Non-fermentative Gram-negative rods bacteremia in adult patients with hematological malignancies

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Background:

Information about the characteristics and outcomes of Non-fermentative Gram-negative rods (NF-GNR) bacteremia in adult patients with hematological malignancies is limited.

Aim:

The objective of this study was to present the clinical picture, antimicrobial susceptibility pattern and outcomes of NF-GNR bacteremia in this population.

Methods:

Prospective multicenter study. Episodes of monomicrobial *Pseudomonas aeruginosa* (PA), *Acinetobacter baumannii* (AB) and *Stenotrophomonas maltophilia* (SM) bacteremia in adult patients with hematological malignancies were included in 12 centers in Argentina, from May 2014 to August 2019. Other species of NF-GNR were excluded from the analysis due to their lower frequency. The 30-day mortality was examined by the Kaplan-Meier method with the log-rank test, and the Cox regression model was used to test statistical significance.

Results: 136 patients developed 168 episodes of NF-GNR bacteremia:
PA 111 (66%), AB 36 (21.5%) and SM 21 (12.5%)

CLINICAL CHARACTERISTICS

Most of the episodes developed in patients with acute leukemia (57.8%) and lymphoma (22.9%), being 122 (72.6%) neutropenic. In 46 (27.4%) the patient had recently undergone an HSCT.

The most common sources of bacteremia were central-line (22%), abdomen (15.5%) and respiratory (11.3%), with no differences between the three groups.

The incidence of breakthrough bacteremia was 19.6%, being similar in the three groups.

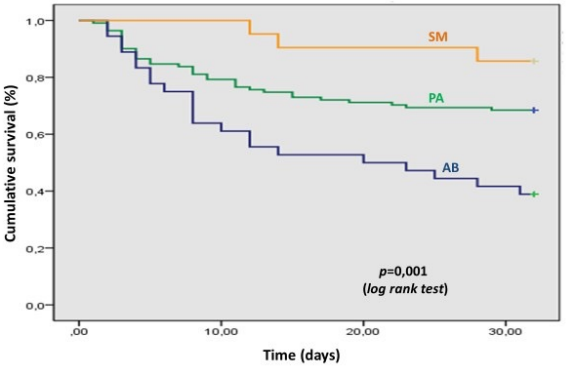
The overall 30-day mortality was 35.7%, being lower for SM (14.3%), 31.5% for PA, and higher for AB (61.1%, p=0.0001)

ANTIMICROBIAL RESISTANCE PROFILE

Antibiotic tested (N resistant/N tested) (% Resistant)	*Pseudomonas aeruginosa*	*Acinetobacter baumannii*	*Stenotrophomonas maltophilia*
GNR R to Quinolones	54/111 (48.6%)	28/34 (82.4%)	**3/20 (15%)**
GNR R to Third G Cephalosporins	56/111 (50.5%)	26/33 (78.8%)	Ceftazidime: 5/10 (50%)
GNR R to Cefepime	49/111 (44.1%)	23/26 (88.5%)	-
GNR R to Piperacillin/Tazobactam	53/111 (47.7%)	26/33 (78.8%)	-
GNR R to Carbapenems	**51/111 (45.9%)**	**29/35 (82.9%)**	-
GNR R to Amikacin	24/111 (21.6%)	11/33 (33.3%)	5/6 (83.3%)
GNR R to Colistin	**1/111 (0.9%)**	**0/35 (0%)**	4/4 (100%)
GNR R to Sulbactam	-	**21/25 (84%)**	-
GNR R to Tigecycline	-	**1/33 (3%)**	**2/10 (20%)**
GNR R to Minocycline	-	1/31 (3.2%)	**0/18 (0%)**
GNR R to Fosfomycin	14/98 (14.3%)	-	-
GNR R to TMS	-	-	**1/19 (5.3%)**
GNR R to Ceftazidime/avibactam	5/29 (17.2%)	-	-
GNR R to Ceftolozane/tazobactam	**5/21 (23.8%)**	-	-

Resistance pattern	*Pseudomonas aeruginosa*	*Acinetobacter baumannii*	*Stenotrophomonas maltophilia*	*p*
Multi-Drug Resistance (MDR)	50 (45%)	29 (75%)	21 (100%)	*0.0001*
Extremely-Drug Resistance (XDR)	20 (18%)	10 (27.8%)	-	
Pan-Drug Resistance (PDR)	1 (0.9%)	0	0	
Difficult-to-treat resistance (DTR)	35 (31.5%)	22 (61.1%)	0	*0.0001*

OUTCOMES – 30 day Mortality



Risk factor	UNIVARIATE HR (IC95%)	*p*	MULTIVARIATE HR (IC95%)	*p*
High APACHE II score (>20)	3.1 (1.8-5.7)	*0.0001*	**2.4 (1.3-4.4)**	***0.004***
High PITT score (>4)	2.6 (1.2-5.4)	*0.014*	2 (0.9-4.4)	*0.06*
Acinetobacter baumannii	2.5 (1.5-4.3)	*0.0001*	**1.9 (1.1-3.4)**	***0.015***
Stenotrophomonas maltophilia	0.3 (0.1-0.9)	*0.04*	0.4 (0.1-1.4)	*0.1*
Respiratory infection	2.6 (1.4-4.8)	*0.002*	**2.4 (1.3-4.6)**	***0.005***

Conclusion: Multidrug resistance in NF-GNRs is common and compromises treatment options. This is especially important in *Acinetobacter baumanii* infections, where non-toxic and effective therapies are limited, and mortality is strikingly high.