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DOES IT MATTER IF WE GET IT RIGHT? AN ANALYSIS OF WHO DIES WHEN EMPIRIC ANTIBIOTIC THERAPY IS INAPPROPRIATE

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Introduction: Inappropriate initial therapy for infection has been associated with increased mortality in medical patients. We hypothesized that inadequate initial therapy would predict mortality among surgical patients and sought to identify predictors of death among patients who receive inappropriate empiric therapy.

Methods: We analyzed all infections on our surgical services between 12/1996 to 8/2007. For each infection, initial antimicrobial therapy was compared to final culture results. Infections where initial treatment was appropriate (all organisms isolated were sensitive by in vitro testing to at least one other antimicrobial agents started on the first day of therapy) were grouped, as were those where initial treatment was inappropriate and subsequently changed. Logistic regression was used to determine whether appropriate initial therapy predicted survival and which factors predicted death among those not receiving appropriate initial therapy.

Results: 6,570 surgical infections were treated with empiric antibiotics; 5,072 (77.2%) received initially appropriate therapy while 1,498 (22.8%) were changed to appropriate therapy. Appropriateness of empiric therapy was not independently associated with mortality. However, among infections initially treated inappropriately, several factors were significant, independent predictors of death (see table). A separate logistic regression model limited to patients with pneumonia and an APACHE II score \geq 10 demonstrated a survival advantage for patients receiving initially adequate empiric antimicrobial therapy.

Factors predictive of death among infections treated with inappropriate empiric therapy, based on logistic regression analysis

Variable	Odds Ratio	95% CI of Odds Ratio	p value
Patient Variables			
APS	1.05	1.01-1.08	0.018
APACHE II Score			
0-9	1.00*	-	
10-20	3.78	1.88-7.58	<0.0001
Greater than 20	6.51	2.78-15.2	
Max temperature			
\leq 35	2.52	0.24-26.3	
35-36.9 C	1.53	1.02-2.29	
37-38.4 C	1.00*	-	<0.0001
38.5-39.9 C	0.27	0.19-0.38	
\geq 40 C	0.15	0.05-0.52	
Renal insufficiency	1.85	1.16-2.94	0.0095
Psych diagnosis	1.75	1.06-2.92	0.030
More Than One Positive Culture Site	1.88	1.35-2.62	0.0002
Infectious Site			
Lung	2.12	1.46-3.09	<0.0001

* Referent group

Conclusions: Overall, appropriateness of initial empiric therapy was not predictive of mortality in this large cohort of surgical patients; at least one explanation is that surgical patients are more likely to have infections treated procedurally, rendering empiric therapy less important. We did, however, identify critically ill patients with pneumonia as one subgroup that may deserve broader empiric therapy as they are at increased odds of death following inappropriate initial therapy.