



Incidence and Outcomes of ICU-Acquired Multi-Drug Resistant Organism Infections in the Critically Ill Geriatric Population

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INTRODUCTION

The elderly have more interactions with health care institutions, predisposing them to colonization with multi-drug resistant organisms (MDRO, including MRSA, VRE, and any GNR resistant to all members of any major class of Gram negative antimicrobials), and prompting suggestions that elderly patients should receive broader-spectrum empiric antibiotics when infection is suspected.

METHODS

A single-institution, 14-year prospectively-collected database of all surgical ICU-acquired infections was reviewed. Univariate analyses of demographics, incidence of MDRO infections, and in-hospital mortality for patients <65 years ("adult") versus ≥65 years ("elderly") were performed using Chi-square or student's t-tests. Multivariate analysis was used to determine the effect of being elderly on the frequency of MDRO infections and for mortality in patients with and without MDRO-infections.

HYPOTHESIS

We hypothesized that the elderly have a higher incidence of ICU-acquired MDRO infections and poorer outcomes.

	Adults (≤64) n = 2409	Elderly (≥65) n = 1004	p-value
APS	13.3 ± 0.1	11.9 ± 0.2	<0.0001
Diabetes	380 (15.8)	222 (22.1)	<0.0001
Immunosuppression	653 (27.1)	197 (19.6)	<0.0001
Previous Infection	1407 (58.4)	607 (60.5)	0.28
Prior Transfusion	2077 (86.2)	850 (84.7)	0.26
Days Admit to Treatment	21.8 ± 0.5	24.4 ± 1.1	0.01
MDRO	679 (28.2)	277 (27.6)	0.76
All Mortality	482 / 2409 (20.0)	400 / 1004 (39.8)	<0.0001
Mortality, MDRO	190 / 679 (28.0)	125 / 277 (45.1)	<0.0001
Mortality, no MDRO	16 / 193 (8.3)	30 / 69 (43.5)	<0.0001

Table 1: Patient demographic comparison by age; mean ± standard error or N (%); independent t-test or Chi-square test.

RESULTS

Analysis identified 3413 ICU-acquired infections. Demographics are shown (Table 1). By multivariate analysis, MDRO infection is associated with immunosuppression, prior transfusions or infections, and days from admission to diagnosis, but not being elderly (OR 0.98, 95% CI 0.82-1.17, p>0.1, Table 2). Being elderly was a predictor of mortality for both MDRO (2.561, [1.80-3.65], p<0.001) and non-MDRO infections (3.71, [2.94-4.68], p<0.001, Tables 2 & 3), but the OR did not differ significantly between the two, suggesting that the increased mortality for all infections among the elderly is not related to MDRO.

	Wald	Odds Ratio	95% CI	p-value
Elderly	0.04	0.98	0.82-1.17	0.84
Diabetes	0.11	0.97	0.79-1.19	0.75
APS	2.76	1.01	1.00-1.03	0.10
Immunosuppression	11.75	1.39	1.15-1.67	0.001
Previous Infection	47.65	1.95	1.61-2.36	0.000
Prior Transfusion	21.29	1.95	1.47-2.59	0.000
Days Admit to Treatment	53.14	1.01	1.01-1.02	0.000

Table 2: Multivariate analysis by presence or absence of MDROs.

	Wald	Odds Ratio	95% CI	p-value
Elderly	27.25	2.56	1.80-3.65	0.000
Diabetes	0.87	0.83	0.57-1.22	0.35
APS	12.04	1.05	1.02-1.08	0.001
Immunosuppression	8.47	1.67	1.18-2.36	0.004
Prior Transfusion	7.74	2.47	1.31-4.66	0.005

Table 3: Multivariate analysis by mortality for patients with MDROs.

	Wald	Odds Ratio	95% CI	p-value
Elderly	122.92	3.71	2.94-4.68	0.000
Diabetes	1.20	1.16	0.89-1.50	0.27
APS	65.63	1.08	1.06-1.10	0.000
Immunosuppression	0.84	1.13	0.87-1.47	0.36
Prior Transfusion	18.49	1.98	1.45-2.69	0.000

Table 4: Multivariate analysis by mortality for patients without MDROs.

CONCLUSIONS

Being elderly is associated with neither more frequent ICU-acquired MDRO infections nor higher mortality compared to younger adults or patients with non-MDRO infections. These data suggest chronological age alone should not influence empiric antimicrobial therapy in the ICU.