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### Community-acquired Bacteremia with an ESBL-producing *E. coli*

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**BACKGROUND** ESBL-producing organisms are usually hospital-acquired; however, we recently encountered a patient with community-acquired bacteraemia with an ESBL-producing *Escherichia coli* and report it here.

**CASE REPORT** A 50-year-old woman presented with a three-day history of fever, chills and rigors. There was a mild headache but no cough, dysuria, diarrhoea or vomiting. There was a history of dilation and curettage (one year before) for perimenopausal bleeding. She had received no antibiotic during her two-day stay. Uterine curettings were negative for malignancy and were culture-negative for *Chlamydia* and Mycobacteria. She had received a one-week course of amoxicillin from her dentist a few months before admission. She denied contact with sick persons. The blood pressure was 54/32; no localising signs were found. She was resuscitated and started on broad-spectrum antibiotics. Blood cultures yielded an ESBL-producing *E. coli* sensitive to piperacillin-tazobactam, ciprofloxacin, gentamicin and imipenem. ESBL was detected using the Double-Disk Diffusion test. She was put on piperacillin-tazobactam and completed a 10-day course of the drug before being sent home on ciprofloxacin. Evaluation for a source of the bacteraemia was unyielding apart from a colonic diverticulum. The urinalysis was normal, as was a CT scan of the abdomen and pelvis.

**DISCUSSION** The recovery of an ESBL-producing organism from her blood is worrying. She had none of the usual risk factors for the acquisition of such a multi-resistant organism. Did she acquire the strain from her short stay in hospital for the gynaecologic procedure or from the community? These questions influence our understanding of ESBL-producing organisms.

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### Comparative Study of Three Phenotypic Methods for the Detection of Extended Spectrum Beta-lactamase (ESBL) in a Singapore Hospital and their Antimicrobial Susceptibilities

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**OBJECTIVES** In 1998, the incidence of ESBL was estimated to be 40% in Changi General Hospital. A second study is carried out in Year 2000 to evaluate three methodologies for their detection and to determine their antimicrobial susceptibilities.

**MATERIALS and MATERIALS** 134 non-duplicate strains of ceftazidime (CAZ) resistant Enterobacteriaceae comprising 80 *Klebsiella* spp. 28 *E. coli*, and 26 *Enterobacter* spp. are obtained from clinical specimens of patients over two months. The strains are tested against the following methods:

1. ESBL Etest
2. Key-hole test
3. NCCLS ESBL CAZ/CLA disk test.

Antimicrobial susceptibility testing was carried out using the NCCLS disk diffusion method on the following antimicrobials: cefepime (FEP), tazobactam (TZP), ciprofloxacin (CIP), imipenem (IPM), amikacin (AN) and augmentin (AMC).

**RESULTS** Using ESBL Etest as the gold standard, the performance of the other two is compared.

Table 1. Detection of ESBL by Key-hole test and NCCLS ESBL disk test

Statistical analysis	Key-hole test	NCCLS ESBL disk test
Specificities	100%	100%
Sensitivities	92.9%	94.1%

Table 2. Antimicrobial susceptibilities of the ESBLs

% Susceptibilities	FEP	TZP	CIP	IPM	
Sensitive	68 52	33	99	75	46
Resistant	32 48	67	1	25	54

**CONCLUSION** The overall incidence rate is found to be 30 % and Key-hole test is recommended for the detection of ESBL in the routine laboratory with further testing using Etest in doubtful cases. Measures are being taken to investigate further the problem of ESBLs in the hospital.

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### Prevalence and Risk Factors associated with Extended Spectrum Beta-lactamase (ESBL) Production Among Selected Enterobacteriaceae Isolates at the Philippine General Hospital.

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**OBJECTIVES** To determine the prevalence and clinical risk factors associated with extended spectrum beta lactamase production among Gram negative isolates among hospitalized patients, specifically *Klebsiella pneumoniae*, *Escherichia coli*, and *Enterobacter* spp.

**STUDY DESIGN** Case-control.

**SETTING** A 1336 bed-tertiary care hospital.

**PATIENTS/PARTICIPANTS** Sequential isolates of *K pneumoniae*, *E coli*, and *Enterobacter* spp. obtained from the Microbiology lab with respective patients sought out in the wards and ICUs. All patients from whom ESBL-confirmed organisms (cases) were isolated were matched against controls according to etiologic agent and type of specimen. No criteria for exclusion.

**INTERVENTIONS** Risk factors studied were: age, sex, presence of comorbidities, severity of illness, length of hospital stay, surgical interventions, presence of invasive devices, and recent antibiotic therapy. Clinically suspicious isolates were tested for ESBL production by double disk diffusion and phenotypic confirmation using clavulanate.

**OUTCOME MEASURE(S)** Development of ESBL-related resistance.

**DATA ANALYSIS** Descriptive statistics, univariate, and multivariate analyses were done. To estimate prevalence of ESBL production among the aforementioned Gram negative organisms, with the expected prevalence being 10% (precision 5%, CI95% 1.19, 2.38), a sample size of 139 ESBL positives was calculated.

**RESULTS** Prevalence of ESBL production among 1349 isolates taken from 784 adults and 565 pediatric patients is 29.9%. Among these 1349 isolates, *Enterobacter* spp. comprised 39.3%, *Klebsiella pneumoniae* 14.9%, and *Escherichia coli* 45.8%. Risk factors shown to independently associated with ESBL production were: each additional invasive device present during confinement (OR 1.68; CI95% 1.19, 2.38), a difference of 4 in the PGH Mortality Prediction Model score (OR 1.72; CI95% 1.14, 2.60), and recent use of Ceftazidime (OR 2.52, CI95% 1.14, 5.55).

**CONCLUSIONS** ESBL prevalence in our setting was 29.9%. Identification of specific modifiable risk factors allows us to intervene in its dissemination.

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### A Study of Extended Spectrum beta-lactamase Producing Organisms in Hong Kong

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**BACKGROUND** The incidence of extended spectrum beta-lactamases (ESBL) producing organisms is increasing in Hong Kong. Yet the information on the resistance pattern, prevalence and characteristics of ESBLs is still rare.

**OBJECTIVES and MATERIALS** In this study, 69 clinical isolates including *E. coli* (43), *Klebsiella* spp. (26) from PWH during 1998-1999 were confirmed for the production of ESBL according to the NCCLS guideline. The ESBLs were determined by isoelectric focusing and PCR amplification methods. MICs of nine antibiotics were determined using agar dilution method.

**RESULTS** Twenty-six of the 69 (37.7%) strains were found to produce TEM-type enzymes, 16 (23.3%) produce SHV-type, two produce TEM+SHV, one produces TEM+OXA-type, the remaining 34.8% required further investigations. Almost all the isolates were resistant to cefuroxime. The ceftazidime resistance rate of *E. coli* and *Klebsiella* spp. were 16.3% and 73.1% respectively. Against cefepime, both *E. coli* and klebsiellae were having resistance rate of 23%. Almost all the isolates were resistant to piperacillin, but in the presence with tazobactam, all *E. coli* became susceptible, and the resistance rate of *Klebsiella* spp. reduced to 15.4%. All the isolates were susceptible to imipenem and meropenem. About 20% *Klebsiella* spp. and 5% *E. coli* were amikacin resistant. Against ciprofloxacin, the resistance rate of *E. coli* and *Klebsiella* spp. were 48.8% and 7.7% respectively.

**CONCLUSION** TEM-type enzyme is the prevalence type of ESBL in this region. Carbapenems and piperacillin in combination with tazobactam remained highly active against ESBL producing organisms isolated from HK.

