**Supplementary Material 1: Details of participating centers**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name of the hospital** | **Province, city** | **Teaching Hospital** | **Beds** | **Staffs of Clinical Microbioloy Lab** |
| Beijing Jishuitan Hospital,  | Beijing | Yes | 1500 | 15 |
| Beijing Chao-Yang Hospital | Beijing | Yes | 1800 | 15 |
| **Qingdao Municipal Hospital** | ShanDong,Qingdao | Yes | 1200 | 8 |

**Supplementary Material 2 Definition of underlying diseases**

1. Cardiovascular disease included coronary heart disease and chronic congestive heart failure;
2. Coronary heart disease included angina pectoris, myocardial infarction, ischemic cardiomyopathy;
3. Heart failure was defined as a clinical syndrome consisting of dyspnea, malaise, swelling and/or decreased exercise capacity due to the loss of compensation for cardiac pumping function due to structural and/or functional abnormalities of the heart.
4. Chronic obstructive pulmonary disease was defined as: persistent airflow limitation, FEV1 / FVC < 70% post bronchodilator;
5. Cerebrovascular diseases included transient ischemic attack, cerebral hemorrhage, subarachnoid hemorrhage, cerebral infarction;
6. Diabetes mellitus: included diabetes mellitus type 1 and diabetes mellitus type 2, not included impaired glucose tolerance and impaired fasting glycaemia;
7. Chronic kidney disease included diabetic nephropathy, hypertensive renal damage, chronic glomerulonephritis, chronic pyelonephritis, lupus nephritis, IgA nephropathy, nephrotic syndrome, hereditary kidney disease;
8. Immunocompromised status included primary immune deficiency diseases, active malignancy, HIV infection with a CD4 T-lymphocyte count < 200 cells/mL or percentage < 14%, immunosuppressive therapy, solid organ transplantation, hematopoietic stem cell transplantation, splenectomy;
9. Immunosuppressive therapy: was defined as receiving cancer chemotherapy, receiving corticosteroid therapy with a dose ≥ 20 mg prednisone or equivalent daily for ≥ 14 d or a cumulative dose > 600 mg of prednisone, receiving biological immune modulators, receiving disease-modifying antirheumatic drugs or other immunosuppressive drugs (eg, cyclosporin, cyclophosphamide, hydroxychloroquine, methotrexate).

**Supplementary Material 3 Antimicrobial susceptibility testing results of CRE isolates**

|  |  |
| --- | --- |
| **Antimicrobial** | **Susceptibility (*n*, %)** |
| **Total****(*n* = 187)** | ***Klebsiella pneumoniae*****(*n* = 164)** | ***Escherichia coli*****(*n* = 21)** | **Others****(*n* = 2)** |
| Ceftriaxone | 2 (1.1) | 1 (0.6) | 1 (4.8) | 0 (0.0) |
| Ceftazidime | 2 (1.1) | 1 (0.6) | 1 (4.8) | 0 (0.0) |
| Cefepime | 3 (1.6) | 2 (1.2) | 1 (4.8) | 0 (0.0) |
| Aztreonam | 7 (3.7) | 4 (2.4) | 3 (14.3) | 0 (0.0) |
| Piperacillin-tazobactam | 8 (4.3) | 5 (3.0) | 3 (14.3) | 0 (0.0) |
| Cefoperazone/sulbactam | 13 (7.0) | 9 (5.5) | 3 (14.3) | 1 (50.0) |
| Levofloxacin | 12 (6.4) | 9 (5.5) | 3 (14.3) | 0 (0.0) |
| Amikacin | 102 (54.5) | 85 (51.8) | 15 (71.4) | 2 (100.0) |
| Gentamicin | 50 (26.7) | 43 (26.2) | 6 (28.6) | 1 (50.0) |
| Sulfamethoxazole | 57 (30.5) | 52 (31.7) | 4 (19.0) | 1 (50.0) |
| Ertapenem | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Imipenem | 2 (1.1) | 1 (0.6) | 1 (4.8) | 0 (0.0) |
| Meropenem | 2 (1.1) | 1 (0.6) | 0 (0.0) | 1 (50.0) |
| Tigecycline | 169 (90.4) | 156 (95.1) | 11 (52.4) | 2 (100.0) |
| Polymyxin B | 172 (92.0) | 151 (92.1) | 19 (90.5) | 2 (100.0) |
| CAZ-AVI | 57/73 (78.1) | 55/64 (85.9) | 3/9 (33.3) | —— |

**Supplementary Material 4 Empirical antimicrobial regimens among patients with CRE-BSI**

|  |  |  |
| --- | --- | --- |
| **Empirical antimicrobial regimen** | **Deceased****(*n* = 78)** | **Survival****(*n* = 109)** |
| Carbapenem | 32 (41.0) | 53 (48.6) |
| Carbapenem + Glycopeptide | 21 (26.9) | 22 (20.2) |
| Carbapenem + Quinolone | 6 (7.7) | 9 (8.3) |
| Carbapenem + Aminoglycoside | 6 (7.7) | 8 (7.3) |
| Third- or fourth-generation cephalosporins | 3 (3.8) | 5 (4.6) |
| Third- or fourth-generation cephalosporins + Quinolone | 5 (6.4) | 6 (5.5) |
| Third- or fourth-generation cephalosporins + Aminoglycoside | 5 (6.4) | 4 (3.7) |
| Quinolones | 0 (0.0) | 2 (1.8) |

**Supplementary Material 5 The impact of definitive antimicrobial regimens on the clinical failure in patients with CRE-BSI**

|  |  |  |  |
| --- | --- | --- | --- |
| **Antimicrobial regimen** | **Clinical failure****(*n*, %)** | **Univariate logistic regression** | **Multivariate logistic regression** |
| ***OR (95% CI)*** | **P value** | ***\*aOR (95% CI)*** | **P value** |
| CAZ-AVI  | 4/13 (30.8) | *ref* |  | *ref* |  |
| CAZ-AVI + Tigecycline  | 4/13 (30.8) | 1.000 (0.189-5.289) | 1.000 | 2.044 (0.324-12.900) | 0.447 |
| CAZ-AVI + Tigecycline + polymyxin B sulfate  | 2/9 (22.2) | 0.643 (0.090-4.581) | 0.659 | 0.8991 (0.099-8.170) | 0.925 |
| Other regimens | 104/152 (68.4) | 4.875 (1.430-16.619) | 0.011 | 8.047 (1.896-34.151) | 0.005 |
| Tigecycline + polymyxin B sulfate  | 32/46 (69.6) | 5.143 (1.354-9.538) | 0.016 | 10.158 (2.127-28.507) | 0.004 |
| Carbapenem + Tigecycline + polymyxin B sulfate  | 24/44 (54.5) | 2.700 (0.722-5.095) | 0.140 | 5.029 (1.124-12.500) | 0.035 |
| Carbapenem + polymyxin B sulfate + Aminoglycoside  | 10/13 (76.9) | 7.500 (1.307-13.028) | 0.024 | 16.297 (2.260-37.519) | 0.003 |
| Carbapenem + Tigecycline  | 12/14 (85.7) | 13.500 (2.510-30.689) | 0.007 | 12.576 (1.345-37.558) | 0.026 |
| Tigecycline  | 15/19 (78.9) | 8.437 (1.681-24.363) | 0.010 | 17.775 (2.598-42.607) | 0.006 |
| Carbapenem + Aminoglycoside  | 11/16 (68.8) | 4.950 (1.071-24.095) | 0.048 | 13.571 (2.142-36.002) | 0.006 |

\*:adjusting for Pitt score, meropenem MIC ≥ 8 mg/L, immunocompromised status, source control of infection, appropriate empirical therapy, possible source of BSI and days of appropriate antimicrobial therapy.

**Supplementary Material 6 Effect of each type of antimicrobial on the mortality of patients with CRE-BSI**

|  |  |  |  |
| --- | --- | --- | --- |
| **Antimicrobial regimen** | **Mortality****(*n*, %)** | **Univariate logistic regression** | **Multivariate logistic regression** |
| ***OR (95% CI)*** | **P value** | ***\*aOR (95% CI)*** | **P value** |
| CAZ-AVI |  |  |  |  |  |
| Without | 72/152 (47.4) | *Ref* |  | *Ref* |  |
| With | 6/35 (17.1) | 0.230 (0.090-0.586) | 0.002 | 0.088 (0.020-0.379) | 0.001 |
| Carbapenem |  |  |  |  |  |
| Without | 38/100 (38.0) | *Ref* |  | *Ref* |  |
| With | 40/87 (46.0) | 1.389 (0.775-2.489) | 0.270 | 2.281 (0.874-5.956) | 0.092 |
| Tigecycline |  |  |  |  |  |
| Without | 16/42 (38.1) | *Ref* |  | *Ref* |  |
| With | 62/145 (42.8) | 1.214 (0.600-2.455) | 0.590 | 1.139 (0.410-3.166) | 0.802 |
| Polymyxin B sulfate |  |  |  |  |  |
| Without | 37/75 (49.3) | *Ref* |  | *Ref* |  |
| With | 41/112 (36.6) | 0.593 (0.327-1.074) | 0.805 | 1.020 (0.394-2.642) | 0.968 |
| Aminoglycoside |  |  |  |  |  |
| Without | 65/158 (41.1) | *Ref* |  | *Ref* |  |
| With | 13/29 (44.8) | 1.162 (0.524-2.581) | 0.711 | 2.259 (0.741-7.143) | 0.165 |

\*: adjusting for Pitt score, meropenem MIC ≥ 8 mg/L, immunocompromised status, source control of infection and appropriate empirical therapy.