolfgang Kohnen, PhD, Rita Metz, Norbert Mesenich, Gabriele Robinson, Christian Schwab, Susanne Teske-Keiser, Klaus Adler, Simone Jung, Bernd Jansen, MD, PhD

Disclosure Block: B. Jansen, None

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**Background:** The University Clinic of Mainz is a 1500 bed tertiary care hospital with approximately 60,000 admissions per year. Nosocomial infection surveillance is done in 16 departments by the KISS method (national nosocomial surveillance system). On 3 consecutive days in 2007 (2/28-3/2) we performed a hand hygiene campaign in order to improve the compliance of HCWs to hand hygiene.

**Objective:** To determine the quality of the hand hygiene technique of individual HCWs by means of a test using a fluorescent disinfectant. To assess by means of a questionnaire whether the campaign has led to an overall improvement in hand hygiene compliance.

**Methods:** The hand hygiene project was announced prior to the start of the campaign via the clinic's intranet. A booth with information material (posters, flyers, handouts) was posted on day 1 in the clinic canteen, on day 2 in the general surgery department and on day 3 in the building harboring the ear-nose-throat, gynecology and ophthalmology departments. A special feature of the booth was a black box in which the quality of the individual hand hygiene procedure of HCWs could be visualized by using a disinfectant containing a fluorescent dye. Further, a hand swab was taken from each participant before and after hand disinfection. The hands after disinfection were photographed with a digital camera to facilitate computer-aided evaluation (Fig.1). A consecutive number was assigned to each participant allowing him to view his result in the intranet. After the campaign, a questionnaire was sent out to all HCWs to determine a possible improvement of the compliance by self-assessment.

**Results:** A total of 442 HCWs participated at the hand hygiene test with the fluorescent disinfectant. Of these, only 22% had disinfected their hands correctly (showing complete wetting of hands). The other participants exhibited incomplete wetting especially of palm, thumb and distal ends of the fingers. Evaluation of the questionnaires sent out to all HCWs revealed (i) that a total of 579 persons had participated (representing 13% of all doctors and 17% of all HCWs in medical care) (ii) approx. 70% of participants reported basic knowledge of hand hygiene technique before the campaign which improved only slightly to 75% after the campaign (iii) 80% had noticed the hand hygiene campaign and (iv) that by self-assessment 35% of the participants reported an improvement in hand hygiene compliance after the campaign (increase in frequency, better technique).

**Conclusions:** Although basic knowledge of a good hand hygiene technique is present at most HCWs before the campaign, this knowledge is not used in practice. The campaign has obviously led to a better compliance in hand hygiene in a third of HCWs participating at the survey.

**Getting the Eye of the Administrators: Utilizing a Scorecard to Improve Quality of Care Quality Assessment Quality Assessment Scorecard Quality Safety**

Allison L. Sabel, MD, PhD, MPH, CMQ, Kendra Moldenhauer, RN, Philip S. Mehler, MD

Disclosure Block: A.L. Sabel, None

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**Background:** Administrative involvement in infection control is underutilized despite data showing that support from

leadership is crucial to drive change. Healthcare facilities face federal and state external mandates to provide high quality patient care. Hospitals also must recognize individualized issues that impact their delivery of care. Consumer demand for public reporting of health facility acquired infections (HAIs) continues to increase and many policymakers across the nation have recognized this demand. This pressure has led 20 states to pass laws requiring mandatory reporting of HAIs since 2004. With the Centers for Medicare and Medicaid Services requiring that an infection not be present on admission for payment and the push towards value based purchasing, hospitals will face new financial incentives for reducing infection related diagnoses. Quality scorecards have been used by executive staff to track measures of importance in many institutions.

**Objective:** Develop a scorecard to track select external mandates and internal issues that impact quality of care and infection control.

**Methods:** We developed a 37-metric scorecard based on suggestions from executive staff, Quality and Safety manager, Medical Biostatistics director, and Infectious Disease division chief. Graphs were created for each measure to show trends.

**Results:** Inpatient measures were selected for the emergency department, intensive care units, rapid response system, surgery and obstetrics services, medical records, patient complaints, incident reporting system, and infection control. Ambulatory measures focused on preventative screening, immunizations, and chronic disease management. Table 1 lists the metrics and highlights the relevant infection control data. Data are reviewed by the Associate Medical Director every month and distributed to the Directors of Service and Executive Staff on a quarterly basis. The communication of these results by upper management has increased awareness of infection control throughout the institution. Over the past two years we have seen improvements in prophylactic perioperative antibiotic timing, decreased central line associated bacteremia, decreased ventilator-associated pneumonia, and increased adult immunization rate.

[See Table](#) (please magnify)

**Conclusions:** Administrative involvement is a necessity to providing high quality care. Metrics need to be shared with hospital leadership so that they can hone their organization's improvement efforts. With public reporting of HAIs occurring in almost half of the states, consumers will be able to compare facilities in order to choose the hospital that provides the best quality of care. In addition, hospitals will gain financially by decreasing infections.

### **Epidemiological Investigation of a Case of Nosocomial Legionnaires' Disease in Taiwan - Implication of Routine Environmental Surveillance Healthcare-Acquired Pneumonia**

Yusen E. Lin, PhD, MBA<sup>1</sup>, Shang-Tao Chien, MD<sup>2</sup>, Jui-Chen Hsueh<sup>2</sup>, Hsi-Hsun Lin, MD<sup>3</sup>, Hsiu-Yun Shih, MS<sup>1</sup>, Tai-Min Lee, MD<sup>2</sup>, Shao-Ting Chou, MD<sup>2</sup>, Ren-Jy Ben, MD<sup>2</sup>, Cher-Min Fong, PhD<sup>4</sup>

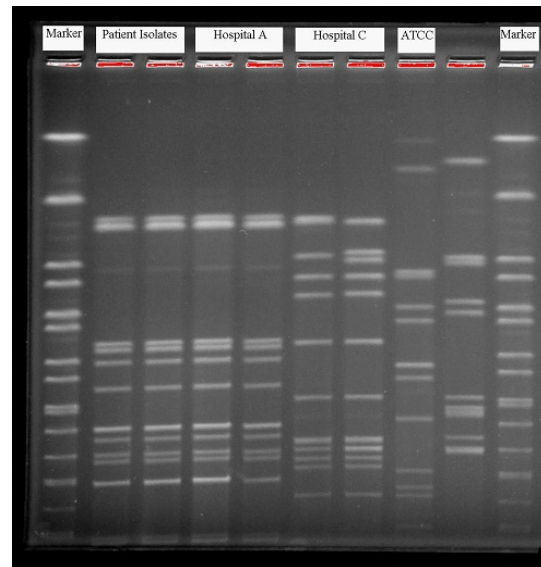
Disclosure Block: Y.E. Lin, None

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**Background:** Culturing hospital water system for Legionella may prevent the nosocomial Legionnaires' diseases (LDs). However, it is not currently mandated in Taiwan, and nosocomial LDs were rarely reported in Taiwan and epidemiological investigations of the infection causing organism have never been systematically performed. A case of atypical pneumonia was discussed which the patient is hospitalized in 3 hospitals within 2 weeks. This case would have been underdiagnosed if the hospital does not perform routine environmental surveillance for Legionella and does not anticipate the occurrence of nosocomial cases of LD.

**Objective:** To determine the source of infection responsible for a case of nosocomial LD. **Methods:** Water distribution systems of the 3 hospitals (Hospitals A, B, and C) were cultured for Legionella. Legionella isolate from patient specimen was compared with the isolates from the hospital water systems using pulse field gel electrophoresis (PFGE).

**Results:** The patient was first hospitalized at Hospital A for productive cough and fever for one month. The patient was discharged, but re-hospitalized at Hospital B due to shortness of breath and fever. Four days later, the patient was transferred to the intensive care unit at Hospital C. Later, an order for testing Legionella in clinical specimen was given by the physician at Hospital C because the physician was aware that the hospital water system was contaminated with Legionella at the average distal site positive rate of 27%. The patient's sputum yielded L. pneumophila serogroup 3. Environmental surveillance of the water systems in Hospitals A, B, and C revealed that L. pneumophila colonization was found in all three hospitals. However, only Hospitals A and C had L. pneumophila serogroup 3, the matching serogroup. The subsequent molecular typing of DNA by PFGE showed that the infection causing organism that matched the patient's isolate came from Hospital A (Figure 1). Appropriate antimicrobial therapy was initiated and the patient was discharged 3 weeks later.



**Conclusions:** Environmental monitoring followed by clinical surveillance appears to be successful in uncovering previously unrecognized cases of nosocomial LD. We suggest hospitals should culture their water supplies for Legionella colonization routinely. If Legionella is found in water supply, higher index of suspicion should be given to patients with nosocomial atypical pneumonia. Supplemental on-site disinfection of hospital water system for Legionella may be necessary if cases of nosocomial LD continue to occur.

## Outbreak of Methicillin-Resistant *Staphylococcus aureus* in a Medical-Surgical Critical Unit

Maxima Lizan-Garcia, MD, PhD, Jesus Garcia Guerrero, MD, Ramon Peyro, MD, Amparo Marin, MD, Manuel Cortiñas, MD, PhD

Disclosure Block: M. Lizan-Garcia, None

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Background: Methicillin-Resistant *Staphylococcus aureus* (MRSA) is an important clinical problem and has become endemic in many institutions and frequently causes nosocomial outbreaks. Moreover, infections caused by these organisms are associated with considerable morbidity and mortality. Active surveillance allows for early detection of cases and a better control of the transmission.

Objective: To describe an outbreak of MRSA in a Medical-Surgical Critical Unit (ICU)

Methods: The study was carried out in the emergency and medical-surgical ICU of a 550-bed teaching hospital where a prospective surveillance of Nosocomial Infection program is working from 1996. A monthly report was sent to the supervisor and ICU head and suspected outbreaks -defined as two cases of the same strains- were immediately investigated thorough identification of MRSA carriers with microbiological culture swab from nasal, armpit and groin. A third case implied a confirmed outbreak and the review of procedures with ICU staff was implemented. The strains isolates were identified by standards culture techniques and the typing of strains was carried out by pulsed field gel electrophoresis (PFGE). The Chen Method for cluster analysis was used and the Statistical Analyses were carried out using EPIDAT release 3.0.

Results: From 29 March to 31 April the total of 25 UCI patients were studied. Two clusters were identified. Ten patients were infected with MARS. Two of them were detected at the recovery. Seven patients share the same strain. The ratio infected: colonized was 0,42. The respiratory tract was he site more frequently colonized. The density of incidence increased from 3 x 1000 patient-day to 9,9 x 1000 patients-day in the epidemic period. The 15 May we consider that the outbreak was finished.

Conclusions: The early detection of cases infected with MARS thought the Nosocomial Infection program allow the implementation of measures with identification of MRSA carriers and review of procedures avoiding the spread of germs and limiting the duration of outbreaks.

- Page 104, abstract 175, was withdrawn.
- The following abstract presentation was displayed on poster board number 175:

### Populations at Low Risk for Methicillin-Resistant *Staphylococcus aureus* Bacteremia: Potential Target for Vancomycin Restriction

Marin L. Schweizer, BS<sup>1</sup>, Jon P. Furuno, PhD<sup>1</sup>, Anthony D. Harris, MD, MPH<sup>1</sup>, Jessina C. McGregor, PhD<sup>2</sup>, Kerri A. Thom, MD<sup>1</sup>, Eli N. Perencevich, MD, MS<sup>3</sup>

Disclosure Block: M.L. Schweizer, Cubist Pharmaceuticals, Grantor/Corporate Organization, Consultant; Pfizer Inc, Grantor/Corporate Organization, Grants/Research Support

<sup>1</sup>University of Maryland, Baltimore, MD, <sup>2</sup>Oregon State University, Portland, OR, <sup>3</sup>VA Maryland Health Care System, Baltimore, MD

Background: Vancomycin is the predominant empiric and definitive therapeutic agent for treatment of suspected and confirmed *S. aureus* bacteremia. However, unnecessary vancomycin use contributes to antibiotic selective pressure. "Know when to say no to vanco" is listed as a step in the Centers for Disease Control and Prevention's Campaign to Prevent Antimicrobial Resistance. Since a rapid diagnostic test for methicillin-susceptible and methicillin-resistant *S. aureus* bacteremia is not currently available, identification of populations at low risk for MRSA may be useful to reduce vancomycin overuse.

Objective: Identify potential patient groups at low risk for MRSA bacteremia, which could be targeted for restricted vancomycin.

Methods: We studied all adult patients admitted to the University of Maryland Medical Center between 1/1/2001 and 12/31/2005 who had a blood culture collected and received any empiric systemic antibiotic therapy. Bivariate analyses were used to measure patient characteristics protective against MRSA bacteremia. Negative predictive values (NPVs) were calculated to assess the ability of certain patient characteristics to predict the absence of MRSA bacteremia.

Results: Among 25,378 admissions, 287 (1%) had an MRSA bacteremia. Diabetes (relative risk (RR)=0.72, p=0.06), malignancy (RR=0.56, p<0.01), and culture collected beyond 48 hours of admission (RR=0.65, p<0.01) were associated with decreased risk of MRSA bacteremia. These characteristics were used to create two low-risk subpopulations. Subpopulation 1: Of the 513 patients with both diabetes and malignancy, only two had MRSA bacteremia (NPV=99.6%). Approximately 21% of this subpopulation received empiric vancomycin, including only one of the two patients with MRSA bacteremia. Subpopulation 2: Of the 152 patients with both diabetes and malignancy and a culture collected beyond 48 hours, no patients had MRSA bacteremia (NPV=100%). However, 15% of this subpopulation received empiric vancomycin. Despite the reduced risk of MRSA in these subpopulations, the proportion of patients in subpopulation 2 who received empiric vancomycin was similar to that of the overall population (15% of subpopulation 2 vs. 17% of the remainder of the population p=0.59). Patients in subpopulation 1 were significantly more likely to receive empiric vancomycin compared to patient in the overall population (21% of subpopulation 1 vs. 17% of the remainder of the population, p=0.01).

Conclusions: Identification of populations at low risk for MRSA may prove useful in regards to reducing unnecessary vancomycin use. In this tertiary-care hospitalized cohort, patients with diabetes, malignancy and who had cultures collected beyond 48 hours of admission were at very low risk for MRSA bacteremia. This subpopulation could be targeted for vancomycin restriction during empiric therapy for suspected bacteremia.

- Page 117, Abstract 232  
Correction: Michael D. Schock

## Program Addendum

Sunday, April 6

- Session 24 was cancelled and does not appear in the *Program-at-a-Glance* or the *Scientific Program Schedule*.
- Page 23  
Submitted Scientific Papers  
21. National Surveillance Systems  
11:15 a.m.  
Alicia I. Hidron, MD  
Affiliation: Centers for Disease Control and Prevention (CDC)  
Atlanta, GA
- Page 25  
Submitted Scientific Papers  
29. Healthcare-Associated MRSA  
2:45 p.m.  
Presenter: Eli Perencevich, MD, MS  
VA Maryland Health Care System  
Baltimore, MD

**Tuesday, April 8**

- Page 38  
Plenary  
67. Controversies in Critical Care: Pro and Con  
8:30 a.m.  
*Selective Digestive Decontamination and Ventilator Associated Pneumonia: Pro*  
Speaker: TBD  
Replacing: Wolfgang A. Krueger, MD  
Tuebingen University Hospital  
Tuebingen, Germany
- Page 38  
Plenary  
68. Respiratory Infections  
11:00 a.m.  
*Preventing Transmission of MDR and XDR Tuberculosis*  
Speaker: Rogier van Doorn, MD  
Hospital for Tropical Disease  
Ho Chi Minh City, Vietnam  
Replacing: Menno de Jong, MD  
Hospital for Tropical Disease  
Ho Chi Minh City, Vietnam