Methods: At a regional hospital, from January 2011 to October 2014, all enterobacteriaceae isolates fulfilled CRE criteria were enrolled. If the isolates were from patients hospitalized for 2 days or longer, they were categorized as hospital-acquired infections (HAI). The remaining isolates were further categorized as nursing home-acquired infections (NHAI), if the patients were readmitted within 90 days of discharge from a prior hospitalization; or community-acquired infections (CAI), if the patients came from the general community and did not fulfill HCAI or NHAI definition.

Results: A total of 68 CRE isolates were enrolled. Of all CRE, 38.2% (26/68), 36.8% (25/68), 13.2% (9/68), and 11.8% (8/68) of CRE were categorized as NHAI, HAI, CAI, and CAI, respectively.

Conclusions: As a result of this study, 75 % (51/68) of CRE acquired from nursing home and hospital, especially the number of CRE was similar between nursing home and hospital. Accordingly, we suggest that monitoring CRE and intervention of infection control measures should extend to nursing home in order to reduce the incidence of CRE.

THE MOST FREQUENT SPECIES OF CARBAPENEM-RESISTANT ENTEROBACTERIACEAE AT A REGIONAL HOSPITAL

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Purpose: Carbapenem-resistant Enterobacteriaceae (CRE) is defined as Enterobacteriaceae resistant to any of carbapenem, including ertapenem, imipenem, meropenem, and doripenem. This study was conducted to explore the most frequent species of CRE.

Methods: This was a retrospective study at a regional hospital in southern Taiwan. From January 2013 to May 2014, all isolates of CRE reported from clinical microbiology laboratory were enrolled in this study. Antimicrobial susceptibility testing was performed by a standard disk diffusion method. The results were interpreted according to criteria recommended by the Clinical and Laboratory Standards Institute 2013 and 2014, respectively. All intermediate results were regarded as resistant in this study.

Results: A total of 80 CRE isolates were collected which included 42 (52.5%) Klebsiella pneumoniae, 12 (15%) Escherichia coli, 11 (13.8%) Enterobacter cloacae, 5 (6.3%) Providencia stuartii, 2 (2.5%) Klebsiella ozaenae, 2 (2.5%) Enterobacter aerogenes, 2 (2.5%) Citrobacter koseri, 1 (1.3%) Enterobacter brakki, 1 (1.3%) Providencia rettgeri, 1 (1.3%) Klebsiella oxytoca, and 1 (1.3%) Morganella morganii.

Conclusions: The most frequent species of CRE in this hospital were K. pneumoniae, E. coli, and E. cloacae. The three species accounted for 81.3% of CRE isolates. Not surprisingly, those are the frequent Enterobacteriaceae causing infections and using antibiotics for treatment in clinical practice. However, E. coli infections were more than K. pneumoniae infections, but the number of carbapenem-resistant K. pneumoniae was more than carbapenem-resistant E. coli. Hence, we think the reason why K. pneumoniae is the frequent species of CRE can be worth further investigations.

Effective Therapy of Imipenem and Colistin for Pneumonia Caused by Klebsiella pneumoniae Harboring blaKPC-17 Gene: A Case Report

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Purpose: Klebsiella pneumoniae carbapenemase (KPC) is one of the most common carbapenemases. KPC-2-containing K. pneumoniae (KPC-2-KP) has been the most worldwide spread and has arrived in Taiwan. Meanwhile, an outbreak of KPC-17-KP is ongoing in southern Taiwan. We report pneumonia caused by a KPC-17-KP strain.

Case report: A 76 years old man of dementia had fever and pleural effusion. There were no chills, no chest pain, no abdominal pain and no nausea and vomiting. The consciousness was clear and BP showed 105/69mmHg. Laboratory data revealed WBC, 13,900/μL and C-reactive protein (CRP), 19.5 mg/L. Antibiotic of moxifloxacin was given. As unstable 02 saturation, left lung consolidation and septic shock, antibiotic with piperacillin-tazobactam was prescribed, which was shifted to imipenem while sputum culture yielded Escherichia coli with extended-spectrum β-lactamase (ESBL-E. coli) pheno-type. CRP increased to 188.3 mg/L. As hemodynamic instability depending on high-dose vasopressor and unstable O2 saturation (SpO2: 93-94%), the patient was intubated with ventilator support. We provided fluid resuscitation, vasopressor infusion, lung protective ventilation with low tidal volume and high PEEP. CXR showed partial resolution of consolidation with residual ground glass opacities. But WBC increased to 26,700/μL and procalcitonin was 27.4 mg/mL. Follow-up sputum culture yielded imipenem-resistant K. pneumoniae, which was later confirmed as a KPC-17-KP by PCR and DNA sequencing. In addition, he had intermittent spiking fever. Antibiotic imipenem was added colistin and then his condition was getting improvement. He was discharged uneventfully after 5 weeks of hospitalization.

Conclusions: We report a patient with ESBL-E. coli pneumonia followed by KPC-17-KP pneumonia after imipenem therapy. Combination of imipenem with colistin achieved a good clinical outcome.

CONTROL OF MULTIPLE-DRUGS RESISTANT ORGANISMS (MDROS) IN SURGICAL WARD OF A GENERAL HOSPITAL IN HONG KONG

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Purpose: There was increased of MRSA infections at the surgical ward since early 2013 and a VRE outbreak was reported in April 2013. This increased concern and suggested to have improvement on infection control (IC) and caring practices. Then a quality IC program has been implemented to ward to control the MDRO infections.

Methods: 1. Enhanced staff’s awareness by: briefing sessions, posting up related information (e.g. MDRO statistics), ICNs participated the departmental meetings.
2. Improved caring practices: Hand hygiene, procedures for bladder irrigation, catheter care for urology patients, ward care and dressing
3. Conducted patrols and audits on hand hygiene by IC link nurses and ICNs
4. Reinforced environment cleansing by using advanced cleaning /disinfection agent and conducting regular audits
5. Provided designated equipment such as stethoscopes, blood pressure monitors etc. for patients with MDROS
6. Enhanced the cleaning of linen and blankets for patients
7. Promoted patient’s awareness on hand hygiene with slogans, leaflets, banner and offering of alcohol wipers for patients to disinfect hands
Results: 1. No MDRO outbreak reported from surgical ward since April 2013
2. MRSA rate decreased from the peak 2.5 (April 13) to 0.8 (April 14) per 1000 pbd
3. Staff hand hygiene compliance rate improved from 77% to 82%


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Background: MRSA causes severe infections with considerable morbidity. Antimicrobial susceptibility test (AST) help physicians to choose appropriate
antibiotics to save lives. The goal is to compare various AST results of MRSA against antibiotics.

Materials and Methods: MRSA from sterile sites were collected from 22 hospitals (Tegaclycin In-vitro Surveillance in Taiwan – TIST 2006-2010) and tested of MIC against antibiotics with variable AST: agar dilution (OX) and vancomycin (VA); Etest for VA and daptomycin (DAP), and Vitek-II automated system for OX, VA, and DAP. Molecular types including SCCmec, spa, and dru were determined by PCR and nucleotide sequencing. The differences of MICs by various AST and correlation of MICs with molecular types were analyzed.

Results: Totally, 670 mecA+ MRSA from sterile sites were collected. The MIC50/MIC90 against VA by agar dilution, Etest, and Vitek-II were 0.25/0.38 and 1/1 mg/L, respectively. The DAP MIC50/MIC90 by Etest and Vitek-II were 2/2 and 1/1 mg/L, respectively. The OX MIC50/MIC90 by agar dilution and Vitek-II were 256/256 and 4/4 mg/L, respectively. The VA arithmetic/geometric mean MICs by Etest (1.87/1.81 mg/L) were higher than agar dilution (1.42/1.36 mg/L) and Vitek-II (0.94/0.87 mg/L) (< 0.001). In contrast, the DAP arithmetic/geometric mean MICs by Etest (0.28/0.24 mg/L) were lower than Vitek-II (0.79/0.67 mg/L) (< 0.001). The number of OX MIC ≥ 4 mg/L (i.e., resistant phenotype) by agar dilution was more than Vitek-II (p < 0.001). Higher VA MICs were noted in molecularly HA-MRSA (e.g., SCCmec IV & III; spa t002 & t037; dru4, 13, and 14) than CA-MRSA (e.g., SCCmecV, V, and VI; spa t437 & t1081; dru & 11) (< 0.05).

Conclusions: Significant differences between AST against VA, DAP, and OX were found among MRSA. Increase in VA MIC may predict treatment failure in patients infected with HA-MRSA.

EVALUATION OF CEFTAROLINE ACTIVITY AGAINST METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS IN A REGIONAL HOSPITAL IN HONG KONG

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Purpose: Ceftaroline fosamil is a new cephalosporin with broad spectrum bactericidal activities against a broad range of organisms including methicillin-resistant S. aureus (MRSA). It was approved in the USA and European countries in 2010 and 2012 for acute bacterial skin and soft tissue infections and community acquired pneumonia. It was registered in Hong Kong in 2013 and its activity against local strains, especially MRSA, remained uncertain.

Methods: We prospectively retrieved 61 isolates of MRSA and 6 isolates of methicillin sensitive S. aureus (MSSA) recovered from blood cultures (unique patient) received in Queen Elizabeth Hospital, Hong Kong, between 2013 and 2014. Bacterial isolates were tested for susceptibility to ceftaroline according to disk diffusion methods of the Clinical and Laboratory Standards Institute (CLSI). QC strains included S. aureus ATCC 25923 and S. epidermidis ATCC 12228 were used. All QC results were within published CLSI ranges.

Results: Out of the 61 MRSA tested, 1.6% (1/61) was resistant ceftaroline, 4.9% (3/61) of the isolates were intermediate, and the remaining 93.4% (57/61) remained susceptible. All the 6 MSSA strains tested were sensitive to ceftaroline.

Conclusion: The local strains of MRSA are not universally susceptible to Ceftaroline, antimicrobial susceptibility test must be performed before decision to switch to this agent.

DETECTION OF TWO NOVEL PLASMID-BORNE AMPC GENES (BLA<sub>AMPC</sub>-<sub>1</sub> AND BLA<sub>AMPC</sub>-<sub>2</sub>) FROM ENTEROBACTER CLOACAE ISOLATES IN SOUTHERN TAIWAN

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Purpose: The plasmid-borne extended-spectrum β-lactamases (ESBLs) and AmpC β-lactamases in Enterobacter spp have been reported in recent years in Taiwan and may result in diagnostic and therapeutic challenges. In this study, we detected the plasmid-borne AmpC β-lactamase and ESBL genes from Enterobacter cloacae bloodstream isolates in a medical center in southern Taiwan.

Material and methods: A total of 41 non-repetitive blood isolates of E. cloacae resistant to ampicillin, ceftazolin and cefazidime were investigated. ESBL and AmpC resistance genes were detected from plasmid using multiplex PCRs and DNA sequencing. A series of primers were used to detect the ESBL (SHV, TEM and CTX-M) and AmpC (ACT, DHA, and MIR) β-lactamase genes. Conjugation experiments were conducted to confirm the resistant gene transferability.

Results: Detection of plasmid-borne genes included bla<sub>TEM-1</sub>, bla<sub>SHV-12</sub> (48.8%, 20/41); bla<sub>CTX-M-15</sub> (22%, 9/41); bla<sub>CTX-M-2</sub> (2.4%, 1/41) and bla<sub>ampc</sub> (73.2%, 30/41), including bla<sub>ampc-1</sub> (n = 26) and bla<sub>ampc-2</sub> (n = 3). The bla<sub>ampc-1</sub> was detected in 7 isolates, in which 4 isolates also harbored a bla<sub>bla</sub> and a bla<sub>bla</sub> in the other 3 isolates harbored an additional bla<sub>ampc-2</sub>. Two novel plasmid-mediated ampC genes designed bla<sub>ampc-1</sub> (GenBank accession number JQ673557) and bla<sub>ampc-2</sub> (GenBank accession number JQ647333) were detected. The bla<sub>ampc-1</sub> gene has a 99% similarity to a chromosome-borne ampC gene in E. cloacae ATCC 13047 strain, and has a 90% similarity to a novel bla<sub>ampc</sub> gene from plasmid of K. pneumoniae. The ampC-encoded plasmids (including bla<sub>ampc-1</sub>) could be successfully conjugated in the experiments. The bla<sub>ampc-1</sub> was highly prevalent and bla<sub>ampc-2</sub> and bla<sub>ampc-2</sub> first emerged in E. cloacae.

USE OF INFORMATION SYSTEMS TO IMPROVE THE INCIDENCE OF CRAB

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Purpose: CRAB Regional Hospital in Taiwan by 2004 to increase the proportion of nosocomial infection surveillance in accordance with the Taiwan Information Systems (TINS) data show that 34% to 77% in 2013. Court from 2008 to 2011 the whole hospital isolates of drug susceptibility testing Acinetobacter baumannii for Carbapenem (imipenem or meropenem) drug susceptibility testing is reduced from 97% to 60%, we can see there is an apparent increase in hospital CRAB trends (2011 ICU detection rate of 45.5%).

Methods: When to validate the test results, it will use the computer to dangerous values notification system will be resistant to the message issued by the hospital Medical laboratory scientist warning to inform clinical unit, on-site contact isolation precautions will be taken immediately informed of the message, and to remind physicians to open a contact isolation doctor’s advice.

Results: 2012 and the first half of the hospital CRAB detection ratio comparing the first half of 2011 decreased by 44% to 32%. Continuously monitor hospital ICU healthcare associated infections CRAB strains have been detected in the ratio of 45.3% in 2011 to 20% in 2013.

Conclusions: A wide range of drug-resistant strains have been omnipresent, how to avoid its spread and cause bunching, is a major challenge we have to face, only the continued implementation of the relevant constant sense and evaluate the effectiveness of control measures and whether they implement it, can only provide a good healthcare environment and enhance patient safety.