

Supplementary Appendix 1

Pseudomonas aeruginosa antibiogram

Percent susceptible ^a								
Ceftazidime- avibactam	Ceftolozane- tazobactam	Amikacin	Tobramycin	Ceftazidime	Piperacillin- tazobactam	Meropenem	Ciprofloxacin	Colistin
73.8	88.7	91.6	77.0	29.0	17.7	11.0	16.2	77.8
N=61	N=168	N=226	N=222	N=169	N=215	N=218	N=148	N=63
a. Clinical and Laboratory Standards Institute (CLSI) 2019 breakpoints used for all antibiotics								

Supplementary Appendix 2

Univariate analyses for clinical failure in patient with MDR *Pseudomonas aeruginosa* infection

	Clinical success^a	Clinical failure^a	Odds ratio (95% CI)	P value
Age, years			1.023 (1.004, 1.041)	0.017
Age ≥ 65 years	51 (36.2)	41 (48.2)	1.644 (0.952, 2.841)	0.074
Male gender	92 (65.2)	50 (58.8)	0.761 (0.437, 1.324)	0.333
African American	38 (46.3)	34 (50.7)	1.193 (0.625, 2.277)	0.592
BMI			1.006 (0.973, 1.040)	0.730
Obese (BMI ≥ 30 kg/m ²)	45 (31.9)	28 (32.9)	1.059 (0.585, 1.917)	0.850
Normal/overweight (BMI 18.5 – 29 kg/m ²)	80 (56.7)	47 (55.3)	Reference	---
Underweight (BMI < 18.5 kg/m ²)	16 (11.3)	10 (11.8)	1.064 (0.446, 2.535)	0.889
CrCl (ml/min)			0.993 (0.989, 0.998)	0.006
CrCl (mL/min) groups ^a				

Hemodialysis	7 (5.0)	11 (12.9)	3.307 (1.207, 9.060)	0.020
CrCl < 15 mL/min	2 (1.4)	2 (2.4)	2.104 (0.288, 15.391)	0.464
CrCl 15 - 29 mL/min	9 (6.4)	11 (12.9)	2.572 (0.999, 6.620)	0.050
CrCl 30 - 50 mL/min	22 (15.6)	13 (15.3)	1.242 (0.577, 2.677)	0.5778
CrCl > 50 mL/min	101 (71.6)	48 (56.5)	Reference	---
CrCl < 30mL/min or Hemodialysis	18 (12.8)	24 (28.2)	2.689 (1.357, 5.327)	0.004
Community admission source	63 (44.7)	41 (48.2)	1.154 (0.673, 1.979)	0.604
Comorbid conditions				
Diabetes	59 (41.8)	38 (44.7)	1.124 (0.653, 1.934)	0.674
Heart Failure	25 (17.7)	21 (24.1)	1.523 (0.790, 2.933)	0.207
COPD	25 (17.7)	26 (30.6)	2.045 (1.087, 3.848)	0.025
Malignancy	12 (8.5)	10 (11.8)	1.433 (0.591, 3.477)	0.424
Liver disease	8 (5.7)	7 (8.2)	1.492 (0.521, 4.273)	0.454
Charlson Comorbidity score			1.084 (0.979, 1.201)	0.121

Charlson Comorbidity score > 4	47 (33.3)	35 (41.2)	1.400 (0.803, 2.441)	0.235
Immunocompromised	12 (8.5)	6 (7.1)	0.816 (0.295, 2.62)	0.696
MDRO infection or colonization within 1 year	85 (60.3)	44 (51.8)	0.707 (0.411, 1.217)	0.210
Recent antibiotic exposure (≥ 24 h within 90 days)	108 (76.6)	65 (76.5)	0.993 (0.526, 1.874)	0.983
Recent hospitalization (≥ 48 hours within 90 days)	96 (68.1)	60 (70.6)	1.125 (0.626, 2.021)	0.693
Recent surgery (within 30 days)	17 (12.1)	14 (16.5)	1.438 (0.669, 3.091)	0.350
ICU at index culture	62 (44.0)	55 (64.7)	2.336 (1.340, 4.071)	0.003
SOFA score			1.217 (1.120, 1.323)	< 0.001
APACHE II score			1.069 (1.034, 1.105)	< 0.001
Hospital-acquired infection	79 (56.0)	63 (74.1)	2.247 (1.248, 4.048)	0.006
Infection Source				

Primary bacteremia	3 (2.1)	1 (1.2)		
Respiratory	82 (58.2)	67 (78.8)		
Ventilator-associated pneumonia	46 (32.6)	43 (50.3)		
Intra-abdominal	7 (5.0)	4 (4.7)		
Skin and soft tissue	18 (12.4)	8 (9.4)		
Osteoarticular	9 (6.4)	1 (1.2)		
Urine	19 (13.5)	2 (2.4)		
Prosthetic device	1 (0.7)	0		
Intravenous catheter	1 (0.7)	1 (1.2)		
Other	1 (0.7)	0		
Respiratory source			2.043 (1.052, 3.966)	0.035
Non-respiratory, non-urinary			Reference	---
Urinary source			0.263 (0.055, 1.263)	0.095
Positive blood cultures	5 (3.5)	3 (3.5)	0.995 (0.232, 4.274)	1.00
Secondary bacteremia	2 (1.4)	2 (2.4)	1.675 (0.232, 12.111)	0.633

Monomicrobial infection	84 (59.6)	60 (70.6)	1.629 (0.916, 2.895)	0.095
Enterobacterales co-infection	30 (21.3)	18 (21.2)	0.994 (0.515, 1.920)	0.986
Treatment information				
Infectious disease consult	141 (100)	85(100)	---	---
Surgical consult	33 (23.4)	18 (21.2)	0.879 (0.459, 1.685)	0.698
Source control in patients with infection amendable to source control	35/45 (77.8)	12/18 (66.7)	0.571 (0.171, 1.908)	0.360
Active antibiotic(s) before C/T	49 (34.8)	23 (27.1)	0.697 (0.386, 1.258)	0.229
Time to active antibiotic(s) (hours)			1.002 (0.999, 1.004)	0.236
Active antibiotic therapy ≤ 48 hours after culture collection	70 (49.6)	34 (40.0)	0.676 (0.392, 1.166)	0.159
Time to C/T (hours)			1.002 (0.999, 1.004)	0.294
C/T within 48 hour	32 (22.7)	19 (22.4)	0.981 (0.515, 1.868)	0.952

C/T within 72 hours	54 (38.3)	37 (43.5)	1.242 (0.719, 2.146)	0.437
C/T within 96 hours	85 (60.3)	53 (62.4)	1.091 (0.627, 1.898)	0.757
C/T within 120 hours	103 (73.0)	58 (68.2)	0.793 (0.440, 1.428)	0.439
Combination IV antibiotic therapy with C/T	37 (26.2)	21 (24.7)	0.922 (0.496, 1.714)	0.798
Combination therapy in patients with a respiratory tract infection	19/82 (23.2)	19/67 (28.4)	1.313 (0.627, 2.747)	0.470
Inhaled antibiotic therapy	22 (15.6)	22 (25.9)	1.889 (0.971, 3.671)	0.059
Inhaled antibiotics in patients with a respiratory tract infection	22 / 82 (26.8)	22 / 67 (32.8)	1.333 (0.658, 2.702)	0.424
High dose C/T	85 (60.3)	58 (68.2)	1.415 (0.802, 2.497)	0.230
High dose C/T in patients with a respiratory tract infection	57/82 (69.5)	48/67 (71.6)	1.108 (0.545, 2.252)	0.777

C/T renal adjustment	35 (24.8)	34 (40.0)	2.019 (1.133, 3.600)	0.016
C/T renal adjustment in patients with a respiratory tract infection	15 (18.3)	29 (43.3)	3.409 (1.627, 7.142)	0.001
<p>a. All values represent number (%) or median (interquartile range)</p> <p>APACHE: Acute Physiology and Chronic Health Evaluation; BMI: body mass index; CI: confidence interval; CRE: carbapenem-resistant Enterobacterales; CrCl: creatinine clearance; CZA: ceftazidime-avibactam; ICU: intensive care unit; LTAC: long-term acute care hospital; MDRO: multidrug-resistant organism; SOFA: Sequential Organ Failure Assessment</p>				

Supplementary Appendix 3

Univariate analyses for clinical failure in patient with C/T susceptible MDR *Pseudomonas aeruginosa* infection

	Clinical success^a N = 87	Clinical failure^a N = 61	Odds ratio (95% CI)	P value
Age, years			1.033 (1.009, 1.057)	0.006
Age ≥ 65 years	28 (32.2)	32 (52.5)	2.325 (1.185, 4.564)	0.013
Male gender	56 (64.4)	36 (59.0)	0.79 (0.402, 1.562)	0.509
African American	47 (54.0)	27 (44.3)	0.676 (0.350, 1.305)	0.242
BMI			1.006 (0.963, 1.050)	0.798
Obese (BMI ≥ 30 kg/m ²)	27 (31.0)	20 (32.8)	1.048 (0.538, 2.186)	0.822
CrCl (ml/min)			0.994 (0.989, 0.999)	0.021
CrCl (mL/min) groups ^a				
Hemodialysis	5 (5.7)	6 (9.8)	1.946 (0.554, 6.830)	0.299
CrCl < 30 mL/min	5 (5.7)	10 (16.4)	3.243 (1.028, 10.233)	0.045
CrCl 30 - 50 mL/min	17 (19.5)	8 (13.1)	0.763 (0.300, 1.944)	0.571

CrCl > 50 mL/min	60 (69.0)	37 (60.7)	Reference	
CrCl < 30mL/min or Hemodialysis	10 (11.5)	16 (26.2)	2.738 (1.145, 6.545)	0.02
Community admission source	34 (39.1)	30 (49.2)	1.509 (0.779, 2.923)	0.222
Comorbid conditions				
Diabetes	36 (41.4)	27 (44.3)	1.125 (0.581, 2.179)	0.727
Heart Failure	17 (19.5)	15 (24.6)	1.343 (0.611, 2.952)	0.463
COPD	17 (19.5)	22 (36.1)	2.323 (1.103, 4.889)	0.025
Malignancy	6 (6.9)	7 (11.5)	1.750 (0.558, 5.491)	0.333
Liver disease	6 (6.9)	6 (9.8)	1.473 (0.452, 4.804)	0.519
Charlson Comorbidity score			1.056 (0.933, 1.195)	0.389
Charlson Comorbidity score > 4	32 (36.8)	24 (39.3)	1.115 (0.568, 2.187)	0.752
Immunocompromised	5 (5.7)	5 (8.2)	1.464 (0.405, 5.295)	0.559
MDRO infection or colonization within 1 year	53 (60.9)	30 (49.2)	0.621 (0.320, 1.203)	0.157

Recent antibiotic exposure (≥ 24 h within 90 days)	71 (81.6)	49 (80.3)	0.920 (0.400, 2.115)	0.845
Recent hospitalization (≥ 48 hours within 90 days)	65 (74.7)	46 (75.4)	1.038 (0.487, 2.213)	0.923
Recent surgery (within 30 days)	8 (9.2)	9 (14.8)	1.709 (0.620, 4.714)	0.297
ICU at index culture	42 (48.3)	44 (72.1)	2.773 (1.377, 5.585)	0.004
SOFA score			1.221 (1.100, 1.354)	< 0.001
APACHE II score			1.077 (1.032, 1.124)	0.001
Hospital-acquired infection	48 (55.2)	44 (72.1)	2.103 (1.043, 4.240)	0.036
Infection Source				
Primary bacteremia	2 (2.3)	1 (1.6)		
Respiratory	54 (62.1)	48 (78.7)		
Ventilator-associated pneumonia	33 (37.9)	29 (47.5)		
Intra-abdominal	4 (4.6)	3 (4.9)		

Skin and soft tissue	8 (9.2)	6 (9.8)		
Osteoarticular	4 (4.6)	0		
Urine	12 (13.8)	2 (3.3)		
Prosthetic device	1(1.1)	0		
Intravenous catheter	1 (1.1)	1 (1.6)		
Other				
Respiratory source			1.697 (0.742, 3.879)	0.210
Non-respiratory, non-urinary			Reference	---
Urinary source			0.318 (0.060, 1.682)	0.178
Positive blood cultures	2 (2.3)	2 (3.3)	1.441 (0.197, 10.517)	1.00
Secondary bacteremia	0	1 (1.6)	---	---
Polymicrobial infection	35 (40.2)	19 (31.1)	0.672 (0.337, 1.341)	0.259
Treatment information				
Infectious disease consult	87 (100)	61 (100)	---	---
Surgical consult	18 (20.7)	11 (18.0)	0.843 (0.366, 1.941)	0.689
Source control in patients	17/23 (73.9)	8/12 (66.7)	0.706 (0.155, 3.224)	0.652

with infection amendable to source control				
Active antibiotic(s) before C/T	29 (33.3)	17 (27.9)	0.773 (0.378, 1.580)	0.480
Time to active antibiotic(s) (hours)			1.001 (0.998, 1.004)	0.488
Active antibiotic therapy ≤ 48 hours after culture collection	35 (40.2)	24 (39.3)	0.964 (0.494, 1.881)	0.914
Time to C/T (hours)			1.002 (0.998, 1.006)	0.335
C/T within 48 hours	16 (18.4)	13 (21.3)	1.202 (0.530, 2.724)	0.659
C/T within 72 hours	28 (32.2)	26 (42.6)	1.565 (0.795, 3.084)	0.194
C/T within 96 hours	51 (58.6)	38 (62.3)	1.166 (0.596, 2.281)	0.653
C/T within 120 hours	67 (77.0)	42 (68.9)	0.660, 0.316, 1.379)	0.267
Combination IV antibiotic therapy with C/T	22 (25.3)	14 (23.0)	0.880 (0.408, 1.897)	0.744
Combination IV therapy in	12/54 (22.2)	12/48 (25.0)	1.167 (0.467, 2.915)	0.741

patients with a respiratory tract infection				
Inhaled antibiotics in patients with a respiratory tract infection	14 /54 (25.9)	15/48 (31.3)	1.299 (0.548, 3.075)	0.552
High dose C/T	53 (60.9)	44 (72.1)	1.660 (0.819, 3.364)	0.158
High dose C/T in patients with a respiratory tract infection	38 (70.4)	35 (72.9)	1.134 (0.478, 2.690)	0.776
C/T renal adjustment	22 (25.3)	23 (37.7)	1.788 (0.881, 3.632)	0.106
C/T renal adjustment in patients with a respiratory tract infection	11 (20.4)	20 (41.7)	2.792 (1.163, 6.707)	0.020

b. All values represent number (%) or median (interquartile range)

APACHE: Acute Physiology and Chronic Health Evaluation; BMI: body mass index; CI: confidence interval; CRE: carbapenem-resistant Enterobacterales; CrCl: creatinine clearance; CZA: ceftazidime-avibactam; ICU: intensive care unit; LTAC: long-term

acute care hospital; MDRO: multidrug-resistant organism; SOFA: Sequential Organ Failure Assessment