Comparison of the therapeutic efficacy of fluoroquinolone and non-fluoroquinolone therapy in patients with *Elizabethkingia meningoseptica* bacteraemia

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Background: *Elizabethkingia meningoseptica* is a non-fermentative Gram-negative bacillus (NFGNB) and usually associated with nosocomial infections. It has been considered as an emerging nosocomial pathogen, and patients with *E. meningoseptica* infection were usually associated with high mortality. This pathogen is inherently resistant to many broad spectrum antibiotics, such as carbapenem and polymyxin, and appropriate antibiotic is crucial for survival among patients with *E. meningoseptica* bacteraemia. Fluoroquinolone has been suggested as a potential agent in the treatment in NFGNB infection. However, limited data analysed the therapeutic efficacy of fluoroquinolone in *E. meningoseptica* bacteraemia in the literature.

Material/methods: We retrospectively enrolled patients with *E. meningoseptica* bacteraemia who were treated with antimicrobial agents with *in vitro* activity against *E. meningoseptica* for at least ≥ 48 h within ≤7 days after obtaining blood cultures in a medical centre in Taiwan from January 2011 to December 2015. Patient with polymicrobial infection and who received combination therapy were excluded. We compared the therapeutic efficacy of fluoroquinolone and non-fluoroquinolone among these patients. In each group, the primary agent for *E. meningoseptica* bacteraemia should be used for the majority of the time during the treatment course. A logistic regression and propensity scores-adjusted model were used to evaluate the risk factors of 14-day mortality.

Results: A total of 60 patients with *E. meningoseptica* bacteraemia were identified. The 14-day mortality among these patients was 24%. Twenty two patients received fluoroquinolone (ciprofloxacin, n=9; levofloxacin, n=13), and 38 patients received non-fluoroquinolone therapy (piperacillin/tazobactam, n=22; trimethoprim/sulfamethoxazole, n=15; minocycline, n=1). The APACHE II score was significantly higher in non-fluoroquinolone group than fluoroquinolone group (20.4 ± 6.7 vs 15.3 ± 6.8, p=0.042). Patients with fluoroquinolone therapy had significantly lower 14-day mortality and in-hospital mortality than those with non-fluoroquinolone therapy. The fluoroquinolone group also achieved significantly higher microbiological cure and clinical success rate than non-fluoroquinolone one (TABLE 1). In multivariate analysis, septic shock was the independent risk factor associated with 14-day mortality (OR, 10.01; 95% CI, 2.17-46.39; p = 0.022), and treatment with fluoroquinolone was the independent factor associated with survival (OR, 0.07; 95% CI, 0.01-0.48; p = 0.021). Treatment with fluoroquinolone was still associated with 14-day survival in this propensity-adjusted analysis (OR, 0.06; 95% CI, 0.01-0.47, p = 0.007, TABLE 2). We further analysed the risk factor for the 14-day mortality stratified by the APACHE II score. Treatment with fluoroquinolone was associated with lower 14-day mortality but did not reach statistical significance in both the group with less severity (APACHE II score < 16) and that with higher severity (APACHE II score ≥16, TABLE 3).

Conclusions: The 14-day mortality of *E. meningoseptica* bacteraemia was high. Fluoroquinolone is a suitable choice of treatment for patients with *E. meningoseptica* bacteraemia.

TABLE 1. Outcomes of patients with *E. meningoseptica* bacteraemia receiving monotherapy with fluoroquinolone or non-fluoroquinolone.

Outcome	Total (n=60)	Fluoroquinolone group (n=22)	Non-fluoroquinolone group (n=38)	*p* value
Shock after bacteraemia	23(38.3)	9(41.7)	14(38.1)	0.775
14-day mortality	15(25.0)	2(9.1)	13(34.2)	0.023
28-day mortality	23(38.3)	6(27.3)	17(44.7)	0.103
In-hospital mortality	35(58.3)	8(36.4)	27(71.1)	0.036
Microbiological cure	44(73.3)	20(90.9)	24(63.2)	0.042
Clinical success	42(70.0)	20(90.9)	22(57.9)	0.006

TABLE 2. Multivariate analysis of risk factor associated with 14-day mortality for patients with *E. meningoseptica* bacteraemia adjusted by propensity score.

Variables	Odds Ratio	95% confidence interval	*p* value
Primary bacteraemia	0.21	0.04-1.27	0.090
Pneumonia	1.12	0.19-6.65	0.894
Treatment with fluoroquinolone	0.06	0.01-0.47	0.007
Propensity score	6.44	0.17-246.3	0.312

TABLE 3. 14-day mortality of patients with *E. meningoseptica* bacteraemia receiving monotherapy with fluoroquinolone or non-fluoroquinolone, stratified by severity of illness

Severity of illness	Total patient	Fluoroquinolone group n (%)	Non-fluoroquinolone group n (%)	*p* value
APACHE II score < 16	26	1/15 (6.7)	3/11 (27.3)	0.216
APACHE II score ≥ 16	34	1/9 (11.1)	9/25 (36)	0.130

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